



# **CW PIPELINES - PERMANENT EASEMENT REPORT**

**FOR**

**KILLINGHOLME POWER STATION**

**JULY 2012**

**Capita Symonds  
6, Bowood Court  
Calver Road  
Warrington  
WA2 8QZ  
Tel: 01925 418333**

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<b>Date:</b>	<b>Prepared by:</b>	<b>Checked by:</b>	<b>Approved by:</b>
July 2012	Dave Morgan	Karl Johnson	Karl Johnson

## 1. Introduction

Centrica plc have a 'permanent easement' agreement over the CW pipelines and associated cables that are routed to the east of Killingholme Power Station to the River Humber.

A Developer wishes to build on the land to the east of the Power Station and in doing so requests the 'permanent easement' to be reduced to 12.5m.

Capita Symonds is a leading consultancy in managing pipeline construction projects on behalf of utility based clients. Centrica plc has therefore requested that Capita Symonds compile a report to determine the minimum width of Permanent Easement required and if the proposed reduction of Permanent Easement to 12.5m is acceptable on the grounds of safety and practicability.

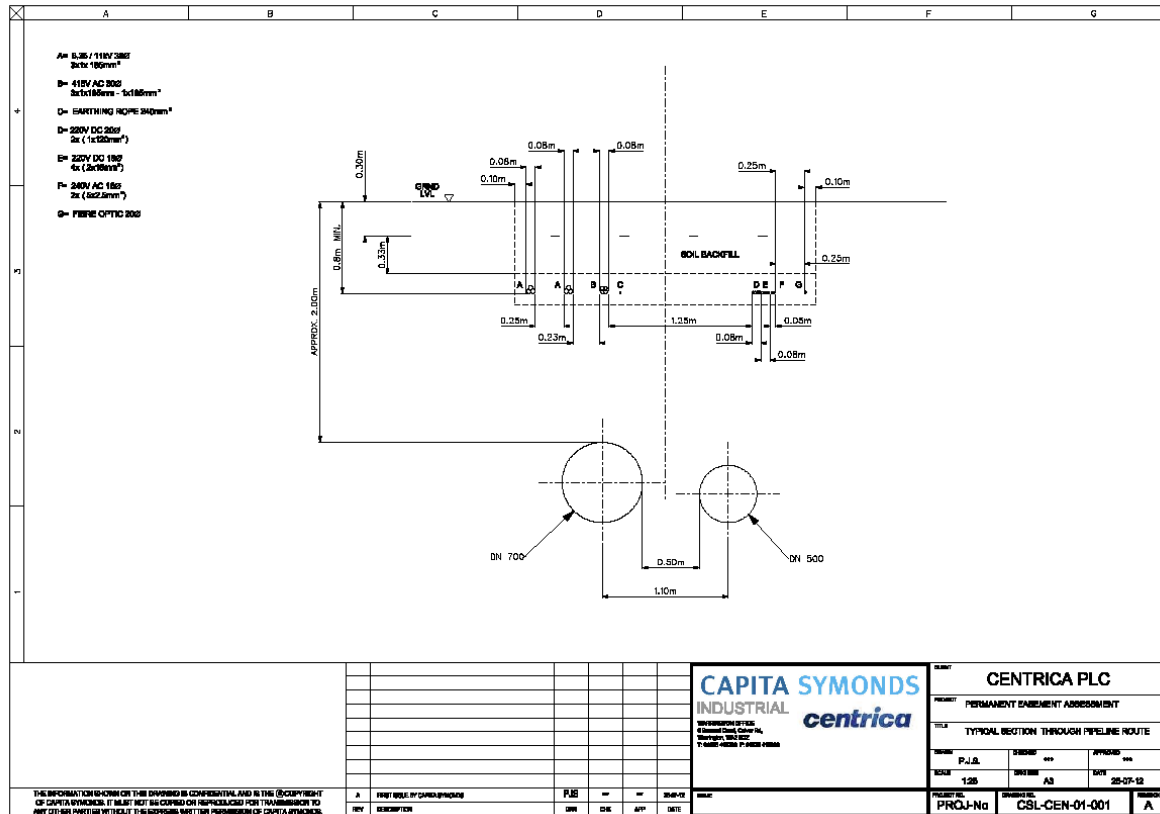
## 2 Scope of Works

Capita Symonds have been instructed to review the request by the Developer to reduce the 'permanent easement' to 12.5m and advise if this is acceptable. In doing so Capita Symonds will assess the proposal based on current and recent knowledge and experience of pipeline construction projects and the principles of Health and Safety Regulations / Guidelines including the Working at Heights Regulations 2005.

Capita Symonds will make recommendations to Centrica plc within this report if the 12.5m proposed corridor is deemed to be insufficient. These recommendations will be based on any future access requirements Centrica plc will need to safely maintain the existing plant and equipment.

### 3 Existing Pipeline Corridor

The corridor contains two large bore pipes (Nb 700mm and 500mm) offset by approximately 500mm. These pipes are laid with an original cover of approximately 1.8m to 2.0m. However Centrica plc are aware that the original ground level has been raised by up to a further 2m along large sections of the route. Immediately above the pipelines there are 21 no. electrical/earthing/fibre optic cables. (See below – Drg No: CSL/CEN/01/001 – Typical Section Through Pipeline Route)



The existing pipelines run in an easterly direction from the Power Station towards the River Humber, crossing two ditches then a services corridor consisting of a 6" AC Water Main, an electricity cable, an 18" Conoco Pipeline, a 30" HP Pipeline, an 18" Liquid Feedstock Pipeline, a 6" I.C.I. Pipeline and a 200mm British Gas "Amethyst" Pipeline before crossing Clough Lane which has a HV cable on the western side and a ditch on the eastern side. After crossing two further ditches the route heads in a north easterly direction crossing a railway line before entering the Make-Up Water Pumphouse / Transfer Structure immediately before the River Humber.

#### 4 Future access requirements

Centrica plc will need to ensure that adequate space is available for any future event that will require access over or down to the buried services. The space requirement will differ depending on the circumstance.

- a) **Visual Inspection / Non-intrusive Surveys** – There are a number of manholes along the route which Centrica plc will need to regularly inspect. These inspections may require vehicular access to be available. Centrica plc may also need to undertake non-intrusive surveys which generally involve “walkover” surveys along the route.
- b) **Localised repairs** - Centrica plc may be required to under take localised repairs to the buried services. In this instance suitable and adequate space will be required for both labour and equipment to facilitate excavation works including equipment storage, excavated material storage, safe access and egress to and from the excavations as well as suitable and adequate working areas both in and around the excavations.
- c) **Full length replacement of part or all of the existing buried services** – Centrica plc may need to replace completely one or all of the buried services in the future. In this case an adequate working area will be required along the full length of the corridor in order for the existing plant to be exposed and removed, for the new pipe / cables to be made above ground and placed within the excavation. Again safe access and egress to and from the excavations, equipment and excavated material storage areas as well as adequate working areas in and around the excavations must be available.

When assessing the space requirements for the above, the need to be able to establish safe systems of work must be considered at all times.

## 5 Proposed Easement Assessment

In order to determine if the proposed 12.5m corridor is adequate it is necessary to establish the potential future work scope. Section 4 above outlines the different scenarios that may arise. The sections below aim to assess the minimum requirements for each of the scenarios.

Option a) above – **Visual Inspection / Non-intrusive surveys** – would require minimal space as this operation is generally limited to above ground activities (with the exception for gaining access in to the manholes). Therefore 12.5m would be sufficient.

Option b) above – **Localised repairs** – would require excavation works to be undertaken over a relatively short linear length of the buried plant. Drawings CSL/CEN/002/001 & CSL/CEN/002/002 below show the required area to allow all safety factors (access/egress, storage, working area in and around the excavation) to be addressed.

**Note: The cables have been removed for clarity. The worst case scenario would involve the deeper large bore pipes and therefore these have been assessed.**

Due to the close proximity of the two pipes – 500mm face to face and the depth of excavation – approximately 3.3m it will be necessary to expose both pipes. In order to allow for safe working within the excavation an allowance of 1.2m has been made to the outside of both pipes. This is necessary given the minimal distance between the two pipes (500mm).

Drawing No. CSL/CEN/002/001 shows a depth to the invert from ground level of 3.3m. This is based on an original cover to crown (700mm pipe) of 2m plus pipe of 700mm plus clearance below pipe for working of 600mm. Using a safe angle of repose of 45 degrees the plan size at ground level of the battered excavation would be - width at bottom of excavation (4.1m) plus 2 x depth (2 x 3.3m) – **10.7m**.

In order to comply with the Working at Heights Regulations 2005 as amended by the Work at Height (Amendment) Regulations 2007 and to prevent overloading of the excavation a “safety zone” of 1m around the excavation should be included. A working area of 4m either side of the excavation would be required to allow for movement of plant, storage of equipment (including pumps) and maximising works above ground rather than in the excavation (this should be undertaken where ever possible to avoid the risks associated with working in an excavation – Working at Height Regs Section 6 (2)). Excavated material storage would need to be considered. The drawing below – CSL/CEN/02/002 shows the plan view of the required easement. As can be seen the preferred plan dimension for the easement would be **24.7m**.

It may be possible to work from 3 sides only. This could be achieved by removing the working area / running track of 4m from one side but still retain the 1m “safety zone” . However it would be necessary to increase the working area / running track on the other side to a minimum of 7m to allow plant and vehicles to pass. This would result in reducing the plan size to **23.7m** however this would result in increasing the difficulty of the excavation operation due to the plant being restricted to working from three sides only.











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## 6 Conclusions

The above assessments are based on the practical working areas to access the pipes having a cover to ground level of 2m (to top of the 700mm pipe from the as-built information provided to CSL).

However, Centrica plc have noted that sections of ground have been built up since the installation of the pipelines by up to 2m along large sections. Where this is the case it would be reasonable to extend the easement by a further 4m on each of the battered excavation options above.

This would result in

- the localised repair option increasing from 24.7m to **28.7m**
- the localised repair option with access to 3 sides only, increasing from 23.7m to **27.7m**
- the full replacement option increasing from 27.7m to **31.7m**

CSL would confirm that the proposed 12.5m easement corridor is insufficient for any future intrusive works on the deeper large bore pipelines.

Based on the above and considering the Health and Safety requirements for any future works, CSL would recommend a minimum easement of **31.7m**. This is above normal easement agreements for most pipelines, however the presence of two pipelines in close proximity as well as the cables results in a larger easement being required.

Due to the potential for introducing hazards (cross excavation supports) and the increased time for undertaking the works within a shored trench (therefore increasing the exposure to hazards for the workforce), the shoring option should be considered only if the conditions for a battered excavation are not deemed to be suitable.

**APPENDIX 1**

**Indicative Masterplan – AME-02006 – Marked up**



DATE: 10/15/2008  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]



PROJECT: ASU Mark and Wendy Park  
 SITE: [Address]  
 DATE: 10/15/2008

**PRELIMINARY**

DATE: 10/15/2008