



# **Tees Renewable Energy Plant**

# **ENVIRONMENTAL STATEMENT**

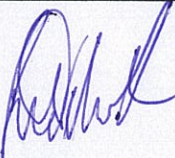



## **Volume 2**

Prepared by



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**A. DRAFT CONSENT CONDITIONS  
(14 pages)**

**A. DRAFT CONSENT CONDITIONS**DRAFT Tees Renewable Energy Plant Consent ConditionsCONSTRUCTION AND OPERATION OF A WOOD CHIP FUELLED RENEWABLE  
ENERGY PLANT AT TEESDOCKDefinitions

(1) In these Conditions unless the context otherwise requires -

"an approved forest certification scheme" means a forest certification scheme approved by the Central Point of Expertise on Timber Procurement (CPET) and its successors as satisfying the UK Government's requirements for the procurement of sustainable and legal timber [The currently approved forest certification schemes are: Canadian Standards Association (CSA); Forest Stewardship Council (FSC); Malaysian Timber Certification Council (MTCC); Programme for the Endorsement of Forest Certification (PEFC); and Sustainable Forest Initiative (SFI)];

"Biomass " means as defined in the Renewable Obligation Order 2002 as amended

"BS 4142 1997" means British Standard 4142: 1997 - Method for rating industrial noise affecting mixed residential and industrial areas;

"Bank Holiday" means a day that is, or is to be observed as, a Bank Holiday or a holiday under the Banking and Financial Dealings Act 1971;

"the commencement of the Development" means the date on which the Development shall be taken to be initiated in accordance with section 56 of the Town and Country Planning Act 1990, as amended;

"the commissioning of the Development" means the date on which the Development first supplies electricity on a commercial basis;

"the Company" means MGT Teesside Ltd and its assigns and successors;



"the Council" means Redcar and Cleveland Borough Council and its successors;

"Natural England" means Natural England and its successors;

"the Development" means the wood chip fuelled renewable energy plant at Teesdock, in North East England;

"emergency" means circumstances in which there is reasonable cause for apprehending imminent injury to persons, serious damage to property or danger of serious pollution to the environment;

"energy crop" means as defined in the Renewable Obligation Order 2002 as amended;

"Environment Agency" means the Environment Agency and its successors;

"heavy commercial vehicle" has the meaning given by section 138 of the Road Traffic Regulation Act 1984;

"the main Development" means the construction work commencing with the placing of the first concrete for the main plant foundations of the Development;

"operating weight" in relation to a goods vehicle has the meaning given by section 138 of the Road Traffic Act 1984;

"the Site" means the area of land outlined red on FIGURE 4.1, annexed hereto.

"steam purging" means any planned release of steam likely to cause noise and be perceptible at residential properties or other land uses in the locality.

#### The Site

- (2) The construction of the Development shall only take place within the boundary of the Site.

Reason: To ensure that no construction takes place beyond the boundary of the area which is the subject of this planning permission.

Time Limits

- (3) The commencement of the Development shall not be later than the expiry of three years from the date of this permission.

Reason: To comply with the requirements of section 91 of the Town and Country Planning Act 1990 as amended by section 51 of the Planning and Compulsory Purchase Act 2004.

Suppression of Dust and Dirt during Construction

- (4) The commencement of the Development shall not take place until there has been submitted to, approved in writing by, and deposited with the Council a scheme for the provision of wheel cleansing facilities for heavy commercial vehicles and any other vehicle which has an operating weight exceeding three tonnes. Such approved facilities shall be installed in accordance with a timescale to be approved in writing by the Council and shall be maintained throughout the period of the construction of the Development unless any variation has been approved in writing by the Council.
- (5) All heavy commercial vehicles and any other vehicle which has an operating weight exceeding three tonnes associated with the construction of the Development leaving the Site, other than those vehicles exclusively using tarmacadam or concrete roads, shall on each occasion, prior to leaving, pass through the wheel cleansing facilities provided pursuant to Condition (4).
- (6) The commencement of the Development shall not take place until there has been submitted to, approved in writing by, and deposited with the Council a scheme employing all practicable measures for the suppression of dust during the period of the construction of the Development. The measures approved in the scheme shall be employed throughout the period of construction unless any variation has been approved in writing by the Council.
- (7) All open bodied heavy commercial vehicles carrying dry loose aggregate, cement or soil into and out of the Site shall be sheeted.

Reason: To ensure that satisfactory measures are in force so as to alleviate any impact dust and dirt may have on the local environment during construction.

Layout, Design, Fire and Flood Risk Prevention

- (8) The commencement of the main Development shall not take place until there has been submitted to, approved in writing by, and deposited with, the Council a scheme which shall include provisions for the:
- (i) details of the siting, design, external appearance, dimensions and floor levels of all new or modified buildings and structures which are to be retained following the commissioning of the Development;
  - (ii) details of the colour, materials and surface finishes in respect of those buildings and structures referred to in (i) above;
  - (iii) details of vehicular circulation roads, parking, hardstandings, turning facilities and loading and unloading facilities on the Site;
  - (iv) details of fire suppression measures and access of fire appliances to all major buildings, structures and storage areas;
  - (v) details of artificial lighting required during the operation of the Development;
  - (vi) details of all new or modified permanent fencing and gates required on the Site; and
  - (vii) phasing of works included in the scheme.
- (9) The Development shall proceed only in accordance with the scheme referred to in Condition (8) subject to any variation as may be approved in writing by the Council.
- (10) The commissioning of the Development shall not take place until there has been submitted to, approved in writing by, and deposited with the Council a scheme for the removal of all temporary buildings, structures and ancillary works connected with the construction of the Development. Such scheme shall include the timing and phasing of removal and



details of the reinstatement of the land. The measures approved in the scheme shall be employed throughout the period of removal unless any variation has been approved in writing by the Council.

Reason: To enable the Council to exercise reasonable and proper control over the design and appearance of the Development and to prevent the risk of fire and flooding.

### Transport

- (11) The commencement of the Development shall not take place until there has been submitted to, approved in writing by, and deposited with, the Council, a scheme for the transport of construction staff to and from the Site. The approved scheme shall remain in operation throughout the period of the construction of the Development.
- (12) Unless otherwise agreed in writing with the Council, road delivery of biomass shall be limited to [200,000] tonnes per annum.

Reason: In the interests of highway safety.

### Construction

- (13) All activities associated with the construction of the Development shall be carried out in accordance with British Standard 5228, Parts 1 and 2: 1997 and Part 4: 1992; Noise and Vibration Control on Construction and Open Sites.
- (14) No construction work associated with the Development shall take place on the Site at any time on any Sunday or Bank Holiday nor on any other day except between the following times:

Monday to Friday	0700 - 1900
Saturday	0700 - 1700

unless such work -

- (a) is associated with an emergency; or
- (b) is carried out with the prior written approval of the Council; or

- (c) does not cause existing ambient noise levels to be exceeded;
- (15) The commencement of the Development shall not take place until there has been submitted to and approved in writing by the Council a scheme for piling, or any other foundation designs using penetrative methods, which demonstrated that there is no resultant unacceptable risk to groundwater and shall also include the methods and duration. The approved scheme shall be adhered to during the period of the construction of the development.
- (16) No impact piling approved under the scheme referred to in Condition (15) shall take place on the Site on any Sunday or Bank Holiday or any other day except the between the following hours;

Monday to Friday	0900 - 1700
Saturday	0900 - 1300

Unless such work –

- (a) is associated with an emergency; or
- (b) is carried out with the prior written approval of the Council.

(17) In any instance where a time limitation referred to in Conditions (14) and (16) is exceeded because of an emergency the Company shall as soon as possible notify the Council and follow up the notification with a written statement detailing the nature of the emergency and the reason why the time limitation could not be observed.

Reason: To ensure reasonable and proper control to be exercised over the methods of construction of the Development and to reduce the number of traffic movements for the safety of other road users and pedestrians.

### Operational Noise

(18) The noise generated by the normal commercial operation of the Development shall not exceed a rating level of [40] dB(A) (measured as an LA eq over 1 hour during the day and 5 minutes at night) when measured generally in

accordance with BS 4142 1997 at the facades of any existing residential property at the date of this permission.

Such noise shall exhibit no tonal or impulse content at those properties in all weather conditions. These limitations as to noise level shall be adhered to at all times except in an emergency or in accordance with any lower noise level which may be approved by the Council pursuant to Condition (18).

(19) In any instance where the noise limitation referred to in Condition (18) is exceeded because of an emergency the Company shall as soon as possible, and at least within two working days, provide the Council with a written statement detailing the nature of the emergency and the reason why the noise level and/or limitation could not be observed. If the emergency period is expected to be for more than twenty-four hours then the Company shall inform those residents affected by the emergency of the reasons for the emergency and the expected duration.

(20) Except in an emergency, the Company shall give at least 2 working day's written notice to the Council of any proposed operation of emergency pressure valves or similar equipment and steam purging.

So far as is reasonably practicable, any such operation shall not take place on any Sunday or Bank Holiday or any other day except the between the following hours;

Monday to Friday	0900 - 1700
Saturday	0900 - 1300

Reason: To ensure the proper control of noise during the operation of the Development and to give advance warning of the timing of exceptionally noisy events.

#### Noise Complaints Procedure

(21) In any instance where a local resident has cause to make a reasonable complaint about noise generated by the construction and/or operation of the Development the Company shall carry out investigations to establish the justification, or otherwise, of the complaint, the likely cause and possible remedial measures. A written report to the complainant shall be made as soon as reasonably



practicable following the investigation and/or remedial work. The Company shall keep all such reports in an appropriate file and such file shall be made available to the Council on request.

Reason: To ensure that any complaints on the grounds of noise are properly dealt with so as to reduce the impact of the Development on local residents.

#### Prevention of Contamination of Watercourses

- (22) The commencement of the Development shall not take place until there has been submitted to, approved in writing by, and deposited with the Council, in consultation with the Environment Agency, a scheme showing the method and working of drainage facilities on the Site. Such facilities shall be put in place in accordance with the approved scheme.
- (23) The scheme referred to in Condition (22) shall include:
- (i) measures to ensure that no leachate or any contaminated surface water from the Site shall be allowed at any time to enter directly or indirectly into any watercourse or underground strata or onto adjoining land;
  - (ii) provision so as to ensure that all existing drainage systems continue to operate and that riparian owners upstream and downstream of the Site are not adversely affected;
  - (iii) provision for trapped gullies in car parks, hardstandings and roadways;
  - (iv) measures to ensure that all foul sewage must drain to an approved foul sewerage and/or sewage disposal system;
  - (v) provisions to distinguish between temporary and permanent parts of the works; and
  - (vi) phasing of works.
- (24) Any surface water contaminated by hydrocarbons which are used during the construction of the Development shall be passed through oil/grit interceptor(s) prior to being

discharged to any public sewer or watercourse or to any other surface water disposal system approved by the Environment Agency.

- (25) All facilities required for the storage of hydrocarbons, process chemicals or similar liquids which are used during the construction of the Development must be sited on impervious bases and surrounded by impervious bund walls. The size of the bunded compound(s) shall be at least equivalent to the capacity of the largest tank plus 10% or 25% of the aggregated contents of all tanks contained within the bund. All filling points, vents and sight glasses must be located within the bund and there must be no drain through the bund floor or walls.
- (26) All bunded compound(s) referred to in Condition (25) in which acids, alkalis or sulphides in addition to being contained in suitable facilities shall have appropriate protective lining applied to the inner walls of the bunds.
- (27) Any storage facility to which Conditions (25) or (26) refer shall be completed in accordance with the requirements of those Conditions before being brought into use.

Reason: To ensure proper drainage of the Site and that proper containment facilities are built.

#### Archaeology

- (28) The commencement of the Development shall not take place until there has been submitted to, approved in writing by, and deposited with, the Council, a scheme of archaeological investigation and an associated implementation programme.
- (29) The scheme approved pursuant to Condition (28) shall provide for:
  - (i) any person nominated by the Council to be permitted safe access to the part of the Site where the find is made;
  - (ii) finds of national importance to be evaluated and, where practicable, preserved in situ; and
  - (iii) phasing of works.

- (30) Any further investigations and recording of such finds as are considered necessary by the Council shall be undertaken prior to the construction of any part of the Development on that part of the Site where such finds are identified, and in the case of finds of national importance in accordance with the phasing of works approved pursuant to Condition (29)(iii), unless otherwise approved in writing by the Council.

Reason: To allow the surveying of the site for archaeological artefacts and the recovery of any important archaeological discovery before construction of the main Development begins.

#### Contaminated Waste

- (31) The commencement of the Development shall not take place until a scheme to deal with the risks associated with contamination of the Site has been submitted to, approved in writing by, and deposited with the Council. The scheme shall include details of the following matters:
- (a) a desk study identifying
    - all previous uses
    - potential contaminants associated with those uses
    - a conceptual model of the Site indicating sources, pathways and receptors
    - potentially unacceptable risks arising from contamination at the Site;
  - (b) a Site investigation scheme based on (a) to provide information for an assessment of the risk to all receptors that may be affected, including those off-Site; and
  - (c) the results of the Site investigation and risk assessment pursuant to (b) and a method statement based on those results giving full details of the remediation measures required and how they are to be undertaken.
- (32) The measures approved pursuant to Condition (31) shall be adhered to during the construction of the Development, unless any variation has been approved in writing by the Council, in consultation with the Environment Agency.

- (33) If, during construction of the Development, contamination not previously identified is found to be present at the Site then no further work shall be carried out until there has been submitted to, approved in writing by, and deposited with, the Council an amendment of the method statement approved pursuant to Condition (31) detailing how this unsuspected contamination shall be dealt with.
- (34) Contaminated material arising from the construction of the Development shall be treated on the Site in accordance with a scheme to be submitted to, approved in writing by, and deposited with, the Council, in consultation with the Environment Agency, or shall be disposed of to licensed disposal facilities.
- (35) Prior to the commissioning of the Development the Company shall provide a verification report on completion of the works set out in Condition (31)(c) confirming the remediation measures that have been undertaken in accordance with the method statement and setting out measures for maintenance, further monitoring and reporting.

Reason: To ensure that contaminated waste found on the Site is disposed of properly and to avoid adverse impacts on the Designated Areas.

#### Protection For Birds

- (36) No trees, hedges, scrub, dense vegetation or other nesting sites shall be cleared from the Site during the bird breeding season of 1 March to 30 September inclusive, except where a suitably qualified ecological consultant, appointed by the Company, has confirmed that such clearance works should not affect any nesting birds, unless otherwise approved in writing by the Council.

Reason: To cause the least interference possible to breeding birds.

#### Fuel

- (39) Unless otherwise agreed in writing with the Council in consultation with the Environment Agency, and with the exception of low sulphur distillate fuel oil or biodiesel used for the start up of the main and auxiliary boilers and use in the

standby-generator, the only fuel to be used in the operation of the Development shall be biomass or wood chip from an approved certification scheme or an energy crop from sustainable sources.

- (40) On a date as near as possible to the anniversary of the commissioning of the development the Company shall provide the Council with written details of the fuel used in the operation of the Development to include the following where applicable:
- i) type and quantity of fuel used;
  - ii) its origin;
  - iii) valid Forest Management (FM) certificates;
  - iii) Chain of Custody (COC) certificates and/or COC numbers;
  - iv) invoices or delivery notes; and
  - v) any other documentation necessary to prove the sustainability of the fuel used.

Reason: To ensure that only fuel from sustainable sources is used in the operation of the generating station.

#### Fuel Stockpile and Ash

- (41) All gantries, conveyors and other means of transport used to handle solid fuel within the Site shall be enclosed so as to prevent the emission of dust and effective means shall be employed to remove dust discharged from bulk silos.

- (42) All solid fuels referred to in Condition (41) shall be stored at a height not exceeding 15 metres.

Reason: To suppress dust and minimise the risk of spontaneous combustion from solid fuel stockpiles

#### Air Pollution Monitoring

- (43) The commissioning of the Development shall not take place until there has been submitted to and approved in writing by the Council, in consultation with the Environment Agency, a scheme for monitoring air pollution in the area. The scheme shall include the measurement location or locations within the relevant area from which air pollution will be monitored, the equipment and methods to be used and the frequency of measurement. The scheme shall provide for the first measurement to be taken not less than 12 months prior to the

Commissioning of the Development and for the final measurement to be taken not more than 24 months after commissioning of the Development. The Company shall supply full details of the measurements obtained in accordance with the scheme to the Council as soon as possible after they become available.

- (44) Should the Council require continued monitoring of air pollution the Company shall extend the Scheme pursuant to Condition (43) for a period of up to 36 months from the date of the last measurement taken pursuant to Condition (43). The Company shall supply full details of the measurements obtained during the extended period to the Council as soon as possible after they become available.

Reason: To ensure that the Council are kept informed on a regular and programmed basis about the changes in the level of air pollution at locations within its area.

#### Cessation of works and restoration of the Site

- (45) Unless agreed with the Council, within 12 months of the Site ceasing to be used for the purposes of electricity generation, the Company shall submit to the Council, for approval in writing, a scheme for the demolition and removal of the Development from the Site.
- (46) The scheme referred to in Condition (45) shall include:
- (i) details of all structures and buildings which are to be demolished;
  - (ii) details of the means of removal of materials resulting from the demolition;
  - (iii) the phasing of the demolition and removal;
  - (iv) details of the restoration works; and
  - (v) the phasing of the restoration works.
- (47) The demolition and removal of the Development (which shall include all buildings, structures, plant, equipment, areas of hardstanding and access roads) and subsequent restoration of the Site shall thereafter be implemented in accordance

with the approved scheme, unless otherwise agreed in writing by the Council.

Reason: To ensure the Site is not allowed to become derelict after the cessation of electricity generation.

#### Use of Waste Heat

- (48) The commissioning of the Development shall not take place until the Company has installed the necessary plant and paperwork to supply waste heat to the boundary of the Site.

Reason: To ensure that waste heat be available for use to the benefit of the local community.

#### Default of Agreement

- (49) Where any matter is required to be agreed or approved by the Council under any of the foregoing Conditions that matter shall in default of agreement or approval be determined by the Secretary of State for Trade and Industry.

**B. STATEMENT OF COMMUNITY INVOLVEMENT  
(6 pages)**



## **B. STATEMENT OF COMMUNITY INVOLVEMENT**

### **B.1 Introduction**

This Statement of Community Involvement (SCI) has been prepared in support of an application for Section 36 Consent under the Electricity Act 1989 to the Department for Business, Enterprise and Regulatory Reform (BERR) (formerly the DTI) to construct and operate an electricity generating station greater than 50 MWe output.

The SCI should be read in conjunction with the Environmental Statement (ES) supporting the Section 36 application.

### **B.2 Proposed Development**

The project will comprise a single circulating fluidized bed boiler that will burn wood chip to generate steam. The steam will be used to turn a steam turbine that will in turn rotate a generator to produce electricity.

The plant will be cooled using an air cooling process, greatly reducing the need for water, avoiding any water abstraction from the River Tees, and minimizing the amount of effluent emitted from the site

Emissions to air will be released through a 95 m stack. Air emissions will be minimized through the use of state of the art emission reduction technologies including Selective Non Catalytic Reduction to minimize emission of nitrogen dioxide and fabric filters to reduce emission of dust and sulphur dioxide.

If consented, the proposed plant could be operational by 2012. The plant would have an operational lifetime of at least 25 years and would directly employ some 150 members of staff throughout this period. It would represent an investment of over £400 million in the local area and will spend circa £30 million per year of operation locally.

It is a major green project. When constructed the Tees Renewable Energy Plant (Tees REP) will contribute 5.5 per cent of the UK's 2012 Renewables Obligation target and over 3 per cent of the UK's CO<sub>2</sub> reduction target. Section 3 of the ES provides further information on the benefits the proposed project will bring in achieving UK energy targets.

MGT Teesside Ltd (MGT) will endeavour to accommodate a combined heat and power (CHP) element to the proposed plant should a suitable off taker be identified. CHP will help make the plant more efficient and help to further reduce the generation of greenhouse gases in the surrounding area by displacing boiler plant that neighbouring sites may currently be operating to generate steam for their own processes.

### **B.3 Statement of Community Involvement**

The importance of relevant stakeholder and community consultation through the development process is engendered through Planning Policy Statement 1 'Delivering Sustainable Development', and supported through the Planning and Compulsory Purchase Act 2004 and other related guidance.

PPS 1 states:

- “Community involvement is an essential element in delivering sustainable development and creating sustainable and safe communities. In developing the vision for their areas, planning authorities should ensure that communities are able to contribute to ideas about how that vision can be achieved, have the opportunity to participate in the process of drawing up the vision, strategy and specific plan policies, and to be involved in development proposals”.
- “Local communities should be given the opportunity to participate fully in the process for drawing up specific plans or policies and to be consulted on proposals for development”.
- “Community involvement is vitally important to planning and the achievement of sustainable development.”
- “The Planning and Compulsory Purchase Act 2004 requires regional planning bodies and local planning authorities to prepare a Statement of Community Involvement, in which they set out their policy on involving their community in preparing regional spatial strategies, local development documents and on consulting on planning applications. Guidance on Statements of Community Involvement, together with details of the Government's overall approach to community involvement, is set out in more detail in ‘Community Involvement in Planning: The Government's Objective’” .

The SCI was adopted by Redcar and Cleveland Borough Council on 26 January 2006 in accordance with the Town and Country Planning (Local Development) (England) Regulations 2004.

### **B.3.1 Scoping report**

A Scoping Report, identifying key issues for the development, was prepared prior to the full ES. The Report addressed:

- Air Quality
- Contaminated Land
- Ecology and Conservation
- Water Quality
- Land Use
- Landscape and Visual
- Noise and Vibration
- Socio-economics

- Traffic and Transport
- Flood Risk

The Report was forwarded to statutory consultees and non-statutory stakeholders for feedback. This feedback was taken into account in the EIA. These included:

- British Geological Survey
- British Telecom
- Campaign to Protect Rural England
- Civil Aviation Authority
- Cleveland Emergency Planning Unit
- Department Business, Enterprise and Regulatory Reform
- Dormanstown Liaison Panel
- Durham Tees Valley Airport
- English Heritage
- Environment Agency
- Grangetown Liaison Panel
- Health and Safety Executive
- Highways Agency
- INCA (Industry Nature Conservation Association)
- Lazenby Community Liaison Panel
- National Monument Record Office
- Natural England
- Network Rail
- Newcastle International Airport
- North East Chamber of Commerce
- One NorthEast
- Redcar & Cleveland Council

- Redcar And Cleveland Borough Council
- Redcar and Cleveland Local Partnership
- Renew Tees Valley
- Tees Valley Wildlife Trust
- The Government Office for the North East
- The National Trust
- The Ramblers Association
- The RSPB
- Yearby Airstrip Trust

### **B.3.2 Stakeholder engagement**

During the production of the Environmental Impact Assessment a number meetings with stakeholders and consultees were held. The meetings allowed extensive feedback into the EIA.

Meetings (excluding phone calls and electronic communications) were held with:

- Cleveland Emergency Planning Unit (27 March 2008)
- INCA (7 April 2008)
- Natural England (28 April 2008)
- Highways Agency and RCBC highways Dep. (1 May 2008)
- RCBC Planning Officers (13 March )
- Environment Agency (29 May 2008)
- Renew Tees Valley (13 March 2008)

### **B.3.3 Stakeholder briefing**

In addition, MGT held two briefing sessions for the local council and one for the local Member of Parliament with latest updates on EIA findings:

- Planning Officer's briefing (1 May 2008)
- RCBC Leader and Deputy Leader (2 June 2008)
- RCBC Planning Committee (16 June 2008)

- Vera Baird QC MP (18 June 2008)

### **B.3.4 Public consultation**

Following the submission of the ES and Section 36 consent application, MGT will hold two local resident's consultation day where members of the MGT and PB Power project teams will be available to answer the questions and queries of the local community and general public. The consultations will aim to:

- raise awareness of the project and its likely impacts;
- establish the concerns of local stakeholders be they real or perceived, in order that these can be addressed and where practical mitigated.

MGT will hold the resident consultation days at the South Bank library on Normanby Road in Middlesbrough. The South Bank library has been chosen as it is regarded as being the most suitable for the community nearest to the proposed project. Prior to the consultation day notices will be published in a local paper. The consultation day will also be publicized in local shops and other suitable public places.

A questionnaire (feedback form) will be available at the consultation day and visitors will be encouraged to complete the form giving their opinion on the development and to ask any questions in writing.

#### **B.3.4.1 Consultation regarding CHP**

As required by the Secretary of States guidance note of March 2001 regarding information that must accompany any application for Section 36 consent, consultations have been undertaken with local companies and other stakeholders identified by the BERR regarding the potential or otherwise for the provision of heat or power to customers.

The consultations undertaken with regard to the CHP investigations and a detailed discussion of the findings of the assessment can be found in the supplementary CHP assessment document accompanying the Section 36 consent application.

#### **B.3.4.2 Post application consultation**

Following the submission of the ES and Section 36 consent application, MGT will publicize the application by placing a notice in a newspaper available in the locality of the development, within a National newspaper, and within the London Gazette. Public notices will also be placed at a number of locations within the vicinity of the site. Copies of the ES will be made available at key locations within the area so that members of the public may view the ES and make any representations on the application.

The local Council will also place a copy of the ES on their Planning Register together with any related documents such as the Scoping Opinion. Within four months of the application being received, Redcar and Cleveland Borough Council will communicate their views on the application to BERR, who will subsequently make a decision on whether or not to give consent to the proposed development.

## **B.4 Project Website**

Information on the project will also be published at [www.mgtteesside.com](http://www.mgtteesside.com) where an electronic copy of the Non-Technical Summary supporting the planning application can be downloaded. The website will serve as a point of contact between MGT, stakeholders and members of the general public to share their views.

**C. LOCAL PLANNING STUDY  
(35 pages)**

## **C. LOCAL PLANNING POLICY**

The application for planning permission for the project will be made under Section 36 of the Electricity Act 1989 to the BERR for permission to build a power generating plant with an output greater than 50 MWe. As discussed in Section 2 of the Environmental Statement the proposed Tees Renewable Energy Plant (Tees REP) will be subject to a number of national and European legislation and guidance that have been discussed within the main text of this ES. It is however also important that the project relates to the local and regional planning policies of the relevant local and regional authorities. This section details the local and regional planning policies relevant to the proposed power station making reference to the following documents as necessary:

- Regional Policy Guidance for the North East (RPG-1);
- Regional Spatial Strategy of the North East of England Regional Assembly
- North East Regional Renewable Energy Strategy 2005;
- Tees Valley Structure Plan;
- Redcar and Cleveland Borough Council Local Plan; and
- Redcar and Cleveland Borough Council Local Development Framework documents (Core Strategy and Development Plan Documents).

These documents form the overall Redcar and Cleveland “Development Plan” against which at a local level the project should be assessed at a local level.

### **C.1 Regional guidance**

Regional Planning Guidance for the North East (RPG1) was published in November 2002. The document sets out policies for the future pattern of economic development in the region, the scale and location of new housing and improvements to transport and environmental protection to 2016. It provides a framework to enable the North East to work to achieve urban and rural renaissance, support economic growth and regeneration, while protecting and enhancing the region’s environment.

RPG1 post dates the Redcar and Cleveland Local Plan but covers the same priorities which are delivered in more detail through the Local Plan. It predates the recent Local Development Framework documents approved by Redcar and Cleveland Council. RPG1 is currently being/will be used as the basis for the review of all Plans in the North East Region as Councils continue to prepare their Local Development Frameworks.

The RPG will be complimented by the Regional Spatial Strategy (RSS) for the North East which is currently in Draft format (as of 2004) but will soon be finalised. The RSS is intended to help development in the region in a coordinated manner.

By definition the RPG and RSS are not especially relevant at a local level but can be used to inform the strategic positioning of major infrastructure projects such as the Tees REP. They also express



broad aims at a regional level that should be respected in the development of any project such as that being proposed by MGT Teesside.

### **C.1.1 Regional Policy Guidance for the North East, Guidance Note 1**

This subsection discusses the planning policy contained within RPG 1 with policies considered to be relevant to the project reproduced in italics.

#### **C.1.1.1 Energy and Renewable Energy**

RPG 1 strongly promotes the development of renewable energy projects in the North East region. The policy of the RPG is focused to a greater extent on wind energy as opposed to biomass and as such the policies developed to govern renewable energy development have only a limited relevance to the proposed biomass power station.

The guidance note requires that due consideration is given to the environmental impact of developments such as the proposed plant which it notes should be located away from sensitive ecological and landscape areas.

With regard to 'energy' developments in general the RPG requires that projects are promoted which, as is the case for the proposed plant, help the Government meet CO<sub>2</sub> emissions targets. It also requires that wherever practical projects incorporate some component of CHP.

#### **Policy EN1 – Energy**

*Development Plans and other strategies should:*

- *consider the relationship between planning, energy and the environment;*
- *support action to meet Government targets for CO<sub>2</sub> reduction, greater use of renewable sources, improvements in energy efficiency and conservation, and installation of combined heat and power and community heating; and*
- *recognise that opportunities for action vary across the region and between urban and rural areas, but an important underlying theme should be local energy generation and conservation.*

#### **Policy EN2 – Renewable Energy**

*Development Plans and other strategies should:*

- *identify "Strategic Wind Resource Areas" (SWRAs) where appropriate to identify the general locations where positive consideration will, in principle, be given to major wind energy developments, (including offshore locations). Areas of Search should also be identified for hydro-generation and other renewable technologies;*

- *prepare formal assessments of the capacity of landscapes within the plan area to accommodate different types and scale of scheme;*
- *give careful consideration to the appropriate type and scale of renewable energy scheme which could be located in, or visible from, the more sensitive locations of the Northumberland National Park, the North Northumberland Coast Area of Outstanding Natural Beauty and North Pennines Area of Outstanding Natural Beauty;*
- *encourage forms of renewable technology compatible with urban and rural environments, such as photovoltaics, biomass (including energy crops), active solar panels and single wind turbines which are of a type and scale appropriate to the particular character of the surrounding environment;*
- *adopt development briefs for the location and appearance of renewable energy developments as Supplementary Planning Guidance where appropriate;*
- *produce guidelines for passive solar design in housing and commercial/institutional buildings, and for photovoltaics and active solar panels; and*
- *investigate the potential of Energy from Waste as a potential source .*

#### **Policy EN3 – Assessing Renewable Energy Applications**

*In developing policies to assess renewable energy proposals, Development Plans should consider :*

- *the impact of development on sensitive habitats;*
- *proximity to suitable grid connection point;*
- *appropriateness of the location in relation to the local and wider landscape;*
- *operational effects such as air quality, noise, visual intrusion odour and water pollution; and*
- *opportunities for environmental enhancements through the improvement of degraded landscapes.*

#### **Policy EN4 – New Energy Technologies**

*Local planning authorities should consider the use of Supplementary Planning Guidance to allow for flexibility in addressing the land use implications of the development of new renewable energy technologies.*

#### **Policy EN5 – Combined Heat and Power (CHP)**

*Development Plans and other strategies should:*

- *encourage the widespread application and development of CHP technology, in preference to electricity only thermal power stations;*
- *encourage the development of heat networks as a new infrastructure assisting the wider development of CHP; and*
- *ensure that the scale of such developments should as far as possible be related to demands that can be met without the need for additional power transmission lines.*

### **C.1.1.2 Employment**

Under Policy EL3 of the RPG authorities are encouraged to facilitate the renewal and modernisation of existing employment areas such as the Teesport area in which the proposed plant is located.

#### **Policy EL3 – Renewal and Modernising of Existing Employment Areas**

*Development Plans and other strategies should:*

- *facilitate the renewal and modernising of existing employment areas;*
- *assess the feasibility for removing constraints from sites within existing employment areas;*
- *protect existing key employment areas from inappropriate development;*
- *protect those employment areas with high public transport accessibility or those with firm proposals to improve public transport accessibility; and*
- *assess the potential to improve access to employment areas by public transport, walking and cycling.*

### **C.1.1.3 Environment**

There are several RPG policies considered to be relevant to the environment, including policies which seek to protect ecosystems, landscapes and areas/sites of historic importance. The RPG supports the protection and enhancement of ecological interests in the region. It is noted that councils should seek to reduce the impact of development to landscape designations and historic landscape features.

#### **Policy ENV5 – Biodiversity**

*Development Plans and other strategies should:*

- *aim to maintain and increase biodiversity within the region, and recognise the nature conservation value of non-designated habitats;*
- *contain policies against which development proposals which will affect sites of nature conservation importance and protected species can be assessed;*

- *promote relevant local Biodiversity Action Plans (BAPs), both in protecting the nature conservation value of designated habitats and the wider countryside, and in assessing the possible contribution of development and regeneration proposals to enhancing biodiversity (and vice versa); and*
- *consider adopting local BAPs as Supplementary Planning Guidance.*

#### **Policy ENV6 – Landscape Character**

*Development Plans and other strategies should:*

- *seek to maintain and enhance the quality, diversity and local distinctiveness of landscape character throughout the North East; and*
- *have regard to the Countryside Agency's landscape character approach.*

#### **Policy ENV7 – National Designations**

*Development Plans and other strategies should:*

- *seek to protect the special qualities of the environment in nationally designated areas, and uphold their statutory purposes, while recognising their role as a living, working and vibrant countryside; and*
- *only permit major developments in the Northumberland National Park and the region's two AONBs, the Northumberland Coast and the North Pennines, and in the three areas of Heritage Coast, North Northumberland, Durham and East Cleveland, in the most exceptional circumstances.*

#### **Policy ENV14 – Historic Landscapes**

*Development Plans and other strategies should:*

- *seek to conserve the historic landscapes of the region;*
- *seek to preserve, in situ, scheduled archaeological sites of national importance and, where appropriate, other archaeological remains of more than local importance; and*
- *identify and give an appropriate degree of protection to historic parks and gardens, battlefields, ancient field systems, green lanes trackways, industrial monuments and other non-scheduled archaeological sites, which reflects their national or regional importance.*

#### **Policy ENV21 – Conservation & Environmental Improvement**

*Development Plans and other strategies should:*

- *encourage the reclamation of derelict land, giving a high priority to regenerating outworn and despoiled areas;*
- *ensure the conservation of naturalised or historically-important areas of previously developed land and facilitate their improvement and management; and*
- *encourage the improvement of coastal areas that have been adversely affected by development.*

#### **C.1.1.4 Flood risk and water quality**

The RPG notes that development within the region should not be located within areas that are currently at risk of flooding. The EA is noted as being an important consultee with regard to flood risk.

With regard to water quality, water conservation measures are encouraged as is the protection of ground water/aquifers.

#### **Policy ENV4**

*Development Plans and other strategies should:*

- *protect flood plains and existing or proposed flood defences;*
- *avoid development in areas identified as being at risk or likely to be at medium to high risk in future from flooding, as defined in PPG25, where alternative sites are available; and*
- *ensure that where other considerations in favour of the development outweigh the flooding issues in identified flood risk areas, development will only be permitted where it has been established, following consultation with the Environment Agency and other relevant organisations, that any necessary protection or management measures will be provided and are environmentally acceptable.*

#### **Policy ENV2 – Water Resource Management**

*Development Plans and other strategies should:*

- *protect the availability and quality of the region's water supply;*
- *encourage water conservation measures;*
- *ensure the timely and sustainable provision of any infrastructure required for water treatment and storage;*
- *ensure that any future scheme involving the exportation of water from Kielder Water should pay particular consideration to its environmental impact; and*

- *promote the use of sustainable drainage systems and the scope to reduce the need for hard infrastructure.*

### **Policy ENV3 – Water Quality**

*Development Plans and other strategies should:*

- *pay careful attention to water quality and, wherever possible, development should lead to positive improvements;*
- *ensure that natural systems within the water environment are thoroughly examined at all stages of planning and design, to help minimise the potential impact of flooding, erosion, and point and diffuse pollution;*
- *ensure timely and sustainable provision of infrastructure for sewage treatment and discharge systems, in particular for new development; and*
- *include policies that ensure that ground water supplies (aquifers) are given adequate protection and conservation, as they can be adversely affected by activities such as tipping and waste disposal.*

#### **C.1.1.5 Air quality**

The RPG requires that planning authorities ensure that development in their respective areas operate so as not to make inappropriate contributions to ground level concentrations of pollutants with the aim of achievement of the national air quality objectives with particular emphasis on AQMAs.

### **Policy ENV1 – Air Quality**

*Development Plans and other strategies should:*

- *ensure that the land use planning system makes an appropriate contribution to the achievement of national air quality objectives;*
- *be closely linked and complementary to any relevant Air Quality Action Plans;*
- *assist in the improvement of air quality through the decisions made on the location of development, transport infrastructure and traffic management;*
- *play a part in promoting policies to reduce emissions from industry and facilitating new higher-quality development; and*
- *ensure that, particularly where Air Quality Management Areas have been designated, air quality is properly considered alongside other material considerations in the planning process.*

### C.1.1.6 Transport

The RPG strongly promotes the use of public transport and sustainable movement of freight through the use of rail and water wherever possible to help minimise the impact of industrial activity. It advises the preparation of transport assessments as part of any major development such as that proposed at the Teesport site.

The guidance note requires under policy T16 that councils “safeguarding sites adjacent to ports for development likely to maximise usage of the movement of goods by sea” as is the case with the proposed plant that will require the import of large quantities of wood chip via the existing port facilities.

#### **Policy T1 – Location of Development**

*Development Plans and other strategies should integrate transport considerations into their land use policies and proposals by:*

- *locating development so as to reduce the need to travel and minimise journey length;*
- *concentrating the bulk of the region’s development within the existing urban areas, where movement needs can be well served by all modes of transport, in particular walking, cycling and public transport;*
- *identifying and protecting sites with high public transport accessibility for development likely to give rise to a high level of demand for travel. Sites which will benefit from firm proposals to improve public transport accessibility to a high level should be similarly identified and protected;*
- *considering the accessibility of development proposals by public transport and assessing major development proposals through Transport Assessments;*
- *locating development to ensure the efficient and sustainable movement of freight, promoting the use of rail and water where possible; and*
- *indicating the likely nature and scope of contributions towards transport infrastructure or service improvements which will be necessary as part of developments in particular areas or sites. Such improvements should be consistent with the priorities set out in RPG1 and Local Transport Plans.*

#### **Policy T2 – Design of Development and Promoting Mixed-use Development**

*Development Plans and other strategies should ensure that the design of new development and redevelopment facilitates safe and convenient movement by all modes of transport, in particular on foot and by cycle and public transport. The aim should be:*

- *to facilitate public transport, cycling and walking through the detailed design of development, using supplementary planning guidance and development briefs where appropriate;*

- *to enable the safe and efficient movement of goods, whilst minimising conflict and disturbance; and*
- *to promote mixed-use developments, well served by public transport, to reduce journey lengths and ensure that the best use is made of transport infrastructure and services.*

**Policy T3 – Transport Infrastructure and Services of Regional Significance**

*Investment in, and the management of, strategic air, sea, rail and road transport infrastructure should support regeneration, opportunity, accessibility and conservation and should be based on a multi-modal assessment of problems and opportunities. Particular priority should be given to:*

- *maintaining, and making the best use of, existing infrastructure;*
- *promoting the use of public transport;*
- *the efficient and sustainable movement of freight;*
- *improving safety across all aspects of the strategic transport network;*
- *reducing the environmental impact of strategic movement on local communities;*
- *reducing congestion across all modes of transport; and*
- *improving journey time reliability.*

**Policy T4 – Transport Infrastructure and Services of Local Significance**

*Local Transport Plans and other strategies should be consistent with the context established in RPG1 and Development Plans, and should set out a balanced strategy of measures to improve accessibility for all, whilst reducing the local and global environmental impacts of transport. Local Transport Plans should establish targets for reduced traffic levels, or rates of growth, taking into account locations with high exposure to vehicles use, air pollution and noise. Particular priority should be given to:*

- *the effective maintenance of existing transport infrastructure;*
- *increasing the attractiveness of public transport, cycling and walking, and promoting Community Transport initiatives where appropriate;*
- *promoting interchange between all modes of transport;*
- *controlling car parking and managing the demand for car use to complement improvements in alternatives to the car;*
- *improving safety across all aspects of the local transport network;*
- *addressing the needs of disabled people and people with mobility impairments;*



- *promoting the implementation of Travel Plans amongst schools and employers; and*
- *promoting the efficient and sustainable movement of freight.*

### **Policy T9 – Principal Roads**

*Development Plans, Local Transport Plans and other strategies should set out proposals for the management and improvement of the principal road network, as part of a balanced transport strategy, giving priority to:*

- *maintaining to a high standard, and making the best use of, existing infrastructure;*
- *balancing the needs of local movement against longer distance traffic;*
- *the efficient and sustainable movement of freight;*
- *promoting travel by light rail, bus, cycle and on foot;*
- *improving safety of all highway users;*
- *reducing the environmental impact of traffic at both the local and global level;*
- *reducing congestion;*
- *improving journey time reliability; and*
- *integrated route management, particularly across highway authority boundaries.*

### **Policy T15 – Freight**

*Development Plans, Local Transport Plans and other strategies should set out measures to promote the vitality of urban and rural areas, securing the more efficient movement of freight, whilst protecting the local environment. Freight Quality Partnerships may be an effective way of implementing these objectives. Particular priority should be given to:*

- *a balance of physical and management measures which give greater priority to goods vehicles, whilst protecting local amenity;*
- *protecting sites which are, or could be, critical in developing infrastructure for the movement of freight, in particular by rail or water;*
- *protecting sites adjacent to railways and ports for development likely to maximise the usage of movement of goods by rail and sea; and*
- *locating development generating significant freight movements, such as distribution and warehousing, away from congested central areas and residential areas and, where there is good (preferably indirect) access to trunk roads.*

**Policy T16 – Ports**

*Development Plans, Local Transport Plans and other strategies should assist the role of ports in supporting the regional economy and meeting transport needs by:*

- *safeguarding land for port use where necessary, whilst ensuring the protection of sites of nature conservation importance;*
- *safeguarding sites adjacent to ports for development likely to maximise usage of the movement of goods by sea; and*
- *seeking to maintain and improve surface access to ports by both road and rail.*

**C.1.1.7 Summary**

The policies contained within RPG 1 are considered to strongly support the development of the proposed renewable energy project. The project is not predicted to give rise to any environmental effects that would significantly affect any protected ecological designations at a local, regional, national or International level. Similarly it is not considered that the plant will compromise the existing landscape being located in an area designated under the local plan for industrial/employment development.

The project is located on a site (adjacent to a port) which the RPG advises is highly appropriate for the proposed development which will require the import of large quantities of fuel. By locating the plant next to the existing port the environmental impacts associated with the transportation of fuel are greatly reduced and the sustainability of the development greatly enhanced.

A Flood Risk Assessment (FRA) for the project has been prepared and is included in Appendix D. The FRA demonstrates that the project will not be at risk of flooding or cause flooding elsewhere as a consequence of its development.

The proposed Tees REP will comply with the requirements of the RPG with regard to impacts to ambient air quality not leading to exceedences of any of the national AQS in isolation or when considered in conjunction with other plant in the area.

**C.1.2 Regional Spatial Strategy of the North East of England Regional Assembly**

This subsection discusses the planning policy contained within the RSS.

**C.1.2.1 Renewable Energy**

The RSS builds on the commitment to develop renewable energy projects outlined in RPG 1 setting sub regional targets for the region including a target for renewable generation in Tees Valley of at least 128 MWe as part of the national target of generating 20 per cent of all electricity from renewable sources by 2020.

The RSS notes that whilst councils should promote renewable energy projects they must ensure that there are no environmental impacts that pose a significant adverse impact.

The site is located within an area identified on the RSS “Environment 1” map, which highlights amongst other issues areas for strategic use for renewable energy generation, as being suitable to house potential biomass plants.

#### **Policy 40 – Renewable Energy Generation**

*Strategies, plans and programmes should:*

- a. *facilitate the generation of at least 10% of the region’s consumption of electricity from renewable sources within the region by 2010 (454 MW minimum installed capacity);*
- b. *aspire to further increase renewable electricity generation to achieve 20% of regional consumption by 2020;*
- c. *require new developments, particularly major retail, commercial and residential, to have embedded within them a minimum of 10% energy supply from renewable sources; and*
- d. *facilitate the achievement of the following minimum sub regional targets to 2010:*

<i>Northumberland</i>	<i>212 MW</i>
<i>Durham</i>	<i>82 MW</i>
<i>Tyne &amp; Wear</i>	<i>22 MW</i>
<i>Tees Valley</i>	<i>138 MW</i>
<b><i>Total</i></b>	<b><i>454 MW</i></b>

#### **Policy 41 – Planning for Renewables**

*Strategies, plans and programmes should support and encourage renewable energy proposals and identify renewable resource areas. In assessing proposals for renewable energy development the following criteria should be considered:*

- a. *wider environmental, economic and social benefits;*
- b. *anticipated effects resulting from development construction and operation such as air quality, atmospheric emissions, noise, odour, water pollution and the disposal of waste;*
- c. *acceptability of the location and the scale of the proposal and its visual impact in relation to the character and sensitivity of the surrounding landscape;*

- d. effect on the region's World Heritage Sites and other national and internationally designated sites, areas or their settings;*
- e. effect of development on nature conservation features, biodiversity and geodiversity, including sites, habitats and species;*
- f. maintenance of the openness of the region's Green Belt;*
- g. accessibility by road and public transport;*
- h. effect on agriculture and other land based industries;*
- i. visual impact of new grid connection lines;*
- j. cumulative impact of the development in relation to other similar developments; and*
- k. proximity to the renewable fuel source such as wood-fuel biomass processing plants within or close to the region's major woodlands and forests.*

### **C.1.2.2 Tees Valley**

The RSS says of Tees Valley, that councils should give priority to major new heavy industries in the area of Teesport whilst also requiring that renewable energy is promoted as part of the regeneration of the area. It requires that support is given to the development of Teesport to help economic development in the future.

#### **Policy 7 – Tees Valley City Region**

*Strategies, plans and programmes should support the polycentric development and redevelopment of the Tees Valley city region by:*

#### **Regeneration**

- a. giving priority to the regeneration of both banks of the Tees between Stockton, Middlesbrough and Redcar; Hartlepool Quays and Central Park Darlington and the links into their town centres for appropriate mixed use development;*
- b. supporting the regeneration of the Coastal Arc from Hartlepool Headland to East Cleveland for appropriate development;*
- c. supporting the regeneration of Newton Aycliffe, Spennymoor, Shildon, Bishop Auckland, Saltburn, Brotton, Skelton, and Loftus for sustainable indigenous growth, without adversely impacting on the regeneration initiatives within the Tees Valley conurbation;*

#### **Economic Prosperity**

- d. giving priority to major new heavy industrial, chemicals and port related development at Billingham, Seal Sands, South Tees, Teesport and Wilton;*

- e. supporting the expansion of the renewable energy and recycling sector and their links to sustainable regeneration;*
- f. supporting the development of Teesport for the export of steel and as a deep sea container port;*
- g. encouraging the development of 80 hectares of land for airport-related uses, to enable Durham Tees Valley Airport's potential as an economic driver to be realised and cater for its anticipated passenger growth;*
- h. supporting the development of business and financial services and new city scale leisure, cultural and retail development in Stockton and Middlesbrough;*
- i. supporting the development of Wynyard and NetPark as prestige employment sites;*
- j. supporting the development of Darlington and Newton Aycliffe as employment locations, particularly to take advantage of their location close to the A1, A66 and East Coast Main Line;*
- k. supporting the expansion of the Universities of Teesside and Durham and the research and development capabilities of the Wilton Centre and NetPark;*
- l. concentrating major new tourist developments related to the coast in Hartlepool and Redcar;*

### **Sustainable Communities**

- m. locating the majority of new retail and leisure development in the sub-regional centres of Middlesbrough and Darlington, whilst additional development in other centres should be consistent with their scale and function to enhance their vitality and viability;*
- n. developing housing to support the economic growth strategies in sustainable locations, mainly on previously developed land in areas where it does not undermine existing housing markets, particularly housing market restructuring areas;*
- o. developing housing market renewal programmes for the Tees Valley city region;*
- p. insisting on high standards of new development and redevelopment, which improve the quality of the environment and promote sustainability;*

### **Connectivity**

- q. encouraging the growth of passenger and freight services from Durham Tees Valley Airport in linking the region to international markets;*
- r. developing a modern integrated public transport network for the Tees Valley;*
- s. supporting the development of Teesport as a Northern Gateway port;*

- t. exploring the need for infrastructure improvements to support regeneration initiatives;*
- u. supporting the upgrading of the East Coast Main Line, the Tyne Tees Express, the Durham Coast Rail improvements and railfreight improvements to Teesport;*
- v. supporting improvements to the A66 Darlington Bypass and a new crossing of the River Tees and reducing congestion on the A19;*

### **Environment**

- w. subjecting development proposals in the Saltholme Nature Reserve, the Heritage Coast and the Tees Estuary to rigorous examination; and*
- x. encouraging the development of renewable energy whilst carefully considering the local impacts of proposals.*

#### **C.1.2.3 Environment**

The RSS seeks to protect areas sensitive to landscape changes such as the Durham and Cleveland Heritage Coast from inappropriate development. The strategy also requires local authorities to protect ecologically sensitive areas from damage through development and looks to ensure that the regions historic environment is not unduly compromised.

#### **Policy 9 – Protecting & Enhancing the Environment**

*Strategies, plans and programmes should seek to maintain and enhance the quality, diversity and local distinctiveness of the environment throughout the North East by:*

- a. promoting a high quality of design in all development and redevelopment;*
- b. promoting development that is sympathetic to its surroundings;*
- c. including policies and proposals to reduce greenhouse gas emissions;*
- d. taking into account the land use implications of the predicted impacts of climate change and plan for both the successful adaptation to the resulting effects and the maximisation of potential economic, environmental and social opportunities;*
- e. promoting appropriate development in the Northumberland National Park and the region's two AONBs, the Northumberland Coast and the North Pennines, and in the three areas of Heritage Coast, North Northumberland, Durham and East Cleveland;*
- f. contributing to the implementation of the National Park and AONB Management Plans*
- g. seeking to conserve and enhance historic buildings, areas and landscapes;*

- h. seeking to preserve, in situ, archaeological sites of national importance and, where appropriate, other archaeological remains of regional and local importance;*
- i. identifying and giving an appropriate degree of protection to historic parks and gardens, battlefields, ancient field systems, green lanes trackways, industrial monuments and other unscheduled archaeological sites, which reflects their national or regional importance;*
- j. incorporating the principles of the management plans of Hadrian's Wall Military Zone World Heritage Site, Durham Cathedral and Castle World Heritage Site, as well as the candidate World Heritage Site at Jarrow and Monkwearmouth as it develops;*
- k. identifying and giving appropriate protection to the region's internationally and nationally important sites for biodiversity and geodiversity*
- l. identifying and protecting existing woodland of amenity and nature conservation value, particularly ancient woodlands; and*
- m. encouraging and facilitating the implementation of the Regional Forestry Strategy, Great North Forest and Tees Forest community forestry strategies, related biodiversity initiatives and other woodland planting.*

**Policy 35 – Biodiversity & Geodiversity**

*Strategies, plans and programmes should ensure that the region's ecological and geological resources are protected and enhanced to return key biodiversity resources to viable levels by:*

- a. continuing to promote the protection and enhancement for internationally and nationally important sites and species;*
- b. reversing habitat fragmentation and species isolation particularly in Biodiversity Target Zones;*
- c. developing habitat creation/restoration projects particularly in the priority Habitat Creation and Enhancement Areas;*
- d. providing for the expansion and linking of existing habitats and species populations including the creation of semi-natural green spaces in and around urban areas and for habitat restoration;*
- e. contributing to improving the region's SSSI's to a favourable condition, by 2010;*
- f. preparing biodiversity and geological audits;*
- g. preparing and implementing Local Biodiversity Action Plans and Local Geodiversity Action Plans; and*
- h. including action for biodiversity and geodiversity within community strategies.*

**Policy 34 – Historic Environment**

*Strategies, plans and programmes should seek to conserve and enhance the historic environment of the region by:*

- a. clearly identifying and assessing the significance of any heritage assets and their vulnerability to change;*
- b. using the process of characterisation to understand their contribution to the local environment and to identify options for their sensitive management;*
- c. encouraging the refurbishment and re-use of appropriate disused or under-used buildings and incorporating them into regeneration schemes;*
- d. seeking to preserve, in situ, archaeological sites of national importance and, where appropriate, other archaeological remains of regional and local importance; and*
- e. recognising the opportunities for business, education and tourism. Strategies, plans and programmes adopt an approach of informed management to maintain and enhance the North East's built heritage by preparing Management Plans by April 2007 for all of the region's World Heritage Site designations, outlining the objectives and delivery proposals for each site. Local authorities should:*
- f. prepare, and regularly maintain registers of Grade II listed buildings 'at risk'; for their areas, and pursue policies and measures which seek to repair and remove all grades of building from 'at risk' registers through repair;*
- g. consider preparing, and regularly maintaining, lists of locally important buildings for their areas, and set out policies in LDFs, which seek, as far as possible, their protection against inappropriate change;*
- h. consider preparing Conservation Area Appraisals for existing and proposed conservation areas, and proceed to the preparation of Management Plans for the delivery of improvements to those areas;*
- i. consider preparing lists of locally important registered landscapes, Historic Landscape Assessments and Conservation Management Plans for historic designated landscapes; and*
- j. consider preparing urban surveys of historic towns and other substantial settlements, to 106 improve knowledge of their entire historic fabric as a guide to ensure future development maximises the potential for preservation, protection and enhancement.*

**C.1.2.4 Flood risk**

To help reduce increased flooding problems the RSS requires that where ever possible new developments are located outside areas known to be at risk of flooding.



**Policy 37 – Flood Risk**

*Strategies, plans and programmes should adopt a strategic, integrated, sustainable and proactive approach to catchment management to reduce flood risk within the region, managing the risk from:*

- a. tidal flooding around estuaries and along the coast; and*
- b. fluvial flooding along river corridors and other significant watercourses resulting from catchments within and beyond the region and other sources of flooding. In developing Local Development Frameworks and considering planning proposals a sequential risk-based approach to development and flooding should be adopted. In addition it is also necessary to:*
- c. ensure that new development is located in appropriate locations, and local planning authorities should liaise closely with the Environment Agency;*
- d. be informed by Strategic Flood Risk Assessments, prepared by planning authorities in liaison with the Environment Agency;*
- e. require development proposals within flood risk areas to be accompanied by Flood Risk Assessments to evaluate the extent of the risk before the commitment to a site or project;*
- f. avoid development in functional floodplains, washlands, and in undeveloped floodplain areas where the risk from tidal and fluvial flooding is high;*
- g. restore natural flood storage capacity through works such as blanket bog restoration in the uplands and restoration of floodplain storage functions in appropriate locations on floodplains;*
- h. ensure, where appropriate, that Sustainable Drainage Systems and other techniques are adopted to reduce flood risk;*
- i. in previously developed areas and areas of undeveloped floodplain where the risk from flooding is lower, development should be of an appropriate type and design and require the availability or provision of an appropriate standard of flood defence and the incorporation of flood mitigation and/or flood warning measures; and*
- j. where other material considerations outweigh the flooding issues in identified flood risk areas, development will only be permitted where it has been established that any necessary protection or management measures can and will be provided and are consistent with relevant management plans.*

**C.1.2.5 Transport**

The RSS as is the case with the RPG promotes the use of public transport and encourages the establishment of travel plans. The strategy promotes the development of the ports at Teesside and Tyneside to alleviate transport issues on national roads in an appropriate manner.

**Policy 11 – Connectivity & Accessibility**

*Strategies, plans and programmes should seek to improve and enhance the internal and external connectivity and accessibility of the North East by:*

- a. managing travel demand particularly by the promoting public transport, travel plans, and cycling and walking;*
- b. reducing the need to travel by focusing development in urban areas that have good access to public transport, cycling and pedestrians;*
- c. minimising the impact of the movement of people and goods on the environment and climate change;*
- d. making best use of resources and existing infrastructure;*
- e. ensuring safe transport networks and infrastructure;*
- f. maximising the potential of the key regional Gateways of the ports and airports and strategic transport infrastructure in supporting regional economic growth and regeneration; and*
- g. improving accessibility and efficiency of movement along the four key transport corridors of:*
  - A1/East Coast Main Line*
  - A66/Tees Valley Rail links*
  - A19/Durham Coast Line*
  - A69 /Tyne Valley Line.*

**Policy 22 – Ports**

*Strategies, plans and programmes should support the growth of the region's ports by:*

- a. supporting the development of import and distribution centres and deep-sea vessel facilities at Teesport;*
- b. promoting improvements and standardisation of gauge on the Tees Valley East Coast Main Line and Transpennine routes rail network to Teesport to accommodate 9' 6" containers;*
- c. continuing to focus the region's international passenger ferry traffic at the Port of Tyne;*

- d. recognising the significant economic investment generated at both the Port of Tyne and Teesport, both directly and indirectly;*
- e. supporting the development of short-sea shipping connections to improve linkages between the region's ports and the wider European network;*
- f. promoting the development of port facilities to redress road transport problems associated with northbound cargo arriving at southern UK ports and berths;*
- g. ensuring that the needs and preferences of tourists, including both leisure and business visitors are taken into account;*
- h. ensuring any new proposed port development or expansion is subject to a full Sustainable Environmental Assessment;*
- i. safeguarding adjacent sites for port operational uses, where appropriate, whilst ensuring the protection of sites of nature conservation importance and features of heritage conservation importance; and*
- j. considering, where appropriate, alternative land uses, particularly where this would contribute to the regeneration of the wider area.*

#### **C.1.2.6 Summary**

As is the case with the RPG the RSS is considered to strongly support the development of the renewable energy plant at the Teesport site.

The RSS promotes the development of renewable energy projects including a target for renewable generation in Tees Valley of at least 128 MWe as part of the national target of generating 20 per cent of all electricity from renewable sources by 2020. The proposed project, with an electrical output of 300 MW, will make a significant contribution to the regional target for renewable energy generation covering the entirety of the Tees Valley target and much of the target for the rest of the North East of 454 MW. Furthermore the site is located within an area identified on the RSS "Environment 1" map as being suitable for potential biomass project development.

The project ES demonstrates that the project will have no significant adverse environmental impacts and so is considered to satisfy the requirements of the RSS in this regard.

The project has been located in an area that will not place the plant at an unacceptable risk of flooding and is located in an area that the RSS says Redcar and Cleveland Borough Council should give priority to for major new heavy industries such as the proposed plant to ensure the further economic development of the area.

#### **C.1.3 North East Regional Renewable Energy Policy 2005**

The Renewable Energy Strategy for the North east was published in March 2005 by the Regional Assembly and outlines the Assembly's approach to renewable energy over the course of the next few years. The document however predates the changes to the Renewable Obligation Certificate scheme

and as a result all but discounts the potential for large biomass power stations as a result which have been made more economic as a result of the changes.

The strategy does not include any specific policies but does establish regional and sub regional targets that have been carried forward in to the RSS (see discussion above).

The document identifies the Teesside area as having potential for the use of biomass along with another other area in the North East, at Lynemouth, in south east Northumberland.

### **C.1.4 Tees Valley Structure Plan**

The Tees Valley Structure Plan was adopted by the unitary authorities of Darlington, Hartlepool, Middlesbrough, Stockton-on-Tees and Redcar and Cleveland in 2004.

Under the provisions of the Planning and Compulsory Purchase Act 2004 Regional Spatial Strategies and Local Development Frameworks (LDF) will collectively replace Structure Plans and Local Plans.

The plan should therefore have been replaced on 28<sup>th</sup> September 2007 however sufficient progress has not been made on all aspects of the various LDF's to allow for this. Under the 2004 Act therefore the Regional Planning Body (RPB) recommend to the Secretary of State, that some key policies be "saved" beyond this period in order to avoid the possibility of a policy void.

The Secretary of State has now issued a "direction" (under Paragraph 1(3) of Schedule 8 of the 2004 Act) setting out those policies to be "saved" in the Tees Valley Structure Plan beyond 2007. Of the surviving policies contained within the Structure Plan just one policy is considered to be relevant to the project.

#### **C.1.4.1 Employment**

The Structure Plan notes that the majority of development should be located in already populated/industrialised areas of the region such as Teesside including the land between Teesport and the Tees Barrage.

#### **Policy STRAT1**

*The majority of future development will be located in urban areas with preference given to:*

- i. previously developed sites within urban areas, particularly along the Tees Corridor between the A66 crossing in Stockton-on-Tees and the Tees Barrage and between Teesport and the Tees Barrage; and*
- ii. in the town and district centres listed in policy TC3. In the event that such areas yield insufficient capacity then development will be located along public transport corridors on the edge of the Teesside conurbation, Darlington or Hartlepool.*

#### **C.1.4.2 Summary**

The project satisfies the requirement of the Structure Plan through the development of land identified as being suitable for future development.

#### **C.1.5 Redcar and Cleveland Borough Council Local Plan**

Since 1999 the Redcar and Cleveland Borough Council Local Plan has set out the planning policies which will guide and control new development in the Borough. However this document was due to expire on the 27 September 2007 to be replaced by the emerging Local Development Framework unless the Secretary of State directed otherwise.

It is understood that the situation at the time of this application is that the Local Plan remains a part of the statutory approved Development Plan until it is fully replaced by appropriate sections of a formally adopted Local Development Framework (LDF). At present the LDF "Core Strategy" and "Developments Policy" documents have been approved though the "Communities" and "Economic" LDF components will not likely to be approved until 2010. The Secretary of State has directed that some, but not all of the policies contained within the Local Plan will be retained for future use whilst the remainder of the LDF is prepared. This does not affect the status of the Local Plan as a material consideration in the determination of planning applications but it does mean that the document must be read in context with emerging national and regional policies.

The EIA has therefore taken into consideration the saved policies of the Local Plan, the available Local Development Scheme documents (including the Core Strategy and Developments policies) adopted in July 2007 and all other relevant supplementary planning guidance applicable to the area.

#### **C.1.6 Economy/the built environment**

Whilst no industrial policies contained within the old Local Plan have been preserved by the secretary of state that are considered to be relevant to the project it is worth noting the now scrapped policy IND 2 which promoted the use of the land in the Teessport areas for projects that, as is the case with the proposed plant, require or benefit from waterside access/access to the port facilities.

##### **Policy IND 2**

*The industrial areas listed below, all of which are shown on the proposals map will continue to be reserved for port-related industrial development which particularly benefits from direct waterside access:*

- a. ICI river frontage / Teesport refinery*
- b. Tees offshore base*

#### **C.1.7 Redcar and Cleveland Borough Council Local Development Framework**

This subsection discusses the relevant LDF policies.

### C.1.7.1 Renewable Energy

The LDF sets out the aim of the Council to fully assist in the meeting of the regional targets for renewable energy generation as summarised in the RSS. Much of the relevant policy (CS21) is aimed at onshore wind farm development however the policy does note that: “*Particular support will be given to biomass projects in the South Tees area*”.

#### **Policy CS21 Renewable Energy**

*Renewable energy schemes will be supported and encouraged where they help to meet the Government's climate change objectives and the Tees Valley sub-regional target for electricity generation from renewable sources set out in the RSS. The scale of the proposal will reflect the capacity and sensitivity of the landscape to accept the proposed renewable technology. Due to the character of the Heritage Coast, opportunities for commercial renewable energy generation will not be appropriate in that area unless the requirements of PPS22 are fully met. The following broad areas of least constraint have the potential for onshore wind farm development:*

- a. South Tees for medium scale development; and*
- b. East Cleveland for small scale development.*

*Particular support will be given to biomass projects in the South Tees area. All proposals will be considered against PPS22, the RSS and the detailed policies contained in the Development Policies DPD.*

### C.1.7.2 Employment

With regard to economic activity in the Redcar and Cleveland area the LDF promotes the continued development on general industrial land where necessary securing the redevelopment of potentially contaminated land with proper decontamination.

Major employment proposals are noted as being appropriate in areas such as the South Tees and Redcar areas, in particular those requiring good access for transporting freight and a suitable workforce nearby as is the case with the proposed plant.

The council also promotes the use of vacant sites with low biodiversity to be used for growing biomass crops as part of policy CS4.

#### **Policy CS4 Spatial Strategy for South Tees Employment Area**

*The Council and its partners will aim to:*

##### *Economy*

- a. Give the area an identity and make it attractive to inward investment;*
- b. Develop the chemical and technology based industries at Wilton;*

- c. Safeguard the steel industry;*
- d. Develop a Centre for Process Innovation at Wilton;*
- e. Develop energy industries including a Fuel Cell Application Centre centred on Wilton, focused on hydrogen and renewable energy;*
- f. Expand Teesport for steel exports and a deep sea container facility;*
- g. Develop a new distribution facility;*
- h. Develop an Eco Park for recycling industries;*
- i. Develop a Motorsports Centre and motor retail industry;*
- j. Continue development on general industrial and business estates;*
- k. Support the development of renewable energy projects where they are compatible with surrounding uses and acceptable in environmental terms;*
- l. Enhance the quality and range of services and facilities that serve the needs of those working in the South Tees employment area;*

#### **Access**

- m. Improve freight access links to Teesport by rail and road;*
- n. Maintain and improve public transport connectivity with settlements in the Borough and Middlesbrough;*

#### **Environment**

- o. Enhance the environmental quality of employment areas including gateway features;*
- p. Secure decontamination and redevelopment of potentially contaminated land;*
- q. Protect European sites, and safeguard and improve sites of biodiversity interest particularly along the River Tees and the estuary and encourage integrated habitat creation and management which supports the Biodiversity Action Plan;*
- r. Enhance the environmental quality of the River Tees and coastline;*
- s. Encourage vacant sites with low biodiversity value to be used for growing biomass crops or to support the expansion of the Tees Forest.*

#### **Policy CS8 Scale and Location of New Employment Development**

*Up to 160 hectares of general employment land will be brought forward in the period up to 2021 in line with Policy CS2 Locational Strategy. The following overall strategy for economic development will be supported:*

- a. *Major employment proposals will be located within the Greater Eston, South Tees and Redcar areas, particular those requiring good access for transporting freight and a suitable workforce nearby;*
- b. *Proposals to create significant employment opportunities in East Cleveland will be centred on Skelton and Skinningrove. Elsewhere in East Cleveland, employment development will be focused on Saltburn, Loftus, Brotton and the service villages, and will be of a scale and type suitable to its location;*
- c. *Employment proposals of an appropriate scale and type that enhance Guisborough as a market town; and*
- d. *Appropriate local rural regeneration and farm diversification in the villages and countryside.*

**Policy CS9 Protecting Existing Employment Areas**

*Land and buildings within existing business parks and industrial estates will continue to be developed and safeguarded for business and general industry. The type of uses encouraged will depend on the Council's strategy for the area. The existing general employment areas in the Borough are:*

- a. *South Tees Industrial and Business Parks, South Tees;*
- b. *Skippers Lane Industrial Park, South Bank;*
- c. *Kirkleatham Business Park, Redcar;*
- d. *Tees Offshore Base, South Bank;*
- e. *Skelton Industrial Estate, Skelton;*
- f. *Warrenby Estate, Redcar;*
- g. *North Liverton Industrial Estate, North Liverton;*
- h. *Barmet Industrial Estate, Lingdale;*
- i. *Longbeck Industrial Estate, Marske;*
- j. *Morgan Drive, Guisborough;*
- k. *Cleveland Gate Business Park, Guisborough.*

*Proposals will be encouraged to improve the quality of the environment, signage, security and accessibility of the sites. Existing employment sites and buildings located outside the employment areas will be safeguarded where they are important to sustaining the local economy and meeting the Council's regeneration objectives.*



### C.1.7.3 Environment

As would be expected the LDF requires that proper consideration is given to the protection of the areas landscape character, biodiversity and historic environment.

With regard to landscape particular mention is made of the natural beauty of the North Yorkshire and Cleveland Heritage Coast located in the south east of the borough in and around which development will not be permitted that would compromise the existing situation.

The LDF highlights the need to maintain and improve biodiversity in the borough through the strengthening of populations of protected and target species and improve the integrity and biodiversity value of wildlife corridors particularly along the coast.

It is noted that development that could impact on historical/archaeological interests would not normally be considered acceptable.

#### **Policy CS22 Protecting and Enhancing the Borough's Landscape**

*The overall approach will be to protect and enhance the Borough's landscape based on the character areas identified through the Landscape Character Assessment. Priority will be given to the protection and enhancement of the landscape character and natural beauty of the North Yorkshire and Cleveland Heritage Coast. Development will not be allowed if this would lead to the loss of features important to the character of the landscape unless the need for the development outweighs the landscape considerations. Where development is justified, proposals will include measures to enhance, restore or create the special features of the landscape. In such circumstances, priority will be given to the creation of habitats to support local and regional biodiversity targets and the planting of new hedgerows, trees and woodlands to support the Tees Forest Strategy will be encouraged.*

#### **Policy CS24 Biodiversity and Geological Conservation**

*The Borough's biodiversity and geological resource will be protected and enhanced. Priority will be given to:*

- a. Protection of the integrity of the European sites in and near the Borough.*
- b. Conserving and enhancing protected biodiversity and geodiversity sites and features in line with PPS9;*
- c. Improving the integrity and biodiversity value of wildlife corridors particularly along the coast, around the Teesmouth estuary and linking with the North York Moors;*
- d. Meeting the objectives and targets in the UK and Tees Valley Biodiversity Action Plan;*
- e. Encouraging management of landscape belts for nature conservation;*
- f. Protecting ancient woodland and veteran trees;*

- g. *Strengthening populations of protected and target species; and*
- h. *Improving site management and increasing public access to wildlife sites.*

*Development will be encouraged to include measures to contribute positively to the overall biodiversity in the Borough.*

#### **Policy CS25 Built and Historic Environment**

*Development proposals will be expected to contribute positively to the character of the built and historic environment of the Borough. The character of the built and historic environment will be protected, preserved or enhanced. Particular protection will be given to the character and special features of:*

- a. *Conservation areas;*
- b. *Listed buildings;*
- c. *Historic parks and gardens;*
- d. *Archaeological sites; and*
- e. *The historic landscape of the Eston Hills.*

*Development which preserves or, where appropriate, enhances the character of important historic buildings and sites and their settings will be encouraged.*

#### **Policy DP11 Archaeological Sites and Monuments**

*Development that would adversely affect important archaeological sites or monuments will not be approved. Development that may affect a known or possible archaeological site will require the results of an archaeological evaluation to be submitted as part of the planning application. Development that affects a site where there is evidence that archaeological remains may exist will only be permitted if:*

- a. *Any archaeological remains are preserved in situ; or*
- b. *Where in situ preservation is not required, or appropriate satisfactory provision is in place for archaeological investigation, recording and reporting to take place before, or where necessary during development. Where archaeological investigation, recording and reporting has taken place it will be necessary to publish the findings within an agreed timetable.*

#### **C.1.7.4 Transport**

The LDF as is the case with the RPG and RSS promotes the use of public transport and sustainable transport of the borough. The development and implementation of travel plans is identified as being something that the council will pursue in the years ahead.

**Policy CS26 Managing Travel Demand**

*Development proposals will be required to support the Redcar and Cleveland Local Transport Plan. Proposals will be supported that:*

- a. Improve transport choice and encourage travel to work and school by public transport, cycling and walking;*
- b. Minimise the distance people need to travel;*
- c. Contribute positively to a demand management strategy to address congestion, environmental and safety issues including managing car parking provision and prioritising bus routes in urban areas; and*
- d. Encourage park and ride at public transport interchanges.*

*The Council will support the preparation and implementation of Travel Plans and other schemes such as Safer Routes to School to encourage the use of sustainable transport.*

**C.1.7.5 Other relevant policies**

The LDF includes a number of other policies including policies to guide the location of developments and to promote sustainable design as well as policies to govern pollution and contaminated land.

The LDF requires that development sites have adequate infrastructure, services and community facilities to serve the development, whilst also affording protection to local landscape and ensuring that agricultural land is retained where practical. With regard to sustainability, developments must be as efficient as practical with major developments having to source 10 percent of their energy usage from renewable energy sources such as the proposed plant. Projects that will have more than 30 employees are highlighted as being required to develop a travel plan that must be agreed with the council.

Where plant are likely to give rise to pollution the LDF requires that proposals include mitigation measures to reduce predicted impacts to acceptable levels. For proposals on land which may be contaminated any development should ensure that there is no unacceptable risk to users of the site or surrounding sites as well as members of the general public. Contamination of land and controlled waters must also be avoided as must any increased treat to building stability on or in the vicinity of the project site.

**Policy DP2 Location of Development**

*In assessing the suitability of a site or location, development will be permitted where it:*

- a. Accords with site allocations and designations in other DPDs;*
- b. Meets the requirements of Policy CS2 Locational Strategy;*

- c. *Does not cause a significant adverse impact on the amenities of occupiers of existing or proposed nearby properties;*
- d. *Does not result in the unacceptable loss or significant adverse impact on important open spaces or environmental, built or heritage assets which are considered important to the quality of the local environment;*
- e. *Minimises any adverse impact on the overall character of the streetscape or landscape of the area;*
- f. *Minimises the loss of best and most versatile agricultural land and follows the sequential test set out in PPS7;*
- g. *Avoids locations that would put the environment or human health or safety at unacceptable risk; and*
- h. *Has adequate infrastructure, services and community facilities to serve the development.*

### **Policy DP3 Sustainable Design**

*All development must be designed to a high standard. Development proposals will be expected to:*

- a. *Respect or enhance the character of the site and its surroundings in terms of its proportion, form, massing, density, height, size, scale, materials and detailed design features;*
- b. *Include a layout and design that takes into account the potential users of the site and does not cause a significant adverse impact on residential amenity;*
- c. *Create a safe and secure environment;*
- d. *Respect or enhance the landscape, biodiversity, geological and heritage designations or assets that contribute positively to the site and the surrounding area;*
- e. *Incorporate sustainable design and construction techniques to meet high standards for energy efficiency, water efficiency, water management and waste management and to minimise vulnerability to climate change. The Council will require major developments to provide at least 10% of their predicted energy requirement from renewable sources;*
- f. *Contribute to a sense of place and quality;*
- g. *Ensure pedestrian, cycling and public transport access is safe, convenient and attractive, linked to existing networks and includes appropriate facilities for cyclists and public transport users;*
- h. *Make appropriate access provision for disabled people and those with restricted mobility;*

- i. *Fully incorporate, where appropriate, biodiversity and geological interests, landscaping and public and private open spaces which meets the Council's open space standards;*
- j. *Incorporate infrastructure and services to serve the development including recycling and waste facilities and Sustainable Drainage Systems if appropriate; and*
- k. *Provide vehicular access and parking suitable for its use and location.*

*In addition:*

- l. *A Design and Access Statement will be required for all proposals. The level of detail will be dependent on the scale and nature of the development and the sensitivity of its location.*
- m. *A Travel Plan will be required for any proposal that:*
  - i. *Exceeds the thresholds set out in Appendix 2;*
  - ii. *Has more than 30 employees; or*
  - iii. *Where the Council considers it necessary, based on the potential cumulative impact of the proposal in the area.*

#### **Policy DP6 Pollution Control**

*Development that would give rise to increased levels of noise or vibration or which would add to air, land or water pollution, by itself or in accumulation with existing or other proposed uses, will only be permitted if it is acceptable in terms of:*

- a. *Human health and safety;*
- b. *Environment; and*
- c. *General amenity.*

*Where pollution is unavoidable, mitigation measures to reduce pollution levels will be required in order to meet acceptable limits.*

#### **Policy DP7 Potentially Contaminated and Unstable Land**

*Development on or near potentially contaminated or unstable land will not be permitted unless effective measures are agreed to deal with any contamination or instability to prevent:*

- a. *An unacceptable risk to users of the site and surrounding land, particularly occupiers of dwellings and gardens;*
- b. *A threat to the structural stability of buildings on the site and surrounding land; and*

c. *Any contamination of land or controlled waters.*

#### **C.1.7.6 Summary**

The proposed renewable energy plant is not considered to run contrary to any of the policies outlined in either the Local Plan (with regard to saved policies) or the Local Development framework documents. In deed it is considered that the policies outlined in the plan strongly promote the development of the plant at the Teesport site. Policy CS21 of the LDF in particular which states that the council will in "*particular support will be given to biomass projects in the South Tees area*" is considered to demonstrate this fact to the greatest effect.

The project will as required by policy CS4 continue the development of future industry on general industrial land in an area identified under policy CS8 as being an area suitable for projects that represent a major employment opportunity for the region and the Redcar and Cleveland area in particular.

Under policy CS4 the council hopes to promotes the use of vacant sites with low biodiversity to be used for growing biomass crops which it is considered the presence of a plant such as the Tees REP will only serve to promote thereby assisting the council in their wider aims of further developing the renewables sector in the area.

With regard to environmental policies it is considered that the project will not pose an unacceptable impact to landscape or historical interests satisfying the requirements of the LDF in this regard. Similarly there will be no unacceptable impact to ecological designations or on site ecology with the site representing habitat of little to no really value.

The project proponent will at a later date develop a full green transport plan that will be agreed with the local authority prior to the commissioning of the plant. Section 11 of Volume 1 of the ES includes discussion of a transport plan detailing the proposed route of vehicles to and from the proposed site amongst other transport issues relating to the project.

Pollution prevention measures will be fundamental to the plants design with the project including state of the are pollution control technology in the form of SNCR to ensure that NOx levels are low. A summary of all monitoring and mitigation measures proposed for the plant are included in Section 15 of Volume 1 of this ES.

## **C.2 Discussion of relevant planning policy**

The project is considered to be compliant with the higher level requirements of the RPG and RSS documents discussed above which are considered to promote the development of areas such as the Teesport area provided that the development can be proved to have no significant adverse impact on the environment.

At a more local scale the Structure Plan and Redcar and Cleveland Local Plan saved policies/LDF policies form the bulk of the planning policies against which it is necessary to judge the proposed renewable energy plant. The policies contained within these documents that have been established as being relevant to the proposed plant are discussed below.

### **C.2.1 Location**

The location of the proposed plant is in full accordance with the policies contained within the Redcar and Cleveland “Development Plan”.

The site is located in an area identified by the RSS and North East Renewable Energy strategy as being suitable for biomass projects, one of just two in the North East region. Further more the Tees Valley Structure Plan at Redcar and Cleveland LDF both promote the further and sustained development of the area of Teesport for projects such as that being proposed.

The selection of the proposed site will help minimise the demand on the surrounding road and rail transport infrastructure given its proximity to the existing Teesport that would otherwise have required a significant number of additional traffic movements on the regions roads. Additionally the location adjacent to a suitable grid connection point will further reduce any potential for inconvenience with regard to the need for new overhead power lines.

The site also affords potential for the provision of a CHP option to local companies with a potential off-taker already identified though this is still the subject of further discussion at the time of this application.

### **C.2.2 Employment**

Several policies contained within the Development Plan including policies CS 4, 8 and 9 of the Redcar and Cleveland LDF promote the use of the land at the Teesport site for housing major developments such as the proposed renewable energy plant.

The project will significantly contribute to the aims of the RPG and RSS which encouraged development within the Teesport area. The project will provide a significant amount of financial investment during both the construction and operational phases .

### **C.2.3 Air quality**

Section 4 of the ES has demonstrated that the power station will operated in full compliance with the air quality strategy objectives of the UK which have been developed in accordance with the requirements of the European Union Air Quality Directive. The project has also been shown not to contribute significantly to existing pollutant ground level concentrations in the surrounding area and therefore satisfies the requirements of the Development Plan.

Further more the proposed plant will be carbon neutral and serve to reduce the quantities of greenhouse gases emitted in the UK today by displacing generation by fossil fuel fired plants.

### **C.2.4 Water quality**

The project will not generate significant quantities of waste water due to the nature of the technology proposed for the project. The plant will not use a wet cooling system which required large amounts of

water but will rather utilise a dry/air cooled system much like a car radiator which requires only small amounts of make up water.

There will in addition be no risk of contamination of nearby surface waters or ground water arising from the construction or operation of the proposed plant.

### **C.2.5 Noise**

There will be little to no impact from the proposed renewable energy plant with regard to noise due to distance from any potentially sensitive receptors as is demonstrated in Section 8 of this ES. The project will include mitigation measures to ensure this is the case.

### **C.2.6 Landscape**

The site is not located within an area designated as having any particular landscape sensitivity.

Given the industrial nature of the site and it's surroundings it is considered that the project is located in an area that can incorporate the construction of a power station without significant impacts to the local landscape.

The nearest national landscape designation is the Redcar and Cleveland Heritage Coast which is located some 12.5 km to the south east of the site. The project is not considered likely to have any significant on this area due to distance.

### **C.2.7 Transport**

There are a number of policies contained in the Development Plan relating to transport and infrastructure associated with new developments.

The location of Teesport immediately to the north east of the site will allow the project to import biomass by sea, minimising the impact to the local road traffic infrastructure as a result.

As required by the Development Plan under policy DP3 of the Redcar and Cleveland LDF, MGT Teesside will seek to promote the use of public transport by construction and operational staff where ever practical and will for the construction phase require the contractor to develop a green traffic management plan promoting car sharing and the use of minibuses etc.

As part of the EIA for the proposed plant an indicative route for the transport of materials and equipment to the site has been identified with a full discussion of transport of materials and components is provided in Section 11 of the ES.

### **C.2.8 Ecology**

The proposed site does not lie within any internationally, nationally or regionally significant ecological designations. An ecological impact assessment of the proposed Tees REP development site has



been undertaken comprising a detailed desk study, consultation and field survey. Details of the studies and results can be found in Section 13 of the ES.

The only additional studies to the Phase 1 Habitat assessment of the site was a dedicated survey of any potential for the presence of reptiles. This survey confirmed reptile absence from the site.

Other protected species potential in the immediate area was limited to the presence of terrestrial bird species that may utilize the scrub habitats and buildings on site for breeding. Where potential exists for terrestrial breeding birds (scrub vegetation and buildings), removal or demolition will be undertaken outside the bird breeding season (March to late September inclusive for the majority of species) or alternatively, an ecologist will supervise the works. If these procedures are followed the potential impacts upon birds are considered negligible.

### **C.2.9 Culture and heritage**

As a part of the EIA process a desk-based assessment (DBA) of the proposed site has been undertaken following a suitable methodology. This included investigation of various information sources such as the County Sites and Monuments Record and a site walk. The DBA determined that there was potential for archaeological remains from a number of historical periods. The findings of this report have been issued to the Council's Archaeologist and are summarised in Section 14 of the ES.

It is considered that the DBA did not identify any archaeological interests that could be significantly impacted on by the project and that the project therefore satisfies the requirements of the development plan with regard to archaeology and cultural heritage issues.

### **C.2.10 Coastal Protection and flood risk**

The Development Plan notes that proposals for new development shall not be permitted in flood risk areas or where development may increase the risk of flooding elsewhere.

A full flood risk assessment has been undertaken for the project following the guidance included in PPS 25 "Development and Flood Risk" and the requirements of the Development Plan. The assessment has demonstrated that the project will not be at any significant risk of flooding or cause flooding in other areas as a result of its construction and is therefore considered to fully satisfy the requirements of both the Development Plan and PPS 25. Flood Risk is discussed further in Section 7 of the ES with the flood risk assessment undertaken for the project included in Appendix D.

## **C.3 Conclusion**

The relevant planning policy documents at national regional and local level are considered to support the construction and operation of the proposed Tees REP.

This Environmental Statement summarises the findings of the detailed Environmental Impact Assessment undertaken for the project based on the requisite legislation and the relevant planning policy framework. It concludes that the proposed plant will have no significant adverse environmental

impacts and is thus, due to its clear compatibility with both national planning policy, the provisions of the adopted Development Plan and the clear national need for additional power generation, is an acceptable proposal.

**D. TEES FLOOD RISK ASSESSMENT  
(14 pages)**

## D. TEES FLOOD RISK ASSESSMENT

### D.1 Introduction

#### D.1.1 Project background

MGT Teesside Ltd. (MGT) proposes to construct a biomass fuelled power station (Tees Renewable Energy Plant) in Teesport, on the banks of the Tees Estuary. The proposed plant will provide 300 MW of power generation capacity at rated site conditions. During normal operation the plant will fire on clean wood chip, sourced from sustainable forestry operations.

As part of the planning process, PB Power was commissioned by MGT to prepare a Flood Risk Assessment (FRA) to support a planning application for the development of the Renewable Energy Plant. This assessment identifies the flood risk to the site based on the available information and addresses the requirements of Planning Policy Statement 25 (PPS 25) 'Development and Flood Risk' and CIRIA C624: 'Development and Flood Risk Guidance'.

#### D.1.2 Site location and description

The proposed power station will be located on land adjacent to the main southern dock at Teesport on the south bank of the River Tees, on land which forms part of the PD Teesport Estate. The site is at national grid reference NZ 5430 2323.

The Teesport Estate is a large industrial area in the borough of Redcar and Cleveland, close to the large urban areas of Redcar and Middlesbrough. Teesport is one of the few natural deep water tidal facilities in the UK, and is the second largest port in the UK, in terms of tonnage.

Historically the site was occupied by an undeveloped intertidal foreshore of open sands, associated with the banks of the River Tees. Land for the site was reclaimed between 1950 to 1965, and subsequently used for large oil storage tanks and an electricity substation.

The site is relatively flat and is situated at approximately 5 m above ordnance datum (AOD). The majority of the site comprises undeveloped scrubland covered in road planings. On the north-eastern boundary, there is a steel export terminal adjacent to Tees Dock quay. The Steel Export Terminal will be dismantled in advance of the land being leased to MGT for the power station development.

Reference to BGS Sheet 33 (Stockton) revealed that the underlying geology comprises made ground underlain by estuarine and marine alluvium drift deposits. The underlying bedrock is indicated to comprise Mercia Mudstone overlying Sherwood Sandstone (classified as a Major Aquifer).

The main watercourse in the vicinity of the site is the River Tees; a large tidally influenced River which lies approximately 5 m from the northern site boundary. The Tees flows from the Pennines, eastward through Middlesbrough and discharges into the North Sea, approximately 5 km northeast of the site.

Environment Agency (EA) flood maps indicate that the site is partially located within Flood Zone 3a. Developments in Flood Zone 3a are described as being "*at high risk of flooding if flood defences are not present*". Land in this zone is assessed as having a 1 in 100 or greater annual probability of river

flooding (>1%) or a 1 in 200 or greater annual probability of sea flooding (>0.5%) in any year. The flood map also indicates that the site does not currently have any flood defences in place.

### **D.1.3 Adjacent sites**

The site is bounded to the north and northwest by the River Tees, to the northeast by a large steel export terminal and to the south by various industrial developments in the Teesport Estate. To the west of the site is a tank farm owned by Sabic (previously Huntsman Chemical) which is used for the storage of various chemicals such as Benzene, Xylene, Paraxylene and Butadiene. There are a series of pipelines associated with the tank farm that run around the perimeter of the site.

### **D.1.4 Consultation with relevant bodies**

On October 1<sup>st</sup> 2006 the Environment Agency (EA) was made a statutory consultee for planning applications where flood risk is a key issue. The consultation requirement was introduced by Statutory Instrument 2006 No 2375: The Town and Country Planning (General Procedure Order) (Amendment) (No 2) (England) Order 2006. In December 2006, along with the introduction of PPS25, the Department for Communities and Local Government introduced The Town and Country Planning (Flooding) (England) Direction 2007, which introduces the new consultation arrangement.

Information provided by the EA, comprising predicted tidal high water levels for 1 in 200 years and 1 in 1000 year tidal events, has been used in this assessment.

Previous studies that have been considered as part of the FRA for the proposed renewable energy plant include the following:

- The Tees Valley Strategic Flood Risk Assessment (SFRA) which has recently been completed by JBA consulting. This document outlines the extent and severity of flood risk to the whole of the Tees Valley area.
- Recent work by the EA completed for the Tees Tidal Flood Risk Management Strategy. The study is being undertaken to define the existing flood risk for areas along the Tees Estuary up to the Tees Barrage.
- A Scoping Report for the Tees Catchment Flood Management Plan which has also been completed by the Environment Agency.
- A Flood Risk Assessment has been undertaken by Royal Haskonning Ltd. for the proposed development of the Northern Gateway Container Terminal at an adjacent site to the north east of the main dock at Teesport, also within the PD Ports Estate.

### **D.1.5 Potential sources of flooding**

The potential sources of flooding at the site comprise the following:

Tidal flooding from the River Tees;

The River Tees lies approximately 20 m to the north of the site. The tidal reach of the River stretches from the Tees Mouth estuary (approximately 5 km northeast of the site) to the Tess Barrage (approximately 8 km to the southwest of the site). The River is approximately 450 m wide at this location. The Teesport Dock is located approximately 250 m to the northwest of the site. As outlined by the EA indicative flood map (Annex A to Appendix D), the main potential threat from flooding is from Teesport Dock, rather than directly from the River. Flooding may potentially occur if there are tidal surge events or if further industrial development in the area increases runoff and hardstanding and decreases site levels.

Risk of flooding from culvert Blockage

The Kinkerdale Beck was culverted beneath the site in 1994. Currently, the beck bisects the centre of the site in a north-south direction. Previous records show that the culvert is constructed of a 1.2 m diameter concrete pipe. There have been no previous issues with flooding from blockage of the culvert. As part of the development works, the culverted section of the beck will be re-directed around the site boundary (see further discussion in Volume 1 of the project ES).

Site-related flooding (surface water runoff and sewers);

The proposed development will increase the area of hardstanding on site to approximately 14 ha. All site drainage will drain to the River Tees. However, quantities are likely to be small (e.g. from boiler blowdown and surface run-off) and will be discharged through existing drainage channels after passing through oil/sediment interceptors. All sewage will be discharged to a local water treatment plant.

Overland flow from adjacent sites;

As the site is surrounded by a large amount of industrial development, the majority of which is constructed on hardstanding, there is a small risk from flooding from adjacent sites.

The impacts that each may have on the site are discussed in detail in Sections D.2.3 – D.2.8.

## **D.2 FLOODING AND FLOOD RISK**

### **D.2.1 Historical flooding**

The EA Tees Tidal Flood Risk Strategy has provided a limited amount of data relating to historical flooding events in the Tees Estuary. Records of historical flooding along the River Tees date back to 1635.

- The 'St Hilda's Day Flood' in November 1771 destroyed bridges and property.
- The highest recorded flood level in Teesside (+4.0 m AOD) occurred in February 1953; an area of low pressure, in conjunction with north-westerly winds caused a large storm surge which produced some of the worst flooding in history along the

northeast coast. This resulted in flooding of properties at Port Clarence, and the Greatham Creek embankment was breached in places.

- In 1978 the northeast embankment of Greatham Creek breached during a tide level of 3.8 m AOD. Records also show that the southeast embankment was breached in 1983.
- Records show that the site has not experienced problems with flooding in the past greater than the 1 in 100 year return period. The recorded water level of 4.0 m AOD in 1953 represents approximately a 1 in 100 year return period event (1 per cent probability). However, it does show that the possibility of flooding in Teesport is present beyond the 1 in 200 year (0.5 per cent) return period, especially taking into consideration future predictions of sea level rise from climate change.

## D.2.2 Risk of tidal flooding

The River Tees is the primary source of flooding for the Teesport Estate. The River runs immediately to the north and northwest of the site boundary. The River is approximately 5 km from the estuary at this point and therefore the flood risk is entirely tidal. A range of return period tide levels for the mouth of the Tees are given below and are based on estimates given in the EA scoping report for the Tees Tidal Flood Risk Management Strategy (2002). Return periods have then been estimated for 2013 (estimated operational date of the plant) and 2038 (estimated date of decommissioning). At the advice of the Environment Agency, these return periods have been estimated using figures in Appendix B of PPS 25, rather than original figures quoted in the Tees Tidal Flood Risk Management Strategy.

**TABLE D.1**  
**FLOOD LEVELS FOR VARIOUS RETURN PERIODS AT TEESMOUTH**

<b>Tide Level (Return Period)</b>	<b>2002 (m AOD)</b>	<b>2013 (m AOD)</b>	<b>2038 (m AOD)</b>
1 in 100 (1%)	4.06	4.09	4.21
1 in 200 (0.5%)	4.19	4.22	4.34
1 in 1000 (0.1)	4.39	4.42	4.54

Appendix B of PPS 25 states that for the North East of England, sea levels are expected to rise by 2.5 mm/year until 2025 and then by 7.0 mm/year from 2025 until 2050. With an expected operational start date of 2013, and plant lifetime of 25 years, the expected net sea level rise for the life of the development is estimated as 121 mm.

The 1 in 200 year return period at Teesmouth at the date of project decommissioning is estimated at 4.54 m AOD, as shown by Table 1. The majority of the site is currently situated at approximately 5 m AOD, and is therefore likely to be above the 1 in 200 year tidal return period, taking into account climate change. In addition, the site is located some 5 km inland of the mouth of the Tees, (where the highest tide levels are expected). This is likely to offer further protection to the high tidal levels.

However, the site is not protected by any flood defences and recent guidance produced by the EA (Tees Estuary Flood Risk: November 2007 update) states the following development control advice to planners and developers:

*“Based on a 1 in 200 yr (0.5% probability) tidal level of 4.21 m AOD with additional allowance of 600mm freeboard (to account for wave height etc) and a sea level rise of 375 mm over the 60 year lifetime of the development gives recommended minimum floor levels for non-residential development of 5.185 m AOD”*

The proposed floor of the power station and wood chip storage area will be raised to 6 m AOD in order to compensate for rising sea levels and storm surge tides, to be in line with the minimum floor levels for non-residential development recommended by the latest Tees Estuary flood risk advice and to allow safe access to the power station. Raised floor levels will also ensure that electrical equipment is not at risk of water damage (fire hazard).

### **D.2.3 Risk of fluvial flooding**

As the development is so close to the River Tees, and relatively close to the Tees Estuary, the main source of flooding is likely to be tidal, and mainly dictated by surge tides. The tidal limit of the Tees stretches approximately 8 km up-river of the site to the Tees Barrage. Discussions with the EA confirm that they do not consider the impact of fluvial flows at this location to be an issue. The main freshwater input to the River Tees is at Low Moor, approximately 9 km southwest of the site. In addition, fluvial flows are regulated by the Tees barrage, which is operated to maintain upstream water levels and prevent the upstream penetration of saline water. Flows downstream of the barrage are therefore not a natural continuation of fluvial upstream flows. The closest fluvial watercourse to the site is the Kinkerdale Beck, which bisects the site in a south-north direction and discharges into the River Tees just outside the north-western site boundary. However, the beck is a small watercourse with minimal flow, and has been culverted beneath the site. Any risk from Kinkerdale Beck is therefore likely to be the result of a blockage of the culvert, rather than from direct fluvial influence.

An area approximately 700 m north of the site is also shown as being at in Flood Zone 3a by the EA indicative Floodplain Map for Teesport. The Risk of flooding is from several drainage ditches. However, these ditches will not be used for site drainage from the renewable energy plant, and they are considered a sufficient distance from the site so as not to impact the hydrological regime of the site. In addition, floor levels at the site will be raised to a higher level than the ditches, reducing flood risk to a very low level.

### **D.2.4 Waves**

Although the Tees Estuary is effected by offshore swell and locally generated waves, the development site is located far enough away from the estuary so as not to be affected. Previous modelling (outlined on the Royal Haskoning Teesport Flood Risk Assessment) has stated that there is no impact from swell or wind waves at Teesport.



## **D.2.5 Risk of overland surface water flooding from adjacent sites**

Land for the proposed development site is currently at 5 m AOD and will be raised and levelled as part of the development. Floor levels in both the west of the site (in the main power station area) and the east of the site (the wood chip storage area) will be raised to approximately 6.0 m AOD, which will ensure that floor levels are higher than the surrounding land. There are no steep banks or large changes in elevation surrounding the site. Therefore, the risk of overland surface water flooding from or to adjacent sites is considered negligible.

It has also become apparent that further developments in the Teesport Estate will also involve the raising of site levels, which will further protect the site from inundation from the Tees. For example, a new rail line terminal will be constructed approximately 1600 m northeast of the site adjacent to Dabholm Gut, to a level of over 6.5 m AOD, allowing a freeboard protection of approximately 2 m above the 1 in 200 year return period, taking into consideration climate change. The 'Northern Gateway Container Terminal' will also be constructed to the north and northeast of the site. This will consist of a 1000 m quay which will have a proposed deck level of 6.15 m AOD (allowing an approximate 1.65 m freeboard). This will offer further protection to the proposed power station development as it will provide an additional barrier between the Tees and the site.

## **D.2.6 Site generated surface water runoff and sewers**

At the time of this assessment, the development layout plan remains subject to change in the detailed design phase, therefore this runoff assessment is not definitive but should guide considerations at the detailed design stage.

The proposed Tees Renewable Energy Plant will increase the area of hard, impermeable surfacing by approximately 14 ha. Currently the site is covered in road planings with a small amount of vegetation, therefore, the development is expected to slightly increase the amount of surface water generated by the site as a whole. A new drainage system will be constructed for the power station development and for the solid fuel storage area. Where possible, swale ditches and other SUDS techniques will be incorporated into the drainage design.

The new drainage system will be designed and sized in accordance with current best practice to ensure that no flooding out of manholes results from storms of 1 in 30 year return period. In addition, the new drainage system will be simulated under a 1 in 100 year design storm to determine which parts of the drainage system are likely to flood in such a storm event. Road levels and building floor levels in these areas will be arranged in such a manner that essential buildings are not put at risk, and that there is no increased risk of flooding to existing parts of the site, or surrounding area.

An oil interceptor will be incorporated into the new drainage system upstream of the discharge to provide pollution control measures for the site runoff.

In the event of a fire, flames will be dowsed with water from storage tanks or by water from a fire ship which can be mobilized for any major fire on the Teesport Estate. Fire water will be collected in a storm drain which surrounds the site and then passed through oil interceptors/silt traps before being discharged to the River Tees. The entirety of the site will be contained within a bund with the purpose of containing fire water. As the water will be collected on site, it will not pose a flood risk to other

sites. In addition, a high intensity, short duration period of runoff into the River Tees would be unlikely to cause an additional flood risk, as the river at this location is relatively insensitive to runoff.

### **D.2.7 Climate change**

The impact of the possible effects of climate change on flood risk in Teesside are complex. For the UK, projections of future climate change indicate that more frequent short-duration, high-intensity rainfall and more frequent periods of long-duration rainfall could be expected. Rising sea levels, and hence peak tide levels, will result in an increase in flood risk in those areas identified as being at risk of tidal flooding. In addition, it has been noted by PPS25 that annual rainfall in England and Wales is expected to increase by up to 10 per cent by the year 2050, however, seasonal variations could become wetter by as much as 20 per cent. This issue affects the overall catchment from both coastal and fluvial sources. Specific issues, with regard to the proposed development of the Power Station are as follows:

- It is estimated that the lifetime of the plant will be 25 years. Based on the recommended contingency allowances for net sea level rise for the North East of England (Appendix B of PPS 25). The expected total net sea level rise is expected to be 121 mm. Vertical movement of the land is also calculated into the estimated rise. Floor levels at the site will be constructed to 6 m AOD to mitigate against climate change and allow protection from rising sea levels over the entire life of the plant. These raised floor levels will provide 1.61 m of freeboard allowance above extreme water levels. This is in line with PPS 25, which recommends a nominal freeboard of 600 mm.
- The River Tees, in the vicinity of the site, is very insensitive to increase in run-off rate because the upstream rural catchment floods first. The tidal and fluvial areas of the Tees are essentially separated by the Tees Barrage and the urban areas around Teesport are relatively flat. Therefore we would not expect that the increased rate of run-off, due to increased rainfall from climate change, will be an issue.
- It is also likely that the EA will receive funding to allow them to assess the risks faced over the next 25 years and consequently provide an adequate standard of protection and create flood defences if necessary. It is therefore anticipated that this policy position will be maintained for the lifetime of the development.

In this way we can conclude that it appears reasonable to assume that the development will be safe for its design lifetime.

### **D.2.8 Flood warning**

There is no residential development planned for the site, although some parts of the power station will be manned 24 hours a day. The statutory responsibility for issuing flood warnings now lies with the Environment Agency, although actions should also be taken by police and Borough Council staff on the receipt of flood warnings and during a flood event. Warnings are issued using television, local radio broadcasts and loudspeaker vans and, in addition, the Agency operate an automatic flood warning system by which warning messages are telephoned to properties considered to be at

significant risk of flooding. A flood warning procedure is already in place for the Teesport Estate, to ensure those present have enough time to vacate the site should a significant flood risk occur. This procedure will also apply to the proposed power station.

### **D.2.9 Safe access to and from the site**

The site is currently at c.5 m AOD which offers protection against the 1 in 200 year return period. Floor levels at the site will be raised to 6 m AOD giving further protection to site workers. The main access road is above the 1 in 200 year tidal flood level and the 1 in 1000 year tidal flood level, taking into account sea level rise due to climate change over the life of the plant. Therefore, it is expected that safe access to the site will be possible, even in times of flooding. The raising of floor levels above those recommended by the EA (5.185 m) will ensure that all electrical equipment will remain well above the 1 in 200 year tidal return period, taking into account climate change. This will allow any necessary evacuation of the site to be conducted in a safe manner.

In addition, the main area of the site situated in Flood Zone 3a will be developed as a storage area for wood chip solid fuel. This will be an area enclosed on three sides by a 5 to 10 m retaining wall. The wood storage area will not be manned on a 24 hour basis and the building will not contain electrical equipment. In addition, floor levels will be raised with a reinforced concrete platform to the same level as the main power station (6.0 m AOD). Therefore, safe access to and from the area will be available at all times.

Advance warnings will be provided by the EA and other local services in the event of an extreme tidal flood that could overtop the banks of the Tees. It is also noted that there is currently a flood warning system in operation for part of the Teesport estate occupied by the Corus Steelworks. Safe ground is available nearby and safe evacuation of the site can be made such that the risk to human life at the site, in the event of an extreme tidal event, is managed, reducing it to a low residual level.

## **D.3 THE SEQUENTIAL TEST AND EXCEPTION TEST**

### **D.3.1 The sequential test**

#### **D.3.1.1 Introduction**

The EA state that a sequential risk-based approach to determining the suitability of land for development in flood risk areas is central to PPS 25 and should be applied at all levels of the planning process.

The purpose of the Sequential Test is to steer new development towards areas with the lowest probability of flooding. Ideally this would be areas classified as Flood Zone 1. When approving land for development in flood risk areas, Local Authorities are expected to demonstrate that there are no suitable alternative development sites located in lower flood risk areas. A sequential test is used to prioritize sites in order of probability to flood risk and their acceptability in terms of allocation for development.

The Sequential Test should be applied to all developments which are considered at risk from flooding to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed.

### D.3.1.2 Site selection

MGT has considered several sites for the development of the Tees Renewable Energy Plant before settling on the preferred site at Teesport. The following criteria were addressed when selecting suitable sites;

- The site must be in close proximity to a deep water jetty or deep water harbour capable of accommodating Panamax size vessels (i.e. 14 m draft).
- Facilities must already be in place to accommodate the transfer of wood fuel from the ships to the development site.
- Sufficient electrical transmission capacity (approximately 400 kV connection) must be available to connect the renewable energy plant to the electricity transmission system.
- A large area of land must be available for a long period (approximately 25 years) of lease.
- The plant should ideally be situated in an already heavily industrialized area, so as to not detrimentally affect the surrounding landscape.
- Suitable access to the site via road, rail and sea are required for the import of large items of plant, raw materials (woodchip) and the export of ash.

Biomass power stations requiring large quantities of imported fuels are best located on the coast within existing port developments, preferably on land that is readily available for development. This minimizes the need for further port development or modifications. Previous biomass projects have tended to be sited within or close to forest supplies of biomass. Road congestion means that these projects are often constrained by small deliveries of woodchip, meaning that they are relatively small scale and have a low thermal efficiency. By siting the plant at Teesport, MGT are able to access global trades of biomass delivered by a large, efficient fleet of ships, improving plant efficiency and significantly reducing the impact on the road network.

There are a limited number of locations within the UK where such facilities exist. In addition, the necessity to locate the development within a deepwater port means that there are very few locations which are completely free from flooding (i.e. entirely within Flood Zone 1). Other sites selected for development included the following:

- Hunterston Port, West Central Scotland
- Immingham Port, Humberside
- Kingsnorth, South East England
- Canvey Island, River Thames.

However, none of the above locations had the necessary infrastructure required for such a large scale development. In addition, facilities at Canvey Island and Kingsnorth are situated in Flood Zone 3a.

Data for flood zoning in Hunterston Port is not available, although as the development was to be situated on a small strip of reclaimed land within a tidal estuary, the risk of flooding is not considered to be less than at Teesport.

The large amount of previously developed land in the Teesport Estate was also considered a major benefit to the project as the development can be supported with minimal impact to the surrounding environment in terms of ecology, landscape and visual impact.

The sustainable aspects of the project are therefore considered to outweigh the potential risk of flooding, especially if mitigation measures are applied which do not increase the risk of flooding to adjacent sites.

A Scoping Report for the Tidal Tees Flood Risk Management Strategy has been compiled by the Environment Agency, dated March 2005. In this document, the proposed site is not considered to lie within a designated 'Flood Cell' the document also states that land above 4.39 m AOD is not considered at risk from flooding for the 1 in 200 year event.

Notwithstanding the above, the development is shown partly to lie within Flood Zone 3. The type of development proposed would be classified as 'Essential Infrastructure'; (power generation) and an Exception Test is required.

### **D.3.2 The exception test**

Where departures from the Sequential Test are justified by the need to locate development in medium or higher risk zones or in order to meet the wider aims of sustainable development, it is necessary to apply the Exception Test. The test provides a method of managing flood risk while allowing necessary development to occur.

For the Exception Test to be passed, it must be demonstrated that:

1. The development provides wider sustainability benefits to the community that outweigh the flood risk;
2. The development should be preferably on developable, previously-developed land; and
3. A Flood Risk Assessment demonstrates that the development will be safe, without increasing flood risk elsewhere, and , where possible, will reduce risk overall.

Recently, Britain has seen a growing concern for anthropogenic climate change caused by carbon dioxide (CO<sub>2</sub>) emissions. Since power generation has traditionally relied on the combustion of fossil fuels, there is an increasing pressure on this sector to contribute to sustainable development by supplying more environmentally sound alternatives.

The proposed development will provide 300 MW of power at rated site conditions. The electricity will feed into the national grid and will provide year round, reliable electricity generation from a clean, sustainable source. The constant supply of 300 MW power at over 90% load factor is in comparison

to e.g. wind and solar power which provide a much smaller generation capacity and are entirely dependent on weather conditions.

The wood chip which will form the fuel source for the plant under normal operation will be independently certified to the highest levels of sustainable growth, harvesting and transportation. Wood chip fuel is classified as a renewable energy source in both EU and UK legislation as it is derived from plant matter. Although a simplified description of a process with many and complex variables, the CO<sub>2</sub> emitted when the wood is burnt is offset by CO<sub>2</sub> absorbed during new tree growth. Therefore, if trees are grown in a truly sustainable manner, there will be minimal net emissions of CO<sub>2</sub> from the combustion of the wood.

The Tees Renewable Energy Plant will therefore assist the UK government national and international commitments on climate change and sustainable development, in particular Planning Policy Statement 1 (PPS 1) 'Delivering Sustainable Development' (2005).

This MGT application would also be built on land which is considered brownfield, as it was previously re-claimed from the River Tees and developed as an oil storage field, and later as a storage area for steel pipes. The northeast of the site has also been used previously as a steel export terminal, which will be decommissioned and re-developed as a solid fuel storage area associated with the plant.

As the development is to be located on previously developed land in an already heavily industrialized area, it can be supported with minimal impact upon the surrounding environment. There is no requirement to build additional road or rail links because suitable access to the Teesport Estate already exists. The close proximity of the site to a deepwater port means that there are no requirements for large deliveries of raw product via the existing east coast road network.

Although the site will increase the amount of impermeable hardstanding and therefore the amount of runoff, a large proportion of the site is currently covered by road planings or hardstanding, with very little vegetation. Therefore the hydrological regime is unlikely to be altered dramatically. In addition, all site runoff will flow into an appropriate drainage system.

The main method of mitigation against flood risk at the site will be the raising of floor levels. The Tees Valley Strategic Flood Risk Assessment states that if the flood risk to the site is tidal, then land raising is unlikely to increase tidal flood levels and compensatory flood storage is not required, unlike fluvial risk of flooding. The development would therefore not increase the risk of flooding either on the site or elsewhere.

## **D.4 CONCLUSIONS**

The proposed development comprises electricity generation infrastructure; fuelled by a sustainable and environmentally sound fuel. Sustainable electricity generation is much needed in the current political situation surrounding climate change and global warming brought about largely through the burning of fossil fuels. The proposed location is on brownfield land which is situated in an already heavily industrialized area. Other sites have been considered for development, but the transport links, deep harbour and electricity transmission capacity of Teesport are considered to represent the most favourable option for development.

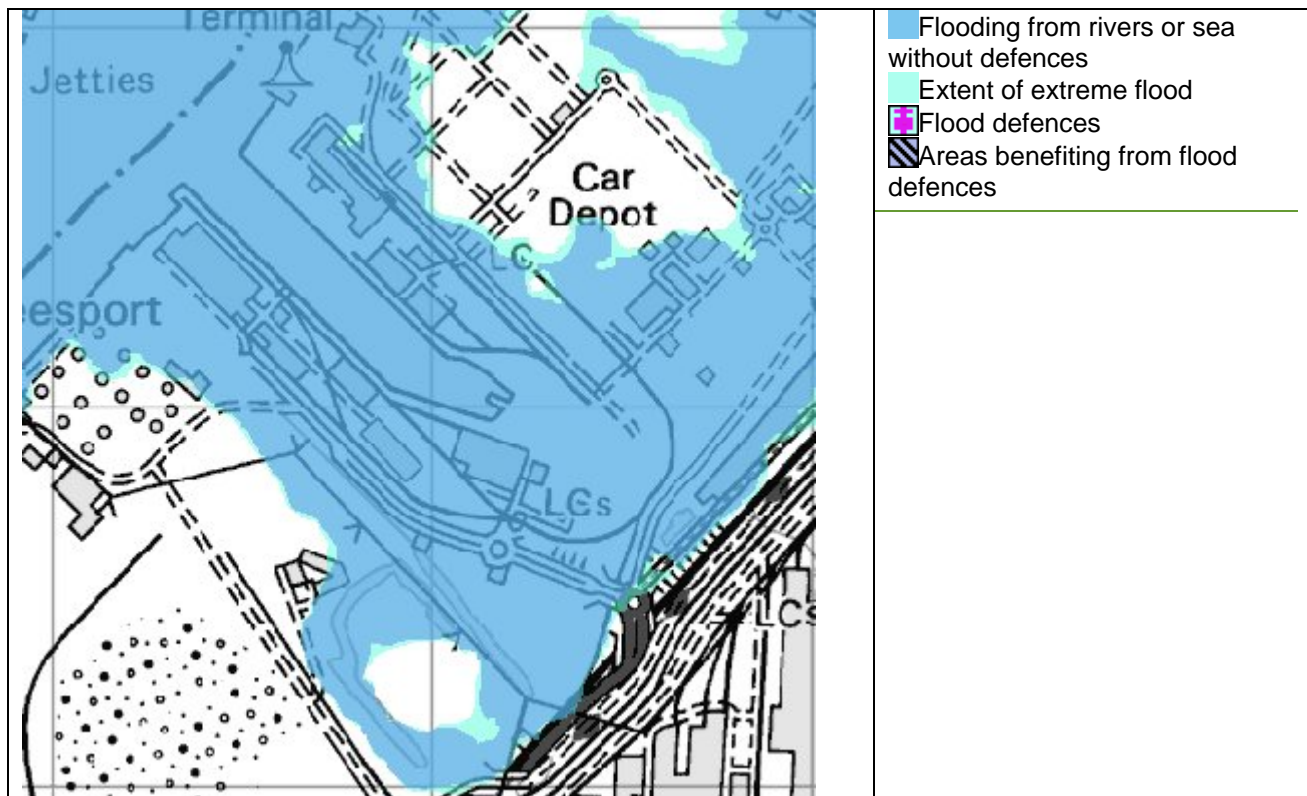
A sequential test has been applied to justify site selection above other locations in Flood Zone 1 areas. The development is also considered to meet the requirements to pass the Exception Test.

The Flood Risk Assessment has considered the various types of flooding that could result at this site. Conclusions are as follows:

- The site is currently situated at 5 m AOD. A level of 4.39 m is considered to meet the 1 in 200 (0.5%) return period for the Tidal Tees, taking into account sea level rise due to climate change. 5.185 m is considered an adequate floor level to protect a non-residential development from the 1 in 200 year return period, taking into consideration sea level rise. Floor levels across the site will be constructed at 6 m AOD to ensure this return period is met for the entire life of the project. These raised floor levels will provide 1.61 m of freeboard allowance above extreme water levels. This is in line with PPS 25, which recommends a nominal freeboard of 600 mm.
- The main area shown to be at risk from tidal flooding on the Environment Agency Flood Map will be developed as a storage area for wood chip. This area will not be manned 24 hours a day and will have floor levels raised to 6 m AOD.
- The risk of overland flooding from neighbouring sites is also considered small as the Teesport Estate is relatively flat and the power station will have raised floors above those of neighbouring developments. In addition, the majority of the Teesport Estate to the south and east of the proposed development site is shown by the EA indicative floodplain map as not at risk from flooding. The construction of a new rail terminal with floor levels above 6.5 m AOD will offer further protection to the site.
- A new surface water drainage system will be provided for the proposed development that will include a storm bypass tank to mitigate for the increased amount of surface water runoff generated by the site. The drainage system will also include an oil separator to provide pollution control for the site generated runoff. It is proposed that the new surface water drainage system will incorporate SUDS techniques wherever possible.
- Raising of floor levels is considered an acceptable mitigation method for sites at risk of tidal flooding as it would not result in the loss of floodplain storage. Therefore, the development would not increase the risk of flooding across the site or surrounding area. A flood warning system is already in place and will be adopted for the proposed development.

**ANNEX A TO APPENDIX D**  
**ENVIRONMENT AGENCY INDICATIVE FLOODPLAIN MAP**  
**(1 page)**



**A. ENVIRONMENT AGENCY INDICATIVE FLOODPLAIN MAP**

**E. BASELINE NOISE REPORT  
(26 pages)**

## **E. BASELINE NOISE REPORT**

### **INTRODUCTION**

#### **E.1 Background**

Parsons Brinkerhoff has been commissioned to conduct an Environmental Impact Assessment of the proposed Tees Renewable Energy Plant (Tees REP).

As part of the assessment, and in order to build a picture of how the new facility will affect the noise climate in the area, PB has undertaken a baseline noise survey to quantify the existing noise levels at the nearest noise sensitive receptors. This report details the approach and the findings.

#### **E.2 Site Description**

The site proposed for the biomass facility is on the South East bank of the river Tees in the Redcar/Cleveland administrative region. At this point the river Tees flows from the South West towards the North East.

The site is surrounded by industrial activities. Immediately South East of the site (moving further from the river) is the Corus Steel works.

Residential areas in the vicinity that may be affected by any potential change in the noise climate are:

- Redcar Town Centre
- Dormans Town
- Grange Town
- South Bank

There are several major roads in close proximity to the site which contribute to the ambient noise level along with the existing industrial activity.

#### **E.3 Legislative Guidance**

The guidance on the assessment of noise within PPG 24[1] has been adhered too. PPG 24 outlines the key considerations to be taken into account when assessing the impact of a new development on the local noise climate.

The method detailed in BS 7445-1:2003 [2] and BS 7445-3:1991[3], were followed during the surveys undertaken. BS 7445 defines and prescribes best practice during the recording and reporting of environmental noise. It is inherently applied in all instances when making environmental noise measurements.

## METHODOLOGY

### E.4 General

A noise survey has been conducted to quantify the existing ambient noise levels in the vicinity of the proposed site. A short term sampling method (spot measurements) was undertaken at the nearest Noise Sensitive Receptors (NSR's) to the proposed site. Measurements were taken during the daytime, evening and night-time periods.

A glossary of acoustics terminology is provided in Annex A to Appendix E.

### E.5 Noise Sensitive Receptors

The following locations have been identified as potential NSR's, representative of the nearest locations that could be affected by the proposed scheme:

- L1** Henry Street, South Bank, TS6 6PL
- L2** Normanby Road, Southbank, TS6 6SP
- L3** Elgin Avenue, Southbank, TS6 6TP
- L4** Bolkow Road, Grangetown, TS6 7EJ
- L5** West Coatham Lane, Dormantown, TS10 5QD
- L6** Tod Point Road, Redcar, TS10 5EB

Exact measurement locations and coordinates are presented in Annex B to Appendix E.

### E.6 Background Monitoring

All noise monitoring was conducted in accordance with the guidance set out in BS 7445:2003. Measurements were made using Class 1 Integrating-Averaging Sound Level Meters as defined in IEC 61672:2003[4]. Meters were calibrated and checked before and after each measurement period, with no change in level noted. The calibration certificates for the meters used are provided in Annex C to Appendix E, which also shows the serial numbers of all the equipment used. Microphones were placed 1.2 - 1.5m above the ground, and at least 1.5m from any acoustically reflective surface. Meters were set to a fast response time for all measurements.

Measurements took place on a typical weekday: 23rd April 2008. Weather conditions were conducive to successful monitoring; with wind speeds less than 1ms<sup>-1</sup>. Roads were dry, and there was no rain at the time of measurement. The ambient temperature was between 12 and 14°C during the daytime, reducing to 7°C during the night-time period.

The site engineers were Philip Jordan (AMIOA) and Chris Borak of PB.

## SURVEYS UNDERTAKEN

### E.7 Spot Measurements

Measurements were taken at the monitoring locations listed as NSR's. The measurement sampling time for each of the periods was as follows:

- Daytime (1100 – 1700) – 15 Minutes
- Evening (1900 – 2300) - 10 Minutes
- Night-time (0200 – 0500) – 5 Minutes

Two sets of measurements were taken during the night time period.

The following statistical parameters were recorded in third octave bands,  $L_{A10}$ ,  $L_{A90}$ ,  $L_{Amax}$ ,  $L_{Amin}$ ,  $L_{Aeq}$ .

## BASELINE RESULTS

### E.8 Noise Sensitive Receptors

The full set of results for the spot measurements are shown in the Noise Monitoring Forms in Annex D to Appendix E. A summary of the lowest measurements taken at each of the locations are presented in Table 1.

Measurement	Daytime		Evening		Night-time	
Location	$L_{Aeq}$ (dBA)	$L_{A90}$ (dBA)	$L_{Aeq}$ (dBA)	$L_{A90}$ (dBA)	$L_{Aeq}$ (dBA)	$L_{A90}$ (dBA)
L1	53.9	49.3	49.5	44.4	42.6	37.9
L2	62.4	53.0	61.3	45.0	43.8	33.3
L3	66.7	60.0	60.7	52.9	47.5	37.2
L4	54.7	48.6	54.8	48.7	45.1	37.3
L5	56.3	45.1	52.7	48.8	46.6	44.4
L6	49.9	38.3	49.4	39.4	42.4	39.1

Table 1: Summary of Spot Measurements

Road traffic noise from A66/A1053/Trunk Road road network was the dominant contributor to the background noise level in locations 1 to 5 during the day and evening periods.

Location 6 was the only exception, with activity from the nearby recycling plant dominating the noise climate during the day and a low frequency industrial hum of indefinable direction dominating during the evening.

Industrial Noise dominated the noise climate across locations 1, 2, 4, 5 & 6 throughout the night. Individual noise sources could not be quantified as the direction of the low frequency noise encountered was indeterminate and the character of the sound not attributable to any specific type of activity that could be identified.

At location 3 the A66 remained present as the dominant noise source all night. Traffic did become less regular late at night, however, individual cars could be heard for a long time as they approached and receded.

## REFERENCES

1. **PPG 24: September 1994 “*Planning Policy Guidance: Planning and Noise*”, Department of the Environment**
2. BS 7445-1: 2003 “*Description and Measurement of Environmental Noise: Guide to quantities and procedures*”, BSI
3. **BS 7445-3: 1991 “*Description and Measurement of Environmental Noise: Guide to application to noise limits*”, BSI**
4. **IEC 61672:2003 “*Electroacoustics - sound level meters*”, BSI**

**ANNEX A TO APPENDIX E**  
**GLOSSARY OF ACOUSTICS TERMINOLOGY**

## GLOSSARY OF ACOUSTICS TERMINOLOGY

**Decibel (dB)** The decibel scale is used in relation to sound because it is a logarithmic rather than a linear scale. The decibel scale compares the level of a sound relative to another. The human ear can detect a wide range of sound pressures, typically between  $2 \times 10^{-5}$  and 200 Pa, so the logarithmic scale is used to quantify these levels using a more manageable range of values.

**Sound Pressure Level (SPL)** The Sound Pressure Level has units of decibels, and compares the level of a sound to the smallest sound pressure generally perceptible by the human ear, or the reference pressure. It is defined as follows:

$$\text{SPL (dB)} = 20 \log_{10}(P/P_{\text{ref}}) \quad \text{where } P = \text{Sound Pressure (in Pa)}$$

$$P_{\text{ref}} = \text{Reference Pressure } 2 \times 10^{-5} \text{ Pa}$$

An SPL of 0dB suggests the Sound Pressure is equal to the reference pressure. This is known as the *threshold of hearing*.

An SPL of 140dB represents the *threshold of pain*.

**Loudness** The loudness of a sound is subjective, and differs from person to person. The human ear perceives loudness in a logarithmic fashion, hence the suitability of the decibel scale. Generally, a perceived doubling or halving of loudness will correspond to an increase or decrease in SPL of 10dB. Note that a doubling of sound energy corresponds to an increase in SPL of only 3dB.

**A-Weighting** The human ear can detect a wide range of frequencies, from 20Hz to 20kHz, but it is more sensitive to some frequencies than others. Generally, the ear is most sensitive to frequencies in the range 1 to 4 kHz. The A-weighting is a filter that can be applied to measured results at varying frequencies, to mimic the frequency response of the human ear, and therefore better represent the likely perceived loudness of the sound. SPL readings with the A-weighting applied are represented in dB(A).



Equivalent Continuous Level ( $L_{eq,T}$ )	<p>The Equivalent Continuous Level represents a theoretical continuous sound, over a stated time period, <math>T</math>, which contains the same amount of energy as a number of sound events occurring within that time, or a source that fluctuates in level.</p> <p>For example, a noise source with an SPL of 80 dB(A) operating for two hours during an eight-hour working day, has an equivalent A-weighted continuous level over eight hours of 74 dB, or <math>L_{Aeq,8hrs} = 74</math> dB.</p> <p>The time period over which the <math>L_{eq}</math> is calculated should always be stated.</p>
Maximum Sound Level ( $L_{max}$ )	The maximum sound level, $L_{max}$ (or $L_{Amax}$ if A-weighted) is the highest SPL that occurs during a given event or time period.
Minimum Sound Level ( $L_{min}$ )	Similarly, the minimum sound level, $L_{min}$ (or $L_{Amin}$ if A-weighted) is the lowest SPL that occurs during a given event or time period.
$L_{90}$ or $L_{A90}$ and other percentile measures	This represents the SPL which is exceeded 90% of the time, expressed in dB or dB(A). $L_{A90}$ is used to quantify background noise levels (see below). Other percentiles exist and are used for various types of noise assessment. These include $L_{01}$ , $L_{10}$ , $L_{50}$ , $L_{99}$ .
Noise	A noise can be described as an unwanted sound. Noise can cause nuisance.
Ambient Noise	The totally encompassing sound in a given situation, at a given time, including noises from any source in any direction.
Background Noise	This is defined as the $L_{A90}$ of the residual noise.
Noise Sensitive Receptors (NSR's)	Any identified receptor likely to be affected by noise. These are generally human receptors, which may include residential dwellings, work places, schools, hospitals, and recreational spaces.
Octave	In reference to the frequency of a sound, an octave describes the difference between a given frequency and that which is double that frequency, e.g. 125Hz to 500Hz, or 4kHz to 8kHz.
Octave/Third Octave Bands	A sound made up of more than one frequency can be described using a frequency spectrum, which shows the relative magnitude of the different frequencies within it. The possible range of frequencies is continuous, but can be split up into discrete bands, often an octave or third-octave in width. Each octave band is referred to by its centre frequency, generally 63Hz, 125Hz, 250Hz, 500Hz, 1kHz etc.

**ANNEX B TO APPENDIX E**  
**MEASUREMENT LOCATIONS AND MAP**







Receptor	Address	Latitude (°)	Longitude (°)
Location 1	The Albion Social Club, Henry Street, South Bank, TS6 6PL	54.579930	-1.173305
Location 2	St. Peters Social Club, Normanby Road, Southbank, TS6 6SP	54.574375	-1.170345
Location 3	A66 roundabout, Elgin Avenue, Southbank, TS6 6TP	54.577340	-1.158000
Location 4	131, Bolckow Road, Grangetown, TS6 7EJ	54.580065	-1.146627
Location 5	Behind No 120, West Coatham Lane, Dormantown, TS10 5QD	54.605302	-1.105528
Location 6	Marsh Farm House, Tod Point Road, Redcar, TS10 5EB	54.617157	-1.103480

**ANNEX C TO APPENDIX E  
CALIBRATION CERTIFICATES**



## CERTIFICATE OF CALIBRATION

**Certificate Number** CAL010816  
**Date of Issue** 31<sup>st</sup> January 2008  
**Customer** Parson Brinkerhoff

### Description of Instrument

**Calibrator** Rion NC-74 [Serial No.35173440]  
with 1/2" adaptor type NC-74-002 fitted.

**Date of Calibration** 30/01/2008.

**Test Procedure** ANV/CAL/SLM/003  
Calibration Results currently at Issue 1  
Test procedures in accordance with BS EN 60942: 2003 (Annex B)

**Test Engineer** Chazz Gill

APPROVED SIGNATORY .....  
Les Jephson ☒ / Mike Breslin ☐

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# CERTIFICATE OF CALIBRATION



CERTIFICATE NO. CAL010816  
DATE OF ISSUE 31/01/2008.

## Results

The sound pressure level generated in its half inch configuration was measured using a Rion UC-53A microphone with its protective grid in position.

The environmental conditions at the start and end of the calibration were within the specified range for calibration and were noted to be as follows:

Conditions	Measured Value at Start	Measured Value at End
Atmospheric Pressure	101.7 kPa	101.7 kPa
Temperature	24.3 °C	24.8 °C
Relative Humidity	30.4 %	30.1 %

The mean level of the calibrator output was **94.08 ± 0.32dB**.

The fundamental frequency of the sound output was **1002.6Hz 0.3 %** and its total distortion was **1.59 ± 0.02%**.

The Sound Calibrator has been shown to conform to the Class 1 requirements for periodic testing, described in Annex B of IEC 60942: 2003 for the sound pressure level and frequency stated, for the environmental conditions under which the tests were performed. However, as public evidence was not available, from a testing organisation responsible for pattern approval, to demonstrate that the model of sound calibrator conformed to the requirements for pattern evaluation described in Annex A of IEC 60942: 2003, no general statement or conclusion can be made about conformance of the Sound Calibrator to the requirements of IEC 60942: 2003.

The total expanded measurement uncertainties associated with the calibration equipment and procedures is based on a standard uncertainty multiplied by a coverage factor  $k=2$  to provide a confidence of approximately 95% in the results. The assessment of uncertainty has been carried out in accordance with national and international guidance upon the calculation of uncertainties in metrology.

## Notes

1. The manufacturer states that the instrument compensates for the effects of atmospheric pressure (96 – 106 kPa ± 0.03 dB).
2. The Sound Calibrator has not been adjusted.



## CERTIFICATE OF CALIBRATION

**Certificate Number** CAL040803  
**Date of Issue** 02/04/2008  
**Customer** Parsons Brinckerhoff Ltd

### Description of Instrument

**Calibrator** Rion NC-74 [Serial No. 01020510]  
With ½" adaptor type NC-74-002 fitted.

**Date of Calibration** 02/04/2008.

**Test Procedure** ANV/CAL/SLM/003  
Calibration Results currently at Issue 1  
Test procedures in accordance with BS EN 60942: 2003 (Annex B)

**Test Engineer** Amrat Patel

APPROVED SIGNATORY .....

Les Jephson ☐ / Mike Breslin ☒

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# CERTIFICATE OF CALIBRATION



CERTIFICATE NO. CAL040803.  
DATE OF ISSUE 02/04/2008.

## Results

The sound pressure level generated in its half inch configuration was measured using a Rion UC-53A microphone with its protective grid in position.

The environmental conditions at the start and end of the calibration were within the specified range for calibration and were noted to be as follows:

Conditions	Measured Value at Start	Measured Value at End
Atmospheric Pressure	101.4 kPa	101.4 kPa
Temperature	21.5 °C	21.7 °C
Relative Humidity	35.0 %	34.8 %

The mean level of the calibrator output was **93.97 ± 0.29 dB**.

The fundamental frequency of the sound output was **1001.1 Hz ± 0.1%** and its total distortion was **1.22 ± 0.02%**.

The Sound Calibrator has been shown to conform to the Class 1 requirements for periodic testing, described in Annex B of IEC 60942: 2003 for the sound pressure level and frequency stated, for the environmental conditions under which the tests were performed. However, as public evidence was not available, from a testing organisation responsible for pattern approval, to demonstrate that the model of sound calibrator conformed to the requirements for pattern evaluation described in Annex A of IEC 60942: 2003, no general statement or conclusion can be made about conformance of the Sound Calibrator to the requirements of IEC 60942: 2003.

The total expanded measurement uncertainties associated with the calibration equipment and procedures is based on a standard uncertainty multiplied by a coverage factor  $k=2$  to provide a confidence of approximately 95% in the results. The assessment of uncertainty has been carried out in accordance with national and international guidance upon the calculation of uncertainties in metrology.

## Notes

1. The manufacturer states that the instrument compensates for the effects of atmospheric pressure (96 – 106 kPa ± 0.03 dB).
2. The Sound Calibrator has not been adjusted



## CERTIFICATE OF CALIBRATION

**Certificate Number** CAL010817  
**Date of Issue** 31<sup>st</sup> January 2008  
**Customer** Parson Brinkerhoff

### Description of Instrument Including Manufacturer / Supplier

**Sound Level Meter** Rion NA-28 Sound Level Analyser [Serial No. 01070573] with Rion NH-23 preamplifier [Serial No. 70589] and Rion UC-59 Microphone [Serial No. 00367] fitted with a WS-10 foam windshield.

The instrument conforms to Class 1 of BS EN 61672-1:2003

The instrument was running Version 1.60 Firmware

**Associated Calibrator** Rion NC-74 [Serial No. 35173440] with ½" adaptor type NC-74-002 fitted. This calibrator was calibrated by ANV Measurement Systems on 30/01/2008 [Certificate No. CAL010816]

**Date of Calibration** 30/01/2008.

**Test Procedure** ANV/CAL/SLM/001  
Calibration Results currently at Issue 2  
Test procedures in accordance with BS EN 61672-3:2006  
NOTE: Test 10.1 (Self Generated Noise with Microphone Installed) omitted.

**Test Engineer** Andy Jones

APPROVED SIGNATORY .....  
Les Jephson ☒ / Mike Breslin ☐

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# CERTIFICATE OF CALIBRATION



**CERTIFICATE NO.** CAL010817  
**DATE OF ISSUE** 31/01 /2008.

Information relating to the operation and adjustment of the sound level meter were obtained from the data contained in the Rion Instruction Manual 50490 and associated Technical Notes 50860. Additional information relating to measurement uncertainties required by clause 11.3 has been provided by the Rion European Office and is available for inspection upon request.

## Results

Tests on the Sound Level Meter were principally performed on the Main Channel. Limited tests were also performed using the Sub-Channel.

When the Acoustic Calibrator supplied with the instrument was applied the Sound Level Meter initially read 94.0dB (A). No adjustment was made to the meter.

The environmental conditions at the start and end of the calibration were within the specified range for calibration and were noted to be as follows:

Conditions	Measured Value at Start	Measured Value at End
Atmospheric Pressure	101.8 kPa	101.7 kPa
Temperature	23.7 °C	23.8 °C
Relative Humidity	33.1 %	30.5 %

The self generated noise levels of the instrument with the microphone replaced by the electrical input device were as follows:

11.1 dB(A);  
14.0 dB(C); and  
21.2 dB(Z).

These measured levels were within the specified limits defined within the instruction manual.

The sound level meter submitted for testing has successfully completed the Class 1 Periodic tests of BS EN 61672, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about the conformance of the sound level meter to the full requirements of BS EN 61672-1:2003 because evidence was not publically available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements of BS EN 61672-1:2003 and because the periodic tests of BS EN 61672-3:2006 only cover a limited subset of the specifications in BS EN 61672-1:2003.

No information on the uncertainty of measurement, required by 11.7 of IEC 61672-3:2006, of the adjustment data given in the instruction manual or obtained from the manufacturer of the Sound Level Meter, or the manufacturer of the Microphone, or the manufacturer of the multi-frequency Sound Calibrator was published in the instruction manual or made available by the manufacturer or supplier. The uncertainty of measurement of the adjustment data has therefore been assumed to be numerically zero for the purpose of this periodic test. If these uncertainties are not actually zero, there is a possibility that the frequency response of the Sound Level Meter may not conform to the requirements of IEC 61672-1:2002.

# CERTIFICATE OF CALIBRATION



**CERTIFICATE No.** CAL010817  
**DATE OF ISSUE** 31/01 /2008.

No information on the uncertainty of measurement, required by 11.7 of IEC 61672-3:2006, of the adjustment data given in the instruction manual or obtained from the manufacturer of the Sound Level Meter, or the manufacturer of the Microphone, or the manufacturer of the multi-frequency Sound Calibrator was published in the instruction manual or made available by the manufacturer or supplier. The uncertainty of measurement of the adjustment data has therefore been assumed to be numerically zero for the purpose of this periodic test. If these uncertainties are not actually zero, there is a possibility that the frequency response of the Sound Level Meter may not conform to the requirements of IEC 61672-1:2002.

The total expanded measurement uncertainties associated with the calibration equipment and procedures is based on a standard uncertainty multiplied by a coverage factor  $k=2$  to provide a confidence of approximately 95% in the results. The assessment of uncertainty has been carried out in accordance with national and international guidance upon the calculation of uncertainties in metrology.

## Notes

1. The wind screen correction on the instrument was set to *on* and the diffuse field correction set to *off* for the duration of the calibration.
2. The tests were conducted principally on the main channel, with a limited number of tests conducted for the sub channel. The Peak C sound level measurements were carried out for the sub channel as they are only available on this channel.



## CERTIFICATE OF CALIBRATION

**Certificate Number** CAL020631  
**Date of Issue** 27 February 2006  
**Customer** Parsns Brinkerhoff Limited

	<b>Manufacturer</b>	<b>Type</b>	<b>Serial Number</b>
<b>Sound Level Meter</b>	Rion	NA-27	00621817
<b>Pre Amplifier</b>	Rion	NH-20	25517
<b>Microphone</b>	Rion	UC-53A	102652

**This equipment has been calibrated and tested for compliance with Manufacturer's Performance Specifications.**

### Notes

Conditions	Measured Value
Atmospheric Pressure	100.8 kPa
Temperature	21.3 °C
Relative Humidity	31.3 %

ANV Measurement Systems' Calibration Laboratory electroacoustic test equipment is fully traceable to national standards. Additional electronic and ancillary equipment used in the procedures has been calibrated to a certified degree of accuracy that ensures that any additional uncertainties are minimal.

Tests were carried out in controlled environmental conditions to the extent that extraneous environmental factors will have had no substantial effect on the measured parameters in comparison to the tolerances required to unequivocally determine compliance with the manufacturer's specifications.

The total expanded measurement uncertainties associated with the calibration equipment and procedures provide a confidence of approximately 95% in the results. The assessment of uncertainty has been carried out in accordance with national and international guidance upon the calculation of uncertainties in metrology.

ANV Measurement Systems recommended calibration interval is 12 months.

Signed.....

Position.....DIRECTOR.....

Date.....27/2/06.....

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**ANNEX D TO APPENDIX E**  
**NOISE MONITORING FORMS & RAW DATA**

Noise Monitoring Form



<b>Project:</b> Teeside Bio Mass	<b>Job No.:</b> 63265A
<b>Location:</b> 1	<b>Date:</b> 23/04/2008

<b>Equipment:</b> Rion NA-28 and Rion NA-27	<b>Engineer:</b> Philip Jordan, Chris Borak
<b>Pre-Calibration Level:</b> 93.9 dB	<b>General Weather Description:</b> Dry, Some cloud cover
<b>Post-Calibration Level:</b> 93.9 dB	

Measurement Period				Weather			Statistical Noise Levels / dB(A)					Description of Audible Noise
Date	Start	Elapsed	End	Speed (m/s)	Wind Direction from	Temp (°C)	L <sub>max</sub>	L <sub>min</sub>	L <sub>eq</sub>	L <sub>10</sub>	L <sub>90</sub>	
23/04/2008	14:28	00:15	14:43	0	N/A	12	78.7	45.5	53.9	55.5	49.3	Local and Distant traffic
23/04/2008	21:55	00:10	22:05	1	S	13.4	54.0	41.4	49.5	52.3	44.4	Local Road Traffic Noise (RTN), Voises from social club, Distant RTN, Distant Industrial.
23/04/2008	03:05	00:05	03:10	0	N/A	7	63.3	35.5	42.6	45.4	37.9	Industrial Noise from North
23/04/2008	04:55	00:05	05:00	0	N/A	7	66.2	38.5	48.8	52.5	41.8	Industrial Noise from North

Noise Monitoring Form



<b>Project:</b> Teeside Bio Mass	<b>Job No.:</b> 63265A
<b>Location:</b> 2	<b>Date:</b> 23/04/2008

<b>Equipment:</b> Rion NA-28 and Rion NA-27	<b>Engineer:</b> Philip Jordan, Chris Borak
<b>Pre-Calibration Level:</b> 93.9 dB	<b>General Weather Description:</b> Dry, Some cloud cover
<b>Post-Calibration Level:</b> 93.9 dB	

Measurement Period				Weather			Statistical Noise Levels / dB(A)					Description of Audible Noise
Date	Start	Elapsed	End	Speed	Wind Direction	Temp (°C)	L <sub>max</sub>	L <sub>min</sub>	L <sub>eq</sub>	L <sub>10</sub>	L <sub>90</sub>	
23/04/2008	14:52	00:15	15:07	1	N/A	12	74.3	45.3	62.4	65.9	53.0	Road traffic noise from Normandy road
23/04/2008	21:35	00:10	21:45	1	S	13.4	94.7	42.2	61.3	60.6	45.0	Local Road Traffic Noise (RTN), voices from social club (low level talking etc.), Reversing alarms at nearby depo.
23/04/2008	02:55	00:05	03:00	0	N/A	7	63.4	30.5	43.8	44.7	33.3	Distant industrial from north, distant traffic.
23/04/2008	04:50	00:05	04:55	0	N/A	7	68.4	38.8	52.4	56.1	42.7	Local RTN, Distant RTN, Industrial, Bird Song



Noise Monitoring Form



<b>Project:</b> Teesside Bio Mass	<b>Job No.:</b> 63265A
<b>Location:</b> 3b	<b>Date:</b> 23/04/2008

<b>Equipment:</b> Rion NA-28 and Rion NA-27	<b>Engineer:</b> Philip Jordan, Chris Borak
<b>Pre-Calibration Level:</b> 93.9 dB	<b>General Weather Description:</b> Dry, Some cloud cover
<b>Post-Calibration Level:</b> 93.9 dB	

Measurement Period				Weather			Statistical Noise Levels / dB(A)					Description of Audible Noise
Date	Start	Elapsed	End	Speed (m/s)	Wind Direction from	Temp (°C)	L <sub>max</sub>	L <sub>min</sub>	L <sub>eq</sub>	L <sub>10</sub>	L <sub>90</sub>	
23/04/2008	15:12	00:15	15:27	2	N/A	12	85.1	53.9	66.7	69.3	60.0	Road Traffic Noise (RTN) from A66
23/04/2008	21:20	00:10	21:30	1	S	13.4	76.2	48.9	60.7	63.8	52.9	Local Traffic
23/04/2008	02:53	00:05	02:58	0	N/A	7	62.3	32.6	47.5	51.2	37.2	RTN A66, Low freq. distant industrial.
23/04/2008	04:45	00:05	04:50	0	N/A	7	69.8	37.1	52.3	56.1	41.6	RTN A66, Low freq. distant industrial, Bird song.

Noise Monitoring Form



<b>Project:</b> Teeside Bio Mass	<b>Job No.:</b> 63265A
<b>Location:</b> 3	<b>Date:</b> 23/04/2008

<b>Equipment:</b> Rion NA-28 and Rion NA-27	<b>Engineer:</b> Philip Jordan, Chris Borak
<b>Pre-Calibration Level:</b> 93.9 dB	<b>General Weather Description:</b> Dry, Some cloud cover
<b>Post-Calibration Level:</b> 93.9 dB	

Measurement Period				Weather			Statistical Noise Levels / dB(A)					Description of Audible Noise
Date	Start	Elapsed	End	Speed (m/s)	Wind Direction from	Temp (°C)	L <sub>max</sub>	L <sub>min</sub>	L <sub>eq</sub>	L <sub>10</sub>	L <sub>90</sub>	
23/04/2008	15:32	00:15	15:47	3	N/A	12	76.0	41.9	54.7	56.4	48.6	A66 Traffic to the east, Distant industrial noise, bird song. Local Traffic
23/04/2008	21:00	00:10	21:10	1	S	13.4	80.2	46.5	54.8	55.5	48.7	
23/04/2008	02:35	00:05	02:40	0	N/A	7	67.9	34.0	45.1	48.2	37.3	Humming from nearby industry - from North West, occational local traffic.
23/04/2008	04:25	00:05	04:30	0	N/A	7	69.6	38.2	47.6	50.0	41.0	Humming from nearby industry - from North West, bird song.

Noise Monitoring Form



<b>Project:</b> Teeside Bio Mass	<b>Job No.:</b> 63265A
<b>Location:</b> 4	<b>Date:</b> 23/04/2008

<b>Equipment:</b> Rion NA-28 and Rion NA-27	<b>Engineer:</b> Philip Jordan, Chris Borak
<b>Pre-Calibration Level:</b> 93.9 dB	<b>General Weather Description:</b> Dry, Some cloud cover
<b>Post-Calibration Level:</b> 93.9 dB	

Measurement Period				Weather			Statistical Noise Levels / dB(A)					Description of Audible Noise
Date	Start	Elapsed	End	Speed (m/s)	Wind Direction from	Temp (°C)	L <sub>max</sub>	L <sub>min</sub>	L <sub>eq</sub>	L <sub>10</sub>	L <sub>90</sub>	
23/04/2008	15:53	00:15	16:08	4	N/A	12	78.3	40.7	56.3	56.2	45.1	Bird Song, Local Traffic, Some Distant Industrial Noise (Direction indeterminate).
23/04/2008	20:42	00:10	20:52	1	S	13.4	67.7	47.5	52.7	54.6	48.8	Distant Traffic, Industrial Noise from the north West.
23/04/2008	02:03	00:05	02:08	0	N/A	7	60.2	42.6	46.6	48.0	44.7	Industrial from NE - Air flow noise, occational low freq. bleep.
23/04/2008	04:10	00:05	04:15	0	N/A	7	80.9	41.7	57.1	54.6	44.4	Industrial from NE, noise from nearby rook (bird song)

Noise Monitoring Form



<b>Project:</b> Teeside Bio Mass	<b>Job No.:</b> 63265A
<b>Location:</b> 5	<b>Date:</b> 23/04/2008

<b>Equipment:</b> Rion NA-28 and Rion NA-27	<b>Engineer:</b> Philip Jordan, Chris Borak
<b>Pre-Calibration Level:</b> 93.9 dB	<b>General Weather Description:</b> Dry, Some cloud cover
<b>Post-Calibration Level:</b> 93.9 dB	

Measurement Period				Weather			Statistical Noise Levels / dB(A)					Description of Audible Noise
Date	Start	Elapsed	End	Speed (m/s)	Wind Direction from	Temp (°C)	L <sub>max</sub>	L <sub>min</sub>	L <sub>eq</sub>	L <sub>10</sub>	L <sub>90</sub>	
23/04/2008	16:11	00:15	16:26	5	N/A	12	68.0	33.8	49.9	54.0	38.3	Scrap yard (reversing alarm), some local traffic, Recycling centre activities, Aircraft noise.
23/04/2008	20:30	00:10	20:40	1	S	13.4	64.8	37.1	49.4	53.3	39.4	Local Road Traffic Noise (RTN), from the north, Industrail Noise (West)
23/04/2008	02:15	00:05	02:20	0	N/A	7	61.1	38.6	42.4	43.2	40.6	Industrial noise from west, low freq air movement from north east.
23/04/2008	03:55	00:05	04:00	0	N/A	7	60.8	36.9	47.1	51.1	39.1	Industrial noise from west, low freq air movement from north east, bird song

**F. PHASE II CONTAMINATION ASSESSMENT  
(304 pages)**

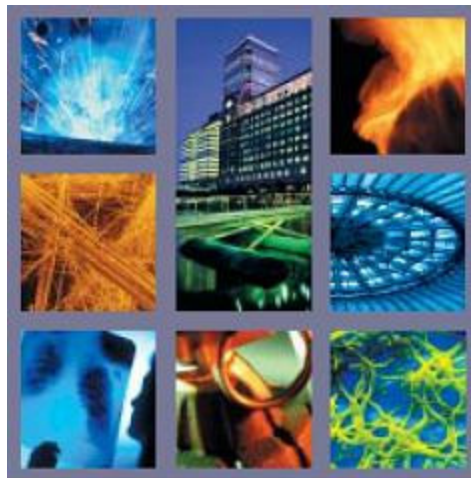


**10 Hectare Site Behind QEII Jetty  
Teesport**

**Phase II Contamination Assessment**

**For**

**PD Ports Limited**



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**RCM4738-007 R Final  
February 2008**

***This report has been prepared within the  
RPS Group Quality Management System  
to British Standard EN ISO 9001 : 2000.***

***Report Type:***

***Contamination Assessment***

***Report Status:***

***Final***

***Project Reference:***

***RCM4738***

***Consultant***

***Signature***

***Date***

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***26 February 2008***

***Technical Review:***

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Senior Consultant***

***26 February 2008***

# **RPS SITE INVESTIGATION**

## **General Terms**

1. The assessments made in this report are based on the ground conditions as revealed by trial pits and boreholes, together with the results of field or laboratory testing or chemical analysis undertaken and other relevant data which may have been obtained including previous site investigations. In any event, ground contamination often exists as small discreet areas of contamination ("hotspots") and there can be no certainty that any or all such areas have been located and/or sampled.
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# **PHASE II CONTAMINATION ASSESSMENT**

10 Hectare Site Behind QEII Jetty  
Teesport

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## EXECUTIVE SUMMARY

<b>Project Background</b>	<p>PD Ports Limited commissioned RPS Health, Safety &amp; Environment to undertake a Phase II Contamination Assessment of the 10 hectare site behind QEII Jetty, Teesport prior to the proposed long term lease of the site for industrial redevelopment. The site is understood to have formerly operated as part of a crude oil refinery.</p> <p>It is understood that PD Ports wish to identify a baseline relating to existing ground and groundwater contamination prior to agreement of the lease. This Contamination Assessment will also provide identification of environmental issues which may represent a significant redevelopment constraint. The report contains the appropriate environmental risk assessments and a conceptual site model and may therefore also be used to support a future planning application, subject to Local Authority approval.</p>
<b>Site Details</b>	<p>The site is located in Teesport at national grid reference NZ 5430 2323. The site is located adjacent to the River Tees within the PD Teesport complex at approximately 5 m above ordnance datum. Topography of the site and surrounding land is generally flat. Immediately to the northeast of the site are the River Tees and several associated Jetties.</p>
<b>Current Condition and Activities</b>	<p>The majority of the site currently comprises vacant open ground. Part of the site was being used for the storage of steel pipeline sections at the time of the intrusive investigation. The southern section of the site is occupied by six disused oil storage tanks.</p> <p>A large industrial shed currently operating as a Steel Export Terminal forms the northwestern boundary of the study area. The southwestern boundary is marked by a wire fence beyond which, is a chemical works with associated bulk storage tanks. To the southeast are buildings operated by PD Teesport and the main access road.</p>
<b>Site History</b>	<p>A plan provided by PD Ports illustrates that bulk storage tanks once dominated the site. These tanks are annotated Kero Avtur, LDD, gas oil, DERV, waxy distillate and wash oil.</p> <p>The site is part of a large area of reclaimed intertidal foreshore. The land to the west of Kinkerdale Beck which bisects the site was reclaimed prior to 1950, the land to the east of the Beck was reclaimed prior to 1965. By this time period the bulk storage tanks associated with the oil refinery were present across the site; the Beck was culverted beneath the site. The existing Steel Export Terminal structure had been constructed by 1973 to the east of the site. By 1988 the tanks associated with the oil refining operations on site had been made redundant. Other than the six tanks currently present on site, the redundant tanks were demolished during 1994 when Kinkerdale Beck was culverted beneath the site.</p>
<b>Environmental Site Setting</b>	<p>The underlying geology is indicated to comprise Made Ground underlain by estuarine and marine alluvium drift deposits. The underlying bedrock is indicated to comprise the Mercia</p>

	<p>Mudstone Group which is classified as a Non-Aquifer; the underlying Sherwood Sandstone Group is classified as a Major Aquifer. Significant groundwater may be associated with the alluvial deposits indicated to be present across the site. Groundwater in the region is considered likely to be in hydraulic continuity with the River Tees and is likely to flow in a northwards direction.</p> <p>Several borehole logs were provided to RPS by PD Ports. These boreholes, dated 1946, were located along the northeastern and northwestern extents of the site. The logs suggest that the site is underlain by fine to medium grained brown sand to approximately 4.5 to 7.5 m.bgl. This in turn is indicated to be underlain by a narrow band of Glacial Till (Boulder Clay) and Red Shale which is likely to be representative of the weathered upper surface of the Mercia Mudstone Group.</p>
<b>Intrusive Investigations</b>	<p>The intrusive investigation was undertaken between Monday 19th November 2007 and Tuesday 4th December 2007 and comprised the advancement of nine boreholes by cable percussive boring (three were terminated at shallow depths due to immovable ground obstructions) and seventeen trial pits using an hydraulic excavator.</p> <p>Excavation locations were targeted at those areas which were identified to present the most likely sources of contamination based on the former and current site uses. A total of twenty eight representative soil samples were collected by RPS and submitted to a UKAS accredited laboratory for a range of analysis.</p> <p>Groundwater samples were collected on two occasions from the six monitoring wells and two surface water samples were collected from Kinkerdale Brook on a single occasion. Ground gas monitoring was carried out on six weekly occasions in all six monitoring wells. Groundwater level monitoring was carried out continuously over eight days to investigate the tidal influence of shallow groundwater levels.</p>
<b>Identified Contamination</b>	<p>No ground contamination was identified in excess of the relevant soil screening values. Relatively low concentrations of a small variety of SVOCs and VOCs were identified at a few locations; notably cabazole and dibenzofuran. No guideline values protective of either human health or controlled waters have been assigned to these compounds.</p> <p>Asbestos in the form of Amosite (Brown) asbestos was identified in TP10 at a depth of 0.0-0.3 m.bgl. Visual inspection of soils and laboratory inspection of six further samples did not identify further asbestos contamination.</p> <p>Shallow groundwater samples were found to contain contamination in the form of metals, PAHs (BH02 and BH06) or PAHs and petroleum hydrocarbons (BH01 and BH04).</p>
<b>Risk Assessment</b>	<p>Asbestos was the only soil contaminant to be identified. This may pose a significant risk to construction workers who are in close contact with disturbed ground during future development works or other works involving significant ground disturbance.</p>

	<p>Should dust be generated during such works, site users and off site users may also be at significant risk as a result of the presence of asbestos. During such works personal protective equipment comprising particulate face masks and disposable clothing should be issued and worn by persons in close contact with exposed ground. Dust mitigation measures will be necessary to prevent fugitive dust.</p> <p>The risk to current site users is considered to be low as the ground is not being significantly disturbed at present. The risk to future site users is considered to be low as it is likely that the future industrial development of the site will result in the entire site being covered in building structures, hard standing or landscaping (which will require the importation of topsoil cover). Such features will result in the breaking of the exposure pathway.</p> <p>There is the potential that contamination not identified during the site investigation may be present on site. Should this be identified during redevelopment works, further investigation including its identification and delineation may be required together with an appropriate remediation strategy.</p> <p>There is no apparent pathway linking identified human health receptors with contaminated shallow groundwater and therefore no significant risk exists to current or future site users.</p> <p>Significant shallow groundwater contamination in the form of metals, PAHs and petroleum hydrocarbons has been identified. These contaminants were not identified in soils during the intrusive investigation. There is the potential that soil contamination once present on site, has been mobilised and is now present within the shallow groundwater.</p> <p>The shallow groundwater contamination does not appear to be having a detrimental impact upon Kinkerdale Beck and the dilution factors associated with the River Tees suggests that it is unlikely to have a discernable impact upon this. The underlying deposit of Glacial till may provide some protection to the underlying Non-Aquifer which will in turn provide significant protection to the underlying Major Aquifer as a result of its significant thickness and low permeability.</p> <p>The ground gas risk assessment was undertaken with reference to CIRIA C665. Characteristic Situation 1 (very low risk) has been identified and therefore no precautionary measures are considered necessary.</p>
<p><b>Conclusions and Recommendations</b></p>	<p>This report has identified limited ground contamination (asbestos) and groundwater contamination comprising metals, petroleum hydrocarbons and polyaromatic hydrocarbons. It would be prudent to place liability for future contamination of the site to future occupiers under the proposed lease agreement providing such contamination can be identified as being caused by that tenant.</p> <p>On the basis of the findings of this investigation, no further intrusive investigation works for the purposes of human health or controlled waste risk assessment are considered</p>

	<p>necessary at this time.</p> <p>The presence of in excess of six metres of non engineered imported fill located across much of the site may be a significant development constraint from a geotechnical perspective and should be considered at an early stage during the design. It is recommended that a full geotechnical ground investigation is carried out prior to the onset of any future redevelopment.</p> <p>If this report is to be used to support a future planning application the report should be submitted to the Local Authority for approval prior to the onset of redevelopment works.</p> <p>The Environment Agency (via the Local Authority) should be consulted with regard to the identified shallow groundwater contamination. Such contamination may be widespread in the region as a whole and as such remediation of this site alone would not be feasible. Although the identified shallow groundwater contamination is not considered to represent a significant constraint to future site development there is the potential that the Environment Agency could request further investigation and subsequent remediation under the planning regime or under Part IIA Environmental Protection Act 1990.</p> <p>Due to the potential for asbestos contamination and other unidentified ground contamination, care should be taken during future intrusive works. Personnel in close contact with soils should be made aware of the potential risks and provided with sufficient personal protective equipment including particulate face masks and disposable clothing. Measures should also be implemented to mitigate the generation of fugitive dust that might represent a significant risk to site users and off site users.</p> <p>Should contamination be identified during redevelopment works, further investigation including its identification and delineation may be required together with an appropriate remediation strategy.</p> <p>The developer should be made aware that these additional considerations may also be necessary prior to redevelopment.</p> <p>Environment Agency flood maps indicate that the site is located within a flood zone and the site is in excess of one hectare in area. Future redevelopment should therefore be preceded by a formal Flood Risk Assessment under PPS25. RPS has considerable expertise in this field and a fee quotation can be provided upon request.</p> <p>As of April 2008 all new commercial properties require an Energy Performance Certificate. RPS can provide a fee quote for such works upon request.</p> <p>There is the potential, depending on end use, that the future tenant of the site will require an Integrated Pollution, Prevention and Control (IPPC) permit; this investigation may be suitable to support this application. RPS has considerable expertise in this field and can provide support upon request.</p>
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## 1 INTRODUCTION

- 1.1 PD Ports Limited commissioned RPS Health, Safety & Environment to undertake a Phase II Contamination Assessment of the 10 hectare site behind QEII Jetty, Teesport prior to the proposed long term lease for industrial redevelopment. The site is understood to have formerly operated as part of a crude oil refinery.
- 1.2 It is understood that PD Ports wish to identify a baseline relating to existing ground and groundwater contamination prior to agreement of the lease. The Contamination Assessment will also provide identification of environmental issues which might represent a significant redevelopment constraint. The report contains the necessary environmental risk assessments and a conceptual site model and therefore may also be used to support a future planning application subject to Local Authority approval.
- 1.3 The site was previously subject to a Phase I Environmental Review carried out by Environ UK Ltd during January 2007, Report reference 66-C11294. This report contains detailed information regarding the historical development, the environmental setting and potential historical and present contamination sources associated with the site. This report is presented as Appendix A.
- 1.4 The principle objectives of the Contamination Assessment were to:
  - i investigate the presence and nature of ground and groundwater contamination;
  - ii investigate the presence of flammable and asphyxiating ground gases;
  - iii identify the potential environmental liability and risks posed by identified contamination; and
  - iv determine the requirements for further investigation and/or risk assessment.
- 1.5 In order to achieve these objectives the following items of work were undertaken:
  - i detailed walkover of the site and discussions with site personnel;
  - ii excavation of seven boreholes and seventeen trial pits and the collection of representative soil and groundwater samples;
  - iii analysis of soil and groundwater samples for a range of contaminants including metals, speciated petroleum hydrocarbons, speciated polycyclic aromatic hydrocarbons, semi-volatile organic compounds (SVOC), volatile organic compounds (VOC), polychlorinated biphenyls and asbestos;

- iv monitoring of ground gas concentrations and groundwater levels on six occasions over a period of six weeks;
- v collection of groundwater samples on two occasions over a period of four weeks and surface water samples from Kinkerdale Beck on a single occasion;
- vi production of a conceptual site model (CSM) to allow for the identification of significant source – pathway – receptor pollutant linkages associated with industrial end use; and
- vii completion of qualitative risk assessments for human health, controlled waters and ground gas in accordance with current UK guidance.

## 2 BACKGROUND INFORMATION

### *Site Location and Description*

- 2.1 The site is located in Teesport at National Grid Reference NZ 5430 2323. A Site Location Plan is presented as Figure 1. The extent of the study area is indicated on the Sample Location Plan which is presented as Figure 2.
- 2.2 The site is located adjacent to the River Tees within the PD Teesport complex at approximately 5 m Above Ordnance Datum (AOD). The topography of the site and surrounding area is generally flat. Immediately to the northeast of the site is the River Tees and several associated jetties. A large industrial shed currently operating as a Steel Export Terminal forms the northwestern boundary. The southwestern boundary is marked by a wire fence beyond which is a chemical works with associated bulk storage tanks. To the southeast are buildings operated by PD Teesport.
- 2.3 The majority of the site currently comprises vacant bare ground although part of this area was being used for the storage of steel pipeline sections at the time of the intrusive investigation. The southern section of the site is occupied by six disused oil storage tanks. An annotated plan provided by PD Ports indicates five of the tanks to contain Kero Avtur, a kerosene based aviation fuel; the sixth tank is labelled LDD, a form of diesel.
- 2.4 The same plan indicates that bulk storage tanks historically existed across much of the site. These tanks are indicated to have contained several hydrocarbons including gas oil, DERV, waxy distillate and wash oil.

### *Site History*

- 2.5 The site is part of a large area of reclaimed intertidal foreshore. The land to the west of Kinkerdale Beck which bisects the site was reclaimed prior to 1950, the land to the east of the beck was reclaimed prior to 1965. By this time the bulk storage tanks associated with the oil refinery were present across the site; the Beck was culverted beneath the site. The existing Steel Export Terminal structure had been constructed by 1973 to the east of the site. By 1988 the tanks associated with the oil refining operations on site had been made redundant. Other than the six tanks currently present on site, the redundant tanks were demolished during 1994 when Kinkerdale Beck was culverted beneath the site.

### *Site Sensitivity*

#### *Geology*

- 2.6 The geology has been assessed by reference to the British Geological Survey (BGS) Map Sheet 33, Stockton, Solid and Drift Edition, 1:50,000 scale. The underlying geology is indicated to comprise Made Ground underlain by estuarine and marine alluvium drift deposits. The underlying bedrock is indicated to comprise the Mercia



Mudstone Group which is underlain by the Sherwood Sandstone Group at considerable depth.

- 2.7 Several borehole logs were provided to RPS by PD Ports. These boreholes, dated 1946, were located along the northeastern and northwestern extents of the site. The logs suggest that the site is underlain by fine to medium grained brown sand to approximately 4.5 to 7.5 m.bgl. This in turn is indicated to be underlain by a narrow band of Glacial Till (Boulder Clay) and Red Shale which is likely to be representative of the weathered upper surface of the Mercia Mudstone Group.
- 2.8 PD Ports issued RPS with a plan illustrating that the fill material located to the east of Kinkerdale Beck comprises dredged sand. The fill material which forms the western side of the site is labelled slag.

#### *Hydrogeology*

- 2.9 Environment Agency Groundwater Vulnerability Map Sheet 5 Tyne & Tees 1:10,000 scale indicates that the Mercia Mudstone Group is classified as a Non-Aquifer and the underlying Sherwood Sandstone Group is classified as a Major Aquifer. Significant groundwater may be associated with the alluvial deposits indicated to be present across the site although such has not been assigned a formal classification. Shallow groundwater present in the region is considered likely to be in hydraulic continuity with the River Tees and is likely to flow towards the north.
- 2.10 No licensed or private groundwater abstractions are known to be located within 1 km of the site. The site is not located within a Environment Agency designated Source Protection Zone.

#### *Hydrology*

- 2.11 The River Tees is located immediately northeast of the site. Kinkerdale Beck, which has been culverted beneath the site, flows in to the River Tees just beyond the northern site boundary.
- 2.12 The Environment Agency has not assigned water quality targets under the General Quality Assessment scheme (GQA) for these surface waters. Rivers with a tidal influence are not classified under the GQA scheme.
- 2.13 Two licensed surface water abstractions operate within 1 km of the site. Both abstractions are taken from the River Tees and are for industrial uses. RPS is not aware of any private water abstractions located within 1 km of the site.
- 2.14 The site is located within an Environment Agency designated flood zone.

*Landfill*

- 2.15 There are records of twelve landfill sites located within 1 km of the site, the closest being operated by Impetus Waste Management which is licensed to accept household, commercial and industrial waste; this is located approximately 207 m south of the site.

### **Previous Reports**

#### *Phase I Environmental Review, Environ UK Ltd, January 2007*

- 2.16 This report was produced to provide an initial assessment of the potential for significant ground contamination. It contains detailed information regarding the current and historical use of the site and surrounding land and the environmental setting. The report also includes an initial qualitative risk assessment which identifies potentially significant source – pathway – receptor pollutant linkages.
- 2.17 This Phase II Contamination Assessment forms the next stage in the assessment process as set out in current UK guidance. The Phase I Environmental Review should be read in conjunction with this Phase II Contamination Assessment. This report is presented as Appendix A.

#### *Shell Refinery – Harbour Master's Recollections, 1996*

- 2.18 The full details of this account are presented in the Phase I report.

### **Initial Conceptual Site Model (CSM)**

- 2.19 Information from previous reports relating to past and current uses of the site has been used to identify potentially significant pollutant linkages. The identification of pollutant linkages is used to create the initial CSM which has been based on the proposed industrial end use of the site. The conceptual model is then used to inform the design of the intrusive site investigation. The initial CSM may be updated and refined on the basis of the intrusive investigations. The revised CSM is discussed in Section 6 of this report.

### **Potential Sources of Contamination**

- 2.20 The following potential sources of contamination have been identified:

**Table 2A – Potential Sources of Contamination**

<b>Site Uses/Activities</b>	<b>Potential Contaminants</b>
Refining and storage of hydrocarbons	Petroleum hydrocarbons.
Importation of steel slag	Metals, asbestos.
Electricity substations	Hydrocarbons, PCBs.
Imported fill	Ground gases.
Adjacent SET	Metals, hydrocarbons, solvents.
Adjacent chemical works	Metals, hydrocarbons, solvents.

### **Potential Receptors (Based on Industrial Redevelopment)**

- 2.21 Human Health:
- Current site users;
  - Construction workers;
  - Future Site users; and
  - Off site users;

2.22 Controlled Waters:

- Shallow groundwater;
- Non-Aquifer (Mercia Mudstone);
- Kinkerdale Beck; and
- Tees Estuary.

2.23 The Major Aquifer associated with the Sherwood Sandstone is not considered to be a significant receptor due to the presence of the Non-Aquifer associated with the overlying Mercia Mudstone Group.

2.24 There is also the potential that building structures may be at risk from aggressive ground conditions which should be investigated as part of the geotechnical investigation.

2.25 Due to the presence of fill materials on site there is a significant risk of the presence of ground gas which may impact human health and building structures.

**Potential Pathways**

2.26 Potential exposure pathways to the identified receptors of the anticipated contaminants include:

2.27 Human Health:

- Ingestion of contaminated soils and dust;
- Dermal contact with contaminated soils;
- Inhalation of soil based contaminants (dust); and
- Inhalation of soil based contaminants (vapours).

2.28 Controlled Waters:

- Vertical migration through permeable strata;
- Lateral migration through strata;
- Lateral migration along utility services and culvert; and
- Surface run off.

### 3 SITE INVESTIGATION

#### *Summary*

- 3.1 The site investigation has been designed on the basis of the initial CSM in order to identify the existence of the anticipated pollutant linkages and to determine their significance.
- 3.2 Contamination potentially present on site is anticipated to include metals, oils, fuels, solvents, polychlorinated bi-phenyls (PCBs), asbestos and ground gas.
- 3.3 Information obtained from this intrusive investigation has been used to refine the CSM and enable recommendations regarding the site suitability and any potential remedial measures to be presented.

#### *Methodology*

- 3.4 The intrusive investigation was undertaken between Monday 19<sup>th</sup> November 2007 and Tuesday 4<sup>th</sup> December 2007 and comprised the excavation of nine boreholes by cable percussive boring (three were terminated at shallow depths due to immovable ground obstructions) and seventeen trial pits using an hydraulic excavator. The location of the exploratory points is presented as Figure 2. Detailed logs are provided as Appendix B.
- 3.5 Excavation locations were targeted at those areas which were identified to present the most likely sources of contamination based on the former and current uses of the site, and to provide sufficient site coverage.
- 3.6 Prior to excavation, all locations were cleared of utility services by an independent specialist contractor. In addition, completed borehole locations were surveyed in relation to Ordnance Datum in order to provide accurate positions and ground levels.
- 3.7 Access to certain areas of the site was restricted due to the presence of buildings and services. Table 3A details the locations and potential sources of contamination that were investigated.

**Table 3A – Borehole locations and Potential Contamination Sources**

Borehole	Contamination Source	Potential Contaminants
BH01	Fill, former tanks & pipes, adjacent site.	Metals, hydrocarbons, solvents, asbestos.
BH02	Fill, former tanks & pipes.	Metals, hydrocarbons, asbestos.
BH03	Fill, slops tanks & pipes	Metals, hydrocarbons, asbestos.
BH04	Fill, former tanks & pipes, adjacent site.	Metals, hydrocarbons, solvents, asbestos.
BH05	Fill, former tanks & pipes, boiler house.	Metals, hydrocarbons, asbestos.
BH06	Fill, drain sump and pipe track.	Metals, hydrocarbons, asbestos.
BH07	Fill, former tanks & pipes, adjacent site	Metals, hydrocarbons, asbestos.

Borehole	Contamination Source	Potential Contaminants
TP01	Fill, former tanks & pipes.	Metals, hydrocarbons, asbestos.
TP02	Fill, former tanks & pipes	Metals, hydrocarbons, asbestos.
TP04	Fill, former tanks & pipes	Metals, hydrocarbons, asbestos.
TP05	Fill, former tanks & pipes	Metals, hydrocarbons, asbestos.
TP06	Fill, oil catcher, oil drain, pump house & boiler house.	Metals, hydrocarbons, asbestos.
TP07	Fill, SET, substation.	Metals, hydrocarbons, PCBs, asbestos.
TP08	Fill, former tanks & pipes.	Metals, hydrocarbons, asbestos.
TP09	Fill, former tanks & pipes.	Metals, hydrocarbons, asbestos.
TP10	Oil catcher, oil drain, pump house & boiler house.	Metals, hydrocarbons, asbestos.
TP11	Fill, SET, pipe track.	Metals, hydrocarbons, asbestos.
TP12	Fill, former tanks & pipes.	Metals, hydrocarbons, asbestos.
TP13	Fill, former tanks & pipes, adjacent site, substation	Metals, hydrocarbons, PCBs, asbestos.
TP14	Fill, SET.	Metals, hydrocarbons, asbestos.
TP15	Fill, former tanks & pipes.	Metals, hydrocarbons, asbestos.
TP17	Fill, former pipe track, adjacent site.	Metals, hydrocarbons, solvents, asbestos.
TP18	Fill, substation	Metals, hydrocarbons, PCBs, asbestos.
TP19	Fill, former pipe track, adjacent site.	Metals, hydrocarbons, solvents, asbestos.

- 3.8 A total of six boreholes were completed as permanent groundwater and gas monitoring wells by the installation of 50mm HDPE stand pipe. The annular space was filled with non-calcareous pea gravel (2mm to 5mm) filter. The top 1.0 m or greater, of the annular space was sealed with bentonite clay in order to prevent the downward migration of surface water or spilt contaminants. All installations were finished with a rubber gas tap and steel cover. Where a separate gas monitoring well was required a 35 mm standpipe was installed adjacent to the 50 mm groundwater monitoring well.
- 3.9 Soils arising from the boreholes were subject to visual inspection and the appearance and nature of the soil was recorded by the RPS Site Representative. All exploratory locations were lithologically logged during advancement to determine the stratigraphical relationships of the underlying geology and fill materials and detailed borehole records and well construction details were made.
- 3.10 Sampling procedures adopted during the site investigation and further monitoring were designed to minimise the potential for cross contamination.

### **Chemical Analysis**

- 3.11 Representative samples were collected by the RPS representative during the investigation. A total of twenty eight soil samples and twelve groundwater samples (six boreholes sampled on two occasions) were submitted to a UKAS accredited laboratory under the 'Chain of Custody' procedure for the analysis for a range of determinands which included the following:

- Metals and pH;
- Petroleum Hydrocarbons (TPHCWG);
- Speciated Polyaromatic Hydrocarbons (PAH);
- Semi-volatile organic compounds (SVOC);
- Volatile organic compounds (VOC);
- Cyanide & phenols;
- Polychlorinated biphenols (PCB); and
- Asbestos.

3.12 The samples comprised twenty six samples of made ground including slag and dredged sand and two samples of natural strata (alluvium).

3.13 The complete analytical results are presented as Appendix C and Appendix D and summarised in Section 5 of this report.

### **Monitoring**

3.14 Groundwater was encountered in all six monitoring wells. Groundwater monitoring was undertaken at all six wells on two separate occasions.

3.15 Groundwater rest levels were recorded in all boreholes manually using a dip meter on five occasions and over eight days using levelloggers set to record at ten minute intervals. Groundwater samples were collected from each borehole after purging the wells of at least three volumes of groundwater. Surface water samples were collected from Kinkerdale Beck close to the entry point to the site and immediately before the outfall of the Beck to the River Tees. The sample locations were designed to provide samples upstream and downstream of the identified potential contamination sources.

3.16 Ground gas monitoring was undertaken on six weekly occasions in all six installed monitoring wells. The installed wells were monitored for flammable gas (calibrated to methane), carbon dioxide and oxygen, using a portable infrared gas analyser; borehole flow rates were also recorded.

## 4 FIELD OBSERVATIONS

### Ground Conditions

- 4.1 A full description of soil conditions encountered at the site is included in the lithological logs presented in Appendix B. The ground conditions encountered are summarised in Table 4A below.

**Table 4A - Description of Geological Strata Encountered**

Location	Exploratory locations	Strata Description	Maximum Thickness (m)	Depth Range Encountered (m bgl)
<b>West of Kinkerdale Beck</b>	BH01, BH02, BH04, BH05, BH06, BH07, TP01, TP02, TP04, TP05, TP08, TP09, TP10, TP12, TP13, TP15, TP17 TP18, TP19.	Made Ground: Steel slag.	7.3	0.0 - 7.3
	BH01, BH02, BH04, BH06, BH07.	Alluvium.	6.3	5.8 - 12.2
	BH02.	Glacial Till.	0.4*	12.2 - 12.6
<b>East of Kinkerdale Beck</b>	TP02, TP07, TP11, TP14.	Made Ground: Steel slag.	0.5	0 - 0.5
	TP02, TP07, TP11, TP14.	Made Ground: Dredged Sand.	3.3*	0.2 - 3.6
	BH03	Made Ground: Steel slag.	5.8	0 - 5.8
	BH03	Alluvium.	4.7	5.8 - 10.5
	BH03	Glacial Till.	0.2*	10.5 - 10.7

\*Base of strata not proven.

### Groundwater Conditions

- 4.2 Groundwater was encountered in all six monitoring wells and samples were collected from each well on Tuesday 8<sup>th</sup> January 2008 and Friday 25<sup>th</sup> January 2008. During groundwater monitoring a strong odour was noted in waters collected from BH01 and BH04. In general the water taken from the boreholes was relatively clear with little suspended sediments. The samples collected from BH04 were dark grey/black in colour and an oily sheen on formed on the surface once the water was allowed to settle. The water collected from BH02 effervesced significantly on extraction from the monitoring well.



- 4.3 Due to the potential tidal influence on groundwater levels, constant monitoring was carried out from Thursday 31st January 2008 to Friday 8th February 2008 in BH02, BH03 and BH04 using level loggers set to measure groundwater levels at ten minute intervals. Groundwater levels were also measured during each groundwater monitoring and gas monitoring visit. The following table presents the groundwater levels measured manually on a weekly basis.

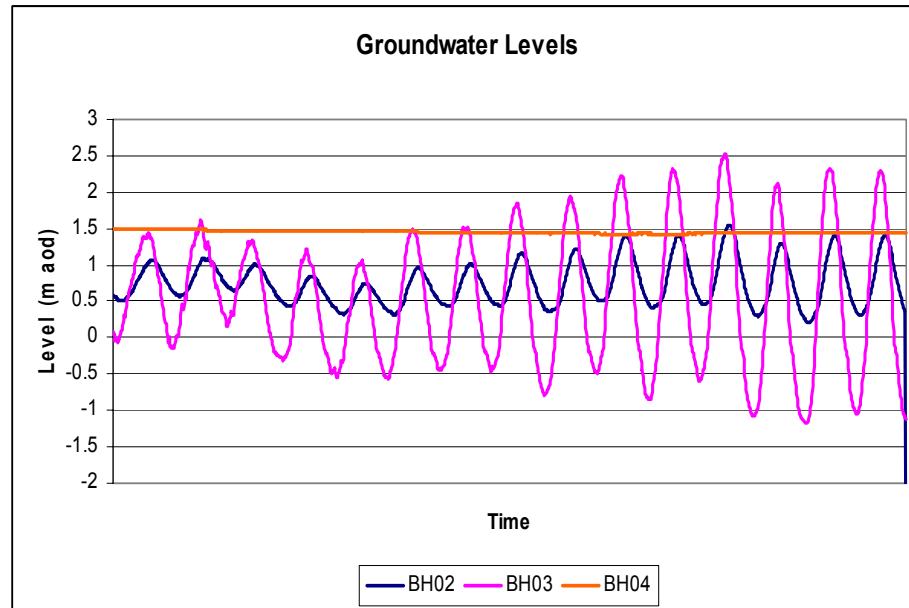
**Table 4B - Manual Groundwater Monitoring Levels**

	Date	Groundwater m AOD	Borehole Base m AOD
BH01	8/1/08	0.792	-0.248
	18/1/08	1.362	-0.198
	21/1/08	0.752	-0.308
	31/1/08	0.992	-0.278
	8/2/08	0.292	-0.278
BH02	8/1/08	0.483	-4.617
	18/1/08	0.963	-4.687
	21/1/08	0.433	-4.657
	31/1/08	0.733	-4.667
	8/2/08	0.333	-4.697
BH03	8/1/08	0.887	-2.653
	18/1/08	1.657	-2.713
	21/1/08	-0.283	-2.673
	31/1/08	0.407	-2.673
	8/2/08	-1.103	-2.543
BH04	8/1/08	1.368	-1.792
	18/1/08	1.578	-1.612
	21/1/08	1.558	-1.672
	31/1/08	1.468	-1.382
	8/2/08	1.468	-1.752
BH06	8/1/08	1.479	-0.701
	18/1/08	1.529	-0.641
	21/1/08	1.659	-0.491
	31/1/08	1.669	-0.461
	8/2/08	1.589	-0.481
BH07	8/1/08	1.514	1.424
	18/1/08	1.524	1.404
	21/1/08	1.624	1.394
	31/1/08	1.694	1.434
	8/2/08	1.594	1.394

- 4.4 The data from the constant groundwater level monitoring is presented in full as Appendix E. The line graph presented below illustrates that a definite tidal cycle was observed in the groundwater levels of BH02 and BH03 which have been plotted against the levels obtained from BH04 for comparative purposes; little variation was observed in BH04.
- 4.5 The maximum groundwater level range observed in BH03 was approximately 3.5 m while the maximum range identified in BH02 was approximately 1.25 m. Both these monitoring wells are located a similar distance from the River Tees but were located in different stratum. BH02 was installed in silty alluvium while BH03 was installed

into sandy alluvium. The permeability of these deposits may explain the differing range of tidal fluctuations observed.

**Table 4C - Groundwater Monitoring Levels**



### Ground Gas Monitoring

- 4.6 Concentrations of flammable gas, carbon dioxide, oxygen and flow rates were measured on six weekly occasions. The results are presented in Table 4D below.

**Table 4D - Gas Monitoring Results**

	Date	Flammable Gas (% v/v)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Atmospheric Pressure (mb)	Flow (l/h)
BH01	3/1/08	ND	ND	20.1	1000	0.1
	8/1/08	ND	ND	20.4	1004	0.1
	18/1/08	ND	ND	20.3	1000	0.1
	21/1/08	ND	ND	20.4	1020	0.1
	31/1/08	ND	0.1	20.1	990	-0.2
	8/2/08	ND	ND	20.1	1025	0.1
BH02	3/1/08	ND	ND	20.0	1000	0.1
	8/1/08	ND	ND	20.3	1003	0.1
	18/1/08	0.2	0.1	19.8	999	0.1
	21/1/08	ND	0.1	20.4	1020	0.1
	31/1/08	ND	ND	20.2	990	-0.1
	8/2/08	ND	ND	20.1	1025	0.1
BH03	3/1/08	ND	ND	19.8	1000	0.1
	8/1/08	ND	ND	20.7	1003	0.1
	18/1/08	ND	ND	20.2	1000	-0.1
	21/1/08	ND	0.2	20.5	1020	0.1
	31/1/08	ND	ND	20.3	990	0.1
	8/2/08	ND	ND	20.3	1025	0.1
BH04	3/1/08	ND	ND	20.1	999	-0.1
	8/1/08	ND	ND	20.3	1002	0.1

	Date	Flammable Gas (% v/v)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Atmospheric Pressure (mb)	Flow (l/h)
BH06	18/1/08	ND	ND	19.5	1000	0.1
	21/1/08	ND	0.1	20.3	1002	0.1
	31/1/08	ND	ND	19.9	990	-0.3
	8/2/08	ND	ND	20.5	1026	0.0
	3/1/08	ND	ND	20.1	999	0.1
	8/1/08	ND	ND	20.3	1002	0.1
	18/1/08	ND	ND	20.5	999	-0.1
	21/1/08	ND	0.2	20.5	1020	0.1
	31/1/08	ND	ND	20.0	990	-0.1
	8/2/08	ND	ND	20.3	1025	0.1
	3/1/08	ND	ND	20.0	999	-0.1
	8/1/08	ND	ND	20.3	1001	0.1
BH07	18/1/08	ND	ND	20.1	998	0.1
	21/1/08	ND	0.2	20.6	1020	0.1
	31/1/08	ND	ND	19.8	989	0.2
	8/2/08	ND	ND	20.3	1025	0.1

- 4.7 The Ground Gas Risk Assessment is discussed in full in Section 7 of this report.

## 5 SUMMARY OF ANALYTICAL RESULTS

- 5.1 A summary of all soil and groundwater results are displayed in Tables 5A and 5B. The complete laboratory certificates are presented as Appendix C and Appendix D.
- 5.2 In order to evaluate whether a particular substance presents a significant hazard, the concentration at which it is identified in the environment is compared to relevant guidelines or standards.
- 5.3 With regard to soils, the UK Contaminated Land Exposure Assessment (CLEA), 2002 soil guidance values (SGV's) for industrial and commercial land use have been used as initial screening criteria. These are considered to be the most appropriate to the proposed development site end use.
- 5.4 In the absence of CLEA SGVs generic assessment criteria (GAC) developed by RPS using CLEA UK in accordance with current UK guidance have been used. Soil organic matter (SOM) values identified on site ranged from 0.39% to 25% with a mean value of 8.21%. For the purposes of this project, SGVs and GAC for industrial/commercial use with a conservative SOM of 1% have been assumed.
- 5.5 Analytical results for water samples have been compared to the Environmental Quality Standards (EQS) for List I and II substances (saline waters). These are considered to be the most appropriate values given the nature of the identified receptors (River Tees, Kinkerdale Brook, Shallow Groundwater). Where EQS values are not available, results have been compared to concentrations World Health Organisation (WHO) guidelines for drinking water quality.
- 5.6 These initial screening values are purely used to provide an indication of the significance of contaminants identified during the investigation. The exceedance of a screening value does not necessarily mean that a significant risk to an environmental receptor has been identified, just that further consideration is considered necessary.
- 5.7 The calculated mean concentration of a particular contaminant, based on a small number of samples, may be a poor estimate of the true (population) mean. A Mean Value Test is used account for this uncertainty and is used in accordance with CLR 7. The output value of the Mean Value Test ( $US_{95}$ ) for a particular contaminant, can then be compared to the appropriate adopted screening value.

### **Soil Analysis**

#### *Inorganic Compounds*

- 5.8 pH values ranged from 7.93 to 12.41 with a mean value of 8.96 which suggests that alkaline ground conditions prevail across the site. In general, the higher values were identified in samples of the steel slag while samples of dredged alluvium and alluvium were only slightly alkaline.

- 5.9 A total of twenty five samples were analysed for a wide range of inorganic compounds. No toxic or phototoxic metal concentrations were identified in exceedance of the relevant screening values during the investigation.
- 5.10 A visual inspection of soils was carried out on site in order to identify asbestos contaminations. Suspected asbestos fibres were identified in a sample taken from TP10 at a depth of 0.0-0.3 m.bgl. Subsequent laboratory identification has confirmed that the fibres are Amosite (Brown) asbestos. Six further samples were submitted for asbestos screening; no fibres were detected in these samples.

#### *Petroleum Hydrocarbons*

- 5.11 A total of fifteen samples were submitted for petroleum hydrocarbon analysis. The analysis was split by carbon chain length for both aliphatic and aromatic hydrocarbons. A concentration for each of a group of compounds commonly referred to as BTEX (benzene, toluene, ethyl benzene and xylene) was also provided. None of the BTEX concentrations identified exceeded the laboratory limit of detection of 0.01 mg kg.
- 5.12 Concentrations of aliphatic and aromatic hydrocarbons were identified in the carbon chain bands greater than C8 however none of the identified concentrations exceeded the RPS GAC for industrial land use.

#### *Polyaromatic Hydrocarbons*

- 5.13 Fifteen samples were submitted for speciated (16) PAH analysis. No concentrations of PAHs, including naphthalene and benzo(a)pyrene, were identified in excess of the adopted screening values.

#### *Semi Volatile Organic Compounds*

- 5.14 SVOC analysis was carried out on a total of eleven samples. No appropriate screening values exist for SVOCs (or VOCs) and therefore concentrations notably greater than the laboratory limit of detection will be discussed. Carbazole and Dibenzofuran were identified at concentrations greater the laboratory limit of detection of 0.1 mg kg in four samples with maximum concentrations of 22 mg kg and 7.7 mg kg respectively; these maximum concentrations were identified in the samples taken from TP02 (1.0-1.5).
- 5.15 Trace concentrations of 4-methylphenol, 2-methylnaphthalene, 4-nitroaniline, hexachlorobutadiene and hexachlorobenzene were identified in a small number of samples.

#### *Volatile Organic Compounds*

- 5.16 VOC analysis was carried out on eleven samples. A sample taken from BH01 at a depth of 3.5 m was the only sample to contain concentrations of VOCS exceeding the laboratory limit of detection. These exceedances included isopropylbenzene, propylbenzene, 1,2,4

and 1,3,5-trimethylbenzene, 4-isopropyltoluene and sec-butylbenzene and the BTEX compounds.

### **Groundwater Analysis**

- 5.17 Groundwater samples were collected on 8th January 2008 and 25 January 2008 from each of the six monitoring wells.

#### *Inorganic Compounds*

- 5.18 pH vales ranged from 7.55 to 9.1, in general slightly alkaline groundwater conditions were found to prevail across the site.
- 5.19 Arsenic and chromium concentrations were found to exceed the appropriate EQS values of 25  $\mu\text{g l}^{-1}$  and 15  $\mu\text{g l}^{-1}$  respectively in the sample taken from BH02 on one occasion. The concentrations identified were 26  $\mu\text{g l}^{-1}$  and 33  $\mu\text{g l}^{-1}$  respectively. Elevated concentrations of these contaminants were not identified during analysis of the previous sample taken from this borehole.
- 5.20 The selenium concentrations identified in each borehole on both occasions exceeded the WHO drinking water value of 10  $\mu\text{g l}^{-1}$ ; no EQS value exists for selenium. No other exceedances of toxic or phytotoxic metals were identified during analysis of groundwater samples.

#### *Petroleum Hydrocarbons*

- 5.21 No screening values exist for carbon banded hydrocarbons in groundwater, however EQS values do exist for benzene (30  $\mu\text{g l}^{-1}$ ), toluene (40  $\mu\text{g l}^{-1}$ ) and xylene (30  $\mu\text{g l}^{-1}$ ). The only contamination identified in excess of the appropriate EQS value was identified in the sample collected from BH01 on 8<sup>th</sup> January which contained 190  $\mu\text{g l}^{-1}$  benzene. This sample also contained concentrations of gasoline range organics (980  $\mu\text{g l}^{-1}$ ) and ethyl benzene (110  $\mu\text{g l}^{-1}$ ) far greater than those concentrations identified in samples taken from other boreholes. The sample collected from BH01 on 25<sup>th</sup> January contained only 44  $\mu\text{g l}^{-1}$  of gasoline range organics and trace concentrations of the BTEX compounds.
- 5.22 In addition to the above, petroleum hydrocarbon concentrations in exceedance of the laboratory limit of detection was identified in waters sampled from BH01 and BH04 on both monitoring occasions. BH01 contained a total hydrocarbon concentration of 1000  $\mu\text{g l}^{-1}$  attributable to the short chain hydrocarbons discussed in the previous paragraph. Groundwater sampled from BH04 was found to contain a total of 9300  $\mu\text{g l}^{-1}$  and 1500  $\mu\text{g l}^{-1}$  of total hydrocarbons which was attributable to hydrocarbons of the carbon range C12 to C35.
- 5.23 Petroleum hydrocarbon concentrations exceeded the limit of detection on one occasion in BH02 (390  $\mu\text{g l}^{-1}$ ) and BH05 (1400  $\mu\text{g l}^{-1}$ ). Both concentrations were attributable to longer chain hydrocarbons (C16 to C35); no appropriate screening value exceeds for such contamination.

### *Polyaromatic Hydrocarbons*

- 5.24 Naphthalene concentrations exceeded the EQS value of  $5 \mu\text{g l}^{-1}$  in samples taken from BH01 on two occasions ( $28 \mu\text{g l}^{-1}$  and  $4.9 \mu\text{g l}^{-1}$ ) and BH04 on a single occasion ( $10 \mu\text{g l}^{-1}$ ). Benzo(a)pyrene concentrations exceeded the WHO drinking waster standard of  $0.7 \mu\text{g l}^{-1}$  on a single occasion in samples collected from BH02 ( $5.0 \mu\text{g l}^{-1}$ ) and BH06 ( $3.1 \mu\text{g l}^{-1}$ ). Individual PAH concentrations were identified at relatively high concentrations in the samples collected from BH02 and BH06. BH01 and BH04 contained relatively high concentrations of naphthalene but relatively low concentrations of the other fifteen PAHs analysed.

### *Semi Volatile Organic Compounds*

- 5.25 No significantly elevated SVOC concentrations were identified.

### *Volatile Organic Compounds*

- 5.26 No significantly elevated SVOC concentrations were identified.

### **Surface Water Analysis**

- 5.27 The two samples collected from Kinkerdale Brook were found to contain slightly elevated concentrations of copper ( $6.7 \mu\text{g l}^{-1}$  and  $5.2 \mu\text{g l}^{-1}$ ) in comparison to the adopted EQS value of  $5 \mu\text{g l}^{-1}$ . No other significantly elevated contaminant concentrations were identified in the samples collected from the Beck.
- 5.28 Copper concentrations identified in soil samples taken from across the site are not considered to be significantly elevated. The concentration identified in SW1 (upstream) is greater than that identified in SW2 (downstream) which suggests that the elevated copper concentrations identified originate upstream of the site.
- 5.29 In general, the contaminant concentrations of the two surface water samples were found to be similar which suggests that the site is having no discernable detrimental impact upon this surface water.
- 5.30 The concentration of boron was significantly higher in SW1 while the concentrations of both nickel and zinc were greater in SW2. The concentration of organic contaminants was found to be very similar in each sample however, SW1 contained  $4 \mu\text{g l}^{-1}$  chloroform compared to  $2 \mu\text{g l}^{-1}$  which was identified in SW2.

### **Summary of Results**

- 5.31 No ground contamination has been identified in excess of the adopted soil screening values. Relatively low concentrations of a variety of SVOCs and VOCs were identified at several locations; notably cabazole and dibenzofuran. As there are no appropriate screening values for such contaminants concentrations in exceedance of the limit of detection have been considered elevated.

- 5.32 Asbestos in the form of Amosite (Brown) asbestos was identified in TP10 at a depth of 0.0-0.3 m.bgl. Visual inspection of soils and laboratory inspection of six further samples did not identify further asbestos contamination.
- 5.33 Groundwater samples were found to contain contamination in the form of PAHs (BH02 and BH06) or PAHs and petroleum hydrocarbons (BH01 and BH04)
- 5.34 Analysis of the two surface water samples collected from locations along Kinkerdale Brook upstream and downstream of the identified contamination sources suggest that the site is not having a significant impact on the Beck.

**Table 5A - Summary of Soil Chemical Data**

Determinant	No. of samples	Min conc. mg kg <sup>-1</sup>	Max conc. mg kg <sup>-1</sup>	Mean conc. mg kg <sup>-1</sup>	Screening value mg kg <sup>-1</sup>	Elevated conc's No	US <sub>95</sub> mg kg <sup>-1</sup>
Arsenic	25	3	250	22.88	500	0	40.88
Cadmium	25	0.3	2.90	0.7	1400	0	0.97
Chromium	25	4.5	390	88.47	5000	0	121.63
Copper	25	6	210	33.28	Na	na	48.17
Lead	25	2	710	35.36	750	0	105.04
Mercury	25	0.6	17.0	1.97	480	0	3.25
Nickel	25	0.9	110	17.20	5000	0	24.79
Selenium	25	3	17	4	8000	0	5.19
Zinc	25	7.2	1200	273.53	Na	na	408.1
PH Value	25	7.93	12.41	8.96	Na	na	na
<b>Petroleum Hydrocarbons</b>							
MTBE	15	0.01	0.01	0.01	Na	na	0.01
Benzene	15	0.01	0.01	0.01	1.67	0	0.01
Toluene	15	0.01	0.01	0.01	150	0	0.01
Ethyl Benzene	15	0.01	0.01	0.01	48000	0	0.01
M & P xylene	15	0.01	0.01	0.01	344	0	0.01
O xylene	15	0.01	0.01	0.01	344	0	0.01
Aliphatic C5-C6	15	0.01	1.8	0.13	94.6	0	0.34
Aliphatic C6-C8	15	0.01	6.7	0.46	241	0	1.24
Aliphatic C8-C10	15	0.01	13	0.92	64.1	0	2.44
Aliphatic C10-C12	15	0.01	17	1.43	31300	0	3.44
Aliphatic C12-C16	15	0.1	120	17.72	31300	0	32.15
Aliphatic C16-C21	15	0.1	230	33.43	614000	0	61.08
Aliphatic C21-C35	15	0.1	730	79.30	614000	0	166.81
Aromatic C6-C7	15	0.01	0.01	0.01	41.6	0	0.01
Aromatic C7-C8	15	0.01	0.01	0.01	46.8	0	0.01
Aromatic C8-C10	15	0.01	19	1.34	106	0	3.57
Aromatic C10-C12	15	0.01	26	2.17	608	0	5.26



Aromatic C12-C16	15	0.1	130	14.83	12500	0	30.82
Aromatic C16-C21	15	0.1	280	31.47	9210	0	64.75
Aromatic C21-C35	15	0.1	790	107.46	9210	0	205.24
<b>Polyaromatic hydrocarbons</b>							
Napthalene	15	0.013	14	2.35	290	0	4.53
Acenaphthylene	15	0.005	1.3	0.23	Na	na	0.43
Acenaphthene	15	0.014	57	6.03	88000	0	13.17
Fluorene	15	0.012	25	2.49	58700	0	5.45
Phenanthrene	15	0.021	16	3.8	58600	0	6.39
Anthracene	15	0.009	19	2.37	440000	0	4.70
Fluoranthene	15	0.025	38	7.61	2810	0	12.95
Pyrene	15	0.028	26	5.5	44000	0	9.29
Benzo(a)anthracene	15	0.034	10	2.73	281	0	4.5
Chrysene	15	0.019	11	2.7	28100	0	4.45
Benzo(b)fluoranthene	15	0.018	14	3.7	281	0	6.17
Benzo(k)fluoranthene	15	0.024	4.8	1.4	281	0	2.28
Benzo(a)pyrene	15	0.012	7.0	2.09	28.1	0	3.41
Indeno(123cd)pyrene	15	0.011	4.5	1.27	281	0	2.06
Dibenzo(ah)anthracene	15	0.008	1.9	0.52	281	0	0.86
Benzo(ghi)perylene	15	0.011	5.5	1.43	44000	0	2.34

Exceedances marked in **bold** font.

**Table 5B – Summary of Groundwater Chemical Data**

Determinant	No. of samples	Min conc. mg kg <sup>-1</sup>	Max conc. mg kg <sup>-1</sup>	Mean conc. mg kg <sup>-1</sup>	EQS Value ug kg <sup>-1</sup>	Elevated conc's No
<b>Arsenic</b>	12	6	<b>26</b>	16.27	25	<b>1</b>
Cadmium	12	0.4	0.5	0.45	2.5	0
<b>Chromium</b>	12	1	<b>33</b>	7.82	15	<b>1</b>
<b>Copper</b>	12	1	<b>8.2</b>	3.19	5	<b>1</b>
Lead	12	0.5	6.4	2.63	25	0
Mercury	12	0.01	0.01	0.01	0.3	0
Nickel	12	4	17	8.19	30	0
Selenium	12	7	77	50.55	na	na
Zinc	12	3	15	6.45	40	0
PH Value	12	7.55	9.1	8.22	na	na
<b>Petroleum Hydrocarbons</b>						
MTBE	12	10	10	10.00	na	na
<b>Benzene</b>	12	10	<b>190</b>	26.08	30	<b>1</b>
Toluene	12	10	28	11.50	40	0
Ethyl Benzene	12	10	110	19.25	na	na
M & P xylene	12	10	11	10.08	30	0
O xylene	12	10	10	10.00	30	0
GRO C4-C12	12	10	980	94.00	na	na

Aliphatic C5-C6	12	10	350	38.33	na	na
Aliphatic C6-C8	12	10	130	20.00	na	na
Aliphatic C8-C10	12	10	19	10.75	na	na
Aliphatic C10-C12	12	10	43	12.75	na	na
Aliphatic C12-C16	12	10	6100	587.27	na	na
Aliphatic C16-C21	12	10	410	61.91	na	na
Aliphatic C21-C35	12	10	770	175.45	na	na
Aromatic C6-C7	12	10	190	26.08	na	na
Aromatic C7-C8	12	10	28	11.50	na	na
Aromatic C8-C10	12	10	160	23.42	na	na
Aromatic C10-C12	12	10	64	14.83	na	na
Aromatic C12-C16	12	10	2000	259.00	na	na
Aromatic C16-C21	12	10	110	29.09	na	na
Aromatic C21-C35	12	10	440	82.73	na	na
<b>Polyaromatic hydrocarbons</b>						
Napthalene	12	0.1	<b>28</b>	4.53	5	3
Acenaphtylene	12	0.011	1	0.19	na	na
Acenaphthene	12	0.015	3.2	0.49	na	na
Fluorene	12	0.014	2.2	0.34	na	na
Phenanthrene	12	0.022	6.5	0.97	na	na
Anthracene	12	0.015	3.3	0.44	na	na
Fluoranthene	12	0.017	11	1.58	na	na
Pyrene	12	0.015	8.1	1.22	na	na
Benzo(a)anthracene	12	0.017	4.7	0.71	na	na
Chrysene	12	0.013	4	0.62	na	na
Benzo(b)fluoranthene	12	0.023	6.4	1.01	na	na
Benzo(k)fluoranthene	12	0.027	2.4	0.41	na	na
Benzo(a)pyrene	12	0.009	5	0.79	na	na
Indeno(123cd)pyrene	12	0.014	3	0.49	na	na
Dibenzo(ah)anthracene	12	0.016	0.86	0.15	na	na
Benzo(ghi)perylene	12	0.016	3.9	0.67	na	na

Exceedances marked in **bold** font.

## 6 ENVIRONMENTAL RISK ASSESSMENT

- 6.1 A qualitative risk assessment (QRA) has been undertaken in line with current guidance to provide a preliminary indication of the significance of elevated contaminant concentrations identified during the intrusive investigation.
- 6.2 The overall aim of the QRA is to characterise areas of concern and to identify those areas that might require further investigation in order to make an informed decision with respect to the potential risk that the site poses to the environment and future development.
- 6.3 The results of field observations, field measurements and the chemical analysis of samples collected during the intrusive investigation constitute the hazard identification stage of the risk assessment process. These hazards or sources of contamination will be assessed further in relation to the initial CSM produced in Section 2 of this report in order to identify significant pollutant linkages with respect to the proposed site end use.

### *Conceptual Site Model*

- 6.4 The preliminary CSM has been updated on the basis of the findings of the intrusive investigation and subsequent monitoring programme.

### *Identified Contamination*

#### Soils:

- Relatively low concentrations of a variety of SVOCs and VOCs; notably carbazole and dibenzofuran at several locations). No suitable screening values exist for such compounds; and
- Asbestos in the form of Amosite (Brown) asbestos at a single shallow location (TP10).

#### Groundwater:

- Petroleum hydrocarbon contamination; (BH01, BH02, BH04, BH06); and
- PAH Contamination (principally naphthalene); (BH01, BH02, BH04, BH06).

### *Receptors of Contamination*

- 6.5 The following receptors could potentially be affected by the identified contamination;

#### Human Health:

- Site users (current and future);
- Off site receptors; and

- Construction workers.

Controlled Waters:

- Shallow groundwater;
- Non-Aquifer (Mercia Mudstone);
- Kinkerdale Beck; and
- Tees Estuary.

- 6.6 The Non-Aquifer may be provided some protection by the overlying Glacial Till, however, due to uncertainty as to the thickness and presence of this strata across the entire site, the Non-Aquifer remains a potential receptor.

*Contaminant Migration & Exposure Pathways*

- 6.7 Potential migration and exposure pathways that may be relevant to the site include:

Human Health:

- Inhalation of asbestos fibres

Controlled Waters:

- lateral migration of contaminated groundwater to Kinkerdale Beck and River Tees;
- Vertical migration of contaminated groundwater to the underlying Non Aquifer. (some protection may be afforded by the presence of Glacial Till)

***Risk Characterisation and Evaluation***

- 6.8 The risk characterisation and evaluation refers to the conceptual model and takes account of mitigating circumstances that relate to the site and the proposed redevelopment. The significance of any potential risk or liability is therefore evaluated.

*Human Health*

- 6.9 The only significant ground contaminant to be identified during the intrusive investigation was asbestos which may pose a significant risk to construction workers in close contact with disturbed ground during excavation works. Should dust be generated during such works site users and off site users may also be at risk. During such works personal protective equipment comprising particulate face masks and disposable clothing should be issued and worn by persons in close contact with exposed ground. Dust mitigation measures must be implemented to prevent fugitive dust.
- 6.10 The risk to current site users is considered to be low as the ground is not being significantly disturbed in its present state. The risk to future site users from asbestos is considered to be low as it is likely that the redevelopment will result in the entire site being covered in building

structures, hard standing or soft landscaping which will require the importation of topsoil cover. Such features will result in the breaking of the exposure pathway. Current and future site users are unlikely to be in continued direct contact with contaminated soils.

- 6.11 There is the potential that contamination not identified during the site investigation may be present on site. Should this be identified during redevelopment works, further investigation including its identification and delineation may be required together with an appropriate remediation strategy.
- 6.12 There is no apparent pathway linking human health receptors with contaminated shallow groundwater and therefore no significant risk exists.

#### Controlled Waters

- 6.13 The contaminants identified in shallow groundwater were not identified in soils during the intrusive investigation. It must be noted however, that hydrocarbon refinement and storage has historically occurred on site which has the potential to have resulted in significant ground contamination not identified during the intrusive investigation. There is the potential that hydrocarbon ground contamination once present on site has been mobilised and is now present in the shallow groundwater.
- 6.14 The indicated Non-Aquifer which underlies the shallow groundwater identified in the alluvium is likely to provide significant protection to the underlying Major Aquifer associated with the Sherwood Sandstone Formation. Groundwater migration within the Non-Aquifer is likely to be limited to fractures and weaknesses and although the depth of this aquifer is not known, it is likely to be considerable. Further protection to both the Major Aquifer and Non-Aquifer is likely to be afforded by the Glacial Till identified beneath the alluvial deposits.
- 6.15 Groundwater underlying the site has been identified as being affected by tidal fluctuations and is therefore considered to be in direct hydraulic continuity with the River Tees.
- 6.16 Although significant groundwater contamination has been identified beneath the site, analysis of two samples collected from Kinkerdale Beck do not indicate any evidence of contamination resulting from this contaminated groundwater.
- 6.17 Due to the significant dilution factors that will be operating, it is considered highly unlikely that the identified shallow groundwater contamination will have a discernable impact on the River Tees.

#### Summary

- 6.18 Asbestos is the only contaminant identified during the investigation which may pose a significant risk to human health, however this is not considered to represent a significant risk to current site users and the associated risks can be controlled during redevelopment and future

use of the site. No soil contaminants were identified at a concentration greater than the adopted screening values.

- 6.19 Shallow groundwater associated with the alluvial deposits identified on site contains elevated concentrations of metals and organic contaminants. This however, is not considered to represent a significant risk to human health as no complete pollutant linkages have been identified.
- 6.20 The shallow groundwater contamination does not appear to be having a detrimental impact upon Kinkerdale Beck and the dilution factors associated with the River Tees suggests that it is unlikely to have a discernable impact upon this. The underlying deposit of Glacial till may provide some protection to the underlying Non-Aquifer which will in turn provide significant protection to the underlying Major Aquifer due to its significant thickness and low permeability.

## 7 GROUND GAS RISK ASSESSMENT

- 7.1 This ground gas risk assessment has been undertaken with reference to CIRIA C665, 'Assessing risks posed by hazardous ground gases to buildings', 2007. This document makes reference to two distinct methods of ground gas risk assessment, Situation A and B. Situation A was developed by Wilson and Card, 1999 and has been widely used prior to CIRIA C665 being published for ground gas risk assessment. This has now been adopted for all types of development except for low rise housing.
- 7.2 Situation B was proposed by Boyle and Witherington (2006) and has been further developed by the NHBC for use specifically with low rise housing that has a block and beam floor and a ventilated under floor void. Both methods of ground gas risk assessment include the derivation of a Gas Screening Value (GSV) based on identified carbon dioxide and methane concentrations and borehole flow rates. The following formula is used to calculate the GSVs:

$$\text{GSV (l/hr)} = \text{borehole flow rate (l/hr)} \cdot \text{gas concentration (\%)}$$

- 7.3 Gas Screening Values (GSV) have been derived by combining data on both gas concentrations and borehole flow rates, thereby, establishing the rate at which hazardous soil gas will be emitted from the ground. This allows the derivation of a "Characteristic Situation" for a site, ranging from 1 - Low Risk to 6 - High Risk. The Characteristic Situations, and corresponding hazardous gas emission rates are tabulated below:

**Table 1 – CIRIA C665 Characteristic Situations**

Characteristic Situation	Risk Classification	Gas Screening Value (l/hr)
1	Very Low	<0.07
2	Low	<0.7
3	Moderate	<3.5
4	Moderate to High	<15
5	High	<70
6	Very High	>70

Taken from CIRIA C665.

- 7.4 For this assessment RPS has taken a worst case approach by applying the maximum peak gas volume of methane and carbon dioxide identified during the entire monitoring period. The maximum identified peak volumes for methane and carbon dioxide are as follows:
- Maximum peak methane concentration: 0.1% v/v.
  - Maximum peak carbon dioxide concentration: 3.9% v/v.
  - Maximum peak flow rate: 0.2 l/hr.
- 7.5 A GSV may be calculated using these parameters in accordance with the above methodology. The corresponding GSV for the site is therefore:

- GSV (methane) = 0.0002 l/hr.
- GSV (carbon dioxide) = 0.0078 l/hr.

7.6 By comparison with the above table, this worst-case assessment indicates that methane and carbon dioxide conditions at the site correspond to Characteristic Situation 1 (Very Low Risk).

#### ***Gas Protection Measures***

7.7 According to CIRIA C665 no special precautions are necessary where Characteristic Situation 1 has been identified.



## 8 CONCLUSIONS AND RECOMMENDATIONS

### *Summary of Contamination*

- 8.1 No ground contamination has been identified in excess of the relevant soil screening values. Relatively low concentrations of a small variety of SVOCs and VOCs were identified at a few locations; notably cabazole and dibenzofuran. No guideline values protective of either human health or controlled waters have been assigned to these compounds.
- 8.2 Asbestos in the form of Amosite (Brown) asbestos was identified in TP10 at a depth of 0.0-0.3 m.bgl. Visual inspection of soils and laboratory inspection of six further samples did not identify any further asbestos contamination.
- 8.3 Shallow groundwater samples were found to contain contamination in the form of metals, PAHs (BH02 and BH06) or PAHs and petroleum hydrocarbons (BH01 and BH04).

### *Risk Assessment*

#### *Human Health*

- 8.4 Asbestos was the only significant ground contaminant to be identified. This may pose a significant risk to construction workers who are in close contact with freshly exposed ground during redevelopment or other excavation works. Should dust be generated during such works, site users and off site users may also be at risk. Personal protective equipment comprising particulate face masks and disposable clothing should be issued and worn by persons in close contact with exposed ground. Dust mitigation measures will be necessary to prevent fugitive dust.
- 8.5 The risk to current site users is considered to be low as the ground is not being significantly disturbed at present. The risk to future site users is considered to be low as it is likely that the future industrial redevelopment of the site will result in the entire site being covered in building structures, hard standing or landscaping (which will require the importation of topsoil cover). Such features will result in a break in the exposure pathway.
- 8.6 There is the potential that contamination not identified during the site investigation may be present on site. Should this be identified during redevelopment works, further investigation including its identification and delineation may be required together with an appropriate remediation strategy.
- 8.7 There is no apparent pathway linking human health receptors with contaminated groundwater and therefore no significant risk is considered to exist.

### Controlled Waters

- 8.8 Significant shallow groundwater contamination in the form of metals, PAHs and petroleum hydrocarbons has been identified. These contaminants were not identified in soils during the intrusive investigation. There is the potential that soil contamination once present on site, has been mobilised and is now present within the shallow groundwater.
- 8.9 The shallow groundwater contamination does not appear to be having a detrimental impact upon Kinkerdale Beck and the dilution factors associated with the River Tees suggests that it is unlikely to have a discernable impact upon this. The underlying deposit of Glacial Till may provide some protection to the underlying Non-Aquifer which will in turn provide significant protection to the underlying Major Aquifer as a result of its significant thickness and low permeability.

### Ground Gas

- 8.10 The ground gas risk assessment was undertaken with reference to CIRIA C665. Characteristic Situation 1 (very low risk) has been identified; therefore no precautionary measures are necessary.

### Recommendations

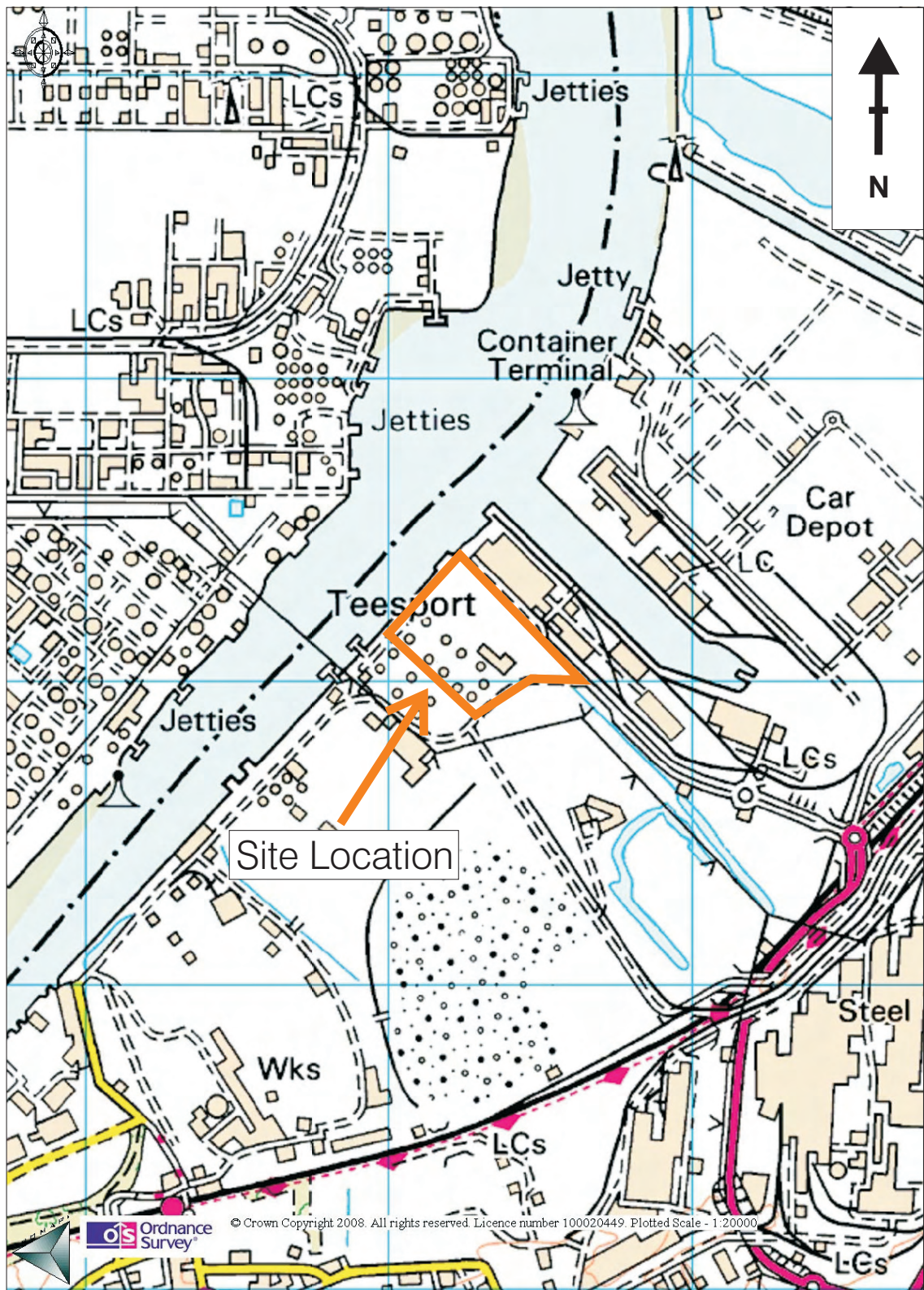
- 8.11 This report has identified limited ground contamination (asbestos) and groundwater contamination comprising metals, petroleum hydrocarbons and polyaromatic hydrocarbons. It would be prudent to place liability for future contamination of the site to future occupiers under the proposed lease agreement providing such contamination can be identified as being caused by that tenant.
- 8.12 On the basis of the findings of this investigation, no further intrusive investigation works for the purposes of human health or controlled waters risk assessment are considered necessary at this time.
- 8.13 The presence of in excess of six metres of non engineered imported fill located across much of the site may be a significant development constraint from a geotechnical perspective and should be considered at an early stage during the design. It is recommended that a full geotechnical ground investigation is carried out prior to the onset of any future redevelopment.
- 8.14 If this report is to be used for the purposes of supporting a planning application associated with future industrial redevelopment, the report should be submitted to the Local Authority for approval prior to the onset of redevelopment works.
- 8.15 The Environment Agency (via the Local Authority) should be consulted with regard to the identified shallow groundwater contamination. Such contamination may be widespread in the region as a whole and as such remediation of this site alone would not be feasible. Although the identified shallow groundwater contamination is not considered to represent a significant constraint on future development there is the potential that the Environment Agency could request further

investigation and subsequent remediation under the planning regime or Part IIA Environmental Protection Act 1990.

- 8.16 Due to the potential for asbestos contamination and other unidentified ground contamination, care should be taken during future intrusive works. Personnel in close contact with soils should be made aware of the potential risks and provided with sufficient personal protective equipment including particulate face masks and disposable clothing. Measures should also be implemented to mitigate the generation of fugitive dust that might represent a significant risk to site users or off site users.
- 8.17 There is the potential that contamination not identified during the site investigation may be present on site. Should this be identified during redevelopment works, further investigation including its identification and delineation may be required together with an appropriate remediation strategy.
- 8.18 The developer should be made aware that these additional considerations may also be necessary prior to redevelopment.
- 8.19 Environment Agency flood maps indicate that the site is located within a flood zone and the site is in excess of one hectare in area. Future redevelopment should therefore be preceded by a formal Flood Risk Assessment under PPS25. RPS has considerable expertise in this field and a fee quotation can be provided upon request.
- 8.20 As of April 2008 all new commercial properties require an Energy Performance Certificate. RPS can provide a fee quote for such works upon request.
- 8.21 There is the potential, depending on end use, that future tenant of the site will require an Integrated Pollution, Prevention and Control (IPPC) permit; this investigation may be suitable to support this application. RPS has considerable expertise in this field and can provide support upon request.

Figure 1  
Site Location Plan





Project: QEII Jetty, Teesport

Project Number: RCM4738

Date: February 2008

Scale: Not To Scale

Figure 1: Site Location Plan

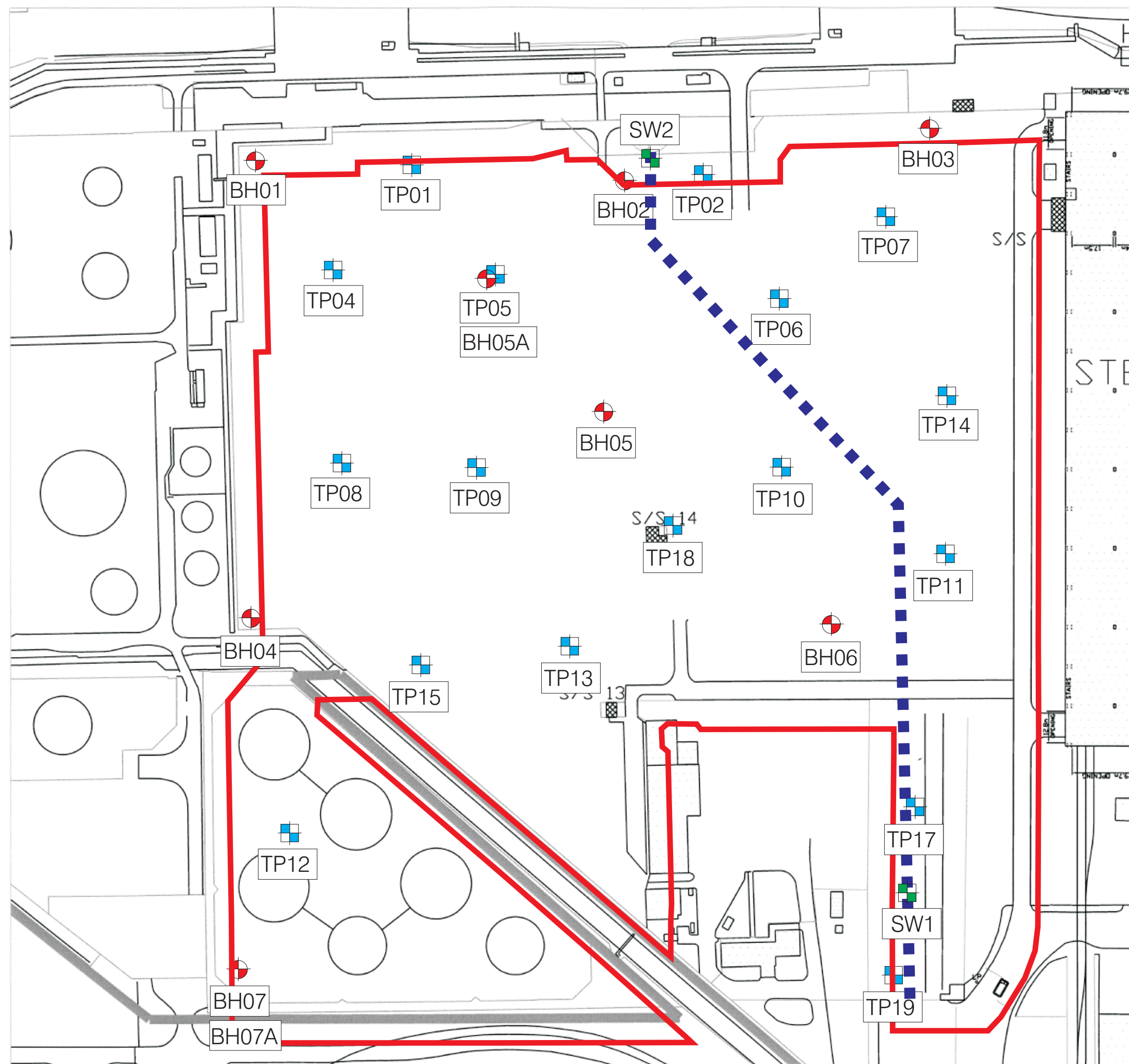
Based on Ordnance Survey maps with sanction of the Controller of H M Stationary Office.  
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Figure 2  
Sample Point Location Plan



- Study Area Boundary
- - - Approximate Line Of Culvert
- Trial Pit Location
- Borehole Location
- Surface Water Sample Location

Project: QEII Jetty, Teesport  
 Project Reference: RCM4738  
 Date: February 2008  
 Scale: Not To Scale  
 Figure 2: Sample Point Location Plan



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Appendix A  
Phase I Environmental Review  
(Environ, 66-C11294)



**FINAL**  
**Phase I Environmental Review**  
**Land off Tees Dock Road,**  
**Teesport, Middlesbrough**  
  
**PD Teesport**

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Contract/Proposal No:	66-C11294
Issue:	2
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Date:	12 <sup>th</sup> January 2007

*This report has been prepared by ENVIRON with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. This report is confidential to the client, and ENVIRON accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by ENVIRON beforehand. Any such party relies upon the report at their own risk.*

*ENVIRON disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.*

#### VERSION CONTROL RECORD

ISSUE	DESCRIPTION OF STATUS	DATE	REVIEWER INITIALS	AUTHORS INITIALS
A	First Draft	7/12/2006	SGR	JB
1	First Release to Client	22/12/2006	SGR	JB
1A	Second Draft	10/1/2007	SGR	JB
2	Second Release to Client	12/1/2007	SGR	JB

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**FIGURE 1** SITE LOCATION PLAN

**FIGURE 2**     *SITE LAYOUT PLAN*

**ANNEX A**     *HISTORICAL MAPS*

## ***EXECUTIVE SUMMARY***

ENVIRON UK Limited (ENVIRON) was commissioned by PD Teesport (the “Client”) to undertake a Phase I Environmental Review of land located off Tees Dock Road, Teesport, Middlesbrough. It is understood that the client is considering providing a long term lease of the land for the development and operation of a Biomass Plant. The land was formerly part of a historic Shell Oil Refining operation, which extended across a much wider part of the Teesport area.

The objectives of the review were to assess the potential for ground contamination, both at and in the vicinity of the site, and assess its significance in terms of risks to current and future site occupants and potential liabilities to the site owner. For example, this includes the possibility of investigation and clean-up actions being enforced by the Regulatory Authorities or other parties.

In particular it is known that the site was formerly occupied by Shell Oil Company for Refining of Crude Oil, and this may have resulted in historical contamination of soils/groundwater at the site. The Client wishes therefore to establish a “baseline”, prior to agreement of the Lease for development of the site, as well as determining if there are any residual contamination issues which might need to be addressed to permit the development to proceed.

The findings of the Phase 1 Environmental Review may be summarised as follows:

- The site is currently owned by PD Ports, but activities are limited to storage of steel goods for import/export, and a Depot. There are areas of waste “fly-tipping” and leakages from electrical transformers. Overall, ENVIRON considers that the possibility of significant ground contamination having occurred at the site due to current/recent activities is ***low to moderate***;
- The site was occupied by an undeveloped intertidal foreshore of open sands, associated with the banks of the River Tees. A channel emanating from the sands flowed through the centre of the site towards the River Tees immediately north. Half of the site, (to the west of the channel) was reclaimed by 1950 and by 1954/55 Tees Dock Road had been constructed alongside the channel bisecting the site. By 1965 the entire site had been reclaimed and the western part of the site was developed with several large circular features annotated as Tanks, a chimney and several small buildings collectively annotated as a Depot which represents the occupation by Shell. By 1973 a large Transit Shed had been constructed on the eastern half of

the site. By 2000 the circular tanks and most structures on the western part of the site had been demolished and the site remained unchanged according to the 2004 map. Shell occupied the site from the mid 1960s until 1988 and used it for the storage of refined petroleum products. The potential for contamination resulting from the historic uses of the site is **high**;

- The surrounding area has generally been associated with the River Tees banks reclamation since the early 1900s. Raised areas of land associated with a Slag Reduction Works were present 800m south-west, but were extended to within 250m south-west by the 1950s. This corresponds with a current landfill operated by Impetus Waste Management, 270m south of the site, for household, commercial and industrial wastes. A series of small rectangular buildings and one angular building, collectively annotated as Teesport, were constructed on the newly reclaimed land, 100m south-west by 1929. By 1950, the small buildings associated with Teesport 100m south-west of the site had been demolished. Two large circular features, possibly tanks, had been erected on this land, immediately south-west of the site. By the mid-1950s a Gun Emplacement (disused) was annotated 100m south-east of the site. By the mid-1960s, Tees Dock (approximately 900m long) had been excavated and developed immediately north-east of the site, lying in a north-west/south-east orientation, fed from the River Tees. Additional large circular features had been erected immediately south-west of the site. During the 1970s and 1980s, the entire area surrounding the Dock was developed with buildings and circular tanks but by 1993 all of the tanks had been removed and the area annotated as Teesport Refinery. Only one large tank remained. The potential for contamination to exist at the site as a result of off-site activities is considered **high**;
- The site is underlain by Made Ground (associated with the reclamation of the banks of the River Tees). The Made Ground is underlain by drift deposits of Estuarine and Marine Alluvium (Minor Aquifer) underlain by solid strata of Mercia Mudstone Group (Keuper Marls) (Non-Aquifer). The Mercia Mudstone is underlain by the Sherwood Sandstone Group (Major Aquifer). There are no sensitive groundwater abstractions within 2km of the site, and the site is not located within a groundwater Source Protection Zone. Overall the site is considered to be of **low to moderate** hydrogeological sensitivity; and
- The nearest surface watercourse (River Tees) is located immediately north of the site, and Kinkerdale Beck flows in a culvert through the site. Given their distance from the site, these watercourses are considered vulnerable to site-derived contamination (if any) and the site is located within a flood plain. There are no sensitive surface water abstractions within 2km of the site. Overall the site is considered to be of **moderate to high** hydrological sensitivity.

In the UK, a risk-based approach is used to assess the potential impact associated with ground contamination. There are significant potential sources of contamination, and several receptors present at and in the vicinity of the site. Overall there is considered to be a ***moderate to high*** potential for significant soil and ground contamination (depending on the extent of any clean-up that may have been carried out by Shell on its exit from the site).

Since the site is proposed to be redeveloped in the future a Phase II intrusive investigation and Remedial Strategy would be required as part of the Planning Process, by the Council.

The Investigation should examine the degree of residual contamination present at the site, and also the pathways through which this might impact sensitive receptors at and in the vicinity of the site. Through Quantitative Risk Assessment the Remedial requirements for the proposed development can be determined, and a suitable Strategy developed.