

Ensign Installation Decommissioning Programme



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TERMS AND ABBREVIATIONS

| ABBREVIATION | EXPLANATION |
|--------------|-------------------------------------------------------------------------------------|
| CPUK | Conoco Phillips UK Limited |
| CSV | Construction Support Vessel |
| DCA | Decommissioning Operations (Master Application Template) |
| DSV | Diving Support Vessel |
| Ensign | Installation comprising small topsides and jacket held in location using 4x piles |
| ESDV | Emergency Shutdown Valve |
| GMG | Global Marine Group |
| HSE | Health and Safety Executive |
| Installation | Installation as defined by the Section 29 Notice, comprising topsides and jacket |
| “ | Inch; 25.4 millimetres |
| JNCC | Joint Nature Conservation Committee |
| JUWB | Jack Up Work Barge |
| km | Kilometre |
| LAT | Lowest Astronomical Tide |
| LOGGS | Lincolnshire Offshore Gas Gathering System |
| m | Metre(s) |
| MAT, SAT | Master Application Template, Supplementary Application Template |
| MCV | Monohull Crane Vessel |
| MSV | Multipurpose Support Vessel |
| N,S,E,W, ESE | North, South, East, West, East-South-East |
| n/a | Not Applicable |
| NFFO | National Federation of Fishermen's Organisations |
| NIFPO | Northern Ireland Fish Producers Organisation |
| NORM | Naturally Occurring Radioactive Material |
| NPAI | Not Permanently Attended Installation |
| NUI | Normally Unattended Installation |
| OPEP | Oil Pollution Emergency Plan |
| OPRED | Offshore Petroleum Regulator for Environment and Decommissioning |
| OSPAR | Oslo-Paris Convention |
| Piggybacked | Smaller pipeline is adjacent and clamped to a larger pipeline throughout its length |
| Pipeline | Pipeline or umbilical |
| PL | Pipeline Identification numbers |
| PLA | Pipeline Operations as defined in MAT Operation Types |
| Platform | Installation, typically comprising topsides and jacket |
| PON | Petroleum Operations Notice |
| ROVSV | Remotely Operated Vehicle Support Vessel |

| ABBREVIATION | EXPLANATION |
|---------------|----------------------------------|
| SFF | Scottish Fishermen's Federation |
| SLV | Shear Leg Vessel |
| Spirit Energy | Spirit Energy North Sea Limited |
| SSCV | Semi-Submersible Crane Vessel |
| UK | United Kingdom |
| UKCS | United Kingdom Continental Shelf |
| WGS84 | World Geodetic System 1984 |

1. EXECUTIVE SUMMARY

1.1 Decommissioning Programme

This document contains one Decommissioning Programme for the set of notices under Section 29 of the Petroleum Act 1998. The Decommissioning Programme is concerned with:

- The Ensign installation, comprising a steel jacket and topsides.

Although decommissioning of the Ensign installations and pipelines is being treated in this document as a standalone project, Spirit Energy will also continue to explore cost saving synergies with other projects.

A separate Decommissioning Programme will be prepared for the Ensign pipelines.

1.2 Requirement for Decommissioning Programme

Installations: In accordance with the Petroleum Act 1998, Spirit Energy North Sea Limited (as operator of the Ensign field, and on behalf of the Section 29 notice holders (Table 1.4.2), is applying to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) to obtain approval for decommissioning the installations detailed in Section 2 of this document.

In conjunction with public, stakeholder and regulatory consultation, this Decommissioning Programme is submitted in compliance with national and international regulations and OPRED guidance notes. The schedule outlined in this document is for a six-year period due to begin mid-2019 with well decommissioning. This allows flexibility for exploring synergistic decommissioning opportunities in the area.

1.3 Introduction

The Ensign field lies within the main Southern North Sea (SNS) Gas Province in UK Block 48/14a. The field lies ~109km west of Easington on the coast of Norfolk in water depths of ~25m.

The Ensign gas field was developed using a single platform. The field achieved first production in 2011. The Ensign installation and pipelines are wholly owned by Spirit Energy North Sea Limited. The installation itself is a Not Permanently Attended Installation (NPAI) supported by four-legged conventional piled steel jacket. Decommissioning of the associated pipelines (PL2838, PL2839, PLU2840 and PL2841) as discussed in the separate Decommissioning Programme for the pipelines [3] and so for brevity shall not be discussed further here. The Cessation of Production justification for Ensign is in the process of being approved by the Oil and Gas Authority.

Following public, stakeholder and regulatory consultation, the Decommissioning Programme will be submitted without derogation and in full compliance with the OPRED guidance notes. The Decommissioning Programme explains the principles of the removal activities and are supported by an environmental impact assessment documented in the environmental appraisal.

1.4 Overview of Installation Being Decommissioned

1.4.1 Installation

| Table 1.4.1: Installations Being Decommissioned | | | |
|-------------------------------------------------|-----------------------------|----------------------|------------------------------------|
| Field(s): | Ensign | Production Type | Gas |
| Water Depth (m) | Approx. 25m | UKCS Block | 48/14a |
| Surface Installations | | | |
| Number | Type | Topsides Weight (Te) | Jacket Weight (Te) |
| 1 | Steel jacket | 465 | 599 ¹ |
| Subsea Installation(s) | | Number of Wells | |
| n/a | | Platform | 2 |
| | | Subsea ² | 1 |
| Drill Cuttings piles | | Distance to median | Distance from nearest UK coastline |
| Number of Piles | Total Estimated volume (m3) | 79km (Norway) | 109km E of Easington |
| n/a | n/a | | |

| Table 1.4.2: Installation Section 29 Notice Holders Details | | |
|-------------------------------------------------------------|---------------------|-----------------|
| Section 29 Notice Holder | Registration Number | Equity Interest |
| Spirit North Sea Gas Limited | SC182822 | 0% |
| Spirit Energy North Sea Limited | 04594558 | 100% |
| Centrica Resources UK Limited | 06791610 | 0% |
| GB Gas Holdings Limited | 03186121 | 0% |
| NSGP (Ensign) Limited | 92236 | 0% |

1.5 Summary of Proposed Decommissioning Programme

| Table 1.5.1: Summary of Decommissioning Programme | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Proposed Decommissioning Solution | Reason for Selection |
| 1. Topsides | |
| Complete removal and recycling. The topsides will be removed and recovered to shore and recycled unless alternative options are meantime found to be viable and more appropriate. Any permit applications required for work associated with removal of the topsides (DCA MAT) will be submitted. | Allows jacket to be removed and maximises recycling of materials. |
| 2. Jacket | |
| Complete removal and recycling. The leg piles will be cut 3.0m | To comply with OSPAR requirements |

¹ The jacket weight excludes the weight of the leg-piles. Including the four piles and grout this weight increases to 1,032Te.

² The subsea well 48/14a-7y has never produced and is suspended.

Table 1.5.1: Summary of Decommissioning Programme

| Proposed Decommissioning Solution | Reason for Selection |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <p>below seabed and the jacket will be removed and recovered to shore for recycling.</p> <p>Any permit applications required for work associated with removal of the jacket (MAT) will be submitted.</p> | <p>leaving unobstructed seabed. Removes a potential obstruction to fishing operations and maximises recycling of materials.</p> |
| <p>3. Wells</p> | |
| <p>Wells will be decommissioned to comply with HSE “Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996” and in accordance with the latest version of Oil & Gas UK Well Decommissioning Guidelines.</p> <p>The wells will be decommissioned using a Jack Up Drilling Rig. A Master Application Template (MAT) and the supporting Subsidiary Application Template (SATs) will be submitted in support of activities carried out; a PON5 application will be submitted to OGA to decommission the wells.</p> | <p>Meets the OGA and HSE regulatory requirements.</p> |
| <p>4. Interdependencies</p> | |
| <p>The whole of the Ensign installation will be removed. The piles can be cut with small amounts of seabed sediment being displaced to allow access for cutting.</p> <p>For PL2838 and piggybacked PL2839 there is one third party pipeline crossing and one third party cable crossing. These are both outside 500m safety zone but will not be disturbed because of these decommissioning proposals.</p> <p>Pipeline stabilisation features such as concrete mattresses and any grout bags found that are exposed will be removed as part of the pipeline decommissioning activities, but deposited rock and any buried stabilisation features will remain <i>in situ</i>.</p> | |

1.6 Field Location in UKCS

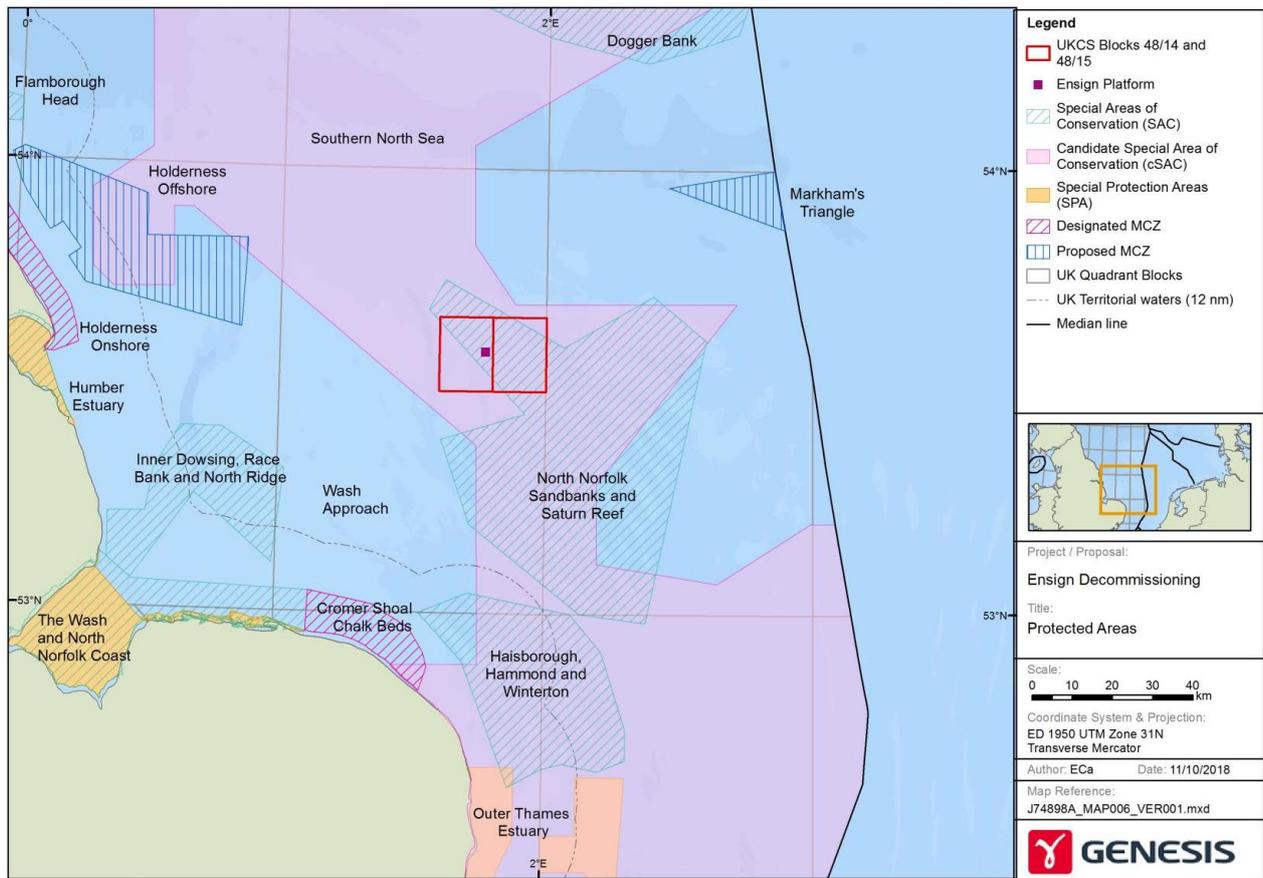


Figure 1.6.1: Field Location in UKCS

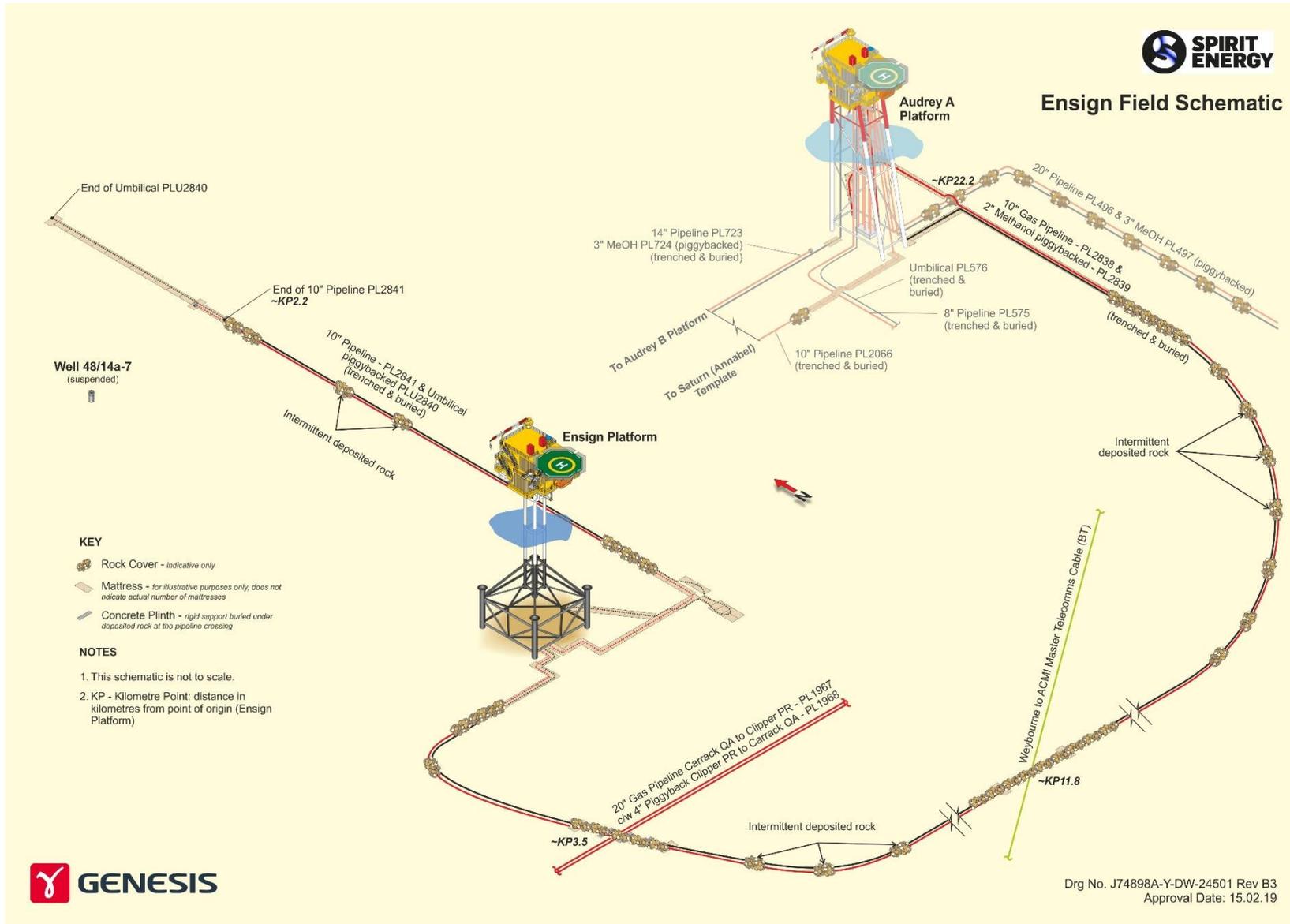


Figure 1.6.2: Ensign Prior to Decommissioning

Ensign Installation Decommissioning Programme

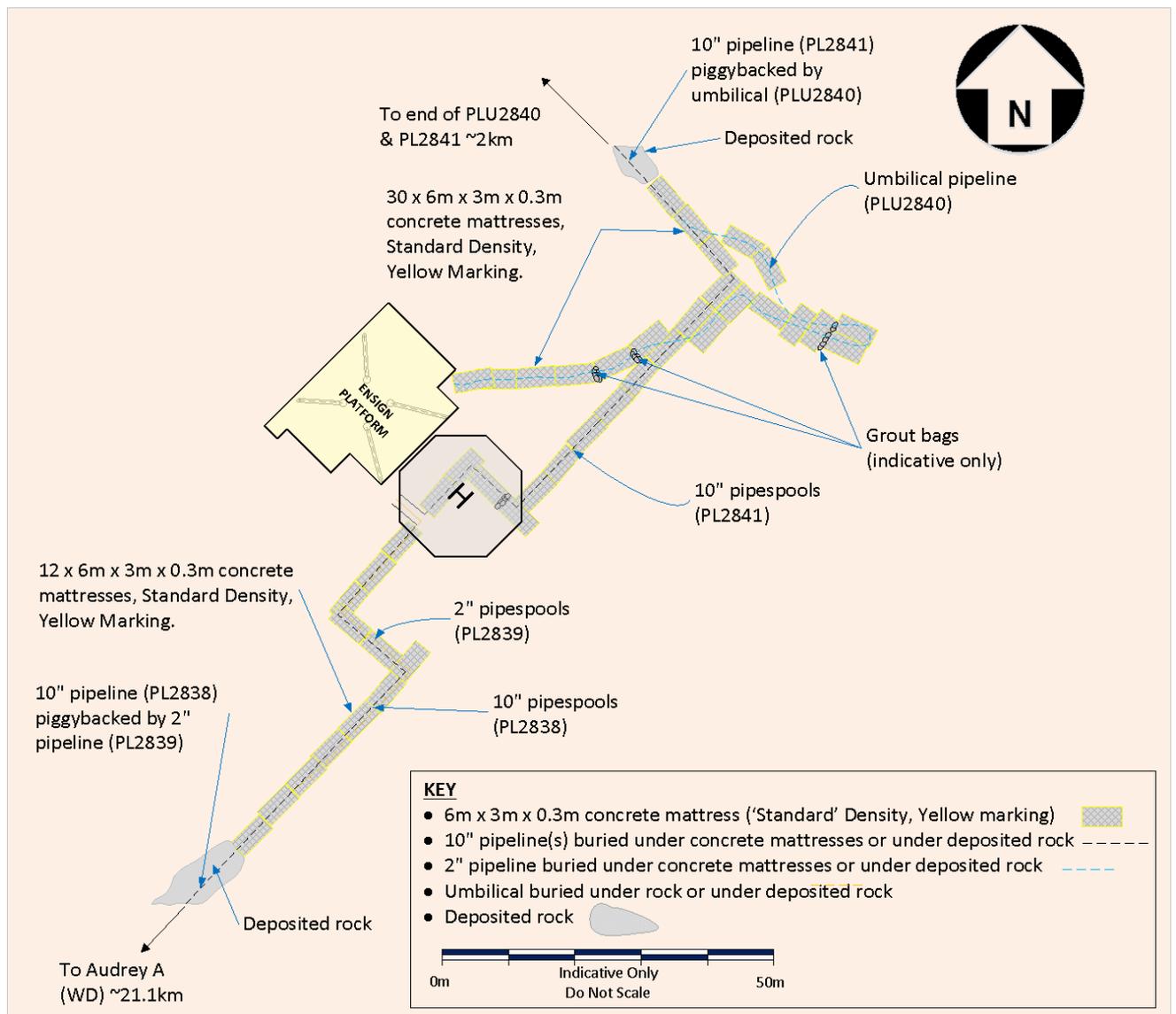


Figure 1.6.3: Overview of Ensign Approaches

Table 1.6.1: Adjacent Facilities

| Owner | Name | Type | Distance/Direction | Information | Status |
|---------------|----------------------------|---------------------------|----------------------|---------------------------------------------------|-----------------|
| Spirit Energy | Audrey A (WD) | Fixed Steel Platform. NUI | 16.9km ESE of Ensign | Ensign used to export gas via Audrey A onto LOGGS | Cold Suspension |
| Spirit Energy | Audrey B (XW) | Fixed Steel Platform. NUI | 13.2km ESE of Ensign | | Cold Suspension |
| CPUK | LOGGS Riser Platform | Fixed Steel Platform. NUI | 26.8km SE of Ensign | | Operational |
| CPUK | LOGGS Compression Platform | Fixed Steel Platform. NUI | 26.9km SE of Ensign | | Operational |
| CPUK | North Valiant Platform | Fixed Steel Platform. NUI | 27km SE of Ensign | | Operational |

Table 1.6.1: Adjacent Facilities

| Owner | Name | Type | Distance/Direction | Information | Status |
|------------------|------------------------------|---------------------------|--------------------|------------------------------|-------------|
| CPUK | LOGGS Production Platform | Fixed Steel Platform. NUI | 27km SE of Ensign | | Operational |
| CPUK | LOGGS Accommodation Platform | Fixed Steel Platform. | 27km SE of Ensign | | Operational |
| Shell UK Limited | Clipper PH | Fixed Steel Platform | 14.3km S of Ensign | Accommodation Platform | Operational |
| Shell UK Limited | Clipper PR | Fixed Steel Platform. NUI | 14.3km S of Ensign | Riser Platform | Operational |
| Shell UK Limited | Clipper PW | Fixed Steel Platform. NUI | 14.8km S of Ensign | Wellhead Platform | Operational |
| Shell UK Limited | Clipper PC | Fixed Steel Platform. NUI | 14.9km S of Ensign | Compression Platform | Operational |
| Shell UK Limited | Clipper PM | Fixed Steel Platform. NUI | 14.9km S of Ensign | Metering & Manifold Platform | Operational |
| Shell UK Limited | Clipper PT | Fixed Steel Platform | 14.9km S of Ensign | Production & Platform | Operational |

Impacts of Decommissioning Proposals

There are no direct impacts on adjacent facilities from the associated decommissioning works outside the Ensign installation.

Where crossings and concrete mattresses are overlain with rock, it is proposed to decommission the rock and the infrastructure beneath by leaving *in situ*.

As part of the environmental appraisal we have considered potential in combination or cumulative effect of activities in the area, including decommissioning and new developments. This has been done using data that are publicly available. However, operational windows tend to include a degree of flexibility, so it is not possible to be precise. However, as part of the operational phase any potential impacts will be mitigated in two ways. The first is via direct communication with the parties involved, and the other is via submission of the MATs and SATs.

1.7 Industrial Implications

The platform well and subsea well decommissioning will be completed using a jack-up drilling rig. The activities to decommission the installation will be completed using a crane vessel supported by a Dive Support Vessel (DSV), Remotely Operated Vehicle Support Vessel (ROVSV), Construction Support Vessel (CSV), or Multi Support Vessel (MSV). The need for diving related activities will be minimised.

It is Spirit Energy’s intention to develop a contract strategy that will result in an efficient and cost-effective execution of the decommissioning works. Where appropriate existing framework agreements may be used for decommissioning of the pipelines and pipeline stabilisation features. Spirit Energy will try to combine Ensign decommissioning activities with other development or decommissioning activities to reduce mobilisation costs should the opportunity arise; as a minimum the current intention is for decommissioning activities at the Audrey A (WD) location to be carried out at the same time as activities for Ensign pipelines PL2838 and PL2839. The decommissioning schedule allows flexibility for when decommissioning operations are carried out and completed.

2. DESCRIPTION OF ITEMS TO BE DECOMMISSIONED

2.1 Installation: Surface Facilities

Table 2.1.1: Surface Facilities Information

| Name | Facility Type | Location | | Topsides/ Facilities | | | Jacket | |
|---------------------|-------------------|----------------------|-----------------------------|-------------------------|---------------|-------------|------------------------|----------------------|
| | | | | Weight (Te) | No of modules | Weight (Te) | Number of legs & piles | Weight of piles (Te) |
| Ensign installation | Small fixed steel | WGS84 Decimal | 53.59054°N 1.773314°E | 465 | 1 | 599 | 4 piles | 433 |
| | | WGS84 Decimal Minute | 53°35.4322"N 1°46.3988"E | | | | | |

2.2 Wells

| Table 2.2.1: Well Information | | | |
|-------------------------------|----------------|------------|------------------|
| Well ID | Designation | Status | Category of Well |
| 48/14a-7y | Gas production | Suspended | SS-0-4-3 |
| 48/14a-5 | Gas production | In Service | PL-3-4-3 |
| 48/14a-6 | Gas production | In Service | PL-3-4-3 |

For details of well categorisation see the latest version of the Oil & Gas UK Guidelines for the Decommissioning of Wells.

2.3 Inventory Estimates

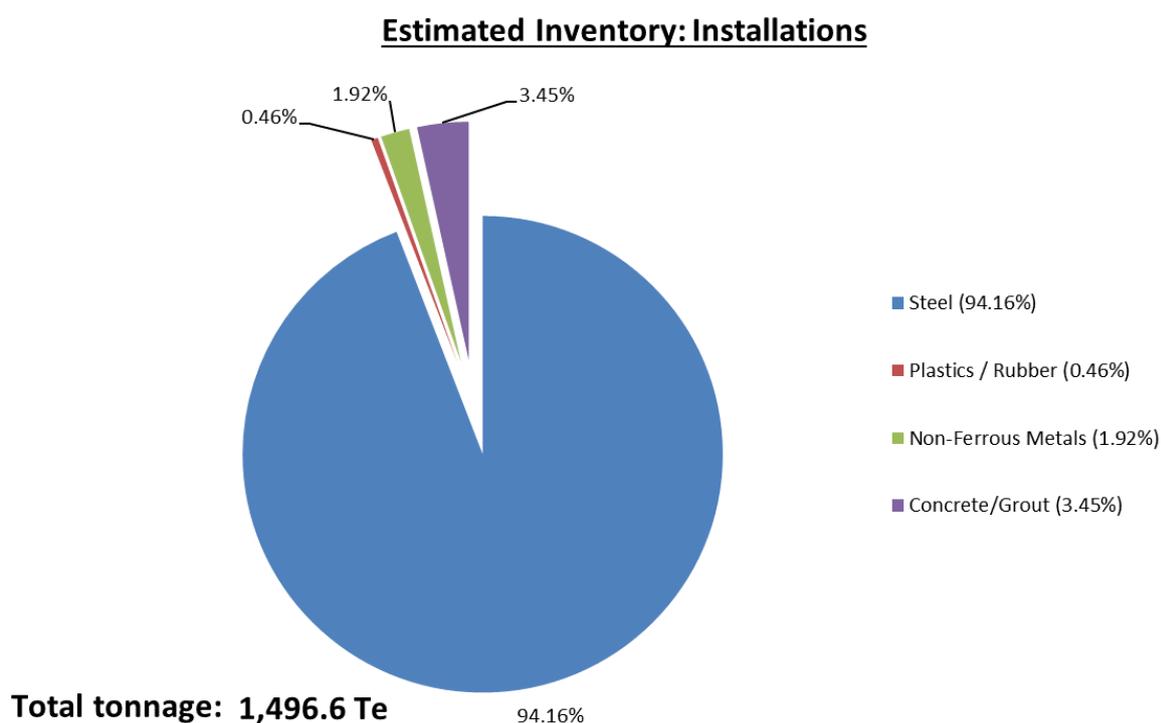


Figure 2.3.1: Pie chart of estimated installation inventory

Refer to Section 4.7 of the Environmental Appraisal [2] for further details.

3. REMOVAL AND DISPOSAL METHODS

Waste will be dealt with in accordance with the Waste Framework Directive. The reuse of an installation or pipelines (or parts thereof) is first in the order of preferred decommissioning options. Options for the reuse of installations or pipelines (or parts thereof) are currently under investigation. Waste generated during decommissioning will be segregated by type and periodically transported to shore in an auditable manner through licensed waste contractors. Steel and other recyclable metal are estimated to account for the greatest proportion of the materials inventory. Refer to Section 4.7 of the Environmental Appraisal [2] for further details concerning disposal of waste.

3.1 Topsides

3.1.1 Topsides Decommissioning Overview

Topside description: The Ensign topside structure comprises a cellar deck, mezzanine deck and weather deck with overall plan dimensions 35m x 24m. It weighs approximately 465Te excluding rigging. The topside features a manifold to collect fluids subsea as well as platform wells. The combined fluids used to be exported via the 10” pipeline to Audrey A (WD) and onwards to LOGGS.

Removal method: the topsides will be completely removed and recovered to shore. Possible methods are described in Table 3.1.2, although the topsides will most likely be removed in a single lift. A final decision on removal methods will be made following a commercial tendering process.

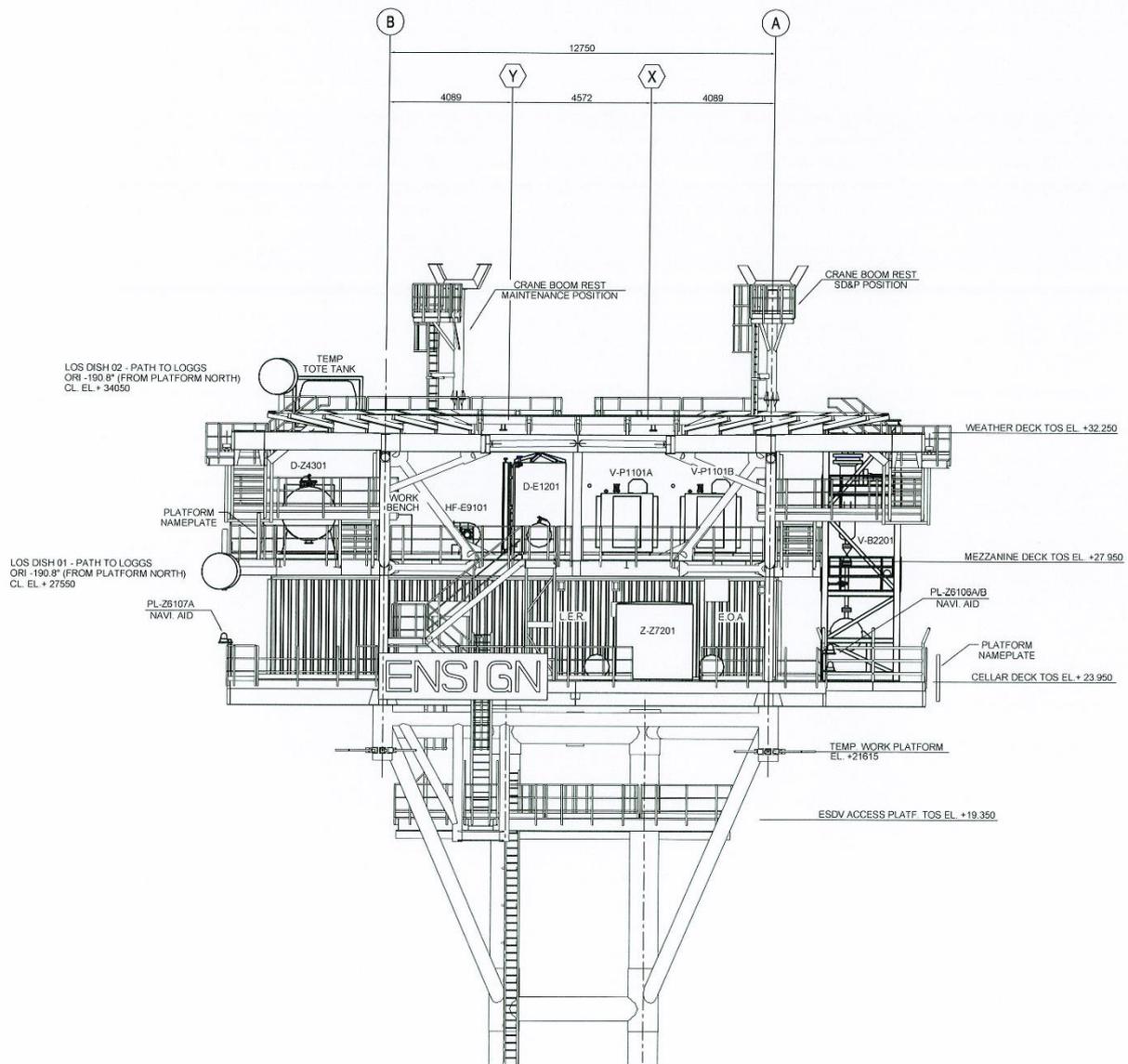


Figure 3.1.1: Ensign Looking North

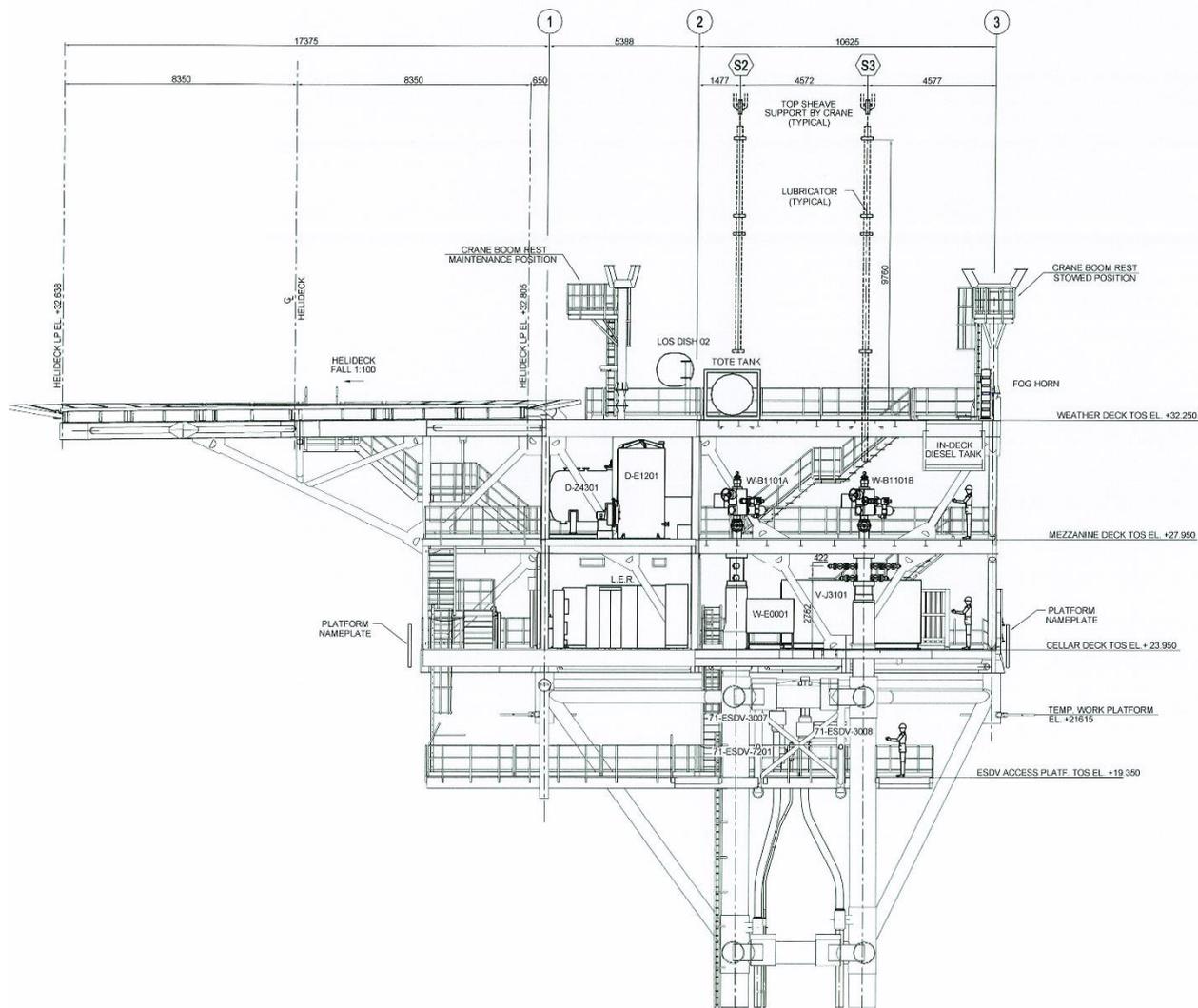


Figure 3.1.2: Ensign Looking West

Preparation and cleaning: The methods that will be used to vent and purge the topsides prior to removal to shore are summarised in Table 3.1.1.

| Table 3.1.1: Cleaning of topsides for removal | | |
|-----------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Waste type | Composition of Waste | Disposal Route |
| On-board hydrocarbons | Hydrocarbons | On-board hydrocarbons have already been evacuated from topsides. |
| Other hazardous materials | The presence of NORM will be identified. | NORM, if present, will be disposed of in accordance with the appropriate permit. |
| Original paint coating | The presence of lead-based paints will be identified. | May give off toxic fumes / dust if flame-cutting or grinding / blasting is used so appropriate safety measures will be taken. Painted items will be disposed of onshore with consideration given to any toxic components. |

Table 3.1.2: Topside Removal Methods

1) Semi-Submersible Crane Vessel ; 2) Monohull Crane Vessel ; 3) Shear Leg Vessel ; 4) Jack up Work barge ; 5) Piece small or large ; 6) Complete with jacket ;

| Method | Description |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Single lift removal along with jacket using SSCV / MCV / SLV | Removal of topsides and jacket as a complete unit followed by recovery to shore for re-use, recycling, and disposal as appropriate. |
| Single lift removal using SSCV / MCV / SLV | Removal of topsides as a single unit followed by recovery to shore for re-use, recycling, disposal as appropriate. |
| Piece-small or piece-large removal using JUWB | Removal of topsides in a series of smaller sub-units making use of the JUWB used for the well decommissioning activities, followed by recovery to shore for a programme of re-use, recycling or disposal as appropriate. |
| Proposed removal method and disposal route | Removal of topsides followed by recovery to shore for re-use, recycling, and final disposal to landfill as appropriate. A final decision on the decommissioning method will be made following a commercial tendering process. |

3.2 Jacket

3.2.1 Jacket Decommissioning Overview

Jacket description: The Ensign jacket weighs approximately 599Te excluding the piles and rigging. The legs will be cut at an appropriate elevation to allow the lift aids to be installed, and the jacket will most likely be removed in a single lift⁴ (Figure 3.2.1). Assuming there would be no technical issues, the piles will be internally cut 3.0m below the seabed. If any difficulties are encountered in accessing the piles internally such that an excavation will be required, OPRED will be consulted before the piles are cut. The jacket will be returned to shore for recycling.

Table 3.2.1: Jacket Decommissioning Methods

1) Semi-Submersible Crane Vessel ; 2) Monohull Crane Vessel ; 3) Shear Leg Vessel ; 4) Jack up Work barge ; 5) Complete with topsides

| Method | Description |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Single lift removal along with topsides using SSCV. | Removal of the topsides and jacket as a complete unit followed by recovery to shore for re-use, recycling, and disposal as appropriate. |
| Single lift removal using SSCV. | Removal of the jacket as a single unit followed by recovery to shore for re-use, recycling, disposal as appropriate. |
| Proposed removal method and disposal route | Removal of jacket as a single unit followed by recovery to shore for re-use, recycling, and final disposal to landfill as appropriate. A final decision on the decommissioning method will be made following a commercial tendering process. |

⁴ The technique adopted for removal of the jacket will be subject to engineering feasibility and any commercial agreements.

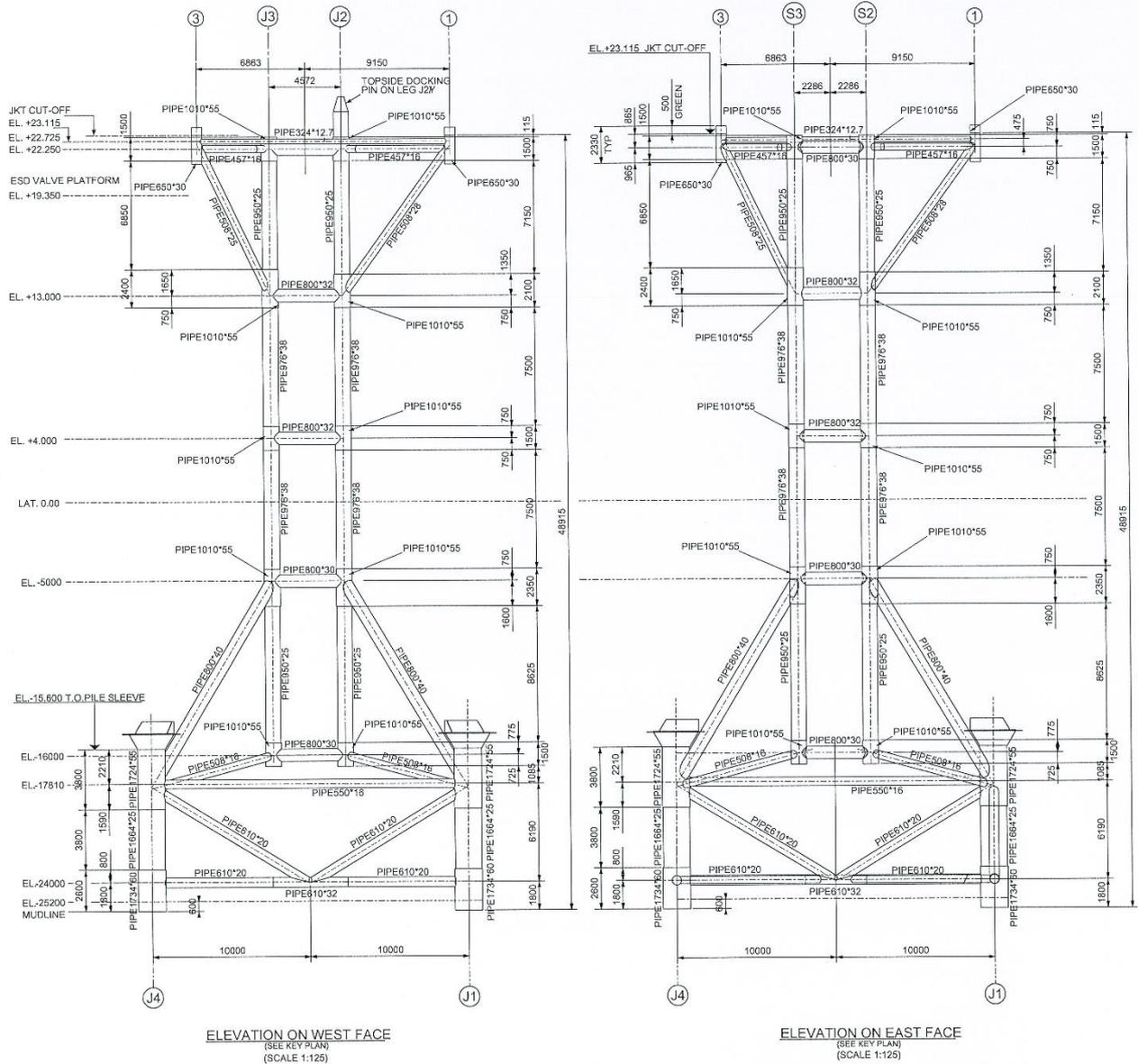


Figure 3.2.1: Elevations on West & East Jacket Faces

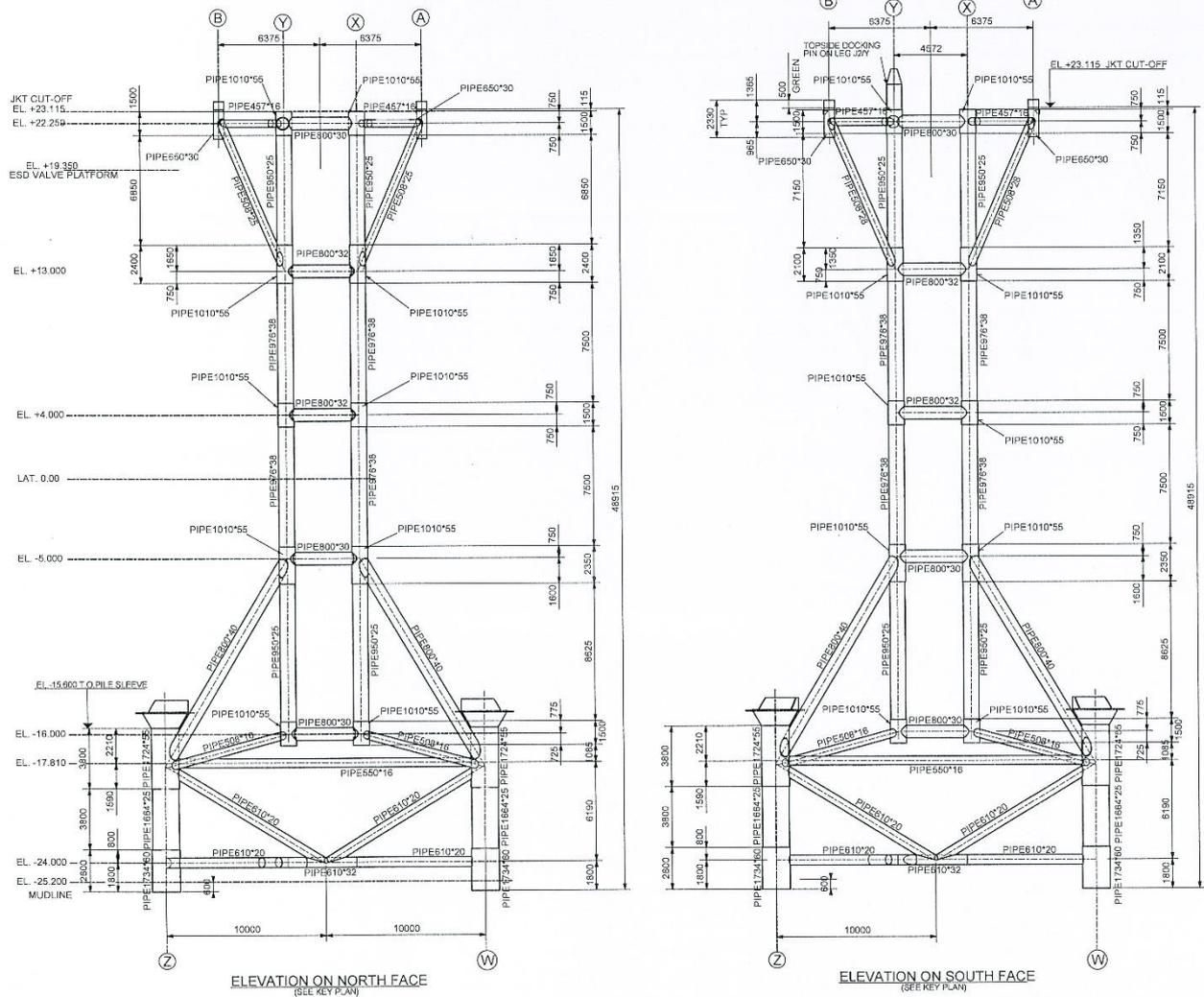


Figure 3.2.2: Elevations on North and South Jacket Faces

3.3 Wells

Table 3.3.1: Well Decommissioning

The Ensign field consists of three wells (48/14a-7y, 5 & 6). The wells listed in Section 2.2 (Table 2.2.1) will be decommissioned in accordance with latest version of the Oil & Gas UK Well Decommissioning Guidelines. A Master Application Template (MAT) and the supporting Subsidiary Application Template (SAT) will be submitted in support of works carried out. A PON5 will also be submitted to OGA for application to decommission the wells. Well decommissioning is scheduled to occur ~2019-20.

3.4 Waste Streams

| Table 3.4.1: Waste Stream Management Method | |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Waste Stream | Removal and Disposal Method |
| Bulk liquids | Residual hydrocarbons will be removed from topsides. Further cleaning and decontamination will take place onshore prior to re-use or recycling. |
| Marine growth | Where necessary and practicable, to allow access some marine growth will be removed offshore. The remainder will be brought to shore and disposed of according to guidelines and company policies. |
| NORM | Tests for NORM will be undertaken offshore by the Radiation Protection Supervisor and any NORM encountered will be dealt with and disposed of in accordance with guidelines and company policies and under appropriate permit. |
| Asbestos | No asbestos is expected, but if small quantities are found they will be dealt with and disposed of in accordance with guidelines and company policies. |
| Other hazardous wastes | Other hazardous waste will be recovered to shore and disposed of according to guidelines and company policies and under appropriate permit. |
| Onshore Dismantling sites | Appropriate licensed sites will be selected. The dismantling site must demonstrate proven disposal track record and waste stream management throughout the deconstruction process and demonstrate their ability to deliver re-use and recycling options. |

| Table 3.4.2: Inventory Disposition | | | |
|------------------------------------|-------------------------|--------------------------|-----------------------------------------------|
| Inventory | Total Inventory Tonnage | Planned tonnage to shore | Planned tonnage decommissioned <i>in situ</i> |
| Installations | 1,497 | 1,225 | 272 |

All recovered material will be transported onshore for re-use, recycling or disposal. It is not possible to predict the market for reusable materials with any confidence, so the figures presented here are aspirational.

| Table 3.4.3: Re-use, Recycle & Disposal Aspirations for Recovered Material | | | |
|----------------------------------------------------------------------------|------------------|---------|----------|
| Inventory | Re-use | Recycle | Disposal |
| Installations | <5% ⁵ | >95% | <5% |

Refer to [2] for further details.

⁵ This figure is predicated by the assumption that all business development and resale opportunities have been exhausted, and that re-use opportunities would then be limited to individual items of equipment.

4. ENVIRONMENTAL IMPACT ASSESSMENT

4.1 Potential Environmental Impacts and their Management

Environmental Appraisal Summary:

There will be some planned and unplanned environmental impacts arising from decommissioning of the Ensign infrastructure (48/14a). Long-term environmental impacts from the decommissioning operations are expected to be low. Incremental cumulative impacts and trans-boundary effects associated with the planned decommissioning operations are also expected to be low.

4.1.1 Overview

| Table 4.1.1: Environmental Impact Management [2] | | |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Activity | Main Impacts | Management |
| Topsides removal | <p>Decommissioning of the topsides will require cutting of the structure above sea level and lifting activities using large lift vessels that are potentially anchored.</p> <p>The principle impacts will include:</p> <ul style="list-style-type: none"> • physical presence of vessels and equipment • energy use and atmospheric emissions • underwater noise from vessels, • surface noise from cutting • discharges to the marine environment from vessels and residues from topsides • disturbance of the seabed from anchors • production of waste materials <p>Risks of additional impact will include:</p> <ul style="list-style-type: none"> • disturbance to the seabed from potential dropped objects • small hydrocarbon and chemical releases to the marine environment | <p>All planned impacts are expected to be short-term and localised and of low significance provided the proposed mitigation measures are implemented when carrying out the topside decommissioning activities.</p> <p>The exception to this is the risk of a large hydrocarbon releases which could have the potential to have a moderate significant impact.</p> <p>The assessment of potential cumulative impacts concludes that no significant impacts are expected to occur because of decommissioning operations.</p> <p>Activities will be planned to be executed as efficiently as possible, minimising cutting to reduce the potential noise impacts.</p> <p>The contractors' capability, processes and procedures will be subject to audit and evaluation as part of the selection process and their vessels will be audited as part of selection and pre-mobilisation and the marine assurance standard adhered to.</p> <p>Vessels will be managed to minimise the durations required and associated discharge. In addition, on board operational practices will address fuel efficiency, noise management and minimise waste.</p> |

Table 4.1.1: Environmental Impact Management [2]

| Activity | Main Impacts | Management |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Jacket removal | <p>Decommissioning of the jacket will require cutting of the structure at the seabed and lifting activities using large lift vessels that are potentially anchored. The piles will be cut below the seabed which may require local water jetting of sediments and temporary placement of equipment and components.</p> <p>The principle impacts will include:</p> <ul style="list-style-type: none"> • physical presence of vessels and equipment; • energy use and atmospheric emissions; • underwater noise from vessels, cutting and excavation operations; • discharges to the marine environment from vessels; • disturbance of the seabed; • production of waste materials. | <p>All planned impacts are expected to be short-term and localised and of low significance provided the proposed mitigation measures are implemented when carrying out the jacket decommissioning activities.</p> <p>The exception to this is the risk of a large hydrocarbon release which could have the potential to have a moderate significant impact.</p> <p>The assessment of potential cumulative impacts concludes that no significant impacts are expected to occur because of decommissioning operations.</p> <p>Activities will be planned to be executed as efficiently as possible, minimising cutting and disturbance of the seabed to reduce the potential for impact on the area around the jacket.</p> <p>The contractors' capability, processes and procedures will be subject to audit and evaluation as part of the selection process and their vessels will be audited as part of selection and pre-mobilisation and the marine assurance standard adhered to.</p> <p>Vessels will be managed to minimise the durations required and</p> |

Table 4.1.1: Environmental Impact Management [2]

| Activity | Main Impacts | Management |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>Risks of additional impact will include:</p> <ul style="list-style-type: none"> • disturbance to the seabed from potential dropped objects; • large and small hydrocarbon and chemical releases to the marine environment; • disruption to fishing activities. | <p>associated discharge. In addition, on board operational practices will address fuel efficiency, noise management and minimise waste.</p> <p>Anchoring procedures will be developed.</p> <p>Risk assessments will be undertaken for the work at key stages throughout planning and execution.</p> <p>The waste hierarchy will be followed with material being segregated and re-used where practicable and by recycling where possible. Only if other options are not possible then waste material will be sent to landfill.</p> <p>Spirit Energy will continue to monitor the performance of the contractor throughout operational activities via our offshore representatives.</p> <p>Compliance with EU and UK waste legislation and duty of care.</p> <p>A post decommissioning debris survey will be conducted, and any debris recovered.</p> <p>As part of the OPEP specialist oil spill management and response services will be in place, to minimise impacts from potential releases to the marine environment.</p> |

5. INTERESTED PARTY CONSULTATIONS

5.1 Informal Consultations

| Table 5.1.1: Summary of Stakeholder Comments | | |
|-----------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Who | Comment | Response |
| INFORMAL CONSULTATIONS | | |
| JNCC | | |
| NFFO | The decommissioning proposals herein were presented to NFFO on 22 Oct 2018. | The NFFO had no adverse comment to make concerning the decommissioning proposals. |
| SFF | The decommissioning proposals herein were presented to SFF on 28 Jan 2018. | The SFF had no adverse comment to make concerning the decommissioning proposals. |
| STATUTORY CONSULTATIONS | | |
| NFFO | | |
| SFF | | |
| NIFPO | | |
| GMG | | |
| Public | | |

6. PROGRAMME MANAGEMENT

6.1 Project Management and Verification

A Spirit Energy project management team will manage the operations of competent contractors selected for all decommissioning activities. The team will ensure the decommissioning is executed safely, in accordance with legislation and Spirit Energy Health and Safety principles. Changes to the Decommissioning Programme will be discussed with OPRED with any necessary approvals sought.

6.2 Post-Decommissioning Debris Clearance and Verification

6.2.1 Offshore

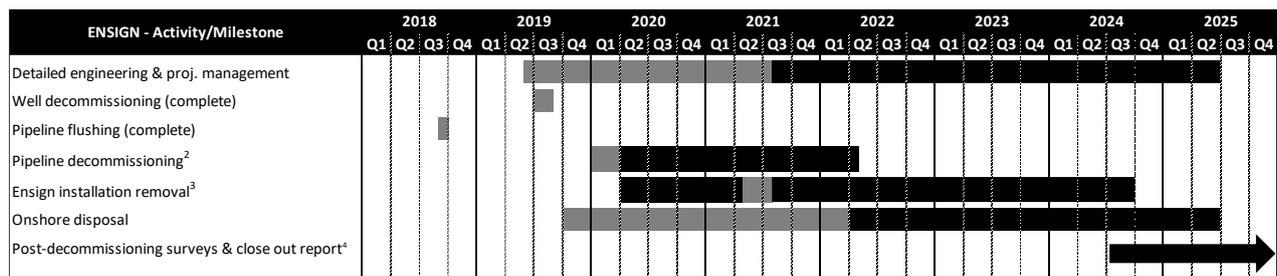
The Ensign installation site including the 500m safety zones will be subject to clean seabed verification surveys when decommissioning activities have concluded. Due to the sensitive nature of the North Norfolk Sandbanks and surrounding area, we would propose to work with OPRED and NFFO to use a non-invasive and evidence-based approach to establish an acceptable clear seabed for the pipelines outside of the existing 500m safety zone.

Any seabed oil and gas debris will be recovered for onshore disposal or recycling in line with existing disposal methods. Independent verification of seabed state will be obtained by trawling the jacket and pipeline area and this will be supported by a Certificate of Clearance. This will be included in the Close Out Report and sent to the Seabed Data Centre (Offshore Installations) at the Hydrographic Office.

6.3 Schedule

A proposed schedule is provided in Figure 6.3.1. The activities are subject to the acceptance of the Decommissioning Programme presented in this document and any unavoidable constraints (e.g. vessel availability) that may be encountered while executing the decommissioning activities. Therefore, activity schedule windows have been included to account for this uncertainty.

The commencement of offshore decommissioning activities will depend on commercial agreements and commitments.



Notes / Key

Earliest potential activity

Activity window to allow commercial flexibility associated with decommissioning activities

1. Well decommissioning was carried out in 2019 and is complete;

2. Current intention is that Ensign pipelines at Audrey 'A' be decommissioned at the same time as the pipelines at Audrey 'A';

3. Removal of Ensign installation is planned for 2021, but may be brought forward to Q2 2020 or may be extended out to 2024 to coincide with decommissioning of other Spirit-Energy assets;

4. Post decommissioning surveys and close out reports will be prepared on completion of decommissioning activities.

Figure 6.3.1: Gantt Chart of Project Plan

6.4 Costs

Decommissioning costs will be provided separately to OPRED and OGA.

6.5 Close Out

A close out report will be submitted within 12 months of completion of the offshore work, including debris clearance and post-decommissioning surveys, as required in OPRED guidance notes. The report will explain any variance from the Decommissioning Programme.

6.6 Post-Decommissioning Liability, Monitoring and Evaluation

After decommissioning activities have been concluded environmental surveys will be completed with the findings being sent to OPRED in the Close Out report. The frequency and scope of future surveys will be agreed with OPRED and supported by a risk assessment. Residual liability will remain with the Section 29 holders identified in Table 1.4.2. Unless agreed otherwise in advance with OPRED, Spirit Energy will remain the focal point for such matters, such as any change in ownership, for example.

The requirement for legacy and liability management will be described in more detail in the Close Out report.

7. SUPPORTING DOCUMENTS

- [1] Fugro (2019) Pre-Decommissioning Environmental & Debris Survey, Ensign, 182070V1.1;
- [2] Spirit Energy (2019) Ensign Decommissioning Environmental Appraisal, SPT-DCM-SNS0104-REP-0002;
- [3] Spirit Energy (2019) Ensign Pipelines Decommissioning Programme, SPT-DCM-SNS0104-REP-0005.

APPENDIX A PUBLIC NOTICE & CONSULTEE CORRESPONDENCE

Appendix A.1 Public Notices