

# Heytesbury Underground Gas Storage (HUGS) Pipeline

Attachment 0

Constructability Assessment

Attachment O



# Heytesbury Underground Gas Storage Project

HUGS Pipeline Constructability Assessment Report

PRM-0021-UGS-UY-0015

Rev A

# **UNCONTROLLED WHEN PRINTED**

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# TABLE OF CONTENTS

1.	INTRODUCTION	3			
1.1	Project Overview	3			
1.2	Scope of Document	4			
1.3	Abbreviations, Terms and Acronyms	4			
2.	CONSTRUCTION ASSESSMENT	5			
2.1	Construction Methods	5			
2.2	Trenchless (HDD)	6			
2.3	Other Constraints	8			
2.4	Conclusion	8			
APPENDIX A – PIPELINE ROUTE9					
APPENDIX B – HUGS PIPELINE CONSTRUCTION METHOD & CONSTRAINTS10					
APPENDIX B – MFCT WELLSITE ACCESS ROUTE ERROR! BOOKMARK NOT DEFINED.					

# TABLES

Table 1-1: Terms & Abbreviations
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# FIGURES

Figure 2-1 MFCT Wellsite Location	. 3
Figure 3-1: HUGS Pipeline Typical ROW Layout	. 5
Figure 3-2: Timboon-Peterborough Road Native Vegetation Impact	. 6
Figure 3-3: Boundary Road / Unnamed Watercourse Native Vegetation Impact	. 7
Figure 3-3: Skull Creek / Leech Creek CH & Native Vegetation Impact	. 7

# 1. INTRODUCTION

## 1.1 **Project Overview**

Lochard Energy is the proponent of the Heytesbury Underground Gas Storage (HUGS Project), which will expand the storage capacity of the Iona Gas Storage Facility (IGSF). The HUGS Project will provide additional security of supply and reliability to the growing demands for energy storage in the eastern Australian energy market, which will help support the transition to a lower carbon future. The project location is shown in Figure 1-1.

Underground storage capacity of the IGSF will be increased through the development of the existing Heytesbury depleted gas fields. The Heytesbury depleted gas fields are all natural sandstone formations that have had pre-existing natural gas extracted and are therefore ideal as a natural geological reservoir for the storage of gas. The HUGS scope of project includes:

- Development of a new wellsite which has the potential to access three depleted gas fields being Mylor, Fenton Creek and Tregony (MFCT). The project aims to develop the Mylor field with 1-2 new gas storage well(s.) The new gas storage wells will be accessed via a drilling program.
- In order to connect the MFCT Wellsite to the IGSF, a new pipeline is required. This new DN300 5.3km pipeline (HUGS Pipeline) will transport natural gas and potentially hydrogen in the future, to and from the new MFCT Wellsite. The HUGS Pipeline will be an extension to Lochard Energy's existing gathering line network from North Paaratte Production Station (NNPS).



Figure 1-1 MFCT Wellsite Location

## **1.2 Scope of Document**

This Pipeline Constructability Assessment defines the construction method employed for the HUGS Pipeline and identifies key constraints that were minimised / avoided during the route selection process and through construction method determination.

Residual constraints will be managed through construction management processes as defined in the Construction Safety Management Plan (CSMP), Construction Environmental Management Plan (CEMP) and the Cultural Heritage Management Plan (CHMP).

## **1.3** Abbreviations, Terms and Acronyms

Abbreviation or Term	Description
CEMP	Construction Environmental Management Plan
СНМР	Cultural Heritage Management Plan
CSMP	Construction Safety Management Plan
EVC	Ecological Vegetation Class
HDD	Horizontal Directional Drill
HSE	Health, Safety and Environment
HSEMP	Health, Safety and Environment Management Plan
HUGS	Heytesbury Underground Storage Project
КР	Kilometer Point
Lochard/LE	Lochard Energy
MFCT	Mylor, Fenton Creek, Tregony
ROW	Right Of Way

#### Table 1-1: Terms & Abbreviations

# 2. CONSTRUCTION ASSESSMENT

## 2.1 **Construction Methods**

The installation of pipelines is a critical process that varies based on the local environmental, cultural heritage, logistical, and operational factors. The pipeline industry has developed several techniques to efficiently install pipelines across different terrains and settings, each best suited for particular conditions and requirements. The HUGS Pipeline employs two of the most common installation techniques:

- 1. Trenching (Open Cut)
- 2. Trenchless (HDD)

The constructability assessment identifies the locations where each construction method is employed and is summarised in Appendix B.

## 2.1.1 Trenching (Open Cut)

The trenching or open cut method is one of the oldest and most utilised techniques for pipeline installation. It is well established and typically the most cost-effective and practical method of installation of a pipeline in most settings.

The design of the HUGS Pipeline adopted the open-cut as the default installation method, with the principle of avoidance through route selection to minimise impact to sensitive areas (such as environmental, cultural heritage, public safety and infrastructure aspects). Where the sensitive areas could not be avoided through route selection, trenchless installation (specifically HDD) was employed where it significantly reduced the impact.

The open-cut installation method requires the establishment of a construction right of way (ROW) to facilitate the construction processes in a safe and efficient manner. The typical ROW width is 25m for the HUGS Pipeline, with standard layout provided in Figure 2-1.



#### Figure 2-1: HUGS Pipeline Typical ROW Layout

At various locations along the route, additional work area is nominated to facilitate the stockpiling of material, vehicle turnarounds, access tracks, HDD pads, bell hole excavations etc.. Similarly, where requirement to minimise or avoid impact to sensitive areas, the ROW width may be reduced. The nominated ROW width for each section is summarised in Appendix B.

For the standard pipeline ROW layout, the offset of the pipeline from ROW boundaries is approximately 8m and 17m. However, this varies for different sections of the pipeline where additional workspace is provided or restriction to ROW apply. The offset of the pipeline for each

PRM-0021-UGS-UY-0015 – HUGS PIPELINE CONSTRUCTABILITY ASSESSMENT REPORT – REV A

section is summarised in Appendix B. Note, the offsets are provided from the left and right ROW boundary when facing ascending KP values.

## 2.2 Trenchless (HDD)

Horizontal Directional Drilling (HDD) is a modern, trenchless technology that allows for the installation of pipelines underneath obstacles with minimal environmental disruption through the crossing (however, there is a degree of disturbance at each end of HDD section). The HUGS Pipeline has nominated two locations for HDD:

- Timboon–Peterborough Road (KP 0.740)
- Boundary Road / Unnamed Watercourse (KP 3.330 KP 3.450)

Significant reduction in impact to native vegetation is achieved at these locations through adoption of HDD installation and which could not be achieved readily through route adjustment.

## 2.2.1 Timboon-Peterborough Road

Timboon–Peterborough Road contains stands of native vegetation classified as Lowland Forest (EVC 16) and large Mana Gums in both the southern and northern road verges – refer Figure 2-2 The implementation of HDD from KP 0.690 to KP 0.790 avoid impact to the native vegetation. Access to the southern side of the crossing (HDD exit) is via existing access crossover to wellsite

from Timboon-Peterborough Road and does not impact native vegetation. Access to northern side of the crossing (HDD entry) is via existing landowner access track and will require relatively minor trimming of low hanging branches of native vegetation. Note, the easternmost access to the north side of Timboon-Peterborough Road is not expected to be implemented

due to impact to native vegetation and requirement to remove at least one large Mana Gum.



Figure 2-2: Timboon-Peterborough Road Native Vegetation Impact

### 2.2.2 Boundary Road / Unnamed Watercourse

The unnamed watercourse at KP 3.330 contains stands of native vegetation classified as Lowland Forest (EVC 16) and Swampy Scrub (EVC 53) – refer Figure 2-3.

Boundary Road contains stands of native vegetation classified as Damp Heath Scrub (EVC 165) – refer Figure 2-3.

The area between the unnamed watercourse also contains stands of native vegetation classified as Lowland Forest (EVC 16) and large Stag and Stringy Bark trees.

The implementation of HDD from KP 3.250 to KP 3.500 avoid impact to the native vegetation in these areas.

Access to eastern side of crossing (HDD entry) via new track from Boundary Road and utilises existing landholder causeway crossing of the unnamed watercourse Some trimming of low hanging branches may be required through the causeway.

Access to western side of crossing (HDD exit) directly from Boundary Road with no impact to native vegetation.



Figure 2-3: Boundary Road / Unnamed Watercourse Native Vegetation Impact

### 2.2.3 Open Cut Watercourse Crossings

The watercourse crossings of Skull Creek (KP 2.370) and Leech Creek (KP 2.860) were considered for HDD, but ultimately selected to be crossed by open-cut installation. Implementation of HDD at these locations was deemed to not reduce environmental or cultural heritage impacts and would have introduced the additional risks associated with drilling trajectories.

The crossing location of Skull Creek was selected to avoid all Swampy Riparian Woodland (EVC 83) and large Swamp Gums.

The crossing location of Leech creek was modified to avoid impact to discovered artefact and also avoid Swampy Riparian Woodland (EVC 83).

Figure 2-4: Skull Creek / Leech Creek CH & Native Vegetation Impact



## 2.3 Other Constraints

Other constraints along the route were identified and are summarised in Appendix B. These include:

- Pipeline crossings working around live high-pressure gas pipeline
- Overhead powerlines working under live high-voltage power lines
- Buried power cables working around live high-voltage power cables
- Telecommunications cables drilling under cables
- End facilities working in close proximity to operating assets.
- Access limited access areas
- Private tracks limiting outage durations
- Property infrastructure water troughs and poly waterlines

### 2.4 Conclusion

The construction methods are appropriate for the HUGS Pipeline route with consideration to minimising, as far as is reasonably practical, impact to environmental and cultural heritage sensitive area, property infrastructure and public safety.

The remaining constraints on the constructability of the pipeline are readily managed through appropriate management plans and controls.

# **APPENDIX A – PIPELINE ROUTE**



# **APPENDIX B – HUGS PIPELINE CONSTRUCTION METHOD & CONSTRAINTS**

KP Start	KP End	Construction Mothod	RoW Width	Section Description	Constraints
0.000	0.210	Trenched	8-10m	Pipeline section within NPPS fence line. Buried sections trenched. Above ground assemblies installed on pipe supports. ROW layout: N/A.	Working in close proximity to operating assets. Reduced ROW within the NPPS fence line to approx. 8-10m which places constraints on earth moving equipment size and reduced traffic movements.
0.210	0.240	Trenched	40 m	Open grazed paddock adjacent to NPPS boundary fence. Additional workspace provided at start of section for truck turn-around. ROW layout: 17m – 8m with varying AWS either side. Existing DN300 Gathering Line crossing (Lochard Energy's Asset). Open cut crossing installed below existing line	Parallel to exiting pipeline (approx. 10m offset). Section only accessible from NP-4/5 wellsite end. Working around live high pressure gas pipeline.
0.240	0.635	Trenched	25 m	Open grazed paddock between NPPS and NP-4/5 Wellsite. ROW layout: 17m – 8m.	Parallel to exiting pipeline (approx. 10m offset). Inaccessible by extendable pipe trucks – section to be built with 12m pipe lengths.
0.635	0.660	Trenched	40 m	Offtake to NP-4/5 Wellsite. Access provided around wellsite boundary. ROW layout: 36m – 4m.	Proximity to wellsite boundary fence.
0.660	0.700	Trenched	40 m	Open grazed paddock adjacent to NP-4/5 Wellsite. HDD exit pad approximately 65m x 40m. Tie-in section between wellsite offtake and HDD road crossing. Access to southern side of crossing (HDD exit) via existing access crossover to wellsite. ROW layout: 36m – 4m.	Proximity to wellsite boundary fence.

#### PRM-0021-UGS-UY-0015 – HUGS PIPELINE CONSTRUCTABILITY ASSESSMENT REPORT – REV A

KP Start	KP End	Construction	RoW	Section Description	Constraints
0.700	0.700	Method	Width	Timberry Detectory of Dead measure by UDD method	
0.700	0.790	HUU	N/A	Ruriod tolocommunications cable crossing by HDD method.	Avoids disturbance to hative vegetation in
				Access to porthern side of crossing (HDD entry) via existing	(EVC 16) and large Mana Gums
				landowner access track	Avoids disturbance to native vegetation in
				BOW layout: N/A	northern road verge – Lowland Forest
					(EVC 16) and large Mana Gums.
0.790	0.820	Trenched	65 m	Open grazed paddock.	Trimming of low hanging branches of
				HDD entry pad approximately 65m x 35m.	native vegetation required for northern
				Access to northern side of crossing (HDD entry) via existing	access.
				landowner access track.	
				ROW layout varies through this section.	
0.790	0.960	Trenched	25 m	Open grazed paddock.	
				ROW layout: 8m – 17m.	
0.960	0.975	Trenched	30m	Landholder farm track.	Limit crossing duration to minimise track
				Additional workspace (5m) provided through crossing.	outage.
				ROW layout: 8m – 22m.	
0.975	1.690	Trenched	25m	Open grazed paddock.	Water trough relocation.
				Crossing of buried water polylines service stock water	
				trougns.	
1 600	1 710	Tranchad	20m	ROW layout: 8m – 17m.	Marking pround live high processing gas
1.090	1.710	Trenched	3011	Existing pipeline crossing (Haliadale Pipeline – Beach Energy).	pipeline
				Additional workspace (5m) provided through crossing	pipeinie.
				ROW layout: 8m – 22m	
1.710	1.790	Trenched	25m	Open grazed paddock.	Avoids artefact scatter (ID 6)
			_	ROW layout: 8m – 17m.	approximately 28m to north of ROW (KP
					1.770).
					Single large Swamp Gum and edge of
					ROW (KP1.780) – may be disturbed /
					removed.

#### PRM-0021-UGS-UY-0015 – HUGS PIPELINE CONSTRUCTABILITY ASSESSMENT REPORT – REV A

KP Start	KP End	Construction	RoW	Section Description	Constraints
		Method	Width		
1.790	1.950	Trenched	25m – 70m	Open grazed paddock. Truck turn-around area approximately 40m x 75m (equivalent area). ROW layout: 8m – 17m with varying AWS on left (southern)	Vehicle crossover of existing pipeline.
1.950	2.000	Trenched	35m	<ul> <li>Side.</li> <li>Existing pipeline crossing (Paaratte to Allansford Pipeline – APA).</li> <li>Open cut crossing installed below existing pipeline.</li> <li>Additional workspace (10m) provided through crossing.</li> <li>ROW layout: 8m – 27m.</li> </ul>	Working around live high pressure gas pipeline.
2.000	2.330	Trenched	25m	Open grazed paddock. Additional workspace (5m) provided for truck access (swept path) at large angle bends. ROW layout: 8m – 17m.	
2.330	2.400	Trenched	25m / 35m	Skull Creek crossing by open cut method. Additional workspace (10m x 15m) either side of crossing. ROW layout: 8m – 17m / 18m – 17m.	Avoids disturbance to native / riparian vegetation – Swampy Riparian Woodland (EVC 83) and large Swamp Gums. CMA designated waterway – ephemeral.
2.400	2.810	Trenched	25m	Open grazed paddock. ROW layout: 8m – 17m.	
2.810	2.850	Trenched	30m	Open grazed paddock adjacent to Spring Creek crossing. Additional workspace (5m) for stockpiling creek crossing material. ROW layout varies through this section.	Avoids cultural heritage find (EP02) including 25 m buffer zone.
2.850	2.870	Trenched	10-15m	Leech Creek crossing by open cut method. ROW width reduced through watercourse crossing. ROW layout: 5m – 10m.	Avoids Swampy Riparian Woodland (EVC 83). CMA designated waterway – ephemeral. Reduced ROW area to minimise

#### PRM-0021-UGS-UY-0015 - HUGS PIPELINE CONSTRUCTABILITY ASSESSMENT REPORT - REV A

KP Start	KP End	Construction	RoW	Section Description	Constraints
		Method	Width		
2.870	2.890	Trenched	29m	Open grazed paddock adjacent to Spring Creek crossing. Additional workspace (4m) for stockpiling creek crossing material. ROW layout: 12m – 17m.	
2.890	3.220	Trenched	25m	Open grazed paddock. ROW layout: 8m – 17m.	
3.220	3.285	Trenched	40m / 25m	Open grazed paddock. HDD entry pad approximately 40m x 40m plus 30m x 25m. ROW layout: 23m – 17m / 8m – 17m.	
3.285	3.470	HDD	N/A	Boundary Road and unnamed watercourse crossing by HDD method. Access to eastern side of crossing (HDD entry) via new track from Boundary Road and utilises existing landholder causeway crossing of unnamed watercourse. Access track crosses under overhead powerlines. ROW layout: N/A.	Minimises disturbance to native vegetation in unnamed watercourse – Lowland Forest (EVC 16) and Swampy Scrub (EVC 53). Some trimming of low hanging branches may be required through causeway. Avoids disturbance to native vegetation between unnamed watercourse and Boundary Road – Lowland Forest (EVC 16) and large Stag and Stringy Bark trees. Avoids disturbance to native vegetation eastern road verge of Boundary Road – Damp Heath Scrub (EVC 165). CMA designated waterway – ephemeral. Equipment movement under powerlines.
3.470	3.565	Trenched	50m / 30m	Open grazed paddock. HDD exit pad approximately 50m x 50m plus 30m x 45m. Access to western side of crossing (HDD exit) directly from Boundary Road. ROW layout varies through this section.	

#### PRM-0021-UGS-UY-0015 - HUGS PIPELINE CONSTRUCTABILITY ASSESSMENT REPORT - REV A

KP Start	KP End	Construction	RoW	Section Description	Constraints
		Method	Width		
3.565	3.705	Trenched	25m	Open grazed paddock.	
				ROW layout: 17m – 8m.	
3.705	3.720	Trenched	30m	Landholder farm track.	Limit crossing duration to minimise track
				Additional workspace (5m) provided through crossing.	outage.
				ROW layout: 22m – 8m.	
3.720	3.830	Trenched	35m /	Unnamed watercourse / drain line crossing.	Avoids disturbance to native vegetation
			25m	Additional workspace (10m x 15m) provided on east side of	unnamed watercourse – Lowland Forest
				crossing.	(EVC 16).
				ROW layout: 27m – 8m / 17m – 8m.	
3.830	4.320	Trenched	25m /	Open grazed paddock.	Avoids disturbance to native vegetation –
			30m	Additional workspace (5m) provided for truck access (swept	Lowland Forest (EVC 16) at KP4.060.
				path) at large angle bends.	
				ROW layout: 17m – 8m / 22m – 8m.	
4.320	4.335	Trenched	30m	Landholder farm track.	Limit crossing duration to minimise track
				Additional workspace (5m) provided through crossing.	outage.
				ROW layout: 22m – 8m.	
4.335	4.615	Trenched	25m	Open grazed paddock.	
				ROW layout: 17m – 8m.	
4.615	4.635	Trenched	30m	Existing buried HV cable.	Working around live HV cable.
				Open cut crossing installed below existing cable.	
				Additional workspace (5m) provided through crossing.	
				ROW layout: 22m – 8m.	
4.635	4.680	Trenched	25m	Open grazed paddock.	
				ROW layout: 17m – 8m.	
4.680	4.700	Trenched	30m	Existing pipeline crossing (Paaratte to Allansford Pipeline -	Working around live high pressure gas
				APA).	pipeline.
				Open cut crossing installed below existing pipeline.	
				Additional workspace (5m) provided through crossing.	
				ROW layout: 22m – 8m.	

#### PRM-0021-UGS-UY-0015 - HUGS PIPELINE CONSTRUCTABILITY ASSESSMENT REPORT - REV A

KP Start	KP End	Construction Method	RoW Width	Section Description	Constraints
4.700	4.920	Trenched	25m	Open grazed paddock.	
				ROW layout: 17m – 8m.	
4.920	5.005	Trenched	25m /	Landholder farm track.	Planted native vegetation removal on
			35m	Additional workspace (10m x 30m) provided either side of	southern side of track.
				crossing.	Limit crossing duration to minimise track
				ROW layout: 27m – 8m / 17m – 8m / 27m – 8m.	outage.
5.005	5.165	Trenched	25m	Open grazed paddock.	
				ROW layout: 17m – 8m.	
5.165	5.220	Trenched	50m	Open grazed paddock adjacent to MFCT Wellsite boundary	
				fence.	
				Additional workspace provided for truck turn-around.	
				Access provided through wellsite.	
				ROW layout: 17m – 8m.	
5.220	5.250	Trenched	N/A	Pipeline section within MFCT Wellsite fence line.	
				Buried sections trenched.	
				Above ground assemblies installed on pipe supports.	
				ROW layout: N/A.	