



**GAS IMPORT JETTY AND PIPELINE PROJECT  
ENVIRONMENT EFFECTS STATEMENT  
INQUIRY AND ADVISORY COMMITTEE**

**TECHNICAL NOTE**

**TECHNICAL NOTE NUMBER:** TN 027

**DATE:** 16 October 2020

**LOCATION:** Pipeline Works

**EES/MAP BOOK REFERENCE:** GIJPP EES Attachment VII Map book – Map sheet 2

**SUBJECT:** Response to the Expert Witness Statement of Dr Graeme Lorimer, filed by the Mornington Peninsula Shire Council

**SUMMARY:** This technical note responds to the 'key issues' raised by Dr Lorimer in regard to HDD construction to avoid a population of Merran's Sun-orchids.

**REQUEST:** N/A

**NOTE:**

1. In various locations where the proposed pipeline alignment intersects areas of high ecological significance, or other constraints, the pipeline is proposed to be constructed using trenchless construction techniques, such as horizontal directional drilling (HDD). This includes the location of a population of Merran's sun orchid *Thelymitra merraniae*, between approximate kilometre points 1.1 and 1.7.
2. It is appreciated that Dr Lorimer commends *"the project proponents for accepting the additional cost of horizontal directional drilling (HDD) in order to avoid the very high risk that would otherwise have been posed to Merran's Sun-orchid and its habitat. That decision also greatly reduces the risk to two other threatened orchid species found with the Merran's Sun-orchids, namely the Gaping Sun-orchid and the Pallid Sun-orchid."*
3. Dr Lorimer raises issues of perceived residual risk arising from the use of HDD. The issues Dr Lorimer raises are discussed in more detail in his statement. The selected extracts reproduced here are intended only to provide context for the response.

**Dr Lorimer – Key Issue 1 – 'Frac outs'**

**(2) It can be very difficult to clean up the fluid without damaging small, delicate groundcover plants like sun-orchids. Any residue sets and can form a prolonged cake over the ground and vegetation. That can render the affected ground unfit for sun-orchids for years.**

**(3)The EES does not deal at all with the threat that a frac-out would pose to Merran's Sun-orchids and their habitat. In my opinion, this threat is very real and could have unacceptable impacts on this extremely rare species. I regard the omission of this risk from the EES as a significant omission.**

**(46) I recommend that MM-FF10 be strengthened by requiring the HDD work between KP1.13 and KP1.7 be done during January to March, when sun-orchids die back to**



**underground tubers. A leak during those months would pose much less risk to the orchids and allow easier clean-up.**

- 4. For each HDD, an HDD management plan, including the drill profile design, the work method statement and the proposed volumetric drilling fluid tracking program, including proposed intervention levels, is to be submitted to DELWP and approved prior to the commencement of HDD activities (Pipeline CEMP Performance Standard - D1). This plan includes the control of down-hole pressures to minimise the risk of mud expression at the surface.
- 5. The HDD design, including the setback of the HDD entry and exit locations and the depth of cover below the Orchid population, will further reduce the risk of surface mud expression.
- 6. The careful planning of HDD is intended to ensure that frac-outs do not occur. It is therefore the primary measure intended to protect the orchid population. If however a frac-out occurs, CEMP Appendix J includes detailed measures to ensure that damage is avoided or minimised.
- 7. Dr Lorimer notes that he has previously observed an HDD mud clean up that damaged vegetation and left a residual 'cake' on the ground and vegetation. APA do not consider this an acceptable response, and Pipeline CEMP Performance Standard D8 is directed to avoiding such a situation. Standard D8 provides:

*Appropriate spill response and clean-up equipment (e.g. sandbags, vac-truck) will be on-site during HDD activities. If a spill/release occurs the Contingency Plan for Chemical Spill response (refer to Section 6.1) will be implemented.*

- 8. The Contingency Plan for Chemical / Fuel Spill Response is included at Appendix F of the CEMP (which is Attachment 2 to EES Attachment IX: Pipeline Licence Application). It sets out comprehensive requirements in relation to the response to and reporting of spills, including containment, collection, reporting/notification, disposal and remediation. It specifies environmental priorities including protecting of sensitive environmental receptors, including sensitive flora, clean-up and remediation of the natural environment to, or as close to, pre-spill condition as reasonably practicable.
- 9. The extent of surface expressions of HDD mud (or return line leaks) can be contained with portable bunding or similar equipment. The mud can usually be removed with suction without damage to vegetation or substantial residue. Drilling muds are water-based. If sensitive vegetation is present, the muds can be mobilised with water and directed to a point where they can be removed with suction without damage to the vegetation.
- 10. In consideration of the above, both the likelihood and consequence of HDD mud release to the orchid population can be effectively managed without restricting the period of construction.
- 11. Dr Lorimer recommends the expansion of EES mitigation measure MM-FF10 to include additional controls. These are set out below, as is APA's response (note that the table includes only those measures that Dr Lorimer proposes to change).

<b>Dr Lorimer's recommended additional control</b>	<b>Proponent's response</b>
HDD work to be conducted only during the months of January to March;	As discussed above, it is considered that the risk of HDD mud release to the orchid population can be effectively managed without restricting the period of construction.

	No change considered necessary.
Drilling to be as deep as possible without the risk of entering the water table;	<p><i>Pipeline CEMP Performance Standard - D1:</i></p> <p><i>For HDDs, the drill profile design, the work method statement and the proposed volumetric drilling fluid tracking program, including proposed intervention levels, is to be submitted to DELWP and approved prior to the commencement of HDD activities.</i></p> <p>Standard D1 ensures that the depth of drilling is optimised for each HDD.</p> <p>No change considered necessary.</p>
Fluid pressures to be kept low enough to ensure negligible risk of a frac-out. [An expert in the field might come up with a more precise specification, e.g. by reference to computer modelling];	<p><i>Pipeline CEMP Performance Standard – D6:</i></p> <p><i>A volumetric drilling fluid tracking program will be implemented to monitor fluid use during drilling operations with defined levels for fluid loss, stop works and further investigation.</i></p> <p>Standard D1 (above) and Standard D6 ensure that fluid pressures are optimised, and that any fluid loss is quickly identified.</p> <p>No change considered necessary.</p>
Visual inspection for frac-outs and return line leaks to be carried out on foot x times daily, in conjunction with return line monitoring [where 'x' would be determined on the basis of advice from one or more independent HDD experts];	<p>A new performance standard (D11) to be added to CEMP Appendix J:</p> <p><i>The HDD alignment and return lines will be inspected regularly on foot for mud release, at a frequency not less than 2-hourly.</i></p>
Fluid pumping must cease immediately if the imbalance between the injection rate and the recovery rate (as determined through Environmental Control D6 in the CEMP) exceeds an amount y [where 'y' would be determined on the basis of advice from one or more independent HDD experts];	Standard D1 (above) will lead to the setting of intervention levels (the limit of acceptable rate of loss of fluid into the formation) and Standard D6 (above) will ensure that fluid loss was monitored and action taken if intervention levels were exceeded. No change considered necessary.
Fluid flow must cease and mud spill kits deployed immediately in the event of a frac out or return line leak;	<p>This is covered by Standard D6 (above) and Standard D8 (above at paragraph 7).</p> <p>No change considered necessary.</p>
An ecologist must be on-call whenever fluid is being pumped. She or he must be called upon to attend any frac-out or return-line	As discussed above at paragraph 7, Standard – D8 provides that the Contingency Plan for Chemical Spill

<p>leak urgently to advise the least ecological harmful way to clean up the spilt fluid;</p>	<p>Response will be implemented if a spill occurs.</p> <p>The Contingency Plan for Chemical Spill Response requires notification of the Project Environment Advisor of the spill and their direction of the response.</p> <p>See also paragraph 12 below in relation to the involvement of environmental advisors in HDD placement and dismantling.</p> <p>No change considered necessary.</p>
<p>Any frac-out or return-line leak must be reported immediately to the Department of Environment, Land, Water and Planning for oversight of incident response, remediation and compensation (e.g. propagation);</p>	<p>Pipeline CEMP Section 7.5 details incident reporting and notification requirements, including HDD mud release.</p> <p>The Contingency Plan for Chemical Spill Response includes requirements for reporting to the appropriate regulator.</p> <p>No change considered necessary.</p>

12. In reviewing Dr Lorimer’s report, it has come to our attention that aspects of MM-FF10 that deal with the HDD return line have inadvertently been omitted from CEMP Appendix J. The following points will be added to Standard B12 in the next version of Appendix J:

- a. Project Environmental Advisor to supervise the placement of the return line, which will be micro-sited to avoid threatened orchids.
- b. Project Environmental Advisor to supervise dismantling of return line and complete inspection of habitat following completion of drilling.

**Dr Lorimer – Key Issue 2 – Contingency for Unfeasibility of HDD**

**(6) While the EES countenances the possibility that HDD may turn out to be unfeasible, it does not address what the alternative could be for the habitat of Merran’s Sun-orchid. Mitigation measure MM-FF10 aims to minimise risks to Merran’s Sun-orchid on the assumption that HDD will occur, but that assumption may not be borne out.**

**(9) I recommend the adoption of a condition on the project that, if HDD is not going to be used between KP1.13 and KP1.8, a new approval process will be required to identify and mitigate the threats to Merran’s Sun-orchid and its habitat.**

13. The EES identifies that geotechnical or technological circumstances can limit or prevent trenchless construction. However, on the basis of investigations undertaken by APA, trenchless construction is expected to be viable in each location where it is proposed. The geotechnical or technological circumstances that may limit or prevent trenchless constructions, and how those circumstances have already been considered as part of the Project, is outlined in Technical Note 012.

14. For each proposed HDD, an HDD Management Plan, including the drill profile design, the work method statement and the proposed volumetric drilling fluid tracking program, including proposed intervention levels, is to be submitted to DELWP and approved prior to the commencement of HDD activities (Pipeline CEMP Performance Standard - D1).
15. If it is determined that this HDD, as designed, is not feasible, the HDD would be redesigned. A revised HDD Management Plan would be required to be resubmitted to DELWP for approval, including consideration of any change to the impact on the orchid population.
16. Pipeline CEMP Performance Standard - B12 includes that if any individual orchids are identified within areas of planned impact, a relocation protocol would be developed in consultation with DELWP.
17. If it eventuates that an HDD is not feasible, the Pipeline CEMP would be required to be updated and this would be subject to an approval process under the Pipelines Act. Any resulting amendment to the Pipeline Licence or alteration of the pipeline route would also be subject to approval under the Pipelines Act.

### **Dr Lorimer – Key Issue 3 – Ground Subsidence or Settling**

**(10) Sometimes during HDD, drilling fluid under pressure does not find its way unintentionally to the ground surface as a frac-out but does leave a cavity in the soil surrounding the pipe. Soil (which is sandy, at Crib Point) ultimately caves in to fill the cavity, leaving a depression in the ground surface. The subsidence or the changed growing conditions in the depression could potentially cause Merran’s Sun-orchids to die out there or diminish in numbers.**

**(11) The possibility of ground settling is not considered in the EES. It should have been, in my opinion.**

18. Dr Lorimer cites an article that states, ‘Conditions that pose potential problems include weak, compressible soils, poorly graded clean sands and gravel (especially combined with low blow counts) and high groundwater’, and notes that ‘the sandy soil at Crib Point appears to be a candidate for settling’.
19. The article is correct that some soil types, particularly clean sand and gravels, may be susceptible to cavity formations and down-hole collapse.
20. Geotechnical investigations have been undertaken for all proposed HDD locations, including the site of the sun-orchid population. The soils at this location are clayey sand and sandy clay, not clean sand. These soil types are suitable for HDD, with good cohesion and low risk of cavity formation.
21. The HDD design, including the setback of the HDD entry and exit locations and the depth of cover below the Orchid population, in conjunction with the ground conditions means the risk of subsequent subsidence at the surface is negligible and need not be considered further.
22. APA does not consider the risk of ground settling credible, which means that the grouting suggested by Dr Lorimer does not need to be considered further. APA notes however that it considers that grouting as proposed by Dr Lorimer is not technically feasible. If it could be done at all, it would involve a high risk of frac-out. It would therefore increase, rather than decrease, the risk to the Orchids.



**CORRESPONDENCE:** N/A

**ATTACHMENTS:** N/A