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## Key Words

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<th>Meaning or Explanation</th>
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<tr>
<td>Carbon</td>
<td>An element, but used as shorthand for its gaseous oxide, CO₂</td>
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<td>Capture</td>
<td>Collection of CO₂ from power station combustion process or other facilities and its process ready for transportation.</td>
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<td>Dense Phase</td>
<td>Fluid state that has a viscosity close to a gas while having a density closer to a liquid. Achieved by maintaining the temperature of a gas within a particular range and compressing it above a critical pressure.</td>
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<tr>
<td>Key knowledge</td>
<td>Information that may be useful if not vital to understanding how some enterprise may be successfully undertaken.</td>
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<tr>
<td>Storage</td>
<td>Containment in suitable pervious rock formations located under impervious rock formations usually under the sea bed.</td>
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<td>Transport</td>
<td>Moving processed CO₂ by pipeline from the capture and process unit to storage.</td>
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<td>Offshore platform</td>
<td>An offshore structure that is permanently fixed to the seabed</td>
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<td>Topsides</td>
<td>The upper half of the platform, located on the Jacket structure above the sea level, outside the splash zone, on which equipment is installed.</td>
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<tr>
<td>Jacket</td>
<td>The steel frame, located on the seabed, supporting the deck and the topsides in a fixed offshore platform.</td>
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Executive Summary

This report is one of a series of reports; these “key knowledge” reports are issued here as public information. These reports were generated as part of the Front End Engineering Design Contract agreed with the Department for the Environment and Climate Change (DECC) as part of the White Rose Project.

White Rose seeks to deliver a clean coal-fired power station using oxy-fuel technology fitted with Carbon Capture Storage (CCS), which would generate up to 448MWe (gross) while capturing at least 90% of the carbon dioxide (CO$_2$) emissions. CCS technology allows the carbon dioxide produced during combustion to be captured, processed and compressed before being transported to storage in dense phase. The dense phase carbon dioxide would be kept under pressure while it is pumped through an underground pipeline to the seashore and then through an offshore pipeline to be stored in a specially chosen rock formation under the seabed of the southern North Sea.

Delivery of the full-chain project is being provided by National Grid Carbon Limited (NGCL), which is responsible for the T&S network, and Capture Power Limited (CPL), which is responsible for the Oxy Power Plant (OPP) and the Gas Processing Unit (GPU).

This “key knowledge deliverable” (KKD) provides the offshore plot plan in such detail as would meet the regulatory requirements should such a requirement arise.
1 Introduction

National Grid Carbon Limited (NGCL) is a wholly owned subsidiary of the National Grid group of companies. Capture Power Limited (CPL) is a special purpose vehicle company, which has been formed by a consortium consisting of General Electric (GE), Drax and BOC, to pursue the White Rose CCS Project (the WR Project).

CPL have entered into an agreement (the FEED Contract) with the UK Government’s Department of Energy and Climate Change (DECC) pursuant to which it will carry out, among other things, the engineering, cost estimation and risk assessment required to specify the budget required to develop and operate the WR Assets. The WR Assets comprise an end-to-end electricity generation and carbon capture and storage system comprising, broadly: a coal fired power station utilising oxy-fuel technology, carbon dioxide capture, processing, compression and metering facilities; transportation pipeline and pressure boosting facilities; offshore carbon dioxide reception and processing facilities, and injection wells into an offshore storage reservoir.

CPL and NGCL have entered into an agreement (the KSC) pursuant to which NGCL will perform a project (the WR T&S FEED Project) which will meet that part of CPL’s obligations under the FEED Contract which are associated with the T&S Assets. The T&S Assets include, broadly: the transportation pipeline and pressure boosting facilities; offshore carbon dioxide reception and processing facilities, and injection wells into an offshore storage reservoir.

A key component of the WR T&S FEED Project is the Key Knowledge Transfer process. A major portion of this is the compilation and distribution of a set of documents termed Key Knowledge Deliverables, of which this document is one.
2 Purpose

The purpose of this document is to provide the offshore plot plan in such detail as would meet the regulatory requirements of the Offshore Installations (Safety Case) Regulations 2005, should such a requirement arise.

Included in this plot plan are:
- main items of equipment;
- Topside Plan, including the vent stacks;
- separate jacket plans at different levels down to seabed; and
- Jacket elevations.
3 Overview

In December 2013 UK Government Department of Energy and Climate Change (DECC) awarded a Front-End Engineering Design (FEED) contract to the White Rose project as part of their CCS Commercialisation Programme.

The project comprises a state-of-the-art coal-fired power plant that is equipped with full CCS technology. The plant would also have the potential to co-fire biomass. The project is intended to prove CCS technology at a commercial scale and demonstrate it as a competitive form of low-carbon power generation and as an important technology in tackling climate change. It would also play an important role in establishing a CO$_2$ transportation and storage network in the Yorkshire and Humber area. Figure 3.1 below gives a geographical overview of the proposed CO$_2$ transportation system.

Figure 3.1: Geographical Overview of the Transportation Facility

The standalone power plant would be located at the existing Drax Power Station site near Selby, North Yorkshire, generating electricity for export to the Electricity Transmission Network (the "Grid") as well as capturing approximately 2 million tonnes of CO$_2$ per year, some 90% of all CO$_2$ emissions produced by the Oxy Power Plant (OPP). The by-product CO$_2$ from the OPP would be compressed and transported via an export pipeline for injection into an offshore saline formation (the reservoir) for permanent storage.

The power plant technology, which is known as Oxyfuel combustion, burns fuel in a modified combustion environment with the resulting combustion gases being high in CO$_2$ concentration. This allows the CO$_2$ produced to be captured without the need for additional chemical separation, before being compressed into dense phase and transported for storage.

The overall integrated control of the End-to-End CCS chain would have similarities to that of the National Grid natural gas pipeline network. Operation of the Transport and Storage System would be undertaken by NGCL. However, transportation of carbon dioxide presents differing concerns to those of natural gas; suitable specific operating procedures would be developed to cover all operational aspects including start-up, normal and abnormal operation, controlled and emergency shutdowns. These procedures would
include a hierarchy of operation, responsibility, communication procedures and protocols. Figure 3.2 below provides a schematic diagram of the overall end-to-end chain for the White Rose CCS Project.

**Figure 3.2: End To End Chain Overall Schematic Diagram**

The proposed location of the platform is as follows:

**Table 3.1: Platform Location**

<table>
<thead>
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<tr>
<td>Northing</td>
</tr>
<tr>
<td>Easting</td>
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<tr>
<td>Water Depth</td>
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The co-ordinate system is UTM Grid Zone 31N, CM 3°E – ED 50.

The drill rig approach is from the South with the conductor field located at Row 1 of the substructure. This face of the substructure is vertical while the other faces are inclined. Platform North points toward geographical North East. A platform schematic is shown below.
Figure 3-1 Platform Schematic
4 Offshore Platform description

The selected concept is a fixed four leg jacket offshore wellhead platform, sitting in 59.3m of water which will be a Normally Unmanned Installation (NUI) designed to last 40 years. The installation would initially have three platform wells for CO\textsubscript{2} injection (3 x 5.5-inch tubing). A total of six conductor slots would be installed to allow future expansion of the number of platform wells and, in future, to install further wells to tie-back to the main platform. The conductor size is confirmed as 30-inch.

The jacket would be lift installed, typical for Southern North Sea operations. The jacket foundation consists of six 72-inch diameter piles with an embedment length of 56m. Early site surveys anticipate hard ground and if driven piles are not feasible then drilled and grouted piles are likely to be more appropriate.

The jacket would house the following appurtenances:
- 1 x 24-inch CO\textsubscript{2} Import riser;
- 1 x 24-inch CO\textsubscript{2} Export riser (spare);
- 2 x 16-inch CO\textsubscript{2} Injection riser (spare);
- 2 x 16-inch Produced Water risers (spare);
- 5 x 12-inch J-tubes for control and 2 x 12-inch J-tubes for power supply;
- 1 x 1500mm Caisson for produced water disposal; and
- 2 x 500mm Seawater lift caisson.

The riser and J-tube routing is designed to suit the positions in the topsides and subsea layouts. The positions of the caissons match the topsides layout. Pump and produced water caissons are vertical.

The Module Support Frame (MSF) will be installed after the jacket installation and made ready to support the main topsides and future module.

The topside structure initially comprises a single lifted unit complete with helideck and platform crane. The structure has four levels and stabs into the MSF on a 20m by 26m footprint. The topsides would have the following facilities:
- Wellheads and manifold;
- Temporary safe refuge and Local equipment rooms;
- Temporary water wash package;
- MEG injection system;
- Helideck with firefighting facilities;
- Platform crane;
- Power generation;
- Fuel and fresh water bunkering;
- Chemical injection;
- Seawater lift pumps;
- PIG trap;
Control system;
- CO₂ and fire detection;
- Life-rafts and a TEMPSC; and
- Wireline equipment (temporary equipment).

In addition, future facilities such as CO₂ booster pumps and future PIG traps would be contained in a future module which would impose additional loads on the MSF structure, jacket and piles. The structure of the offshore platform would be configured to fit with the equipment plot plans and meet all the functional requirements of the structural recommended practice.

Within this report, the jacket gross weight (exclusive of the MSF) is assessed as 2930t with 1400t of piles and the MSF installation weight is assessed as 326t. The main topsides module installation weight is assessed as 2990t while the future module installation weight is assessed as 1595t. The not-to-exceed (NTE) topsides weight was set as 5250t for the jacket analyses.
5 Platform Configuration

5.1 Structural Description

The White Rose Platform would comprise a Normally Unattended Installation (NUI) consisting of a 6 slot Jacket, MSF, main topside and future module supporting a minimum amount of permanent equipment and systems.

The platform would only be manned during wirelining operations and maintenance. Normal access for routine operations is proposed to be by helicopter.

The topsides is a conventional deck supporting the equipment, bulks and a Local Equipment Room (LER) with Emergency Overnight Accommodation (EOA). The platform is orientated with the platform North direction towards the North-East.

The deck is on four levels, which are supported by braced trusses in two orthogonal directions. The weather deck is plated and the mezzanine and cellar decks are generally grated.

The drilling conductors are arranged in a grid on the south side. The platform crane is located over the east side of the main topside. The risers are adjacent to the South-West jacket leg.

The substructure is required to provide support to the risers, J-tubes, caisson and topsides as well as lateral restraint to the conductors. The configuration is a conventional four-leg Jacket with battered faces on the North, East and West sides and vertical face on the South side. Piles would be driven through the sleeves attached to the Jacket legs. The deck would be supported directly on the legs.

The MSF is required to support the main topsides and future module and would be installed after the jacket installation.

Since the area designated to receive the future module would stand empty for a significant duration, further consideration during detail design may be given to temporarily decking this area out for a limited period for use as additional storage/laydown space.

Corrosion protection would be in the form of sacrificial anodes together with an increased wall thickness and protective paint system for members in the splash zone.

The water depth at the platform location has been set at 59.3m LAT.

The primary elements of the Deck, MSF and Jacket structure are shown in Figure 5.1.
Figure 5.1: White Rose Platform
5.2 White Rose Topsides Configuration

5.2.1 General

The topsides comprise main topsides and a future module. It would be a four-level structure comprising weather deck, upper and lower mezzanine decks and cellar deck. A Helideck would be located above the weather deck. The majority of equipment would be situated on the Cellar Deck with major units of piping on the Mezzanine Decks. There would be sufficient space on the Weather Deck for wirelining equipment and associated mast.

Both main topsides and future module would be lift-installed with padeyes on each of the four corner legs.

5.2.2 Primary Framing

The topsides layout would be suitable for a Jack-up rig to approach the platform from the south and access the 6 well slots through hatches in the Weather Deck.

Trusses span along all gridlines which comprise tubular and open sections, utilising the depth across all decks for steelwork efficiency. Orientation of internal truss members has been selected to suit access walkways and equipment requirements.

5.2.3 Equipment

The Weather Deck would be plated and designed to provide dropped object protection to the equipment below. Hatches in the deck structure allow vertical access to the wells, risers, and J-tubes below. Space has been allocated for the Wirelining spread.

The helideck would be cantilevered out over the North-West corner and supported by framework from the north side of the Weather Deck. It is envisaged that the helideck would be a separately fabricated or procured entity which would be mounted over a set of supports on the Weather Deck steelwork.

5.2.4 Substructure Interface

The interface with the substructure would be by means of four stab-in legs on the main topsides and future module. These are welded out to the top of the MSF at (+)23.5m above LAT.

5.3 White Rose Substructure Configuration

5.3.1 Primary Framing

The jacket substructure consists of a four legged structure with skirt piles. The MSF to jacket stab-in cones are located at the top four corners of the jacket at El. +15.5m. The jacket would be inclined on the north, west and east faces and vertical on the south face to allow for jack-up drilling. The top of jacket dimension is set at 20m (E-W) x 26m (N-S) and at the sea bed, the jacket dimension is 44.5m (E-W) x 43.8m (N-S).
The jacket legs are generally cross braced in plan with the exception of El. -56.0m where a diamond brace arrangement is provided. In elevation, “X” bracing is provided at the upper two bays and a “V” bracing arrangement is provided at the lower bay of the jacket to simplify the pile cluster. Additional vertical members are provided for boat impact protection and to reduce the spans of some members. “X” bracing provides superior redundancy to either pure “K” or “V” bracing.

Conductor support framing would be provided at all levels except El. -56.0m and additional framing would be provided to support the appurtenances.

Lift points are provided at El +13.0m and El. -56.0m.

The primary framing of the jacket was generally developed to cater for interfaces with the topsides, appurtenances, risers, caisson and J-tube layout and for transportation and installation restrictions.

5.3.2 Foundations

The jacket foundation consists of six 72-inch diameter piles with an embedment length of 56m.

The jacket would be connected to the foundation via shear plates and pile sleeves with a grouted connection at each pile. The pile sleeves are located to ensure that there would be adequate clearance between the pile hammer and the jacket during installation.

5.3.3 MSF

The MSF would be located between the jacket and the topsides and extends to the west to support the future module. The MSF consists of four main legs with a similar size to the jacket legs and would be cross braced in plan and K-braced in elevation. The deck stab-in would be located at the top of the MSF legs at El. +23.5m.

5.3.4 Appurtenances and Miscellaneous Steel

The dead weight supports of the appurtenances such as risers and caissons are generally provided at El. +13.0m on the jacket with the exception of the produced water caisson where an additional support would be at El. +22.5m on the MSF. All other supports below this level would be guided.
6 Plot Plans, GAs and other Drawings

Copies of the drawings listed below are provided at the Appendix to this report.

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- **Topsides – Plot Plans and Isometrics**
- **Topsides - Piping General Arrangements**
- **Topsides - ATEX classification and HSE Layouts**
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**Jacket – Structural General Arrangement Drawings**

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# Glossary

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<thead>
<tr>
<th>Capitalised Term</th>
<th>Meaning</th>
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<tbody>
<tr>
<td>CCS</td>
<td>Carbon Capture and Storage</td>
</tr>
<tr>
<td>CO₂</td>
<td>carbon dioxide</td>
</tr>
<tr>
<td>CPL</td>
<td>Capture Power Limited</td>
</tr>
<tr>
<td>DECC</td>
<td>The UK Government’s Department of Energy and Climate Change</td>
</tr>
<tr>
<td>FEED</td>
<td>Front End Engineering Design</td>
</tr>
<tr>
<td>FEED Contract</td>
<td>Contract made between DECC and CPL pursuant to which WR Project FEED (as defined) will be performed</td>
</tr>
<tr>
<td>GA</td>
<td>General Arrangement drawing</td>
</tr>
<tr>
<td>GPU</td>
<td>Gas Processing Unit</td>
</tr>
<tr>
<td>KKD</td>
<td>Key Knowledge Deliverable</td>
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<tr>
<td>KSC</td>
<td>Key Services Contract</td>
</tr>
<tr>
<td>LAT</td>
<td>Lowest Astronomical Tide</td>
</tr>
<tr>
<td>LER</td>
<td>Local equipment room</td>
</tr>
<tr>
<td>MEG</td>
<td>monoethylene glycol</td>
</tr>
<tr>
<td>MSF</td>
<td>module support frame</td>
</tr>
<tr>
<td>MWe</td>
<td>Mega-Watts (electric)</td>
</tr>
<tr>
<td>NE</td>
<td>North East</td>
</tr>
<tr>
<td>NW</td>
<td>North West</td>
</tr>
<tr>
<td>NGC KSC</td>
<td>Contract made between CPL and NGC pursuant to which that part of the WR Project FEED (as defined) which appertains to the WR T&amp;S assets will be performed.</td>
</tr>
<tr>
<td>NGC KSC Deliverables</td>
<td>A number of documents and services, the delivery of which is a contractual obligation under the KSC</td>
</tr>
<tr>
<td>NGC EPC Sub-contractors</td>
<td>Contractors providing an offer to develop a part of the WR T&amp;S Assets in pursuance of the WR Development Project</td>
</tr>
<tr>
<td>NGC FEED Sub-contractors</td>
<td>Contractors entering into a contract with NGC to carry out a part of the obligations under the KSC</td>
</tr>
<tr>
<td>NGCL</td>
<td>National Grid Carbon Limited</td>
</tr>
<tr>
<td>NGC WR Team</td>
<td>The NGC team established to meet the obligations in the KSC</td>
</tr>
<tr>
<td>NUI</td>
<td>Normally Unmanned Installation</td>
</tr>
<tr>
<td>OPP</td>
<td>Oxy Power Plant</td>
</tr>
<tr>
<td>PIG</td>
<td>Pipeline Inspection Gauge</td>
</tr>
<tr>
<td>SE</td>
<td>South East</td>
</tr>
<tr>
<td>SW</td>
<td>South West</td>
</tr>
<tr>
<td>T&amp;S</td>
<td>Transport and Storage</td>
</tr>
<tr>
<td>TEMPSYC</td>
<td>Totally enclosed motor propelled survival craft</td>
</tr>
<tr>
<td>TR</td>
<td>Temporary Refuge</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>WR</td>
<td>White Rose</td>
</tr>
<tr>
<td>WR Assets</td>
<td>All those assets that would be developed pursuant to the WR Project</td>
</tr>
<tr>
<td>WR Development Project</td>
<td>A project to develop, operate and decommission the WR Assets which may transpire following the completion of the WR FEED Project</td>
</tr>
<tr>
<td>WR FEED Project</td>
<td>Project to carry out a FEED (as defined in the FEED Contract) with regard to the WR Assets</td>
</tr>
<tr>
<td>WR Project</td>
<td>White Rose CCS Project</td>
</tr>
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### Capitalised Term | Meaning
--- | ---
**WR T&S Assets** | That part of the WR Assets which would carry out the carbon dioxide transportation and storage functions of the WR Project and to which the KSC Contract relates

**WR T&S FEED Project** | The project to be pursued by NGC in order to meet its obligations under the NGC KSC
Appendix Facility Plot Plans and GAs
NOTES

1. PREVAILING WIND FROM SOUTH WEST.
1. PREVAILING WIND FROM SOUTH WEST.
1. PREVAILING WIND FROM SOUTH WEST.
NOTES

1. PREVAILING WIND FROM SOUTH WEST.
Notes:
1. All dimensions are in millimeters.
2. Hatch escape routes & laydown areas are plated.

Hold:
1. Winch size
2. Distance from winch to J-TUBE HATCH
NOTES

1. Personnel attending the platform may be required to carry escape sets on their person. The escape sets shall be of sufficient capacity to enable personnel to reach the EDA.
2. There shall be at least two escape routes provided from each primary deck leading to the EDA. Escape routes shall be provided with fixed stairs (or ramps if practicable) of sufficient width to accommodate stretchers including manover of stretchers on the stair landing.
3. Escape routes shall be clearly marked and provided with direction arrows.
4. Escape routes shall be provided with emergency lighting.
5. Escape routes shall remain clear at all times.
6. Any hinged doors opening onto escape routes shall be self-closing.
7. Any hinged doors opening onto escape routes shall not block the escape route. If there is potential for doors to block the escape route, sliding doors shall be considered. Any doors opening onto escape routes should be self-closing.
8. A wind sock shall be provided at the platform, primary for the purposes of helicopter operation when approaching or leaving the heli-deck.
9. Escape sets, including spare units to be located on the EDA and the Tempest.
10. Additional lifeboat located on the west face of the platform prior to the installation of the future module.

HOLDS

1. Hang off module interface arrangement.

LEGEND

ESCAPE ROUTE

- ESCAPE DIRECTION
- SECONDARY EVACUATION EMERGENCY AREA

SAFETY EQUIPMENT

- LIFEBUOY
- DESCENT DEVICE
- LIFE JACKET
- LIFE RAFT
- COMBINED SAFETY SHOWER AND EYE WASH STATION

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NOTES
1. All dimensions are in millimeters.
2. All dimensions are for pricing purposes only.
3. Drawing to be read in conjunction with reference drawings and
   C001/04/15/20/3832/0021 Specification for Offshore Temporary Refuge
4. The TR building shall have a 900 fire rating.
5. There is no blast rating requirement for the TR.

HOLDS
1. Crane radius

Scale 1:100

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ROOF PLAN - SCALE 1:100 @A3
LER - FLOOR PLAN - SCALE 1:100 ØA3

NOTES
1. All dimensions are in millimeters.
2. All dimensions are for pricing purposes only.
3. Drawing to be read in conjunction with reference drawings and
   C001.04.10.TR/GD200.6801 Specification for Offshore Temporary Refuge
   Equipment Room layout
4. Drawing to be read in conjunction with C001.10.26.99.G0200.9001
   Equipment Room layout

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NOTES
1. FOR GENERAL NOTES, SEE DRAWING NO.
   CO01-12-25-99-GD200-0005
2. FOR TYPICAL PRIMARY JOINT DETAILS, SEE DRAWING NO.
   CO01-12-25-99-GD200-0001
3. MATERIALS ON THIS DRAWING TO BE AS FOLLOWS:
   PLATE GIRDERS - TYPE 2
   ROLLED BEAM SECTIONS - TYPE 4
   CAS TUBES - TYPE 5
   NODES - TYPE 1

HOLD
1. SUPPORT STAB TO VENT BOX

CELLAR DECK PLAN AT EL.+25000 T.O.S.
SCALE 1:100

(PLAN TO BE CBO 360 x 105.6" OR 920 x 265"

SECTION A

KEY PLAN

Scales: 1:500

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LOWER MEZZANINE DECK PLAN AT EL.-30000 T.O.S.

Scale 1:100
ELEVATION ON GRID A

ELEVATION ON GRID B

KEY PLAN

SCALE: 1:100

NOTES
1. FOR GENERAL NOTES, SEE DRAWING NO. C001-12-25-99-GD200-0008-0001
2. FOR TYPICAL PRIMARY JOINT DETAILS, SEE DRAWING NO. C001-12-25-99-GD200-0008-0001
3. MATERIALS ON THIS DRAWING TO BE AS FOLLOWS:
   ROLLED TUBULAR - TYPE 2-A
   HOLLOW SECTION - TYPE 2-A (LUM)
4. LIFING PADIES TO BE SET UP AFTER OFFSIDE INSTALLATION
5. STAIRING CONES & LIFTING PADIES TO BE DETERMINED DURING DETAIL DESIGN

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LOWER MEZZANINE DECK PLAN AT EL.+30000 T.O.S.

PLAN BRACKED TO BE CHK.50X & 5G (L.-(CSS.KBD 4-A))
UPPER MEZZANINE DECK PLAN AT EL=35000 T.O.S.

PLAN DRAWN TO BE ONE INSET IN EL = 35000 U.N.C.

NOTES
1. FOR GENERAL NOTES, SEE DRAWING NO. CB01-12-35-99-G0200-0001
2. FOR TYPICAL PRIMARY JOINT DETAILS, SEE DRAWING NO. CB01-12-35-99-G0200-0002
3. MATERIALS ON THIS DRAWING TO BE AS FOLLOWS:
   A. SHEET METAL - TYPE 4,5,6
   B. ROLLED BEAM SECTIONS - TYPE 4,5,6
   C. TUBULAR - TYPE 3
   D. NOSES - TYPE 1,2

SCALE 1:100

KEY PLAN
SCALE 1:100

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WEATHER DECK PLAN AT EL-40000 T.O.S.

SECONDARY MEMBERS TO BE: IPE270 U.N.O

NOTES:
1. FOR GENERAL NOTES, SEE DRAWING NO. CB71-12-25-99-GD200-003
2. FOR TYPICAL SECONDARY JOINT DETAILS, SEE DRAWING NO. CB71-12-25-99-GD200-004
3. MATERIALS ON THIS DRAWING TO BE AS FOLLOWS:
   ROLLED BUM SEGMENTS - TYPE A
4. ALL SECONDARY & TERTIARY STEEL TO BE DETERMINED DURING DETAIL DESIGN

HB 05
1. ALL SECONDARY & TERTIARY STEEL
CELLAR DECK PLAN AT EL+25000 T.O.S.
SECONDARY MEMBERS TO BE IPE270 U.N.O
UPPER MEZZANINE DECK PLAN AT EL+35000 T.O.S.

SECONDARY MEMBERS TO BE IPE270 U.N.G
WEATHER DECK PLAN AT EL+40000 T.O.S.

SECONDARY MEMBERS TO BE IPE270 U.N.O.

KEY PLAN

NOTES:
1. FOR GENERAL NOTES, SEE DRAWING No. C001-12-25-99-GD200-0002
2. FOR TYPICAL SECONDARY JOINT DETAILS, SEE DRAWING No. C001-12-25-99-GD200-0002
3. MATERIALS ON THIS DRAWING TO BE AS FOLLOWS:
   ROLLED BEAM SECTIONS - TYPE B
4. ALL SECONDARY & TERTIARY STEEL TO BE DETERMINED
   DURING DETAIL DESIGN

SOLID
1. ALL SECONDARY & TERTIARY STEEL

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CELLAR DECK PLAN AT EL.+26000 T.O.S.

SCALE 1:100

NOTES
1. ALL DIMENSIONS ARE TO CENTERLINE OF BEAMS
2. FOR GRATING AND PLATING SPECIFICATIONS REFER TO DRG No. 1001/12-29-PW-0020/0031-GENERAL NOTES
3. GRP IS TO BE EXPOSED AND SHOWN AS SHOWN TO REFER TO DRG No. 12-29-PW-0030/0031-GENERAL NOTES AND FUTURE MODULE STANDARD DETAILS
4. PENETRATIONS ADDED BUT FINAL ADJUSTMENT OF SECONDARY STEEL AND PENETRATIONS TO BE DETERMINED DURING DETAIL DESIGN
5. PLATE MATERIAL TO BE TYPE 2
6. ALL PLATING & GRATING TO BE DETERMINED DURING DETAIL DESIGN

1. ALL PLATING & GRATING

KEY PLAN
SCALE 1:100

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LOWER MEZZANINE DECK PLAN AT EL.+30000 T.O.S.

SCALE 1:100

NOTES
1. ALL DIMENSIONS ARE TO CENTERLINE OF BEAMS
2. FOR GRATING AND PLATING SPECIFICATIONS REFER TO ORS
   No. C071-12-09-99-GD005-001 GENERAL NOTES
3. FOR DETAILS OF GRATING AND PLATING
   REFER TO ORS No. C071-12-09-99-GD008-002 TOPSIDE AND
   FUTURE MODULE STANDARD DETAILS
4. PENTAVENTS INDICATED BUT FINAL ALIGNMENT OF SECONDARY
   STEEL AND PENTAVENTS TO BE DETERMINED DURING DETAIL
   DESIGN
5. PLATE MATERIAL TO BE TYPE 2
6. ALL PLATING & GRATING TO BE DETERMINED
   DURING DETAIL DESIGN

KEY PLAN
SCALE 1:500

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Drawing updated 20/02/2019 by D. E. M. (draftsman)
ELEVATION ON ANODE TYPE 1
ALUMINIUM-ZINC-INDIUM (SEE NOTE 2)
(600 No. TOTAL)

SCALE 1:25

NET WEIGHT = 331kg
GROSS WEIGHT (EXCLUDING DOUBLER PLATES) = 416kg

ELEVATION ON ANODE TYPE 2, NOTE 3
ALUMINIUM-ZINC-INDIUM (SEE NOTE 2)
(78 No. TOTAL)

SCALE 1:25

NET WEIGHT = 331kg
GROSS WEIGHT (EXCLUDING DOUBLER PLATES) = 455kg

NOTES
1. FOR GENERAL NOTES REFER TO DPL No.
   C001-12-26-99-G0210-0001
2. ANODE MATERIAL TO BE 6063-T6 ALLOY IN ACCORDANCE WITH THE
   CATHodic PROTECTION SPECIFICATION
   C001-12-26-99-G0210-0001
3. ANODE TYPE 1 TO BE USED ON PILE SLEEVES, MOUNTS & LESS
   ALONGSIDE TO PILE SLEEVES
   ANODE TYPE 1 TO BE USED ELSEWHERE. BOTH TYPES SHALL BE
   LOCATED IN ACCORDANCE WITH NOTES 4 & 5
4. ANODE POSITIONING BY FABRICATOR SHALL SATISFY
   THE FOLLOWING GUIDELINES:
   - MINIMUM 500mm BETWEEN ANODE FACE & ANY STRUCTURAL PART
   - MINIMUM 500mm BETWEEN ANODES
   - NO ANODES SHALL BE LOCATED CloSER THAN 300mm TO NODES
   - DOUBLER PLATES TO CLEAR WELD GEARS BY A MINIMUM OF 100mm
   5. NO ANODES ABOVE EL. +4000

ISOMETRIC VIEW ON JACKET (SEE NOTES 4 & 5)
SCALE 1:25
NOTES
1. FOR GENERAL NOTES AND ABBREVIATIONS SEE DRAWING NO.
   CD01-12-25-99-GD210-0002
2. ALL STEEL TO BE TYPE 2 U.N.D.
3. MINIMUM CIRCUMFERENTIAL SEPARATION OF LONGITUDINAL
   SEAMS IS 2".
4. TOP 2000mm INSIDE:
   NO PAINTING / NO COATING
   NO CIRCUMFERENTIAL WELD GROUND FLUSH
   MIN. CAP HEIGHT OF WELD IS 3mm
5. ALL CIRCUMFERENTIAL WELDS TO BE DOUBLE SIDED
   GROOVE WELDS.

VENT HOLES
4 No. 2204 VENT HOLES EQUALLY SPACED AROUND PILE ROTATED
45° RELATIVE TO LONGITUDINAL WELD.
ALL SURFACES SHALL BE GROUND SMOOTH AND CUT EDGES
CHAMFERED TO 3mm RADIUS MINIMUM.
NO VENT HOLES IN THE CIRCUMFERENTIAL WELD
(MIN 50mm END CLEARANCE)

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a civil claim for damages and criminal prosecution.
Typical Conductor Guide

Conductor Guide Schedule

<table>
<thead>
<tr>
<th>Elevation</th>
<th>No. of Stays</th>
<th>Type of Stay</th>
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<tr>
<td>3 x 8000</td>
<td>8</td>
<td>400 x 10.7</td>
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<tr>
<td>1 x 8000</td>
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<td>400 x 12.5</td>
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<tr>
<td>3 x 6000</td>
<td>8</td>
<td>300 x 15</td>
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Notes:
1. For general notes refer to org. C001-12-25-99-GD001-0301
2. All steel to be type 2 U.N.O.

HOLD
1. Conductor guide details to be confirmed during detail design.
CONSTRUCTION SEQUENCE 7: (SEE NOTE 2)
- SET OUT TEMPORARY SHOP SUPPORTS.
- SET OUT PRIMARY STEELWORK ON SHOP SUPPORTS & WELD OUT.
- INSTALL SECONDARY STEELWORK & WELD OUT.
- INSTALL UPPER MEZZ DECK GRILLAGE & PLATING.
- INSTALL EQUIPMENT & PIPE SUPPORTS.

CONSTRUCTION SEQUENCE 8:
- LIFT UPPER MEZZ DECK ONTO LOWER MEZZ DECK TO UPPER MEZZ DECK COLUMNS.

CONSTRUCTION SEQUENCE 9:
- INSTALL COLUMNS, BRACES & TEMPORARY SUPPORTS REQUIRED FOR THE RATHER DECK INSTALLATION.
- INSTALL UPPER MEZZ DECK MACHINERY: LED WALLS & LARGE BOX PIPING. THESE CAN ALSO BE INSTALLED PRIOR TO THE RESIDING & BRACING INSTALLATION. SUBJECT TO CLEARANCE REQUIREMENTS FOR LIFTING EQUIPMENT & PIPING ITEMS.
- FIT HANDRAILS.

NOTES
1. THE SEQUENCE OF FABRICATION ACTIVITIES INDICATED ON THIS DRAWING ARE REPRESENTATIVE ONLY.
   THE ACTUAL FABRICATION SEQUENCE DEVELOPS CONSTRUCTION METHODOLOGY AGAINST THE SPECIFIC YARD LAYOUT & CAPABILITIES OF VARIOUS CRANES.
2. CONSTRUCTION OF THE UPPER MEZZ DECK CAN BE PERFORMED IN PARALLELS TO THE CONSTRUCTION OF THE LOWER MEZZ DECK, SUBJECT TO YARD SPACE AVAILABILITY.
3. HANDRAILS OMITTED FOR CLARITY.

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CONSTRUCTION SEQUENCE 4: (SEE NOTE 2)
- SET OUT TEMPORARY SHIP SUPPORTS
- SET OUT PRIMARY STEELWORK ON SHIP SUPPORTS & WELD OUT
- INSTALL SECONDARY STEELWORK & WELD OUT
- INSTALL LOWER MEZZ DECK GRATING & PLATING
- INSTALL EQUIPMENT & PIPE SUPPORTS

CONSTRUCTION SEQUENCE 5:
- UPLIFT LOWER MEZZ DECK ONTO CELLAR DECK TO LOWER MEZZ DECK

CONSTRUCTION SEQUENCE 6:
- INSTALL COLUMN BRACES & TEMPORARY SUPPORTS REQUIRED FOR THE UPPER MEZZANINE DECK INSTALLATION
- INSTALL LOWER MEZZ DECK MAJOR EQUIPMENT & LARGE BORE PIPING - THESE CAN ALSO BE INSTALLED PRIOR TO THE COLUMN & BRACE INSTALLATION. SUBJECT TO CLEARANCE REQUIREMENTS FOR LIFTING EQUIPMENT & PIPING ITEMS.
- FIT HARDWARE

NOTES
1. THE SEQUENCE OF FABRICATION ACTIVITIES INDICATED ON THIS DRAWING ARE REPRESENTATIVE ONLY.
   THE NOMINATED FABRICATOR SHALL DEVELOP CONSTRUCTION METHODOLOGY AGAINST THE SPECIFIC MACHINERY SIZE & CAPACITIES OF THE SHOP DURING CONSTRUCTION.
2. CONSTRUCTION OF THE LOWER MEZZ DECK CAN BE PERFORMED IN PARALLEL TO THE CONSTRUCTION OF THE CELLAR DECK.
   SUBJECT TO UPLIFT SPACE AVAILABILITY.
3. HARDWARE OMITTED FOR CLARITY.

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<th>DATE</th>
<th>DRAWING NO.</th>
<th>DESCRIPTION</th>
<th>REFERENCE TITLE</th>
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<td>15.10.15</td>
<td>CONSTRUCTION SEQUENCE DRAWING - FUTURE MODULE - LOWER MEZZ DECK</td>
<td>AS PER ISSUED</td>
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<td>AS PER ISSUED</td>
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</table>

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CONSTRUCTION SEQUENCE A
- SET OUT TEMPORARY SHOP SUPPORTS
- SET OUT PRIMARY STEELWORK ON SHOP SUPPORTS & WELD OUT
- INSTALL SECONDARY STEELWORK & WELD OUT
- INSTALL UPPER MEZZ DECK GRATING
- INSTALL EQUIPMENT & PIPE SUPPORTS

CONSTRUCTION SEQUENCE B
- INSTALL COLONNADE, BRACING & TEMPORARY SUPPORTS REQUIRED FOR THE UPPER DECK INSTALLATION
- INSTALL UPPER MEZZ DECK WELLS OF EQUIPMENT & LARGE BORE PIPING. THESE CAN ALSO BE INSTALLED PRIOR TO THE COLONNADE BRACING INSTALLATION. SUBJECT TO CLEARANCE REQUIREMENTS FOR LIFTING EQUIPMENT & PIPEWORK
- FIT INSULATION

NOTES
1. THE SEQUENCE OF FABRICATION ACTIVITIES INDICATED ON THIS DRAWING ARE REPRESENTATIVE ONLY.
   THE NOMINATED FABRICATOR SHALL DEVELOP CONSTRUCTION METHODOLOGY AGAINST THE SPECIFIC VORD LAYOUT & CAPABILITIES OF WORKSHOP CRANES.
2. CONSTRUCTION OF THE UPPER MEZZ DECK CAN BE PERFORMED IN PARALLEL TO THE CONSTRUCTION OF THE LOWER MEZZ DECK, SUBJECT TO WORK SPACE AVAILABILITY.
3. HANDBRAILS OMITTED FOR CLARITY
CONSTRUCTION SEQUENCE 4:
- Pre-assemble diagonals of grid line C & grid line D.

CONSTRUCTION SEQUENCE 5:
- Install diagonals of grid line C & grid line D & yield out.

CONSTRUCTION SEQUENCE 6:
- Layout & assemble on temporary shop supports grid line 3 frame complete with in-plane diagonals, pile sleeves & nut/fix.

NOTES:
1. The sequence of fabrication activities indicated on this drawing are representative only. The manufacturer shall develop construction methodology against the specific yard layout & capabilities of yard/shop. Chainsaw.
CONSTRUCTION SEQUENCE 7:
- INSTALL J-TUBES & RIGS

CONSTRUCTION SEQUENCE 8:
- LIFT & INSTALL GRID LINE 3 & MOLD OUT

CONSTRUCTION SEQUENCE 9:
- INSTALL CASINGS

NOTES
1. THE SEQUENCE OF FABRICATION ACTIVITIES INDICATED ON THIS DRAWING ARE REPRESENTATIVE ONLY.
THE CONTRACTED FABRICATOR SHALL DEVELOP CONSTRUCTION METHODOLOGY AGAINST THE SPECIFIC YARD LAYOUT & CAPABILITIES OF VARIOUS CRANES.

Drawing updated 24/03/2015 11:17:07 by Sebastian
PLAN - FUTURE MODULE ON ASSUMED TRANSPORTATION BARGE

ELEVATION - FUTURE MODULE ON ASSUMED TRANSPORTATION BARGE

NOTES:
1. THE GENERAL ARRANGEMENT OF THE STRUCTURE ON THE TRANSPORTATION BARGE
   SHOWN ON THIS DRAWING IS REPRESENTATIVE ONLY. THE INSTALLATION CONTRACTOR
   WILL BE RESPONSIBLE FOR THE DETAILING AND SEA TRANSPORTATION ARRANGEMENT AGAINST THE NOMINATED
   TRANSPORTATION VESSEL.
TOPSIDE INSTALLATION - STAGE 1
- Lift transportation
- Lift topside off transportation barge using single crane lift
- Site-wide transportation barge
- Move heavy lift vessel towards White Rose platform west side

TOPSIDE INSTALLATION - STAGE 2
- Lower topside
- Slide topside into NWP
- Mold out topside to NWP connection

NOTES
1. The schematic of installation sequence shown on this drawing is representative only. The installation contractor shall develop installation methodology against the nominated installation vessel.

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Drawing updated by: 04/09/2015 14:19:03 by: David Hines
MSF INSTALLATION - STAGE 1
- CUT DECKFrame
- LIFT MSF OFF TRANSPORTATION BARGE USING SINGLE CRANE LIFT
- DEJACK TRANSPORTATION BARGE
- MOVE HEAVY LIFT VESSEL TOWARDS NORTH PLATFORM WEST SIDE

MSF INSTALLATION - STAGE 2
- LOWER MSF
- STRAP MSF TO JACKET
- WELD LIMIT TO JACKET CONNECTION

NOTES
1. THE SCHEMATIC OF INSTALLATION SEQUENCE SHOWN ON THIS DRAWING IS REPRESENTATIVE ONLY.
   THE INSTALLATION CONTRACTOR SHALL DEVELOP INSTALLATION METHODOLOGY AGAINST THE NOMINATED INSTALLATION VESSEL.

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Drawing updated 30/03/2015 11:20:14 by GenesisInfo