### REFERRAL OF A PROJECT FOR A DECISION ON THE NEED FOR ASSESSMENT UNDER THE *ENVIRONMENT EFFECTS ACT 1978*

**REFERRAL FORM**

The *Environment Effects Act 1978* provides that where proposed works may have a significant effect on the environment, either a proponent or a decision-maker may refer these works (or project) to the Minister for Planning for advice as to whether an Environment Effects Statement (EES) is required.

This Referral Form is designed to assist in the provision of relevant information in accordance with the *Ministerial Guidelines for assessment of environmental effects under the Environment Effects Act 1978* (Seventh Edition, 2006). Where a decision-maker is referring a project, they should complete a Referral Form to the best of their ability, recognising that further information may need to be obtained from the proponent.

**It will generally be useful for a proponent to discuss the preparation of a Referral with the Impact Assessment Unit (IAU) at the Department of Environment, Land, Water and Planning (DELWP) before submitting the Referral.**

If a proponent believes that effective measures to address environmental risks are available, sufficient information could be provided in the Referral to substantiate this view. In contrast, if a proponent considers that further detailed environmental studies will be needed as part of project investigations, a more general description of potential effects and possible mitigation measures in the Referral may suffice.

In completing a Referral Form, the following should occur:

* Mark relevant boxes by changing the font colour of the ‘cross’ to black and provide additional information and explanation where requested.
* As a minimum, a brief response should be provided for each item in the Referral Form, with a more detailed response provided where the item is of particular relevance. Cross-references to sections or pages in supporting documents should also be provided. Information need only be provided once in the Referral Form, although relevant cross-referencing should be included.
* Responses should honestly reflect the potential for adverse environmental effects. A Referral will only be accepted for processing once IAU is satisfied that it has been completed appropriately.
* Potentially significant effects should be described in sufficient detail for a reasonable conclusion to be drawn on whether the project could pose a significant risk to environmental assets. Responses should include:

- a brief description of potential changes or risks to environmental assets resulting from the project;

- available information on the likelihood and significance of such changes;

- the sources and accuracy of this information, and associated uncertainties.

* Any attachments, maps and supporting reports should be provided in a secure folder with the Referral Form.
* A USB copy of all documents will be needed, especially if the size of electronic documents may cause email difficulties. **Individual documents should not exceed 10MB as they will be published on the Department’s website.**
* A completed form would normally be between 15 and 30 pages in length. Responses should not be constrained by the size of the text boxes provided. Text boxes should be extended to allow for an appropriate level of detail.
* The form should be completed in MS Word and not handwritten.

The party referring a project should submit a covering letter to the Minister for Planning together with a completed Referral Form, attaching supporting reports and other information that may be relevant. This should be sent to:

Postal address Couriers

**Minister for Planning Minister for Planning**

**PO Box 500 Level 16, 8 Nicholson Street**

**EAST MELBOURNE VIC 8002 EAST MELBOURNE VIC 3002**

In addition to the submission of the hardcopy to the Minister, separate submission of an electronic copy of the Referral via email to [ees.referrals@delwp.vic.gov.au](mailto:ees.referrals@delwp.vic.gov.au) is required. This will assist the timely processing of a referral.

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# PART 1 PROPONENT DETAILS, PROJECT DESCRIPTION & LOCATION

**1. Information on proponent and person making Referral**

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| **Name of Proponent:** | Vopak Victoria Energy Terminal Pty Ltd |
| **Authorised person for proponent:** | Gary Constantine |
| **Position:** | Project Director |
| **Postal address:** | 567 Collins St Melbourne VIC 3000 |
| **Email address:** | info@vopakvicenergy.com.au |
| **Phone number:** |  |
|  |  |
| **Person who prepared Referral:** | Rob Marks |
| **Position:** | Associate, Environment and Planning |
| **Organisation:** | Aurecon Australasia Pty Ltd |
| **Postal address:** | PO Box 23061, Docklands, VIC 8012 Australia |
| **Email address:** |  |
| **Phone number:** |  |
|  |  |
| **Available industry & environmental expertise:** (areas of ‘in-house’ expertise & consultancy firms engaged for project) | Vopak Victoria Energy Terminal Pty Ltd (Vopak) through its affiliates have been operating in Australia for more than 50 years and globally for over 400 years. In Australia, Vopak currently operates terminals in Sydney and Darwin. It successfully operates, under partnership arrangements, four Liquified Natural Gas (LNG) import terminals globally with a further five under development.  Vopak has engaged Aurecon Australasia Pty Ltd (Aurecon) to prepare this referral. Aurecon has demonstrated Victorian experience undertaking environmental impact assessments in planning, post-contact heritage, cultural heritage and ecology, and navigating approvals for complex infrastructure projects. The referral is supported by a number of specialist consultant reports to form a strong understanding of the existing conditions within the Project area.  The following attachments are provided to assist with assessment of the Vopak Victoria Energy Terminal (the Project):   * Project area Map - Overview **Attachment 1.** * Project area Map - Detailed **Attachment 2.** * Key Features Map **Attachment 3.** * Planning Zones Map **Attachment 4.** * Planning Overlays Map **Attachment 5.** * Siting background – Project locations investigated Map **Attachment 6.** * Siting background – Pipeline alignments investigated Map **Attachment 7.** * Powerline Environmental Review **Attachment 8** * Areas of Cultural Heritage Sensitivity Map **Attachment 9**. * Existing Land Tenure Map **Attachment 10.** * Approved Pipeline Consultation Plan **Attachment 11.** * Pipeline Consultation Plan letter of approval (May 2022) **Attachment 12.** * Ecology Existing Conditions Report **Attachment 13.** * Marine Existing Conditions Report **Attachment 14.** * Greenhouse Gas Existing Conditions Report **Attachment 15.** |

**2. Project – brief outline**

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| **Project title:**  Vopak Victoria Energy Terminal. |
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| **Project location:** (describe location with AMG coordinates and attach A4/A3 map(s) showing project site or investigation area, as well as its regional and local context) |
| The Project and associated Project area extends from an existing anchorage point (G4) in Port Philip Bay, approximately 19 km east from Avalon (refer to Attachment 2 Project area Map, Index Map 1 offshore), then traverses across the shore crossing to agricultural land and road reserves of the Western Treatment Plant (refer to Attachment 2 Project area Map, refer to Index Map 2: onshore). The Project area then extends south along the Princess Freeway until heading northwest within and adjacent to land reserved for a rail link to Avalon Airport, west within and adjacent to Peak School Road past Bacchus Marsh Road and then south to Moorabool Terminal Station (refer to Attachment 2 Project area Map, refer to Index Map 3: onshore powerline). An overview of the Project area is provided in Attachment 1.  Offshore, the Project area intersects with the western shoreline of Port Philip Bay. The western shoreline is part of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site. The Ramsar site covers 22,650 ha, with the Project area intersecting the Ramsar site, offshore and onshore.  Onshore, the Project area is located within the local government area of Greater Geelong in the suburbs of Point Wilson, Little River, Lara, Anakie and Moorabool. The City of Greater Geelong is located 75 km southwest of Melbourne and comprises of suburban, coastal, and rural areas. The commercial centre of Geelong, is situated approximately 25 km southwest and the town of Werribee is located 15 km northeast of the Project area. The Project area lies within a rural area between Geelong and Werribee with the boundary defined by the townships of Little River and Lara.  East of the Princess Freeway, the Project area is within the Ramsar site and Western Treatment Plant (WTP), which began operations in 1897. Aerial photography and historical business records indicate the Project area and surrounds were used primarily for agricultural practices since 1968. The WTP is owned by Melbourne Water and comprises several land uses including the plant operations, wetlands, lagoons, farmland and roads. The Project area is confined to farmland and road reserves of the WTP. Directly adjacent and surrounding the Project area east of the Princes Freeway, is agricultural, commercial and defence industries. The WTP main facilities lie to the east and the Avalon Airport, the Commonwealth Defence Site, Austrak Pty Ltd sleeper factory, MVQ Point Wilson quarry and Jade Tiger Abalone lie to the west.  In 2021 the Commonwealth Defence Site was developed to enable the recommencement of import operations. Future development and expansion to support commercial flight operations is proposed at Avalon Airport as outlined in the approved *Avalon Airport Masterplan* (Avalon Airport, 2015).  West of the Princess Freeway, the Project area is located within and adjacent to existing road reserves and rural areas with the closest residential areas being Little River to the north and Lara to the south west. From west to east, directly adjacent and surrounding the Project area, is rural land, You Yangs Regional Park, Serendip Sanctuary, Hovells Creek and Barwon prison.  The AMG coordinates for the Project area are listed in Table 1 below. Further design development, site investigations and environmental assessment may result in further refinements to the Project area.  Refer to Attachment 1 for an overview map of the Project showing its regional context, Attachment 2 for detailed maps of the Project area and Table 1 below for the AMG coordinates for the Project area.    **Table 1** AMG coordinates for the Project area |
| |  |  |  | | --- | --- | --- | | **Project component location** | **Easting** | **Northing** | | Marine Berth | | | | Marine berth north west corner | 303624 | 5788658 | | Marin berth west corners | 303576 | 5787475 | |  | 304122 | 5786512 | | Marine berth south west corners | 306857 | 5785894 | | Marine berth north east corner | 304813 | 5788837 | | Marine berth east corner | 305155 | 5787659 | | 306455 | 5786606 | | Marine berth south east corner | 306465 | 5786606 | | Pipeline | | | | Offshore pipeline eastern extent at FRSU | 304,539 | 5,787,197 | | Offshore pipeline start bend | 289,057 | 5,786,526 | | Pipeline eastern extent along Beach Road | 285,696 | 5,788,396 | | Pipeline bend at English Road/Beach Road intersection | 283,707 | 5,788,634 | | Pipeline connection with Gas Receiving Station (**GRS**) | 284,175 | 5,793,111 | | Pipeline exit from GRS | 284,033 | 5,793,378 | | Pipeline tie-in to Brooklyn - Corio pipeline | 284,035 | 5,793,659 | | Pipeline laydown area | | | | Pipeline laydown area eastern extent | 286,958 | 5,787,074 | | Pipeline laydown area western extent | 285,618 | 5,787,867 | | Electricity cables | | | | Electricity cables (all options) connection with substation | 283,899 | 5,793,089 | | Electricity cables (Options 1a and 1b) Grills Road northern extent | 285,016 | 5,792,966 | | Electricity cables (Options 1a and 1b) Grills Road southern extent (intersection Cozens Road) | 284,654 | 5,789,861 | | Electricity cables (Options 1a) Cozens Road eastern extent (intersection Chirnside Road) | 285,501 | 5,789,761 | | Electricity cables (Options 1a) southern extent on Chirnside Road/Beach Road intersection | 285,350 | 5,788,485 | | Electricity cables (all options) eastern extent at FRSU | 304,577 | 5,787,341 | | Gas Receiving Station and Substation | | | | GRS north east corner | 284,203 | 5,793,357 | | GRS south east corner | 284,169 | 5,793,056 | | GRS south west corner | 283,972 | 5,793,077 | | GRS north west corner | 284,004 | 5,793,381 | | Substation south east corner | 283,899 | 5,793,085 | | Substation south west corner | 283,799 | 5,793,096 | | Substation western corner | 283,816 | 5,793,245 | | Substation northern corner | 283,915 | 5,793,234 | | Powerline | | | | Powerline connection western side of Moorabool Terminal Station | 262,587 | 5,786,387 | | Powerline eastern side of Moorabool Terminal Station | 263,077 | 5,786,658 | | Powerline south of Staceys Road | 264,710 | 5,789,148 | | Powerline Peak School Road western extent (west of Bacchus Marsh Road) | 265,290 | 5,794,368 | | Powerline Peak School Road / Bacchus Marsh Road intersection | 267,169 | 5,793,794 | | Powerline Peak School Road eastern extent (intersection Mill Road) | 276,669 | 5,792,695 | | Powerline Princes Freeway western extent | 278,620 | 5,790,103 | | Powerline Paradise Road western extent (intersection Princes Freeway) | 281,793 | 5,792,132 | | Powerline Point Wilson Road southern extent (intersection Paradise Road) | 283,257 | 5,791,973 | | Powerline Point Wilson Road northern extent | 283,346 | 5,792,802 | | Powerline substation exit point | 283,823 | 5,793,093 | | Moorabool Terminal Station | | | | Moorabool Terminal Station northern extent | 262,766 | 5,787,100 | | Moorabool Terminal Station eastern extent | 263,357 | 5,786,482 | | Moorabool Terminal Station southern extent | 262,437 | 5,786,020 | | Moorabool Terminal Station western extent | 262,310 | 5,786,671 | |
| **Short project description** (few sentences)**:** |
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| Vopak proposes to build a floating LNG import terminal to help secure energy supply as a part of Victoria’s energy transition.  The aim of the Project is to provide access to a competitive new source of natural gas (peak rate of 650 terajoules (TJ) (600 million standard cubic feet per day (mmscf/d) (a unit of measurement for gases) output for households, businesses and industries in Victoria and across south-eastern Australia. It would underpin energy supply security by providing access to a large international gas market to complement local production in south-eastern Australia as Victoria transitions to a renewable energy future.  The Project would utilise a Floating Storage Re-gasification Unit (FSRU) moored at an existing anchorage point in Port Phillip Bay, approximately 19 km directly offshore from Avalon. The FSRU would receive LNG from import vessels, re-gassify it and supply the gas directly into the Victorian Transmission System via a new 29 km pipeline, comprising of approximately 19 km of pipe under Port Phillip Bay, 1.5 km of pipe within a trenchless shore crossing and 8.5 km of pipe trenched onshore.  Before entering the Victorian Transmission System, gas quality would be monitored at a GRS on land adjacent to the Princes Freeway (between Point Wilson Road and English Road).  A new 132kV overhead transmission line (powerline) (to the substation), substation (located adjacent to the GRS) and electricity cables (from the substation to the shore crossing overhead or underground and subsea from the shore crossing to the FSRU) would supply electricity for the operation of the Project.  The project would be delivered by Vopak. |
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**3. Project description**

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| **Aim/objectives of the project** (what is its purpose / intended to achieve?):  The aim of the Project is to provide access to a competitive new source of natural gas (peak rate of 650 TJ output) for households, businesses and industries in Victoria and across south-eastern Australia. It would underpin energy supply security by providing access to a large international gas market to complement local production in south-eastern Australia as Victoria transitions to a renewable energy future. |
| **Background/rationale of project** (describe the context / basis for the proposal, eg. for siting):  **Rationale**  The Australian Energy Market Operator (AEMO) *Gas Statement of Opportunities* (GSOO)and the *Victorian Gas Planning Report Update* (VGPR)(AEMO, 2022) provides information about the expected gas supply demand balance over the next five to twenty years for Victoria and the wider east coast of Australia. These reports forecast a gas shortage in Victoria commencing by mid decade due to an expected drop in production from existing gas production sources.  This potential shortage is likely to arise due to the continued decline in nearby Victorian production from legacy fields, such as Bass Strait, as demonstrated in the GSOO. The report also shows the need for other gas supply sources such as LNG imports to close this gap, particularly post 2026 (Figure 39 and Figure 40 of the GSOO). Alternative supply options from the significant reserves in Queensland, whilst identified in the GSOO, are constrained by current pipeline capacity, that would require significant expansion to enable sufficient gas volumes to be transported to Victoria to meet the anticipated supply gap.  The AEMO findings highlight that Victoria, under several key scenarios, will be in need of a stable and reliable supply of gas until renewable energy supply can bridge this gap through energy transition.  The *Gas Substitution Roadmap* (DELWP, 2022) outlines key actions to assist in the transition from gas and managing supply as production from existing Victorian gas fields declines. The roadmap states:  *‘New sources of gas supply and new infrastructure may be needed to maintain the reliability of gas supply. Potential investments include new conventional gas supplies, expanded pipeline capacity to allow gas to flow from interstate, new storage facilities or the establishment of LNG import terminals.’ (Page. 41)*  In comparison to other gas supply options such as a new domestic gas field and additional pipeline capacity from northern Australian reserves, an energy import terminal provides a timely solution with smaller capital investment and operational footprint, as well as ease of decommissioning, making it the most suitable option to address gas supply shortages in the short term. The operational timeframe for a floating import terminal can be as short as 10 years, aiding with such a bridging solution to align with the Victorian GHG emissions reduction targets for 2035 while providing the energy security to support transition.  An energy terminal allows for secure and reliable supply for gas by the creation of a virtual pipeline that allows access to a global supply of which Victoria represents less than 1% on a capacity basis. A floating energy terminal also avoids the overbuilding of long term legacy assets and minimises the risk of stranded assets as the floating portion can be repositioned for future use while the fixed assets could potentially be repurposed for the import of other renewable sources.  **Siting Background**  Based on the current understanding of the potential shortage outlined by AEMO Victoria would require new sources of gas supply and new infrastructure. The location of an LNG import terminal in Victorian waters has been subject to considerable investigation by several proponents, with a previous proposal by AGL in Western Port Bay which did not proceed and a proposal by Viva Energy in Corio Bay currently subject to assessment under the *Environment Effects Act 1978*.  Vopak has investigated a number of sites for the Project onshore and offshore:   * Five potential locations in Victoria have been explored for the offshore section of the Project; Portland, Longford, Geelong Port, Altona and Avalon. Refer to Attachment 6 for an overview of the five potential locations. * Once the preferred location was selected, three pipeline and electricity cables corridors were considered for the onshore section of the Project (refer to Attachment 7 below illustrating the three corridors). * Three powerline corridors were considered for the onshore section of the Project (refer to Attachment 8 – Environmental Review for a map of each corridor).   The decisions and factors that influenced the preferred siting onshore and offshore are further detailed in Section 4. |
| **Main components of the project** (nature, siting & approx. dimensions; attach A4/A3 plan(s) of site layout if available):  The Project comprises the following components (refer to Figure 1 below):  Offshore   * Floating Storage Regasification Unit (FSRU) vessel, nominally 295 m in length, 45 m wide and 35 m high, moored approximately 19 km directly offshore from Avalon. The FSRU would contain facilities to store and transform LNG into gas including storage tanks, a regassification module, heating facilities and high pressure pumps. The FSRU may have one or two operating modes (open and/or closed loop), with site investigations and environmental assessment required to confirm the operation mode(s). Depending on demand (typically the highest in winter), the FSRU may leave the marine berth during low demand for asset utilisation elsewhere. * Platform(s) adjacent to the FSRU. The number and arrangement of platforms is subject to the design of the FSRU, however, this does not influence the operational mode of the FSRU. Two arrangements are being investigated: two separate platforms with one Gas Pipeline Riser and one Electricity platform; or one Utility platform which combines the Platform Riser and Electricity facilities.   *Two separate platforms (Gas Pipeline Riser and Electricity platform)*   * + The Gas Pipeline Riser and Electricity platform would be approximately 20 m wide, 20 m long, 17 m high. For this arrangement the three boilers would be contained on the FSRU.   + A Gas Pipeline Riser would contain pipeline maintenance facilities (pigging facilities), comprising a series of equipment that uses pressure to launch or receive a device (pig) which cleans and inspects the pipeline, and flexible hoses to transfer natural gas to the high-pressure gas pipeline.   + An Electricity platform would contain High Voltage transformers and switchgear to convert the electricity to a lower kV.   *One Utility Platform containing all facilities*   * + The Utility platform would be approximately 40 m wide, 20 m long, 20 m high supporting two levels. It would contain all the facilities on the Gas Pipeline Riser and Electricity platform (described above) and three boilers. The three boilers are required on the platform for the closed loop mode. * LNG vessel, of a similar size to the FSRU, would periodically sit adjacent to the FSRU vessel and supply the FSRU vessel with LNG. * Mooring and berthing dolphins would stabilise the FSRU in position. The dolphins would be piled into the seabed and include emergency access ladders and lighting. A walkway may be required between the dolphins, platforms and FSRU vessel to allow personnel access to the platforms an associated facilities.   The marine berth described above would be protected by an exclusion area, approximately 500m wide restricting access of any vessel other than those required for the Project. The final size of the exclusion zone would be agreed in consultation with Ports Victoria.  Offshore and onshore   * 27 km long high-pressure gas pipeline (750 mm diameter) from the FSRU to the GRS and Victorian Transmission System feed-in point. The pipeline would be contained within a 15m wide permanent easement and would comprise three sections:   + **Subsea:** 18 km of pipe buried under the Port Philip Bay seabed from the FSRU to a location approximately 1.1 km from the shoreline. The subsea pipeline would be protected by a restricted area preventing any anchoring. The size and location of this area is still to be confirmed through further consultation with Ports Victoria.   + **Trenchless shore crossing:** 1.5 km of pipe within a trenchless shoreline crossing at a depth between 5 m – 8 m under the shoreline, from 1.1 km offshore to an area of farmland approximately 430 m inland and bounded by Chirnside Road and Beach Road. This area would be used for positioning the launch pad for the trenchless drilling and laydown for pipe stringing.   + **Onshore:** 7.5 km of pipe trenched from the drilling pad and laydown area, heading west along Beach Road, then north along English Road to the GRS adjacent to the Princes Freeway (between Point Wilson Road and English Road). * 26.5 km electricity cables from the FSRU and platform to the substation adjacent to the GRS. The electricity cables would be contained within a 15m wide permanent easement. The voltage of the electricity cables would be 66kV or 132kV to the Electricity platform stepping down to a lower voltage as required for the three boilers and the FSRU systems. The voltage would be confirmed through detailed design, however, would not impact the temporary Right of Way (ROW) during construction or the permanent easement.   + **Subsea and trenchless shore crossing:** 19.5 km of cable parallel with the high-pressure gas pipeline and following the same general alignment from the FRSU to the end of the shore crossing. The exact separation distance from the high-pressure gas would be confirmed following induction studies.   + **Onshore (overhead or underground):** 7 km of cable with three alignments being considered. Option 1a is an underground cable from the pipeline construction laydown area, west along Beach Road, north up Chirnside Road, west along Cozens and north along Grills Road. Option 1b is an underground cable and would follow a similar alignment to Option 1a, however, travels directly from Beach Road north along Grills Road. Both Option 1a and 1b would continue along Grills Road until turning west towards the Substation and GRS site. Option 2 is an overhead cable parallel with the high-pressure has pipeline along west Beach Road and north English Road.   Onshore   * GRS approximately 135,000 m² in area (including the proposed substation below) with a maximum height of 30 m for all facilities and would be located on land adjacent to the Princes Freeway (between Point Wilson Road and English Road) and comprise of:   + An administration office and control buildings with equipment for gas flow, quality metering and heating (if required).   + Warehouses.   + Pigging facilities.   + Nitrogen generation and injection facilities.   + Odorant injection facility.   + Security fencing. * An electrical substation approximately 60,000 m² in area comprising of a number of power poles, transformers and buildings with a maximum height of 15 m located adjacent to the GRS. The Substation would convert power to a lower voltage for use by the FSRU and GRS. The voltage of the substation is dependent on the operating mode of the FSRU (open or closed). * 132kV overhead powerline required to supply electricity for the operation of the Project including works to tie in the new powerline at the existing Moorabool Terminal Station. The required size of the powerline, its location and its pole design is subject to further site investigations and environmental assessment. Vopak working closely with AusNet to assist with the design of the powerline.     **Figure 1** Diagram of the proposed works (not including the onshore powerline and substation) |
| **Ancillary components of the project** (e.g. upgraded access roads, new high-pressure gas pipeline; off-site resource processing):  There are no ancillary works required for the Project. |
| **Key construction activities:**  No construction activities are required for the FSRU, as it is proposed to be built and commissioned elsewhere prior to being brought to the marine berth, with location of construction to be confirmed through procurement.  Key construction activities for the Project would generally include:  Gas Pipeline Riser, Electricity and Utility platforms, berthing and mooring dolphins and walkway (if required)  The final size of the dolphins and platforms, as well as the weights of the topside equipment would dictate how these components would be constructed; however, construction would generally involve the following activities:   * Clearing the seabed of any rocks, debris or other obstacles. * Driving or auguring piles into the seabed using a suitable piling barge. * Lowering of a prefabricated platform for the Gas Pipeline Riser and prefabricated jacket for the dolphins into position over the piles and grouting the structures together.   High-pressure gas pipeline  *Offshore trenching under Port Philip Bay*  The method of trenching would be confirmed following subsea geotechnical investigations; however, this would generally involve:   * A pre-lay seabed survey. * Clearing of the seabed of any rocks, debris or other obstacles. * Trenching using a trenching tool (plough, mechanical cutting trencher or hydraulic jetting machine), control cabin for remotely operating the trenching tool, generator pumps (if required) and a launch and recover system on a dedicated vessel. The trench for the pipeline may be pre-cut before pipe laying, or with the pipeline in situ following laying (i.e. via ploughing or jetting method). The order of work would depend on the seabed soil properties, which would be determined through further investigations. * The pipe would be welded, coated and inspected on the vessel deck and then laid over a stinger ramp on the back of the S-Lay Vessel onto the seabed in a controlled, tensioned curve as the vessel moves slowly forward, laying the pipeline. * Backfilling either after laying the pipe (pre-cut trench) or in situ following pipe laying. * Pipeline flooding and pre-commissioning tests. * Pipeline purging and commissioning.   Figure 2 below provides a high-level summary of the offshore trenching.    **Figure 2** Offshore trenching construction process  *Trenchless shoreline crossing*  The trenchless shore crossing would be performed by either horizontal directional drilling (HDD) or micro-tunnelling, with further geotechnical investigations required to determine the most suitable method. The trenchless crossing would generally involve:   * Site clearance including vegetation removal for a construction laydown area of approximately 8 ha (noting that only a small portion of this total area would be subject to ground disturbance as a result of construction activities described below). * Construction of launch pit foundation, entry pit, a linear pipe string and pre-fabrication area, temporary site offices including earthworks and access roads. * Drilling of a pilot hole. * Construction of a borehole using either HDD drilling or Micro-tunnelling. * The pipe would be welded, coated and inspected either onshore in one or numerous strings or offshore on a S-Lay Vessel. * Installation of the prefabricated pipeline inserted either:   + onshore using a thrusting rig to push the pipe offshore into the shore crossing exit point; or   + onshore and pulled via S-Lay Vessel offshore through the shore crossing bore; or   + offshore with the pipe laid by the S-Lay Vessel then pulled through the shore crossing bore by an onshore winch system.   Figure 3 below provides a high-level summary of the trenchless shore crossing.  The anticipated duration of construction would be approximately 3 months to establish the construction laydown area and 7 - 14 days to bore and install the pipeline.    **Figure 3** Trenchless construction process  *Onshore trenching*   * Establishment of a temporary 50 m wide ROW along the pipeline corridor using stakes to accommodate laydown areas, temporary facilities, machinery, stockpiles, equipment and access roads. The width of the construction of the ROW may vary to accommodate construction activities such as stockpiling or large vehicles. A typical ROW is provided in Figure 4 below. * Grading of the land within the ROW area including vegetation removal. * Trench excavation with spoil stockpiled alongside the trench for backfilling at the completion of works. * Laying of the pipe on supports (timber sleepers or sandbags) alongside the trench. While supported the pipe would be bent and welded.   + Welding the pipe into continuous length typically with a maximum of 1000 m and joint coating of the pipe to prevent corrosion.   + Where there are horizontal changes in direction or topography, pipe bending machinery would be used to bend the pipe to the required angle. * Lowering of the pipe into the trench using side booms and tying in of a pipe segment. * Backfilling the trenching with excavated soil and padding material using excavators or a specialised padding machine. * Reinstatement of the land as agreed with the landholder and new safety signage for the identification of the pipeline.   The trenched pipeline would have an estimated construction period of 6-9 months.    **Figure 4** Typical construction ROW  Electricity cables  The dual electricity cables would be constructed in similar fashion to the gas pipeline using temporary construction laydowns and ROWs (buried under seabed, trenchless under shore crossing, trenched onshore (underground) or piled foundations (overhead)). The onshore ROW required for the electricity cables would be approximately 15 m wide. If the electricity cables is parallel to the pipeline along English Road (Option 2), the 15 m ROW would be included in the 50 m pipeline ROW. If the electricity cables is along Grills Road (Options 1a and 1b) the construction of the electricity cables would have a separate 15m ROW.  GRS   * Site clearance including vegetation removal * Establishment of construction worksite / laydown areas, temporary site offices, worksites and access roads. * Transport of building materials in equipment packages. * Civil, electrical and mechanical works to assemble buildings on site.   The duration of the GRS construction is estimated to be approximately 12 months.  Substation   * Site clearance including vegetation removal. * Establishment of construction worksite / laydown areas, temporary site offices, worksites and access roads. * Civil, electrical and mechanical works to assemble buildings on site.   Powerline   * Establishment of a temporary ROWalong the powerline corridor. The required size of ROW is subject to further site investigations and environmental assessment. * Site clearance including vegetation removal * Construction of access track required for construction and maintenance * Excavation of earth for foundations and the construction of hard stands * Installation of poles and the lines   It is expected that the total duration of construction would be approximately 12 months, with the duration of each activity described above summarised in Table 2 (below). It is likely that some activities would occur concurrently with further design development, site investigations and environmental assessment is required to determine which activities would be concurrent.  **Table 2** Approximate construction durations   |  |  | | --- | --- | | Approximate duration | Construction activity | | N/A | No construction activities are required for the FSRU, as it is proposed to be built and commissioned elsewhere prior to being brought to the site. | | 9 months | Gas pipeline riser platform and dolphins as required for open loop operations. | | 12 months | Gas pipeline riser and electricity platform (or single utility platform), and dolphins as required for closed loop operations. | | 4 months | High-pressure gas pipeline - offshore trenching and pipelay under Port Philip Bay | | 3 months | Electricity cables (66kV or 132 kV) – offshore trenching and cable lay under Port Philip Bay | | 5 months | High-pressure gas pipeline - Trenchless shoreline crossing | | 6 months | Electricity cables (66kV or 132 kV) – Trenchless shoreline crossing | | 6 months | High-pressure gas pipeline - Onshore trenching, laying, jointing and ground restauration | | 3 months | Electricity cables (66kV or 132 kV) – onshore trenching, laying, jointing and ground restauration (underground) or pole foundations (overhead). | | 12 months | GRS | | 9 months | Substation (66kV or 132 kV) | | 8 months | Overhead Powerline (132 kV) | |
| **Key operational activities:**  Following completion of the construction activities, the operation of the Project would involve the following activities:  Visiting LNG vessels   * Depending on demand (typically the highest in winter), the FSRU may leave the marine berth during low demand for asset utilisation elsewhere. * When the FSRU is present an LNG vessel would berth at the FSRU. There is potential to have limited vessel movement when there is low demand. The vessels may bring LNG from domestic or international markets. * The LNG vessels would spend approximately 24 – 36 hours at the berth, transferring LNG to the FSRU via flexible hoses at an indicative rate of 8,000m3/hr to 11,000m3/hr.   FSRU, Platform and Gas Pipeline Riser   * FSRU would store the LNG at approximately -160oC in cryogenic storage tanks which would keep the LNG in a liquid state until required. * As required, the LNG would be transformed from a liquid to a gas to be transferred to the pipeline (regasification). There are two modes of regasification being explored by the Project (open and/or closed loop), the FSRU may operate one or both modes. Section 4 (project alternatives) provides further explanation of each regasification mode. All boil off gas would be transferred into the pipeline. Both operational modes (open or closed) would be powered using onshore renewable energy. * The natural gas would then be transferred via riser hoses across the Gas Pipeline Riser to the subsea pipeline.   Pipeline   * A 15 m permanent easement is required for the pipeline. * Transport of gas from FSRU to GRS, with continuous monitoring of the flow rate by an automated system. * Routine inspections and maintenance activities such as vegetation or erosion management as necessary for the safe operation of the pipeline.   GRS   * Monitoring of the gas quality to meet gas quality specifications defined by AEMO. * Production of nitrogen from the air using various boiling temperatures. * Blending of nitrogen and odorant into the gas as required to meet safety standards. * Transfer of gas to the Victorian Transmission System via APA’s existing Southwest pipeline.   Electricity cables   * A 15 m permanent easement is required for the electricity cables (all options). * The easement allows for ongoing and regular maintenance including vegetation management.   Substation   * Substation building would include electrical equipment, switchgear, transformers and buildings to step down power for use by Project.   Powerline   * A permanent easement is required for the powerline. The size and location of the easement is subject to further site investigations and environmental assessment. * The easement allows for ongoing and regular maintenance including vegetation management. |
| **Key decommissioning activities** (if applicable):  It is expected that the Project would have an operational life of 10 years that could be extended up to 20 years dependent on Victoria’s demand for gas and potential repurposing options. The method of decommissioning would be confirmed following further investigations, detailed design of mooring and consultation with landholders, relevant regulators and management authorities.  Based on Vopak’s previous experience decommissioning of LNG terminals generally involves either the removal or reuse of the marine berth for an alternative function.  It is anticipated that the powerline and substation could remain operational following the life of the Project to benefit the electricity network and support the future operational expansions of surrounding landholders. |
| **Is the project an element or stage in a larger project?**  **r**  **No** r Yes If yes, please describe: the overall project strategy for delivery of all stages and components; the concept design for the overall project; and the intended scheduling of the design and development of project stages).  No, the Project is not an element or stage of a larger project. |
| **Is the project related to any other past, current or mooted proposals in the region?**   **No**  Yes If yes, please identify related proposals.  No, this proposal is not related to any other past, current or mooted proposals in the region. |
| **What is the estimated capital expenditure for development of the project?**  The total cost of the project is estimated to be approximately $400 million. |

**4. Project alternatives**

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| **Brief description of key alternatives considered to date**  (eg. locational, scale or design alternatives. If relevant, attach A4/A3 plans): |
| The Project has conducted a thorough assessment of potential siting locations onshore and offshore. The Project siting has been guided by the following considerations:   * Engagement with key stakeholders including landholders, regulators, interest groups and government to understand the regional and local context including key features, environmental constraints and future masterplans for the area. * Safety in relation to general marine navigation of Port Philip Bay, exclusion zones of vessels travelling to and from the FSRU and flight paths associated with the adjacent Avalon Airport. * Minimising the environmental impacts and footprint of the Project including proximity of proposed infrastructure to existing or future urban areas, the Ramsar site and associated sensitive habitats, avoiding dredging in Port Philip Bay and disruption to commercial and recreational marine activities. * Technical practicality of the Project in relation to construction methodologies, operational feasibility and integration with the existing Victorian Transmission System.   Offshore Siting  Five potential locations in Victoria have been explored for the offshore section of the Project; Portland, Longford, Geelong Port, Altona and Avalon. Portland and Longford were considered technically impractical, posing challenges with pipeline length, capacity and difficulty in construction and unsafe marine conditions for the FSRU and therefore marine berths at these areas were not further explored. Refer to Attachment 6 for an overview of the marine berths explored for Geelong Port and Altona.  Similar to Portland and Longford, Geelong Port and Altona also posed technical challenges. Geelong Port posed a greater of potential marine effects (than Avalon) as it required dredging to create a suitable marine berth and Corio Bay is an embayment with limited water exchange to Port Philip Bay meaning marine impacts of the open loop mode were likely to be greater. Altona required complex construction methodologies and interfaces with existing infrastructure to connect to the existing Brooklyn compressor station. In addition, Altona is located in close proximity to the existing urban areas and therefore posing a greater potential effect on the amenity of residents (than the other options) and increased potential effects to recreational activities and port operations being adjacent to the main navigational channel serving Williamstown, Webb Dock and the port precincts upstream of the Yarra mouth.  The Avalon location was selected as the preferred site for several reasons. The Avalon location is further from existing and planning urban areas (than the other options) and therefore less likely to affect the amenity of residents. The Avalon location does not require dredging to accommodate the FRSU marine berth and therefore poses less potential marine effects than other options. Lastly, the Avalon location is further from key port operations than the other siting options and therefore less likely to affect these operations.  Onshore Siting - Pipeline  Following the selection of the offshore location, two pipeline infrastructure corridors were considered for the onshore section of the Project (refer to Attachment 7 below illustrating the two corridors):   * North of Avalon Airport and north of current Western Treatment Plant operations with the GRS and connection to APA’s existing Southwest pipeline at land adjacent to the Princes Freeway (between Point Wilson Road and English Road). * North of Avalon Airport and south of current Western Treatment Plant operations with the GRS and connection to APA’s existing at land adjacent to the Princes Freeway (between Point Wilson Road and English Road).   The siting of the onshore components of the Project involved consultation with Melbourne Water, the Western Treatment Plant landowner, MPH agricultural company who manages the Western Treatment Plant’s farmland, Avalon Airport and the Biodiversity Conservation Advisory Committee which commenced in 2019 and is ongoing. During consultation onshore siting options were presented to these stakeholders for feedback. The north of Avalon Airport and south of current Western Treatment Plant operations corridor was preferred over the other option for the following reasons:   * Reduced impact to existing Western Treatment Plant operations including processing facilities, conservations areas, farmland and proposed expansion. * Avoidance of conflict between onshore infrastructure including Avalon Airport flight paths and development proposed in the approved Avalon Airport Master Plan (Avalon Airport, 2015). * Greater buffer areas from sensitive environmental areas of habitat in the Western Treatment Plant and the shoreline such as the Spit W. R Reserve, Lake Borrie and Little River. * Increased safety with compliant exclusion zones from the proposed pipeline and nearby defence sites.   Onshore – Powerline siting  An Environmental Review was undertaken to determine the preferred corridor for the powerline (Refer to Attachment 8 – Environmental review).  The Environment Review assessed an 18 km by 30 km study area between the substation site and the Moorabool Terminal Station to understand the significant sensitive land use and environmental constraints.  The assessment determined that:   * The northern half of the Study Area is generally less constrained than the southern half of the study area (with the exception of the You Yangs Regional Park), as it is more rural and sparsely populated and land uses are likely to be less sensitive. * No alignment can avoid intersection with Hovell’s Creek. * Partial co-location with existing rail reserves and/or existing powerline easements are likely to reduce impacts to surrounding land uses.   In consideration of these environmental opportunities and constraints three corridor options were further explored, a northern, central and southern alignment (refer to Attachment 8 – Environmental Review for a map of each corridor). Of these alignments, the northern alignment was determined to be the preferred corridor based on the review finding this alignment would have the least potential impacts on existing and future land uses. |
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| **Brief description of key alternatives to be further investigated** (if known)**:** |
| Vopak propose to further investigate the following design alternatives through detailed design: |
| Regasification mode (open and closed loop)  Two methods for regasification are being investigated for the Project, the FSRU vessel may operate one or both modes. Both operational modes (open or closed) would be powered using onshore renewable energy. The use of electrical steam boilers (power from onshore) would replace the use of gas fired boilers (typically used) and greenhouse gas emissions associated with using gas. The selection of either or both methods is dependent upon various factors including, potential for significant effects to the marine environment (likely higher with open loop), contribution to greenhouse gas emissions (likely higher with closed loop) climatic conditions, throughput capacity, energy efficiency and commercial viability.  *Open Loop*  An open loop system on the FSRU uses seawater to heat the LNG. Seawater is continuously drawn in via intakes, passes once through a heat exchange system and is then returned directly to the sea at temperatures of between 5 and 7 ºC below ambient water temperature. Seawater is generally used as a heat source for warming and vaporising the LNG.  The regasification system would be capable of delivering 400 – 600 mmscf/d of gas at high reliability depending on future market requirement. The seawater intake volume of up to 13,000 m3/hr is based upon the regasification rate of 650 TJ. Anticipated seawater flow-through rate would be lower in accordance with a lower regasification rate.  *Closed Loop*  A closed loop system would use electrical steam boilers to heat a closed loop of circulating a mix of seawater and glycol within the FSRU as an intermediate heating medium for heat exchange in the LNG regasification trains. Around 500 m3 of seawater would be required to fill the FSRU heat exchange piping. Instead of being regularly discharged from the FSRU as per open loop mode, the seawater is continually circulated in the process. The seawater-glycol mix would only be discharged when maintenance is required but would be treated onshore and not discharged back into the marine environment. The Seawater-glycol mix would be transported via a vessel to a local treatment facility for treatment. Following confirmation of the preferred operational mode, the location of the treatment facility would be confirmed.  The regasification system would be capable of delivering the same amount of gas as the open loop mode (400 – 600 mmscf/d) depending on future market requirement.  The closed loop facilities would be located on a platform adjacent to the Gas Pipe Riser and the FSRU.  Offshore platform arrangement  Two platform arrangements are being considered for the Project; one option being separate platforms (Gas Pipeline Riser and Electricity platform) and a second option being one Utility platform which combines the former. The selection of either arrangement is subject to the design of the FSRU, however does not influence the operational mode of the FSRU.  *Two separate platforms (Gas Pipeline Riser and Electricity platform)*  This platform arrangement would require two platforms with separate purposes, a Gas Pipeline Riser and an Electricity platform. The Gas Pipeline Riser would include facilities to transfer gas and pipeline maintenance, the Electricity platform would include facilities to convert electricity to a lower kV. This platform arrangement would have the three boilers contained on the FSRU (unlike the utility platform).  *One Utility Platform containing all facilities*  This platform arrangement would combine all the facilities on the Gas Pipeline Riser and Electricity platform (described above) in addition to the three boilers.  Onshore – Electricity Cables Siting  Three alignments and two configurations (overhead or underground) are being considered for the project. The selection of a preferred alignment and configuration is depended on further consultation with Melbourne Water (landowner), MPH (land manager) and other interested parties as well as induction and ecological investigations.  A key difference in potential impacts between the underground and overhead options are the potential impacts to terrestrial ecology values. Both overhead and underground would result in the clearing of vegetation and potential impacts to Growling Grass Frog (*Litoria raniformis*).  The overhead solution may impact wetland and migratory bird species as a collision and electrocution risk, particularly larger birds with significant wingspans, such as ducks, ibis, pelicans, egrets, herons and bitterns. Locations of overhead wires and poles are greater risk to birds when in close proximity to wetland habitats.  *Option 1a and 1b*  Option 1a is an underground cable from the pipeline construction laydown area, west along Beach Road, north up Chirnside Road, west along Cozens and north along Grills Road.  Option 1b is an underground cable and would follow a similar alignment to Option 1, however, travels directly from Beach Road north along Grills Road.  Both Option 1 and 2 would continue along Grills Road until turning west towards the Substation and GRS site.  *Option 2*  Option 2 is an overhead cable parallel with the high-pressure has pipeline along west Beach Road and north English Road. |

**5. Proposed exclusions**

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| **Statement of reasons for the proposed exclusion of any ancillary activities or further project stages from the scope of the project for assessment:** |
| The following site investigations activities and early works are proposed to be excluded from the referral:   * Activities, approvals or consents associated with designing and assessing the potential impacts of the Project such as geotechnical, terrestrial and marine environmental investigations, site surveys and establishing the location and integrity of existing utilities and services. * Pre-licence surveys and land access arrangements as required under the *Pipelines Act 2005*. * Securing interests in land for the Project to proceed. |
| These works are proposed to be excluded for the following reasons:   * The works are required to prepare the relevant approval documentation and to prepare for the construction of the Project. * These works would not ordinarily require approval under the *Planning and Environment 1987*. |

**6. Project implementation**

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| **Implementing organisation** (ultimately responsible for project, ie. not contractor)**:**  The Vopak group of companies is the world’s largest independent operator of oil and chemical storage facilities, currently operating 73 terminals in 23 countries.  Vopak currently operates four LNG storage terminals in the Netherlands and Mexico (onshore based), and Pakistan and Columbia (FSRU based), with new developments underway in Pakistan (onshore), Singapore and Hong Kong.  Vopak offers terminal services to both gas suppliers and downstream market gas users under an independent service model – re-gassifying LNG for dispatch into local gas infrastructure. Vopak does not take ownership of, nor is it involved in the production, shipping or marketing of LNG or gas.  Vopak leads the development of projects through site identification, concept design, detailed engineering and local approvals, working closely with local stakeholders and partners. Safety is of paramount importance to Vopak and all projects developed have to meet stringent standards to ensure the continued safety of operational staff and communities whilst meeting local regulations. Vopak protects the environment by applying the As Low as Reasonably Practical (ALARP) principle for minimising the environmental impact of construction and operational activities. |
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| **Implementation timeframe:**  Vopak is aiming to have the Project operational from 2026 prior to the peak winter demand, when the AMEO has forecast that Victorian domestic market is expected to face key structural gas shortfalls. The estimated delivery time frames are:   * 2021 - 2022: Preliminary studies, environmental referrals and land access agreements. * 2022 – 2025: Environmental assessments and approvals, pipeline licensing and detailed design. * 2025 – 2026: Construction and mobilisation/mooring of FSRU; testing and commissioning. * 2026 onwards: LNG imports and pipeline operational. |
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| **Proposed staging** (if applicable):  The staging of construction of the Project would be determined following design development, site investigations and environmental assessment. Construction at different locations within the Investigation Area may be staged or occur concurrently. Depending on the results of marine and terrestrial ecology investigations construction may be restricted at certain times of year reduce impacts to ecological values. |
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**7. Description of proposed site or area of investigation**

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| **Has a preferred site for the project been selected?** |
| r No **r Yes** If no, please describe area for investigation. |
| If yes, please describe the preferred site in the next items (if practicable). |
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| **General description of preferred site,** (including aspects such as topography/landform, soil types/degradation, drainage/ waterways, native/exotic vegetation cover, physical features, built structures, road frontages; attach ground-level photographs of site, as well as A4/A3 aerial/satellite image(s) and/or map(s) of site & surrounds, showing project footprint):  A preferred site for the Project has been selected. The preferred site (Project area) includes both onshore and offshore land. The Project area extends from an existing anchorage point (G4), approximately 19 km east from Avalon then traverses across the shore crossing to agricultural land and road reserves of the Western Treatment Plant, extends south along the Princess Freeway until heading northwest within land reserved for a rail link to Avalon Airport, west along Peak School Road past Bacchus Marsh Road and then south to Moorabool Terminal Station. An overview of the Project area and surrounding key features is provided in Attachment 3.  Topography/landform  The topography of the Project area is flat to a gently undulating landform consistent with the Western Volcanic Plains and Uplands landscapes of south west Victoria. The elevation is approximately 2 m Australian Height Datum (AHD) across the onshore elements of the Project. The water depth offshore is approximately 16-17 m at the location of the marine terminal (existing anchorage point G4) and gradually reduces to be approximately 5 m adjacent to Kirk Point and reaching the surface at the pipeline laydown area.  Soil types/degradation  Onshore, the Project area is underlain by Quaternary age Newer Volcanic strata (olivine labradorite basalt), Alluvium and swamp deposits, and high-level alluvium deposits including out-wash sand, gravel and clay. The northern section of the Project area is underlain by Miocene to Holocene Newer Volcanic Basalt material. The remainder of the Project area is comprised of Pilocene to Pleistocene Coastal Lagoon Deposits containing silt material, minor sands, gravel and generic fill encompassed by organic and non-organic land fill of various kinds. Beach sand, shell beds, estuarine silt and clay and raised beach deposits may also be encountered at the shoreline.  Coastal acid sulfate soils are common along many parts of Victoria’s coastal zone, particularly in estuarine and salt marsh environments. Inland acid sulphate soils can also occur in swamp environments. The presence of salt marshes and swamp deposits on publicly available geological maps indicate acid sulphate soils may be encountered in the Project area. According to the Atlas of Australian Acid Sulfate Soils, the Project area between Chirnside Road and the shoreline is class A with a high probability of acid sulfates occurring (>70% change of occurrence). The remaining area has been classified as class C, with an extremely low probability of acid sulfate soils (1-5% chance of occurrence).  The offshore seabed sediments are predominantly soft muds overlying consolidated sediments including muddy silts, muddy sands and occasional sand.  Drainage/ waterways  There are multiple artificial drainage or water transfer channels throughout the agricultural land within the Project area. Little River is located 800 m north of the Project area and the powerline would traverse Hovells Creek, however no other waterways are located within the onshore Project area.    The onshore section of the Project area is located within the Port Phillip Bay (Western Shoreline) and Ramsar Site. Refer to Attachment 3 for the location of Ramsar Wetlands within the Project area.  Native and exotic vegetation cover  The onshore landscape is predominantly cleared, open grazing land with scattered vegetation throughout the paddocks. Vegetation is along the roadsides and along the perimeters of the paddocks and property boundaries. Coastal Saltmarsh vegetation has been identified along the shoreline within the Project area.  Built structures  Built structures onshore within the Project area are limited and only include electrical infrastructure, the Geelong railway line, dwellings, farm sheds supporting agricultural uses and the Barwon prison along Peak School Road  Road frontages  The roads within the Project area include local sealed and unsealed roads. The road system is in a grid structure with wide road verges and gravel or dirt edges. Wide grassed areas (including drainage channels as described above) are adjacent to some roads and include some remnant native vegetation. |
| **Site area** (if known): 5270 ha |
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| **Route length** (for linear infrastructure) 42 (km) **and width** 940 (m) |
| A detailed map of the Project area is shown in Attachment 2. |
| **Current land use and development:** |
| The offshore Project area includes areas of Port Phillip Bay. Port Phillip Bay is located south of the Werribee and opens into the Bass Strait. The Project area is located along the north western shoreline of Port Phillip Bay and extends 19 km east off Kirk Point to the proposed FSRU berth. The proposed berth is also located 15 km south of the Point Cook and 10 km north east of Indented Head within the bay.  The onshore Project area east of the Princes Freeway includes the Western Treatment Plant which is owned by Melbourne Water. The portion of Western Treatment Plant land required for the Project is currently leased to MPH for agricultural cropping and grazing purposes. East of the Princes Freeway, Project area also includes roads within the Western Treatment Plant including English, Beach, Grills, Cozens and Chirnside Roads. An area of the shoreline north of Kirk Point is also included within the Project area, which is currently used for public open space. |
| The onshore Project area west of the Princes Freeway extends beyond the Western Treatment Plant traversing existing road reserves including the Princess Freeway and Peak School Road, land reserved for a rail link to Avalon Airport and private properties within the farming zone. |
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| **Description of local setting** (eg. adjoining land uses, road access, infrastructure, proximity to residences & urban centres): |
| A Detailed map of the key features within and adjoining the Project area is provided in Attachment 3.  The Project area is within the localities of Point Wilson, Avalon, Littler River, Lara, You Yangs and Moorabool. This area is a rural area between Geelong and Werribee, predominately servicing utility, farming and industrial uses.  The Princes Freeway bisects the onshore Project area, with the east being the onshore pipeline and the west being onshore powerline. The Princess Highway would provide access to the GRS site (to the east) from Point Wilson Road and the powerline (to the west) from Peak School Road.  Avalon Airport is located to the south of the Project area and the Western Treatment Plant land is located to the north. The Defence site is located to the south west of the Project area and includes a 2.4 km jetty used for loading and unloading explosive ordnance. Jade Tiger Abalone is an abalone farm located approximately south west of Project area. The farm produces 50 megatonnes of abalone per year and includes processing facilities on site.  West of the Princes Freeway to the Moorabool Terminal Station, the Project area is predominately within freehold rural areas.  The key sites surrounding the Project area to the west of the Princess Freeway are the Little River township, Serendip Sanctuary, You Yangs and Barwon Prison. |
| The offshore infrastructure is located within the western section of Port Phillip Bay. Corio Bay and Portarlington are located to the south and Wyndham Harbour is located to the north. The Port of Melbourne and the Geelong Port are located within Port Phillip Bay and therefore freight vessels use the bay regularly. These vessels are predominantly entering Port Philip Bay and traversing either north and south of the marine berth, with final destinations being Corio Bay, Williamstown or Melbourne (CoastKit 2021). Port Phillip Bay is also used for several recreational uses including fishery, boating and swimming with several beaches being located on both the eastern and western sections of the bay. |
| **Planning context** (eg. strategic planning, zoning & overlays, management plans): |
| **Overview**  Onshore the Project is located within the Greater Geelong City Council local government area and offshore the Project is located within Port Phillip Bay. Offshore within Port Philip Bay, approximately 700 m from the shoreline (boundary of the Spit W.R Reserve) the land is not subject to the planning scheme. This area of Port Philip Bay is Crown Land managed by Parks Victoria and DELWP. Under section 52(i) of the *Commonwealth Constitution and the Commonwealth Places (Administration of Laws) Act 1970* (Vic) and subject to the *Commonwealth Places (Application of Laws) Act 1970* (Cth), the Commonwealth has exclusive legislative power in relation to places acquired by the Commonwealth for a public purpose. Therefore, a planning scheme does not apply.  Planning approval under the *Planning and Environment Act 1987* (via the Greater Geelong Planning Scheme) is likely to be required onshore for the removal of native vegetation and to facilitate the powerline, GRS, substation. Refer Section 10 for further information on the approvals required for the Project.  **Zones & Overlays**  As discussed above, the majority of the onshore Project infrastructure is located within a section of the Western Treatment Plant, owned by Melbourne Water. The section of the land being required for the Project is leased to MPH for agricultural cropping and grazing purposes. This land is within the Public Use Zone Schedule 1 – Services and Utility (PUZ1).  The powerline is mostly located within the Farming Zone (FZ) however does pass over other zoning including Transport Zone – Schedule 2 – Principal Road Network (TRZ2) at the Princess Highway.  The shoreline is located within the Public Conservation and Resource Zone (PCRZ) and is Crown land managed by Parks Victoria.  The following overlays are included in the Project area and are anticipated to intersect with the proposed works onshore:   * A majority of the onshore Project and sections of the powerline is located within the Land Subject to Inundation Overlay (LSIO). This overlay represents land prone to be affected by the 1 in 100 (1 per cent Annual Exceedance Probability) year flood. * The onshore Project land is also covered by the Environmental Significance Overlay – Schedule 2 (ESO2). The areas included within this overlay are considered significant and they include areas of high value wetlands and ecological habitat. * The powerline is located within the Environmental Significance Overlay – Schedule 4 – Grasslands within the Werribee Plains Hinterland (ESO4). The purpose of this overlay is to protect the native vegetation of the Victorian Volcanic Plain bioregion. * The powerline also runs through the Significant Landscape Overlay – Schedule 1 – Foothills of the You Yangs (SLO1), this overlay protects treeless foothills and plains at the base of the You Yangs. * The powerline would run over the Vegetation Protection Overlay – Schedule 1 – Significant Roadsides and linear reserves (VPO1), this overlay is located over the Old Melbourne Road to protect vegetation in the road reserve. * The powerline is located within the Floodway Overlay (FO), this overlay identifies waterways, major flood paths, drainage depressions and high hazard areas which have the greatest risk and frequency of being affected by flooding. * Specific Controls Overlays Schedule 1 - Chisholm Road Prison Project (SCO1). The purpose of this overlay is to manage the use and development of the Chisholm Road Prison Project.   The following overlays are within the Project area, however likely to be avoided through detailed design:   * The Project area intersects with Public Acquisition Overlay – Schedule 10 Outer Metropolitan Ring / E6 Transport Corridor (PAO10). This land was reserved in 2010 for the Outer Metropolitan Ring road and includes a new offramp and upgrade works to Point Wilson Road. * Public Acquisition Overlay Schedule 14 Avalon Airport Railway (PAO14). This land was reserved in 2015 for a railway link to Avalon airport.   Refer to Attachment 4 and 5 for the Zone and Overlay mapping.  **Planning Policy Framework**  The following clauses of the State and Local Planning Policy Framework are relevant to the Project:   * 12.02-1S Protection of the marine and coastal environment * Manage privately-owned foreshore consistently with the adjoining public land. * Protect coastal and foreshore environments and improve public access and recreation facilities around Port Phillip Bay and Western Port by focusing development in areas already developed or in areas that can tolerate more intensive use. * Protect and enhance the overall extent and condition of native habitats and species diversity distributions across public and private land in the marine and coastal environment. * Minimise direct, cumulative and synergistic effects on ecosystems and habitats. * Maintain the natural drainage patterns, water quality and biodiversity in and adjacent to coastal estuaries, wetlands and waterways. * Maintain and enhance water and soil quality by minimising disturbance of sediments. * Avoid disturbance of coastal acid sulfate soils. * Plan for marine development and infrastructure to be sensitive to marine national parks and environmental assets. * Protect the heritage values, the aesthetic quality of locations, cultural links with maritime activities, sea country and sense of place. * 12.02-2S Marine and coastal Crown land * Design, locate and maintain buildings and structures to effectively manage: * Adverse effects on the environment and associated uses and values. * Impact on marine and coastal functions and processes. * Ensure the siting and design of development on marine and coastal Crown land: * Facilitates shared infrastructure and the use of land for more than one use. * Minimises the environmental footprint. * Ensures that use and development on or adjacent to marine and coastal Crown land: * Demonstrates need and has a coastal dependency. * Minimises loss of public open space * 12.03-1S River corridors, waterways, lakes and wetlands * Protect the environmental, cultural and landscape values of all water bodies and wetlands. * Ensure development responds to and respects the significant environmental, conservation, cultural, aesthetic, open space, recreation and tourism assets of water bodies and wetlands. * Ensure development is sensitively designed and sited to maintain and enhance environmental assets, significant views and landscapes along river corridors and waterways and adjacent to lakes and wetlands. * Ensure development does not compromise bank stability, increase erosion or impact on a water body or wetland’s natural capacity to manage flood flow. * 12.05-1S Environmentally sensitive areas * Protect environmentally sensitive areas with significant recreational value from development that would diminish their environmental conservation or recreational values. These areas include Port Phillip Bay and its foreshore. * 12.05-2S Landscapes * Ensure significant landscape areas such as forests, the bays and coastlines are protected. * Ensure development does not detract from the natural qualities of significant landscape areas. * 13.03-1S Floodplain management * Identify land affected by flooding, including land inundated by the 1 in 100-year flood event (1 per cent Annual Exceedance Probability) or as determined by the floodplain management authority in planning schemes. * Ensure land use on floodplains minimises the risk of waterway contamination occurring during floods and floodplains are able to function as temporary storage to moderate peak flows and minimise downstream impacts. * 14.01-1S Protection of agricultural land * Avoid permanent removal of productive agricultural land from the state's agricultural base without consideration of the economic importance of the land for the agricultural production and processing sectors. * Protect productive agricultural land from unplanned loss due to permanent changes in land use. * 14.03-1S Resource exploration and extraction * Recognise the possible need to provide infrastructure, including transport networks, for the exploration and extraction of natural resources. * 19.01-1S Energy Supply * Ensure energy generation, storage, transmission and distribution infrastructure and projects are resilient to the impacts of climate change. * Support energy infrastructure projects in locations that minimise land use conflicts and that take advantage of existing resources and infrastructure networks. * 19.01-3S Pipeline infrastructure * Plan for the development of pipeline infrastructure subject to the *Pipelines Act 2005*. * Plan new pipelines along routes with adequate buffers to residences, zoned residential land and other sensitive land uses and with minimal impacts on waterways, wetlands, flora and fauna, erosion prone areas and other environmentally sensitive sites. * Provide for environmental management during construction and on-going operation of pipeline easement   **Local Planning Policy Framework**   * 12.02-1L Protection of coastal areas * Set use or development back from coastal areas, estuaries and coastal wetlands to provide a buffer that is adequate to accommodate coastal recession and the landward migration of coastal wetland vegetation communities such as mangroves and salt marshes. * Minimise the loss of, and wherever possible increase, public access to the foreshore environment. * 12.03-1L River corridors, waterways, lakes and wetlands * Ensure that land use and development avoid isolating wetlands and provides for connective water flows and vegetative links. * Ensure waterways and wetlands are not drained or adversely affected as a result of development. * 13.03-1L Floodplain management * Discourage land use and development in floodplains where flood function may be impaired. * 14.01-2L-01 Sustainable agricultural land use in Greater Geelong * Encourage aquaculture and horticulture activities in the rural areas around Avalon Airport.   **Strategic and Management Plans**  The following government strategies are relevant to the Project:  Gas Substitution Roadmap (Victorian Government, 2022)  The Gas Substitution Roadmap is a key step in Victorian transition away from fossil gas and provides guidance on the government’s initiatives for this transition. The document recognises the ongoing importance of gas for certain uses and advocates for maintaining gas reliability through the development of new infrastructure including the establishment of LNG import terminals.  Victoria’s Renewable Energy Action Plan (Victoria Government, 2018)  The Renewable Energy Action Plan outlines the initiatives the Victorian Government is taking to encourage investment in the renewable energy sector and to ensure Victorians can access renewable, affordable and reliable energy. Action 18 of the plan includes the ensuring Victoria is able to deliver secure, reliable and fairly priced gas for renewable energy generation.  Draft Avalon Corridor Strategy (2021)  The draft Avalon Corridor Strategy has been prepared by the City of Greater Geelong and Wyndham City Council (in collaboration with DELWP) to provide a long-term strategic vision for the Avalon Corridor to 2050 in order to guide planning decisions for individual sites and the surrounding region. It seeks to maintain a green break between Greater Geelong (Lara) and Metropolitan Melbourne (Werribee) by discouraging development in the break to protect significant cultural, landscape and biodiversity values and safeguard important infrastructure and assets, such as Avalon Airport and the Western Treatment Plant.  Settlement Strategy 2020  The City of Greater Geelong prepared a Settlement Strategy in 2020 and which was later formally incorporated into the Greater Geelong Planning Scheme on 6 May 2021 via amendment C395ggee. The Settlement Strategy implements and encourages the green break between the urban edge of Geelong and Wyndham. The strategy references the Ramsar wetland associated with the Western treatment plant and the You Yangs as areas with landscape value.  Clean air for all Victorians Strategy (DELWP 2022)  The Clean air for all Victorians Strategy sits within an existing framework of legislation, strategy policy and programs that support and enable action to reduce air pollution and improve air quality. These include the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM), *Environment Protection Act 2017* and *Climate Change Act 2017.* It aims to secure Victoria’s clean air future by bring together existing initiatives and new interventions to target priority areas for reducing air pollution. The strategy highlights that energy production from fossil fuels is a significant source of greenhouse gas and as a result sets an agenda to support business to reduce energy use, emissions, and pollution, and invest in energy innovation. |
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| **Local government area(s):**  The Project is located within Greater Geelong City Council. |
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**8. Existing environment**

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| **Overview of key environmental assets/sensitivities in project area and vicinity** (cf. general description of project site/study area under section 7)**:**  The Project area is located within the north western shoreline of Port Philip Bay, the Western Treatment Plant and rural areas of Littler River, Lara, You Yangs and Moorabool. The Project area is largely confined to land subject to cropping and grazing practises supporting the Western Treatment Plant and adjacent to road reserves and freehold rural areas west of the Princess Freeway between the Western Treatment Plant and Moorabool terminal Station. Part of the Project area is within the Port Phillip Bay (Western Shoreline) and Ramsar site which supports habitat for many different species of threatened flora and fauna, large populations of migratory shorebirds and waterbirds.  Offshore section |
| *Marine environment* |
| The north western shoreline of Port Phillip Bay can be characterised as a mostly sediment intertidal and nearshore zone with small rocky outcrops in the deeper waters. The area has historically been commercially fished but is nowadays limited to recreational fishing. The intertidal zone is recognised as an important bird feeding habitat and a habitat feature of the Ramsar site.  The intertidal zone and nearshore environment of the Project area consists of a mosaic of littoral rock, basalt boulders and sediment. Basalt boulders provide habitat for molluscs, shore crabs and other intertidal species. The littoral sediments are characterised by microphytobenthos, drift alae wrack and intertidal seagrass. The Project area is characterised by a sediment and basalt rock intertidal zone and provides habitat for molluscs, shore crabs and other intertidal species.  The sublittoral zone in the Project area is predominantly sediment beds which range from coarse to fine sands with areas of subtidal seagrass. The shallow sediment habitats are common in western Port Phillip Bay and are predominantly characterised by ascidians such as Pyura and algae species, such as the green algae Caulerpa spp. These habitats are often occupied by sponges, hydroids, gastropods and bivalve molluscs. Infauna (animals that live within the sediment) include polychaetes and crustaceans. Microphytobenthos is also a key component of the sediment ecosystem which contributes to primary production and nitrification processes in the bay. The Project area is in the vicinity of several sublittoral rock habitats including Long reef. These rock habitats are severely affected by urchin barrens and drift algae.  In Port Phillip Bay, phytoplankton is mainly composed by diatoms and flagellates and the dominant taxa of zooplankton is the copepod Paracalanus spp. The abundance of phytoplankton and zooplankton varies annually and have been observed to be influenced by inflows into the bays from rivers. Copepods have been shown to be the main diet of snapper larvae in Port Phillip Bay.  A Protected Matters Search Tool (PMST) search has been undertaken of the Project area with three species recorded in the Project area: the Big-belly Seahorse, White-faced Storm petral and the Southern Right Whale. The big-belly seahorse and the Port Phillip Pipefish were associated with reef and seagrass sites in the vicinity of Point Wilson, but not within the Project area. Other marine mammals inhabit Port Phillip Bay are expected to transition through the Project area from time to time. These include the Australian fur seal, common dolphin and Burrunan dolphin. Gannets, little penguins and bottlenose dolphins in particular are known to feed in the Project area. The extent and diversity of fish species in the Project area vary seasonally and include snapper, gummy shark and King George Whiting, species favoured by the recreational fishing community.  The Project area is characterised by low wave and tidal energy. Surface currents are very low and generally flow in a north westerly and northerly direction. Salinity patterns are spatially variable and influenced by freshwater inflows into the bay. Previous water quality studies show early signs of nutrient enrichment and are reflected in the phytoplankton composition of predominantly diatoms. Water quality is monitored by the Environment Protection Authority Victoria (EPA) at fixed sites in Port Phillip Bay and within the Project area these are Long Reef, offshore from the Western Treatment Plant, and Inner Corio Bay. Water quality at these locations were reported as ‘good’ in 2019-2020, with the main contaminants of concern being nutrients and water clarity receiving a ‘fair’ classification in 2018-2019 and 2019-2020.  In summer, EPA water quality is monitored at 36 beaches and the Yarra River in relation to  safety for recreational activities. Alerts are issued to the community on the basis of rainfall  predictions and their relationship to weekly microbial (enterococci and E. coli) sampling. A number of alerts have issued for the Werribee South after high rainfall events.  The Project area intersects with a historic dredged material ground and is adjacent to the Kirk Point-Werribee Aquaculture Fisheries Reserve, a restored shellfish aquaculture site, abalone reefs.  Shoreline and onshore section  *Terrestrial Ecological values – pipeline corridor*  The onshore pipeline corridor occurs with the *Port Phillip Bay (Western Shoreline) and Ramsar site*. The Ramsar site covers 22,650 ha and comprises six distinct areas; Point Cooke/Cheetham, Werribee/Avalon, Point Wilson/Limeburners Bay, Swan Bay, Mud Islands, and the Lake Connewarre complex. The Project is located in the Western Treatment Plant managed by Melbourne Water, which includes the whole property, which is located within the Werribee/Avalon section of the Ramsar site.  The Werribee/Avalon area of the Ramsar site includes freshwater wetlands, estuaries, intertidal shorelines, sub-tidal beds, inland saline wetlands and the Western Treatment Plant. The Western Treatment Plant is currently an operating farm, with a mix cropping and grazing, occurring within the corridor sections of the Project Area. These areas provide a green break the sites of biodiversity significance, being the wetlands and shoreline. The agricultural land is highly modified with exotic vegetation, mainly crop and pasture species along internal farm road, with some strips of planted windbreaks of native trees and shrubs. Potential frog habitat occurs along artificial roadside drainage and the perimeters of paddocks and property boundaries.  Adjacent to the agricultural areas include important wetland habitats that are managed for conservation by Melbourne Water. This includes Lake Borrie to the east of the Project Area and T-section, Western and Summer lagoons to the south of the Project Area. Recycled water is continually applied to around 70 ha of decommissioned treatment lagoons, which go through a rotating cycle of water levels to provide suitable habitat for ducks, waders, shorebirds and Growling Grass Frog.  The Ramsar site supports habitat for many different species of threatened flora and fauna including Australian Fairy Tern (*Sternula nereis nereis*), Spiny Rice Flower (*Pimelea spinescens* subsp. *spinescens*), Orange-bellied Parrot (*Neophema chrysogaster*) and Australasian Bittern (*Botaurus poiciloptilus*). The site also has a regular presence of large populations of migratory shorebirds and waterbirds, including important populations of Red-necked Stint (*Calidris ruficollis*), Curlew Sandpiper (*Calidris ferruginea*), Sharp-tailed Sandpiper (*Calidris acuminata*), Australian Shelduck (*Tadorna tadornoides*), Grey Teal (*Anas gracilis*), Pacific Black Duck (*Anas superciliosa*) and Australasian Shoveler (*Spatula rhynchotis*).  A map of the land uses and key habitat areas within the Western Treatment Plant is provided in the Ecology report (Attachment 13).  *Terrestrial Ecological values – powerline corridor*  The Powerline corridor occurs within a largely agricultural area between Little River and Lara on the Victorian volcanic plain. The area is generally flat open plains and contains a mix of operating farms and rural living areas, where the majority of the land is either cropped or grazed. Areas that are grazed appear to have retained some native grassland and habitat for grassland species, though most the areas that were visible from the site review often contained noxious weeds and exotic grasses.  The vegetation observed during preliminary field survey was representative of the various land uses and management within each individual land parcel. These included a variety of crops and pasture grasses, with patches of native grassland which often included exotic pasture species and other environmental weeds, with strips of planted native trees and shrubs around houses and sheds and along fencelines and property boundaries that act as shade for stock or as a windbreak.    In the Peak School Road reserve, exclusion zones protect the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Flora and Fauna Guarantee Act 1988* (FFG Act) Critically Endangered Spiny Rice-flower. The exclusion zones are well signposted and are found on both sides of Peak School Road.  The Ecological Vegetation Classes (EVCs) modelled as being present along the alignment is predominately EVC 132 Plains Grassland (Endangered), with isolated areas of EVC 68 Creekline Grassy Woodland (Endangered), EVC 125 Plains Grassy Wetland and EVC 55 Plains Grassy Woodland (Endangered). The site survey confirmed the presence of EVC 132 Plains Grassland within the road reserve (Exclusion Zone) and were modelled in adjacent private land.  Further detailed ecological surveys are proposed to occur along the Powerline corridor to confirm the presence and condition of vegetation. |
| *Aboriginal cultural heritage*  The majority of the Project (onshore and offshore) is within the Wadawurrung Traditional Owners Aboriginal Corporation (WTOAC) Registered Aboriginal Party (RAP) area with two small offshore sections of the Project area located within the First People State Relations (non-RAP) area and the Bunurong Land Council Aboriginal Corporation (BLCAC) RAP Area.  The Project area intersects with areas of Cultural Heritage Sensitivity (CHS) associated with:   * being located within 50 m of a Victorian Aboriginal Heritage Register (VAHR) place. * being located within 200 m of a declared Ramsar wetland. * being located within 200 m of a waterway (Hovells Creek). * being located within Crown coastal land. * being located within the Koo Wee Rup Plain. * being located within 200 m of the high-water mark of the coastal waters of Victoria.   A map of the RAP boundaries Cultural Heritage Sensitivity Areas within the Project area is provided in Attachment 9.  A search of the VAHR shows that sixteen (16) Aboriginal places occur in, or within, 50 m of the Project area with 16 of these places occurring in the Project area:  *Within the Project area*   * VAHR 7721-1248-7 to -12 (Avalon Airport LDAD) * VAHR 7721-1354 (Avalon Airport Southern Artefact Scatter 1) * VAHR 7721-1355-2 to -12 (Avalon Airport Southern LDAD 1) * VAHR 7721-1363 (Avalon LDAD 1) * VAHR 7721-1381-1 to -8, -10 to -30 (Avalon Airport Eastern LDAD\_1) * VAHR 7721-1453-1 to -10 (Avalon Airport South West LDAD) * VAHR 7721-1454-1 to -4 (UNPROVENANCED Avalon LDAD 1) * VAHR 7721-1479-1 (Avalon Airport Southern LDAD 2) * VAHR 7722-0499 (ANAKIE EAST 1) * VAHR 7722-0576 (BARWON PRISON 3) * VAHR 7722-0582 (LARA PRISON 9) * VAHR 7722-0746 (MELBOURNE-GEELONG INTERCONNECTOR 3) * VAHR 7722-0747-1 and -3 (MELBOURNE-GEELONG INTERCONNECTOR 4) * VAHR 7722-1090-1 to -14 (Peak School Road LDAD) * VAHR 7822-2044 (POINT WILSON RD 1)   *Within 50 m of the Project area*   * VAHR 7721-1479-2 (Avalon Airport Southern LDAD 2) * VAHR 7822-1074-1 & 2 (LITTLE R/PRINCES FWY SAS 1)   It is noted that whilst VAHR 7721-1479-1 is located within the Project area, one component belonging to the low density artefact distribution (VAHR 7721-1479-2) is located outside of the Project area, within 50 metres and therefore is mentioned twice in the lists above.  These places include six artefact scatters, eight Low Density Artefact Distributions (LDADs), one multicomponent artefact scatter/object collection and one multicomponent artefact scatter/earth feature.  As the Project is located within areas of CHS and is considered a ‘high impact activity’, a mandatory Cultural Heritage Management Plan (CHMP) is required under the *Aboriginal Heritage Act 2006.*  The Project is preparing three CHMPs for each statutory boundary the Project intersects with: the WTOAC area, the First Peoples State Relations area and BLCAC area. The NoI to prepare a Cultural Heritage Management Plan for the WTOAC area was lodged on 17 November 2022. The NoIs for the First Peoples State Relations area and BLCAC area are in preparation.  In consultation with the WTOAC, BLCAC and First People State Relations, further assessments and surveys would be undertaken through the CHMP process to understand the presence and potential impacts to cultural heritage.  *Post-contact Heritage*  The Project area does not intersect with any Heritage Overlays identified in the Greater Geelong Planning Scheme, Victorian Heritage Register (VHR) or Victorian Heritage Inventory (VHI) protected under the *Heritage Act 2017* or Commonwealth Heritage places protected under the EPBC Act. |
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**9. Land availability and control**

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| **Is the proposal on, or partly on, Crown land?** |
| r No **r Yes** If yes, please provide details.  There are several areas where the Project area is within Crown land as follows:   * The proposed powerline corridor intersects with several Crown land parcels including railway land managed by VicTrack (Standard parcel identifiers D~5/PP3910, 5~16B/PP3891 and 005/PP3910), Barwon Prison managed by the Department of Justice and Community Safety (Standard parcel identifiers 2005/PP3184 and C~27/PP3184) and Hovells Creek where management is shared between the Greater Geelong City Council and the DELWP(Standard parcel identifiers 2024/PP3910, 2025/PP3910, 2038/PP3184, 7A~B/PP3910, 2026/PP3891, 2018/PP2974, 2021/PP3184 and 2023/PP3910) * The Project area across the shoreline and Port Philip Bay includes Crown Land permanently reserved for the management of wildlife and managed by Park Victoria (Standard parcel identifiers 12E\PP3241 and 12F\PP3241). * The underwater gas pipeline, electricity cables and Marine berth are proposed on Crown Land. The Crown Land seabed is unreserved and managed by the DELWP. |
| **Current land tenure** (provide plan, if practicable):  The offshore section of the Project is located within Crown Land managed by Parks Victoria (Standard parcel identifiers 12E\PP3241 and 12F\PP3241) and the DELWP. The offshore section is within the jurisdiction of Ports Victoria, who is responsible for the management of commercial shipping in Port Phillip, safe navigation in the port waters of the port of Melbourne, waterside emergency and marine pollution response.  The onshore pipeline section of the Project is located within freehold land managed by Melbourne Water and leased to MPH for agricultural purposes.  The onshore powerline section of the Project is located within the road reserve, private land and Crown land.  Refer to Attachment 10 for a map of the existing land tenure. |
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| **Intended land tenure** (tenure over or access to project land):  Vopak is in the process of securing a seabed lease from DELWP for the offshore section of the Project to enable the construction and operation of the FSRU and offshore pipeline.  The onshore pipeline would require the registration of a 15 m permanent easement or licence in Crown Land areas along the alignment to ensure the safety of the pipeline. The easement would include the requirement for other parties to seek approval for the following activities within the easement:   * Replacing or installing fencing. * Any earthworks. * Land levelling or contouring. * Landscaping and planting trees. * Storing material or erecting structures. * Use of explosives. * Use of vibrating machinery. * Transporting heavy machinery or loads.   The onshore powerline would require an easement along the alignment powerline where it is located within private land. The size and location of the easement is subject to further site investigations and environmental assessment. |
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| **Other interests in affected land** (eg. easements, native title claims):  Part of the offshore section of the Project area intersects with native title claim VC2020/001 made by the Boonwurrung People on 29 May 2022. Consultation and a formal notice has been provided to the Boonwurrung People as part of the agreement to lease.  The Project area interfaces with the following infrastructure which may be subject to encumbrances such as easements, caveats and covenants:   * Existing roads. * Water infrastructure. * The Southwest pipeline, licensed under the *Pipelines Act 2005*.   Specific interests would be investigated further through project development in consultation with landholders and managers. |
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**10. Required approvals**

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| **State and Commonwealth approvals required for project components** (if known):  The construction and operation of the Project requires assessment under Commonwealth and State environmental, planning and heritage legislation.  Table 3 below summarises the approvals which are anticipated to be required for the Project and the responsible authority responsible for the assessment of each approval. This list is not exhaustive and further approval requirements may present themselves throughout detailed design and later stages of the Project.  **Table 3** Summary of Commonwealth and State approval requirements   |  |  |  | | --- | --- | --- | | Legislation | Approval requirement | Authority | | *Commonwealth* | | | | *Environment Protection and Biodiversity Conservation Act 1999* | Referral on the basis that the Project may have a potentially significant impact on Matters of National Environmental Significance (MNES). | Department of Climate Change, Energy, the Environment and Water (DCCEEW). | | *State* | | | | *Pipelines Act 2005* | Approval to construct and operate a new high pressure gas pipeline under Section 14 and 15 of the *Pipelines Act 2005*, including the requirements for a pipeline licence, Environmental Management Plan and Safety Management Plan. | DELWP and Energy Safe Victoria | | *Gas Safety Act 1997* | Gas Safety Case to manage the safe operation of the high-pressure gas pipeline. | Energy Safe Victoria | | *Occupational, Health and Safety Act 2004* | A Major Hazard Facility (MHF) licence for the construction of the FSRU. | WorkSafe Victoria | | *Country Fire Authority Act 1958* | Hot works permit to use fire in open air, in support of operation of construction equipment in the open air during a total fire ban. | Country Fire  Authority | | *Marine and Coastal Act 2018* | Consent for the ‘use and development of marine and coastal Crown land’, pursuant to Section 68 of the *Marine and Coastal Act 2018.* | DELWP | | *Port Management (Local Ports) Regulations 2015* | Parks Victoria Works Permit for works within the Port Philip Bay. | Parks Victoria | | *Port Management Act 1995* | A licence for use of the marine berth, continuously mooring the FSRU. | Ports Victoria | | *Planning and Environment Act 1987* | Planning approval for use, building and works and the removal of native vegetation under the Greater Geelong Planning Scheme. Planning approval under the Greater Geelong Planning Scheme is only required for the GRS, the substation and the powerline.  Under Section 85 of the *Pipelines Act* *2005*‘if a licence is issued under this Act for the construction and operation of a pipeline, nothing in a planning scheme under the *Planning and Environment Act 1987* requires a permit under the Act for the use or development of land or the doing or carrying out of any matter or thing for the purpose of the pipeline’, therefore planning approval is not required for the pipeline. | DELWP / Greater Geelong Council | | *Aboriginal Heritage Act 2006* | A mandatory CHMP is required to be prepared and approved prior to the commencement of the proposed activity, because the Project is located within areas of CHS and is considered a ‘high impact activity’ and may require an EES under the *Environment Effects Act 1978.* | WTOAC  BLCAC  First People State Relations | | *Environment Protection Act 2017* | If required, development and Operating Licence for the installation and operation of the FSRU. | EPA | | *Flora and Fauna Guarantee Act 1988* | If required, permit(s) to take to remove FFG listed species from public land. Public land includes the road reserves. | DELWP | | *Wildlife Act 1975* | If required, authorisation(s) to translocate threatened wildlife. | DELWP | | *Fisheries Act 1995* | If required, permit(s) to take to take, injure, damage or destroy protected aquatic biota. | Victorian Fisheries Authority | | *Catchment and Land Protection Act 1994* | Management of noxious weeds and pest animals. | DELWP | | *Road Management Act 2004* | Permit to conduct works on or  in a roadway including a Traffic Management Plan. | Department of Transport | | *Water Act 1989* | A Permit is required for works built over, or, near any Melbourne Water assets, easements or waterways (Hovells Creek). | Melbourne Water | |
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| **Have any applications for approval been lodged?** |
| r No **r Yes** If yes, please provide details.  On 28 April 2022 Vopak submitted the *Vopak Victoria LNG Pipeline Consultation Plan* (Vopak, 2022) to the Minister for Planning for assessment under the *Pipelines Act 2005*. Refer to Attachment 11 for the Consultation plan. On 18 May 2022 the Minister for Planning determined the *Vopak Victoria LNG Pipeline Consultation Plan* (Vopak, 2022) meets the requirements under Section 17 of the Act. Refer to Attachment 12 for the letter of approval. |
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| **Approval agency consultation** (agencies with whom the proposal has been discussed): |
| Consultation by Vopak has been undertaken with the following approval agencies:  Consultation by the Vopak has been undertaken with the following state approval agencies from 2019 to December 2022   * DELWP * Energy Safe Victoria * WorkSafe Victoria * Country Fire Authority * WTOAC. * EPA * Victorian Fisheries Authority * Department of Transport |
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| **Other agencies consulted:** |
| Consultation by the Vopak has been undertaken with the following agencies from September 2019 to 2022, and ongoing:   * AEMO * Australian Marine Safety Authority * Maritime Safety Victoria * Transport Safety Victoria * Victorian Regional Channels Authority * National Regional Channels Authority * National Offshore Petroleum Safety and Environmental Management Authority * Port Phillip Sea Pilots * Parks Victoria * Department of Industry, Science, Energy and Resources (Commonwealth) * Freight Victoria * Department of Defence * Melbourne Water * City of Greater Geelong * Invest Victoria * Department of Transport (Freight Victoria) * Fire Rescue Victoria * Victoria Police |
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PART 2 POTENTIAL ENVIRONMENTAL EFFECTS

# 11. Potentially significant environmental effects

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| **Overview of potentially significant environmental effects** (identify key potential effects and comment on their significance and likelihood, as well as key uncertainties): |
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| The following overview of potentially significant environmental effects is based on:   * Preliminary studies conducted on behalf of Vopak to date for the Project which include marine and terrestrial ecology desktop-level assessments, terrestrial ecology fieldwork, marine studies and the powerline environmental review (refer to Attachments 6 to16). * Publicly available information including various land use planning, ecological, heritage, contamination and physical environment (soils and water) online databases, as well as various environmental and technical assessments of other FSRU proposals. * Information provided from stakeholders engaged on the Project since project inception in 2019 (information about stakeholder engagement is provided in Section 20).   Based on understanding of the Project scope, environmental studies undertaken specifically for the Project and other available information (public or provided by stakeholders), potential environmental effects were documented based on impact pathways (receptor – impact – activity). A preliminary assessment was undertaken of these impact pathways against the following criteria:   * the location of the potential effect * the project phase the effect could occur in (operation and/or construction) * the level of uncertainty of the effect based on available information * the likelihood that the project activity would cause a significant environmental effect on that value (where ‘significance’ is based on the guidance provided in the Ministerial Guidelines) * whether further study of the potential effect is required.   This preliminary assessment identified three groups of impact pathways based on the priority of the study associated with each potential effect, and the likely complexity of that study and associated environmental management measures (based on available information). These three group types were as follows:   1. **Potential significant environmental effect that requires an in-depth assessment as activity is not commonly undertaken (higher level of uncertainty of impact) and environment management procedures are potentially complex.**   Potential environmental effects in the highest priority study group include those associated with marine biodiversity and greenhouse gas emissions.     1. **Potential significant environmental effect, activity is known (level of certainty of impact is better known) and standard environment management procedures may require site-specific environmental procedures for construction and/or operation.**   Potential environmental effects in this priority study group include those associated with terrestrial ecology; landscape and visual impacts (including bay views); safety, hazard and risk; water quality; Aboriginal cultural heritage; and underwater noise.   1. **Potential environment effect, activity is well understood (level of certainty of impact is well understood) and environmental management procedures are well understood and standard environmental procedures for construction and/or operation.**   Potential environmental effects within this priority study group include those associated with traffic and transport; land use change; social and community disruption; contamination; soils; surface water and groundwater; environmental noise; and air quality.    In addition to the above, no post-contact heritage is present within or immediately adjacent to the Project and thus impacts to post-contact heritage values are considered implausible. This applies to both onshore and offshore environments.  The following sections provides an overview of the potentially significant environmental effects of the Project using the impact pathway group types.   1. **Potential significant environmental effect that requires an in-depth assessment as activity is not commonly undertaken (higher level of uncertainty of impact) and environment management procedures are potentially complex.**   **Marine ecology**  The operation of an open loop FSRU has the potential to cause a significant effect on the marine environment through the entrainment of small marine organisms and the discharge of cold water with residual chlorine. Further detailed assessment of the impact pathways and receiving marine environment is required to determine the extent and magnitude of the potential effects from the open loop FSRU on the marine environment.  Entrainment  During operation, an open loop FSRU may entrain smaller marine organisms (such as small fish, zooplankton and phytoplankton, drifting eggs and larvae) that are present in the water column adjacent to the intake. These marine organisms once entrained as part of the intake water from the FSRU would not be expected to survive the mechanical processes of the FSRU.  Publicly available data from other FSRU projects suggests that entrainment levels as a  percentage of overall populations may be very low, noting however, that each location has unique  characteristics such as water depth, currents and species presence that require local baseline data and modelling.  The extent and magnitude of the potential effects on marine fauna species as a result of the entrainment of smaller marine organisms from the operation of the open loop FSRU would require further detailed assessment. Further assessment would include hydrodynamic modelling and marine ecology assessments.  Residual chlorine in seawater discharge  During operation of the open loop FSRU, the regasification process would take on seawater as part of the exchange process to turn LNG into a gas. Chlorine is expected to be used to control biofouling in the pipes, pumps and heat exchangers. Seawater discharged from the FSRU would contain low levels of short-lived residual chlorine which may have a potential effect on the marine biota in close proximity to the seawater discharge.  Further hydrodynamic and ecotoxicity modelling of the potential impacts on the marine environment would be undertaken as part of the studies to support the approvals process.  Cold water discharge  During operation of the open loop FSRU, cold water may be discharged from the FSRU into the marine environment as part of the regasification process. A cold water plume may have a potential effect on the marine biota in close proximity to the cold water discharge.  The extent and magnitude of the potential effects on marine biota as a result of cold water with residual chlorine discharged from open loop FSRU would require further detailed assessment. Further assessment would include hydrodynamic modelling and marine ecology assessments.  Water Quality  Temporary decreases in water transparency associated with increased concentrations of suspended sediments has the potential to impact light sensitive organisms or those that require clear water to navigate. Further modelling would be conducted to quantify potential impacts.  During operation of the open loop FSRU, cold water may be discharged from the FSRU into the marine environment as part of the regasification process. A cold water plume may have a potential effect on the marine biota in close proximity to the cold water discharge.  Underwater noise  During the construction, localised impacts from underwater noise have the potential to affect marine fauna passing through or near to the Project area. Underwater noise from piling for FSRU moorings and subsea pipeline construction would be expected to create a temporary, localised continuous noise source which could affect marine fauna such as fish and marine mammals. During operation the FSRU onboard pumps, machinery and plant, and visiting vessels may also generate noise. Further noise assessment and modelling would be undertaken to support the approvals process.  **Greenhouse gas emissions**  The major source of greenhouse emissions would be from the operation, generation and consumption of energy associated with the conversion of LNG to natural gas. Electricity from the existing electricity networks would power the FSRU and its operations, reducing gas consumption on the FSRU and overall greenhouse gas emissions.  Expected GHG emissions generated during construction range between 8,314 and 9,000  tCO2-e. Using onshore renewable power, expected GHG emissions generated during operation for open loop mode would be approximately 132 tCO2-e annually, and 21,068 tCO2-e annually for closed loop mode.  Further detailed assessment would include a detailed assessment of scope 1, scope 2 and indicative scope 3 greenhouse gas emissions expected through construction and/or operation of the Project.The desktop assessment does not consider scope 3 greenhouse gas emissions as further design development and confirmation of commercial arrangements is required to determine the scope 3 emissions that would be within the Project’s control and influence.   1. **Potential significant environmental effect, activity is known (level of certainty of impact is better known) and standard environment management procedures may require site-specific environmental procedures for construction and/or operation.**   **Terrestrial ecology**  The onshore section of the Project where the pipeline is proposed is located within the Western Treatment Plant that forms part of the Ramsar-listed wetland, Port Phillip Bay (Western Shoreline) and Ramsar Site. The surrounding area includes wetlands that provide habitat for high numbers of waterfowl, including several threatened species, plus the adjacent intertidal zone, includes important foraging grounds for migratory shorebirds.  The habitat value of the Western Treatment Plant has been enhanced by previous sewerage treatment operations, whereby nutrient loads from sewerage treatment have led to increased foraging opportunities for waterfowl and shorebirds, coupled with Melbourne Water’s management of the site in controlling threats and maintaining permanency of freshwater wetland habitats.  However, the Western Treatment Plant has been extensively modified due to these operations and the long-time use of the Western Treatment Plant as an operational farm. The Project has therefore been able to target onshore components of the Project to disturbed and modified areas currently being utilised by agricultural activities, including grazing and cropping.  Through consultation with Melbourne Water and the Biodiversity Conservation Advisory Council (BCAC), which help guide conservation activities at the Western Treatment Plant, the GRS, shore crossing location, pipeline and electricity cables have avoided direct impacts (through both construction and operations stages) to important habitat areas for waterfowl and migratory shorebirds and native vegetation.  The population of the Growling Grass Frog also contributes to the ecological character of the Western Treatment Plant and is present within the Project area. The species is known to use roadside drains, which are proposed to be directly impacted through the pipeline and electricity cables alignments. Further surveys are proposed to understand the extent of the species use of these drains. However, well-used mitigation measures during construction, including scheduling of works, pre-construction checks by wildlife handlers and re-establishment of habitat would be employed to mitigate any significant and long-term impacts to the population present within the Project area.  Direct impacts to important habitat areas and significant values that form part of the ecological character of the Ramsar site are therefore not anticipated, with the trenchless shore crossing to be drilled or tunnelled from a pad approximately 430 m inland, approximately 5-8 m underground, to an exit point approximately 1.1 km offshore. The permanent GRS would also be located near the boundary of the Western Treatment Plant with the Princes Freeway, located approximately 2 km from the nearest point to Lake Borrie (closest freshwater wetland), and approximately 5 km to the nearest shoreline.  In consideration of the sensitivities of the Project area, the proximity to important habitat and foraging areas was incorporated into the siting of the proposed above-ground construction areas. A 430 m buffer from the shoreline is proposed to further mitigate potential indirect impacts associated with construction. However, potential impacts associated with noise, vibrations, artificial lighting and vehicle movement impacting upon the significant values that form part of the ecological character of the Ramsar site, as a result of construction and operation of the Project are largely unknown and require further detailed assessment.  The powerline alignment includes a range of vegetation communities across a patchwork broader landscape matrix consisting of agricultural land, urban development, basalt plains grassland, open grassy eucalypt dominated woodland and roadside corridor habitat. Vegetation/habitat modelled and previous records of threatened flora and fauna species within the Project area indicates the potential several Commonwealth and State listed species and communities to be present. Detailed flora and fauna field assessment are proposed to confirm the presence / absence of such values within the Project area and inform avoidance and refinement of the project impact footprint.  **Landscape and visual impacts**  The Project area is not within an identified area as having regional or State significant landscape values, however the nearby Bellarine Peninsula has been recently declared as a Distinctive Area and Landscape under the *Planning and Environment Act 1987*. A recent Draft Bellarine Peninsula Statement of Planning Policy (DELWP, 2021) refers to the Peninsula’s Northern Coast landscape as regionally significant (i.e., sensitive receptor). Notwithstanding, views towards the offshore Project area (i.e., FSRU mooring) out into the seascape (Port Phillip Bay) from this regionally significant coastline would naturally be mitigated by a distance of approximately 10 km. The powerline is also nearby the foothills of the You Yangs protected by a SLO1**.** The SLO1 refers to the You Yangs the most prominent landscape feature in the northern area of the City of Greater Geelong, providing panoramic views of Geelong.  Adverse impact on landscape character and sensitive visual receptors are not anticipated through the introduction of onshore infrastructure (i.e., powerline, electricity cables and GRS) due to limited interface with dwellings, farmhouses and other sensitive receptors, noting that the pole types proposed (132kV or 66kV options) are ubiquitous and commonly located in roadways in rural and semi-rural settings. The visual impact of the GRS is also likely to be minor as it would be viewed from the Princess freeway and screened by roadside trees.  Potential impacts associated with the pipeline alignment are temporary and confined to the laydown areas and construction laydown areas associated with construction phase of the Project. It is also the intention as far as practical, to trench the proposed pipeline along road reserves, adjacent to existing easements and fringe agricultural land, to avoid the removal of trees which has the potential to impact landscape values.  Similarly, the trenchless shoreline crossing proposed aims to ensure the sensitive Ramsar site values and landscape character along the section of coastline in the Project area are maintained with no ongoing visual impacts to these areas are anticipated post construction once the pipeline is commissioned and operational.    A landscape and visual impact assessment (inclusive of seascapes) would be undertaken as part of future studies for the Project required to support the regulatory approvals process.  **Safety, hazard and risk**  The Project poses a risk of potentially significant exposure of human communities to health and safety hazards. Further investigations and studies would be undertaken to identify the extent and magnitude of the potential risks and site-specific mitigation measures required to manage such risks. However, it is noted that these risks are well understood and could be managed in accordance with the relevant guidance and regulations to the satisfaction of the relevant authorities, including DELWP, Energy Safety Victoria, WorkSafe Victoria, Fire Rescue Victoria and Ports Victoria.  Offshore  Offshore, Project poses a potential risk for exposure of the community to health or safety hazards through accidental overboard release of hazardous and/or non-hazardous waste from the FSRU or LNG vessels. Whilst the risk is significant, the siting of the FSRU and strong understanding of health and safety hazards reduces the likelihood of potential impacts to community health. In addition, the Defence site and associated jetty at Point Wilson are approximately 20 km from the marine berth. The FSRU exclusion zone would be entirely within the bay, distanced from intensive human activity. While it is acknowledged that LNG vessels may be near commercial and recreational fishing activities while entering the bay such interactions would be transient in nature. The LNG vessel would spend the majority of its time in the bay moored next to the FSRU. In addition, whilst the potential impact would be significant, past LNG operations demonstrate the industry’s strong understanding and effective management of safety and hazard risks. More than 50,000 voyages have taken place since LNG transportation began in 1964 and there have been no fatalities or significant damage to tanks on LNG vessels.  Onshore  Onshore, the Project poses a potential risk for exposure of the community to health or safety hazards through the use of hazardous chemicals or release of air emissions in construction and operation. Given the distance of the onshore infrastructure from sensitive receivers including residential, community, commercial and industrial buildings, it is unlikely that the Project would result in exposure of a human community to health or safety hazards. In addition, construction activities would not require the use of extensive quantities of chemicals that may cause significant impacts to human health of construction workers.  **Aboriginal cultural heritage**  The Project is considered a ‘high impact activity’ intersecting with known areas of cultural heritage sensitivity and hence triggering a mandatory CHMP under the *Aboriginal Heritage Act 2006*.  The CHS intersected by the Project area is associated with:   * being located within 50 m of 16 VAHR places. * being located within 200 m of a declared Ramsar wetland. * being located within 200 m of a waterway (Hovells Creek). * being located within Crown coastal land. * being located within the Koo Wee Rup Plain. * being located within 200 m of the high-water mark of the coastal waters of Victoria.   Potential effects to cultural heritage and specific mitigation measures of potential Aboriginal cultural heritage effects are not yet determined. Development of the CHMP would involve consultation with WTOAC, BLCAC and First Peoples State Relations to develop appropriate mitigation measures for potential impacts to cultural heritage.  **Water quality**  As discussed under marine ecology section (above) cold water discharge and low level of chlorine may have a potential effect on the water quality and marine ecology. A cold water plume created by the sinking cold water discharged from the open loop mode FSRU and low levels of short-lived residual chlorine discharged by the FSRU may have a potential effect on the marine biota in close proximity.  In addition to the cold water discharge and low levels of chlorine discussed above in context of marine ecology, localised impacts to water quality and turbidity are anticipated due to disturbance of the seabed (such as piling for foundations for FSRU, riser platform and mooring dolphins and trenching / jetting for laying subsea pipeline) during the construction phase of the Project.   1. **Potential environment effect, activity is well understood (level of certainty of impact is well understood) and environmental management procedures are well understood and standard environmental procedures for construction and/or operation.**   Potential environmental effects within this priority study group include those associated with traffic and transport; land use change; social and community disruption; contamination; soils; surface water and groundwater; environmental noise; and air quality.  These potential effects are well understood and routinely managed on projects of this scale and nature. Further assessment would be undertaken on these aspects of the Project however sufficient information is available to determine that these effects are not potentially significant in terms of extent, magnitude and/or duration.  Furthermore, the Project is subject to the following regulatory approval or operational requirements that would govern the construction and operation of the Project area and surrounds to the satisfaction of each relevant regulator, or in accordance with Vopak’s general environmental duty:   * *Road Management Act 2004* * *Environment Protection Act 2017* * *Marine and Coastal Act 2018* * *Planning and Environment Act 1987* * *Country Fire Authority Act 1958* * *Pipelines Act 2005* |

# 12. Native vegetation, flora and fauna

Native vegetation

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| **Is any native vegetation likely to be cleared or otherwise affected by the project?**  r NYD r No r **Yes**  If yes, answer the following questions and attach details.  Components of the Project within the onshore pipeline Project area are not predicted to impact on patches of native vegetation. This is due to the Project siting the onshore works within the operational agricultural area of Project area, away from sensitive habitats and vegetation communities. Due to modification of the site from sewage operations and the long-time use of the Project area as an operational agricultural area, there are no modelled patches of vegetation present within the onshore pipeline Project Area.  The majority of the onshore powerline Project area extends through the Victorian Volcanic Plain bioregion within mainly small-scale agricultural areas. No detailed field surveys have been conducted along the alignment, however, there are several areas where modelled Ecological Vegetation Communities (EVCs) have been mapped as likely being present. This includes predominately patches of Plains Grassland EVC, with small and isolated areas of Creekline Grassy Woodland EVC, Plains Grassy Wetland EVC and Plains Grassy Woodland EVC. Each of these EVCs are considered to be endangered within the bioregion. |
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| **What investigation of native vegetation in the project area has been done?** (briefly describe) |
| Ecological investigations within the onshore pipeline Project Area include have been primarily desktop assessments due to the considerable data on ecological values available from Melbourne Water, supported by some limited field surveys. Ecological investigations within the onshore powerline Project area include desktop assessments, supported by a rapid field survey from publicly accessible areas to review consistency of modelled vegetation with on ground conditions.  The quantity of data and reports available for the onshore pipeline Project area is significant and sufficient to understand the values present. This has included monitoring on the threatened species and values that make up the ecological character of the Ramsar site. The desktop assessment was able to obtain data with high accuracy and currency from Melbourne Water on:   * Waterfowl and wetland birds * Australasian and migratory Shorebirds * Large wading birds * Terns * Growling Grass Frog   This information is based on regular and annual monitoring that has been occurring at the Western Treatment Plant since 2002, including on operational ponds, conservation lagoons (operationally decommissioned) and the shoreline / intertidal zone.  Reports provided to the Project and used to inform the ecological impact assessment are detailed in Table 4 below.  **Table 4** Reports provided by Melbourne Water and used to inform the Ecological Impact Assessment   |  |  |  |  | | --- | --- | --- | --- | | **Author** | **Date** | **Report** | | | Ecology and Heritage Partners Pty Ltd | | 2021 | Growling Grass Frog Monitoring 2020/21, Western Treatment Plant, Victoria. Report prepared for Melbourne Water by Ecology and Heritage Partners Pty Ltd. | | A. Organ | | 2003 | Management Plan for the Growling Grass Frog *Litoria raniformis* at the Western Treatment Plant, Werribee, Victoria. Report prepared for Melbourne Water Corporation by Biosis Research Pty Ltd. | | P. Menkhorst, P. Macak, D. Rogers, K. Stamation and B. Fanson | | 2021 | Monitoring waterbird populations at the Western Treatment Plant, Victoria – 2021 annual report. Report prepared for Melbourne Water by the Arthur Rylah Institute for Environmental Research, Department of Environment, Land, Water and Planning. | | Melbourne Water | | 2021 | Western Treatment Plant 2020/21 Compliance Report for EPBC 2008/4221. | |
| **What is the maximum area of native vegetation that may need to be cleared?**  r NYD r No **r Yes** Estimated area: 7.31 (hectares)  No native vegetation is predicted to be impacted within the onshore pipeline Project area as much of the Project area falls on modified agricultural land and road reserves.  Native vegetation is modelled as present within the onshore powerline Project area. The extent of terrestrial native vegetation within the Project area has not yet been confirmed through detailed field surveys. Therefore, the required area of native vegetation to be cleared for the Project has not yet been determined. To inform preliminary ecological impacts for the Project, an impact footprint was established based on standard construction requirements for installation of the required pylons and transmission lines. This was used to identify the potential impact to native vegetation of approximately 7.31 ha, using the EVCs modelled to be present. |
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| **How much of this clearing would be authorised under a Forest Management Plan or Fire Protection Plan?**  r **N/A** ………………………. approx. percent (if applicable) |
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| **Which Ecological Vegetation Classes may be affected?** (if not authorised as above)  **r** NYD  **r Preliminary assessment completed.** If assessed, please list.  Desktop analysis identified four EVCs that are present within the Project area, all of which are located within the onshore powerline Project area. The EVCs predicted to be impacted based on EVC models and the amount of modelled EVC present within the impact corridor are provided in Table 5.  **Table 5** Potential impact to EVC (ha) within the Project area   |  |  | | --- | --- | | **Modelled Ecological Vegetation Community** | **Potential area of impact (ha)** | | Plains Grassy Woodland (EVC 55) | 0.013 | | Creekline Grassy Woodland (EVC 68) | 0.339 | | Plains Grassy Wetland (EVC 125) | 0.225 | | Plains Grassland (EVC 132) | 7.04 | | **Total** | **7.312** |   Detailed ecological surveys are proposed to map extent and condition of EVCs present within the Project Area. Following detailed surveys, this information would be used to refine the Impact Footprint within the onshore powerline Project area. The intent is to avoid and minimise impacts to EVCs through constraining or realigning the construction footprint, and potentially excluding any significant location. These may include where populations of the endangered Spiny Rice-flower *(Pimelea spinescens* ssp. *spinescens*) are known in adjacent road reserves and where other threatened species habitat is considered present. |
| **Have potential vegetation offsets been identified as yet?**  **r NYD** r Yes If yes, please briefly describe. |
| The requirement for vegetation offsets for the Project would be identified through further detailed assessment of the Project area including comprehensive field surveys and further refinement of the impact footprint. |
| **Other information/comments?** (eg. accuracy of information) |
| The information provided above for the onshore powerline Project area and scope of works is desktop only and requires detailed field investigations to confirm the presence or absence of EVCs and other ecological values. This would also include assessment of quality and whether these EVCs meet criteria for listed threatened ecological communities.  The accuracy of information within the onshore pipeline Project area is considered to be high and reliable. This is due to the monitoring and reporting provided by Melbourne Water that have been undertaken by specialists over a significant period of time. |
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NYD = not yet determined

Flora and fauna

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| **What investigations of flora and fauna in the project area have been done?**  (provide overview here and attach details of method and results of any surveys for the project & describe their accuracy)  As outlined above, a desktop flora and fauna assessment was undertaken in December of 2022.  A field assessment along Peak School Road of the onshore powerline Project area to undertake a rapid assessment of ecological values within the road reserve and within 50 m of the road (each side of the road) confirmed that the modelled vegetation communities exist within the private properties. However, their condition was noted as being modified as patches have been impacted by *Catchment and Land Protection Act 1994* (CaLP Act) listed noxious weeds. Some of the communities (EVC 132 Plains Grassland) extend into the road reserve. Spiny Rice-flower is present and protected with exclusion zone fencing within the road reserve, however detailed assessments were not completed. The alignment for the powerline would require a vegetation quality assessment to confirm the presence of these communities.  A field review of the onshore pipeline Project area has also been completed to understand the ecological conditions. As noted previously, the Project area is located in the agricultural area of WTP and the site conditions are typical of areas used by stock and for cropping, with minimal native vegetation. Habitat within the area is generally not suitable for flora and fauna, however, roadside drains contain habitat for frogs, including the Growling Grass Frog, which is known to use these drains in proximity to wetland habitats. The review also identified rows of planted trees that provide nesting sites for raptors and are used by several small bird species. |
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| **Have any threatened or migratory species or listed communities been recorded from the local area?**  r NYD r No **r Yes**  If yes, please:   * List species/communities recorded in recent surveys and/or past observations. |
| * Indicate which of these have been recorded from the project site or nearby. |
| Desktop assessment of available information from stakeholders (including monitoring reports from Melbourne Water) and ecological databases have identified a number of threatened and migratory species, particularly within the onshore pipeline Project area, which is part of the Port Phillip Bay (western shoreline) and Ramsar site.  Flora  Desktop assessment (2022) identified six EPBC listed flora species and 20 FFG listed flora species with potential to occur within 5 km of the onshore powerline Project area. Of these, Spiny Rice-flower, was the only species recorded during a field review and considered present. This includes a population within Peak School Road. The species is also known to occur within Western Treatment Plant, at Lake Borrie Grasslands located approximately two kilometres to the east of the onshore pipeline Project Area. Additionally, although not observed during the assessment, the Ecological report (2022) noted that Large-headed Fireweed (*Senecio macrocarpus*) is known to be present in the rail reserve within the onshore powerline Project area.  In total, 13 flora species have been identified as having a high or moderate potential of occurring within the onshore powerline Project Area (see Table 6). Detailed ecological surveys would confirm the presence of these species.  **Table 6** Threatened flora species with a moderate to high likelihood of occurrence within 5 km of the onshore powerline Project area   | **Common name** | **Scientific name** | **EPBC Act** | **FFG Act** | **Likelihood of occurrence** | | --- | --- | --- | --- | --- | | Basalt Podolepis | *Podolepis linearifolia* | - | Endangered | Moderate - Potential habitat in modelled plains grassland patches. | | Brittle Greenhood | *Pterostylis truncata* | - | Critically endangered | Moderate - Potential habitat in modelled plains grassland patches. | | Buloke | *Allocasuarina luehmannii* | - | Critically endangered | Moderate – Potential habitat in modelled plains grassy woodland patches. | | Button Wrinklewort | *Rutidosis leptorhynchoides* | - | Endangered | Moderate - Potential habitat in modelled plains grassland patches. | | Fragrant Saltbush | *Rhagodia parabolica* | - | Vulnerable | Moderate - Potential habitat in modelled plains grassland patches. | | Large-headed Fireweed | *Senecio macrocarpus* | - | Critically endangered | High - Is currently known from Geelong rail reserve within project area. | | Matted Flax-lily | *Dianella amoena* | - | Critically endangered | Moderate - Potential habitat in modelled plains grassland patches. | | Melbourne Yellow-gum | *Eucalyptus leucoxylon var. connata* | - | Endangered | Moderate - Potential habitat in modelled Plains Grassy Woodland patches. | | Pale Swamp Everlasting | *Coronidium gunnianum* | - | Critically endangered | Moderate - Potential habitat in modelled plains grassland patches or patches of plains grassy wetlands. | | Purple Blown-grass | *Lachnagrostis semibarbata var. semibarbata* | - | Endangered | Moderate - Potential habitat in modelled plains grassland patches. | | Rye Beetle-grass | *Tripogonella loliiformis* | - | Endangered | Moderate - Potential habitat in modelled plains grassland patches. Several recent recorded observations within the impact area of the onshore powerline Project area near Little River, north of Peak School Road. | | Small Milkwort | *Comesperma polygaloides* | - | Critically endangered | Moderate - Potential habitat in modelled plains grassland patches. | | Small Scurf-pea | *Cullen parvum* | - | Endangered | Moderate - Potential habitat in modelled plains grassland patches. | | Spiny Rice-flower | *Pimelea spinescens subsp. spinescens* | Critically endangered | Critically endangered | Present - this species was confirmed as occurring amongst roadside exclusion zones along Peak School Road |   Aside from the Spiny Rice-flower present in the Lake Borrie Grasslands, no other threatened flora species are known to occur, or are likely to occur within the onshore pipeline Project area due to the historic and ongoing operational and agricultural use of the site.  A full list of threatened flora species with potential to occur within the onshore powerline Project area is provided in Appendix B of Attachment 13.  Fauna  A desktop flora and fauna assessment was undertaken to determine potential species occurring within the Project area. This included reviewing data and monitoring reports on the populations of waterfowl and shorebirds within Western Treatment Plant.  The Western Treatment Plant and Werribee/Avalon area of the Ramsar site support several key listed species as per the sites Ecological Character Description (DELWP 2020). Species occurring in greater abundance in the Western Treatment Plant and Werribee/Avalon area include the Australian fairy tern, Australian Shelduck, Pink-eared Duck, Blue-billed Duck and Growling Grass Frog. Migratory shorebirds occur in this region of the Ramsar site in significant numbers, notably populations of Curlew Sandpiper, Sharp-tailed Sandpiper, Red-necked Stint, due to availability of intertidal and littoral zone habitat and foraging resources from increased nutrient flow into the ecosystem through past sewerage treatment processes at the Western Treatment Plant.  Threatened and migratory fauna and other species with significant populations that contribute to the Ramsar listing and ecological character of the site that have been recorded as present in Western Treatment Plant are detailed in Table 7 below.  **Table 7** Fauna and migratory species known to occur within Western Treatment Plant   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Common name** | **Scientific name** | **EPBC Act** | **FFG Act** | **Spatial context** | | **Amphibian** | | | | | | | Growling Grass Frog | *Litoria raniformis* | Vulnerable | Vulnerable | Likely to utilise constructed roadside drains located within and adjacent to the Project area.  Observed during the field review in inundated area adjacent to Beach Road. | | **Shorebird - Australasian** | | | | | | | Australian Pied Oystercatcher | *Haematopus longirostris* | - | - | During low tide, majority of shorebirds forage on tidal flats of Western Treatment Plant between Pont Wilson boat ramp (approximately 500 m south of the Project area) and 145W Outlet.  During high tide shorebirds move to high tide roosts, which include conservation ponds within the Western Treatment Plant with suitable water levels for foraging. | | Banded Lapwing | *Vanellus tricolor* | - | - | | Banded Stilt | *Cladorhynchus leucocephalus* | - | - | | Black-fronted Dotterel | *Elseyornis melanops* | - | - | | Double-banded Plover | *Charadrius bicinctus* | - | - | | Masked Lapwing | *Vanellus miles* | - | - | | Pied Stilt | *Himantopus leucocephalus* | - | - | | Red-capped Plover | *Charadrius ruficapillus* | - | - | | Red-kneed Dotterel | *Erythrogonys cinctus* | - | - | | Red-necked Avocet | *Recurvirostra novaehollandiae* | - | - | | **Shorebird - Migratory** | | | | | | | Bar-tailed Godwit | *Limosa lapponica* | Vulnerable  Migratory | Vulnerable | During low tide, majority of shorebirds forage on tidal flats of Western Treatment Plant between Pont Wilson boat ramp (approximately 500 m south of the Project area) and 145W Outlet.  During high tide shorebirds move to high tide roosts, which include conservation ponds within the Western Treatment Plant with suitable water levels for foraging | | Black-tailed Godwit | *Limosa limosa* | Migratory | Critically Endangered | | Broad-billed Sandpiper | *Limicola falcinellus* | Migratory |  | | Common Greenshank | *Tringa nebularia* | Migratory | Endangered | | Curlew Sandpiper | *Calidris ferruginea* | Critically Endangered  Migratory | Critically Endangered | | Eastern Curlew | *Numenius madagascariensis* | Critically Endangered  Migratory | Critically Endangered |  | | Great Knot | *Calidris tenuirostris* | Critically Endangered  Migratory | Critically Endangered |  | | Hudsonian Godwit hybrid | *Limosa haemastica x* | Migratory | - |  | | Marsh Sandpiper | *Tringa stagnatilis* | Migratory | Endangered |  | | Pacific Golden Plover | *Pluvialis fulva* | Migratory | Vulnerable |  | | Pectoral Sandpiper | *Calidris melanotos* | Migratory | - |  | | Red Knot | *Calidris canutus* | Endangered  Migratory | Endangered |  | | Red-necked Stint | *Calidris ruficollis* | Migratory | - |  | | Ruddy Turnstone | *Arenaria interpres* | Migratory | Endangered |  | | Sharp-tailed Sandpiper | *Calidris acuminata* | Migratory | - |  | | Wood Sandpiper | *Tringa glareola* | Migratory | Endangered |  | | **Waterfowl** | | | | | | | Australasian Shoveler | *Spatula rhynchotis* | - | Vulnerable | Waterfowl are known to utilise Western Treatment Plant treatment area waterbodies and conservation area waterbodies. The closest waterbody likely to be utilised by waterfowl is Lake Borrie. Most of these species, particularly listed duck species, are generally restricted to permanent water. | | Australasian Grebe | *Tachybaptus novaehollandiae* | - | - | | Australian Shelduck | *Tadorna tadornoides* | - | - | | Australian Wood Duck | *Chenonetta jubata* | - | - | | Black Swan | *Cygnus atratus* | - | - | | Blue-billed Duck | *Oxyura australis* | - | Vulnerable | | Chestnut Teal | *Anas castanea* | - | - | | Eurasian Coot | *Fulica atra* | - | - | | Freckled Duck | *Stictonetta naevosa* | - | Endangered | | Great Crested Grebe | *Podiceps cristatus* | - | - | | Grey Teal | *Anas gracilis* | - | - | | Hardhead | *Aythya australis* | - | Vulnerable | | Hoary-headed Grebe | *Poliocephalus* | - | - | | Musk Duck | *Biziura lobata* | - | Vulnerable | | Pacific Black Duck | *Anas superciliosa* | - | - | | Pink-eared Duck | *Malacorhynchus membranaceus* | - | - | | **Large Wading Bird** | | | | | | | Australian Pelican | *Pelecanus conspicillatus* | - | - | Currently utilise conservation ponds that comprise Lake Borrie.  Species also known from T-section Lagoons to the south-west.  Some species occur outside of these areas, with Straw-necked ibis regular foraging in agricultural paddocks, particularly after irrigation. | | Australian White Ibis | *Threskiornis molucca* | - | - | | Brolga | *Antigone rubicunda* | - | Endangered | | Great Egret | *Ardea alba modesta* | - | Vulnerable | | Little Egret | *Egretta garzetta* | - | Endangered | | Royal Spoonbill | *Platalea regia* | - | - | | Straw-necked Ibis | *Threskiornis spinicollis* | - | - | | White-faced Heron | *Egretta novaehollandiae* | - | - | | Yellow-billed Spoonbill | *Platalea flavipes* | - | - | | **Freshwater Tern** | | | | | | | Whiskered Tern | *Chlidonias hybrida* | - | - | Known to utilise both treatment ponds and conservation ponds including Lake Borrie. | | White-winged Black Tern | *Chlidonias leucopterus* | - | - | | **Other Species Utilising the Western Treatment Plant** | | | | | | | Australian Bittern | *Botaurus poiciloptilus* | Endangered | Critically Endangered | Require large, relatively undisturbed freshwater wetlands, where they breed in densely vegetated areas, building nests in deep cover over shallow water.  Likely to utilise vegetation surrounding conservation area lagoons. | | | Australian Fairy Tern | *Sternula nereis nereis* | Vulnerable | Critically Endangered | Fairy Terns hunt in shallow sea waters by plunge-diving beneath the surface for small fish and nest on open sand beaches, free of vegetation and from human disturbance.  This species potentially utilising coastal areas of Western Treatment Plant. | | Orange-bellied Parrot | *Neophema chrysogaster* | Critically Endangered | Critically Endangered | Likely to utilise coastal saltmarsh vegetation adjacent to the shoreline, located within the Western Treatment Plant conservation area at Kirks Point and Point Wilson boat ramp, and Western Lagoons which have been converted to saltmarsh vegetation by allowing tidal penetration. | |   Within onshore powerline Project area the environment is a mix of remnant and modified grassland and agricultural land. The remnant grasslands are predicted to provide suitable habitat for threatened fauna species, particularly in areas that have been subject to less disturbance, such as cropping or pastural improvement.  **Table 8** Threatened fauna species with a moderate to high likelihood of occurrence within 5 km of the onshore powerline Project area   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Common Name** | **Scientific Name** | **EPBC Act** | **FFG Act** | **Likelihood of Occurrence** | | Black Falcon | *Falco subniger* | - | Vulnerable | Moderate. Potential foraging area and individuals may soar above the site particularly in proximity to You Yangs. | | Grey Goshawk | *Accipiter novaehollandiae* | - | Vulnerable | Moderate. Potential foraging area and individuals may soar above the site particularly in proximity to You Yangs. | | Growling Grass Frog | *Litoria raniformis* | Vulnerable | Vulnerable | Moderate. Potential habitat along Hovells Creek, including surrounding 200 m, plus other additional suitable habitat. | | Golden Sun Moth | *Synemon plana* | Vulnerable | Vulnerable | High. High number of recent records within a cluster in adjacent property between Hovell Creek and Ballan Road. Generally, prefers grasslands with sufficient grass and ground cover with minimal disturbance. | | Square-tailed Kite | *Lophoictinia isura* | - | Vulnerable | Moderate. Potential foraging area and individuals may soar above the site particularly in proximity to You Yangs. | | Striped Legless Lizards | *Delma impar* | Vulnerable | Endangered | Moderate. Potential grassland habitats modelled to occur. Prefer sites with suitable surface rock cover and cracking basalt clays that provide habitat and refuge. | | Swift Parrot | *Lathamus discolor* | Endangered | Critically Endangered | Moderate. There is potential for the species to migrate over the Project Area, particularly in proximity to You Yangs. | | White-bellied Sea-eagle | *Haliaeetus leucogaster* | - | Vulnerable | Moderate. Potential foraging area and individuals may soar above the site particularly in proximity to You Yangs. |   A full list of threatened fauna and migratory species with potential to occur within the onshore powerline Project area is provided in Appendix C of Attachment 14. |
| Threatened marine fauna species (excluding migratory waterbirds which have been included in Table 8 above) that have been recorded within 5 km of the Project area are provided in Table 9 below. The Victorian Biodiversity Atlas contains information on the conservation status according to the EPBC Act and FFG Act.  **Table 9** Threatened marine fauna species that have been recorded within 5 km of the Project area   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Common Name | Scientific Name | EPBC Act | FFG Act | Recorded within Project area (Last record year) | | Southern Right Whale | *Eubalaena australis* | Endangered | Endangered | Yes (2018) | | Bigbelly Seahorse | *Hippocampus abdominalis* | Listed |  | Yes (2020) | | White-faced Storm-Petrel | *Pelagodroma marina* | Listed | Endangered | Yes (1987) |   EPBC Listed Communities  The desktop assessment identified three EPBC Act Threatened Communities that have potential to occur within the Project area and one Community considered present (see Table 10 below), with only one community, Natural Temperate Grassland of Victorian Volcanic Plain, considered likely to be present. EPBC listed communities have criteria that needs to be met by a field assessment to be confirmed as a threatened ecological community and determine whether they are present.  Vegetation modelling and habitat survey suggests grassland habitats within the Project area are limited to highly disturbed and modified agricultural land. Remnant grassland appears in small, fragmented patches along roads and saltmarsh extends along the western coast. As HDD drilling has been approved for use, all vegetation within this area is unlikely to be cleared or directly impacted by construction/operation of the Project.  **Table 10** Potential EPBC Act Threatened Communities occurring within the onshore powerline Project area and adjacent areas   |  |  |  | | --- | --- | --- | | **EPBC Act Threatened Community** | **EPBC Act Conservation Status** | **Likelihood of Occurrence** | | Grassy Eucalypt Woodland of the Victorian Volcanic Plain | Critically Endangered | Low-Moderate | | Natural Damp Grassland of the Victorian Coastal Plains | Critically Endangered | Low-Moderate | | Natural Temperate Grassland of Victorian Volcanic Plain | Critically Endangered | Likely |   FFG Listed Communities  Based on the desktop assessment and analysis of modelled EVCs within the Project area, two threatened communities may potentially occur according to their community descriptions (see Table 11). Modelling indicates these communities are likely to occur in the vicinity of Lake Borrie, north of the Project area, and that grassland systems within the Project area are limited to highly modified agricultural grassland.  **Table 11** FFG threatened communities potentially occurring within the Project area   |  |  | | --- | --- | | **FFG Act Floristic Threatened Community** | **Potential EVC known within project area** | | *Western (Basalt) Plains Grassland* | Plains Grassland (EVC 132) | | *Western Basalt Plains (River Red Gum) Grassy Woodland* | Plains Grassy Woodland (EVC 55) | |
| **If known, what threatening processes affecting these species or communities may be exacerbated by the project?** (e.g. loss or fragmentation of habitats) Please describe briefly. |
| The proposed location of terrestrial works has been identified as a preferred location due to its modified nature as a result of being a sewerage treatment plant and operational farm. Therefore, many FFG Act listened threatened processes associated with native vegetation and habitat should be avoided by nature of the Project design within the onshore pipeline area. However, based on modelled vegetation these threatening processes will have potential to be exacerbated for the powerline component of works.  Exacerbation of threatening processes to taxon or communities within the Project area would largely be limited to indirect impacts associated with construction and during operational activities.  Construction activities  Potential threatening processes that may be exacerbated by construction activities include:   * Habitat fragmentation as a threatening process for fauna in Victoria * Increase in sediment input into Victorian rivers and streams due to human activities * Infection of amphibians with Chytrid fungus, notably this may be exacerbated and potentially impact the population of Growling Grass Frog * Input of petroleum and related products into Victorian marine and estuarine environments * The discharge of human-generated marine debris into Victorian marine or estuarine waters * The introduction of exotic organisms into Victorian marine waters.   Operational activities  Potential threatening processes that may be exacerbated by operation activities include:   * Input of petroleum and related products into Victorian marine and estuarine environments * The discharge of human-generated marine debris into Victorian marine or estuarine waters.   Appropriate controls and protocols throughout the construction and operation phases of the Project should largely prevent and limit the impact of any indirect threatening process (i.e., fuel loading and storage, car washdown facilities, waste management, sediment controls, etc). |
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| **Are any threatened or migratory species, other species of conservation significance or listed communities potentially affected by the project?**  r NYD r No r **Yes**  If yes, please:   * List these species/communities: |
| Listed Ecological Community  The desktop assessment indicated that two listed ecological communities have potential to be present within the onshore powerline Project area. However, it is likely that only one community, the Western (basalt) Plains Grassland community will likely be present and potentially impacted. The presence and extent of the community needs to be confirmed through detailed ecological surveys.  Threatened Flora  Desktop assessment indicated rare or threatened flora species listed under the EPBC and/or the FFG Act were unlikely to occur within the onshore pipeline Project area. The Project is proposing a trenchless construction method across the intertidal zone and coastal areas which are likely to contain Coastal saltmarsh, thereby avoiding direct impacts to these communities. Above-ground disturbance works, including HDD shaft and pipeline installation would be located in agricultural modified environments which have a history of high disturbance and have little to no habitat value for listed flora species.  There are several records of threatened flora species within the onshore powerline Project area, however, none of these species records are predicted to be impacted the by proposed construction footprint. Of note, a population of Spiny Rice-flower is known to occur in the road reserve of Peak School Road, but this has been avoided by the current impact footprint. Detailed field surveys are required to confirm the presence of the species, following which avoid and minimisation measures will be put in place to avoid threatened flora species where possible.  Threatened Terrestrial Fauna  Western Treatment Plant is known to support populations of threatened grassland dependent species and threatened frog species.  Growling Grass Frog are known to occur within the Project area and were observed during field habitat assessments for the Project. The species is known to occur in the wetlands, waterways and roadside drains throughout Western Treatment Plant. There is potential for the pipeline to intersect with roadside drains that are potentially used by Growling Grass Frog. There is also potential for the species to use Hovells Creek within the onshore powerline Project area.  Grassland patches have been modelled to occur within the onshore powerline Project area, including one area with numerous records of the Golden Sun Moth (*Synemon plana*). Grasslands in this location are also considered to provide habitat for Striped Legless Lizards (*Delma impar*). Further surveys are required to confirm the presence of habitat for these species and whether is potential for the species to be impacted.  Numerous threatened wetland bird species are known to use wetlands at WTP, including several important populations. Direct impacts to these habitats have been avoided by siting works away from these important habitat areas and located in the agricultural area of WTP. The siting of the gas pipeline and shaft for under-boring the littoral zone greater than 1 km from important wetlands will enable indirect impacts to these species to be mitigated. Options for the power cable associated with the onshore gas pipeline do occur in close proximity to Lake Borrie, however, most of the Project area is located greater that 250 m away from wetland habitat. Further investigation of potential indirect impacts and mitigation measures will be designed during project development.  Several woodland birds, particularly threatened raptors, have been recorded in proximity to the onshore powerline Project area. The installation of a new powerline has a potential risk to individual birds through collision. Design of the powerline will consider measure to reduce the risk of collision with the powerline wires.  Threatened Marine Species  The marine environment is likely to support threatened and migratory species. It is likely that marine species, as well as migratory and waterbirds are present within the broader environment. A total of 24 threatened species have the potential to utilise the Project, only three have been observed within the Project area (as listed in Table 9 above). These 24 threatened species are listed below in Table 12.  **Table 12** Conservation status of marine species, seabirds and plants of significance in Victoria that occur within or in the vicinity of the Project area (Geelong Arm of Port Phillip Bay).   |  |  |  |  | | --- | --- | --- | --- | | **Scientific Name** | **Common Name** | **Conservation Status (EPBC Act 1999 and FFG Act 1988)** | **Recorded within Project area** | | ***Marine species*** | | | | | Arctocephalus pusillus doriferus | Australian Fur Seal | N/A; N/A | No | | Arctophoca forsteri | Long-nosed Fur Seal | L; Vu | No | | Arctophoca tropicalis | Subantarctic Fur Seal | En; N/A | No | | Athanopsis australis | Southern hooded shrimp | N/A; En | No | | Australomedusa baylii | Brackish Jellyfish | N/A; En | No | | Balaenoptera edeni | Bryde's Whale | L; N/A | No | | Dermochelys coriacea | Leatherback Turtle | En; Cr En | No | | Eubalaena australis | Southern Right Whale | En; En | Yes | | Halophila australis | Paddle Weed | N/A; N/A | No | | Hippocampus abdominalis | Bigbelly Seahorse | L; N/A | Yes | | Lepidochelys olivacea | Pacific (Olive) Ridley | En; N/A | No | | Megaptera novaeangliae australis | Southern Humpback Whale | L; Cr En | No | | Mirounga leonine | Southern Elephant Seal | N/A; N/A | No | | Ruppia tuberosa | Tuberous Sea-tassel | N/A; N/A | No | | Thyone nigra | Sea-cucumber species | N/A; En | No | | Tursiops australis | Burrunan Dolphin | N/A; Cr En | No | | Vanacampus philllipi | Port Phillip Pipefish | N/A; N/A | No | | ***Seabirds*** | | | | | Macronectes giganteus | Southern Giant-Petrel | En; En | No | | Macronectes halli | Northern Giant-Petrel | Vu; En | No | | Pelagodroma marina | White-faced Storm-Petrel | L; En | Yes | | Pelecanoides urinatrix | Common Diving-Petrel | L; N/A | No | | Thalassarche carteriIndian | Yellow-nosed Albatross | Vu; N/A | No | | Thalassarche melanophris | Black-browed Albatross | Vu; N/A | No | | **Plants** | | | | | Zostera nigricaulis | Australian grass-wreck | N/A; En | Yes |   Legend:  EPBC Act 1999 and FFG Act 1988 terminology:  Cr EN – Critically Endangered  EN – Endangered  VU – Vulnerable  L – Listed as threatened  While a detailed likelihood of occurrence assessment for the Project is yet to be conducted, preliminary assessment suggests at least three threatened species probably occur within the Project area. These are the Southern-hooded Shrimp *Athanopis australis*, the Sea Cucumber *Thyone nigra*, and the seagrass *Zostera nigricaulis*. Records for such species occur within or in the vicinity of the Project area. Moreover, the sediment type characteristics of the Project area are known to support such species.  Migratory species  The historic land use of the Western Treatment Plant as a wastewater and sewage treatment facility has resulted in a highly productive Ramsar listed wetland, which provides habitat and foraging opportunities for shorebirds of international significance. Nutrient inflows from catchment facilities, historic settlers and buffers and effluent have been a key resource for filter feeding fish and invertebrates, whose abundance has further attracted shorebirds and waders further up the trophic scale. The littoral zone of these wetlands is important for shorebird feeding opportunities at select tidal ranges. Outside the Ramsar wetland but also within proximity to the Project area is the Point Wilson Defence Natural Area, and the Point Cook Marine Sanctuary. Both areas are also known to support migratory and/or threatened species.  Migratory shorebirds are species of bird which utilise the East-Australian flyway to travel between breeding grounds in the northern hemisphere to the south-eastern states of Australia. They undertake this journey of up to 13,000 km as they enter the northern hemisphere winter, and fly to Australia to more temperate feeding grounds through our spring and summer. These species frequent coastal wetlands and intertidal areas, such as the shoreline and intertidal zone adjacent to the Western Treatment Plant, which is deemed of being of international significance and protected under the Ramsar Convention (and protected under the EPBC Act). Migratory shorebirds commonly found in the Western Treatment Plant and Werribee/Avalon zones of the Ramsar site include Bar-tailed godwit (*Limosa lapponica*), Eastern curlew (*Numenius madagascariensis*), Curlew sandpiper (*Calidris ferruginea*), Great knot (*Calidris tenuirostris*), and Red knot (*Calidris canutus*) (DELWP 2020).  In consideration of the high ecological values associated with the shoreline, including the adjacent intertidal zone for migratory shorebirds, the Project is proposing to bore beneath these critical habitats that form an important component of the Ramsar site. Additionally, consultation was undertaken with Melbourne Water and the BCAC to identify a suitable site for above ground works (including the pipeline laydown area) that minimises potential direct and indirect impacts to these habitats that support numerous threatened and migratory species, often in high numbers. This also includes avoidance of Coastal saltmarsh vegetation and Coastal Alkaline Scrub EVC, plus a significant distance, to avoid potential direct and indirect impacts to Orange-bellied parrots (*Neophema chrysogaster*), which are known frequenters of the Werribee Treatment Plant to forage in these communities. |
| **Is mitigation of potential effects on indigenous flora and fauna proposed?**  r NYD r No r **Yes**  If yes, please briefly describe.  The Project design has considered the potential impacts to biodiversity values of the Project area with consideration of the direct impacts to the Ramsar Wetland and associated habitat values to threatened and migratory fauna. Avoidance and mitigation of potential effects on indigenous flora and fauna has been a consideration in the Project design and siting of construction areas. This has included:   * Limiting most proposed construction laydown areas and the site for the GRS to farmland and avoiding remnant or developing native vegetation and sites of ecological importance. * The location of the underground gas pipeline from as far as practicable within or adjacent to already disturbed easements or road reserves within the existing pipeline corridor. * The location of the powerline as far as practicable within or adjacent to already disturbed easements or road reserves. * The commitment to trenchless construction method for the pipeline under the intertidal zone * with a 430 m buffer from the shoreline inland and 1.1km buffer from the shoreline offshore is proposed to avoid direct impacts on of the coastal saltmarsh community and intertidal zone, well recognised as an important feeding habitat for migratory shorebirds. * The location of the pipeline laydown area in consultation with BCAC and Melbourne Water to locate disturbance and the pipe stringing area to existing cleared paddocks and avoiding critical nesting habitat for native and migratory fauna. This proposed construction method mitigates potential direct disturbances to indigenous flora and fauna.   There is potential for indirect impacts to native vegetation and habitat for threatened and migratory species. This would be managed through best practice construction environmental management.  If any unavoidable native vegetation removal is required, this would be offset in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017) or another agreed arrangement. |
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| **Other information/comments?** (eg. accuracy of information) |
| N/A |

# 13. Water environments

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| **Will the project require significant volumes of fresh water (eg. > 1 Gl/yr)?**  r NYD r **No** r Yes  If yes, indicate approximate volume and likely source |
| The Project would not require significant volumes (e.g. > 1GL/yr) of fresh water for construction  or operation.  During construction, water may be required for dust suppression for the onshore component.  However, volumes would be minimal and would not exceed 1 GL/yr.  The estimated volume of water required for hydrotesting the pipeline is estimated to be 8 ML in total (with less expected to be required if hydrotesting of the pipeline is undertaken in sections). |
| **Will the project discharge waste water or runoff to water environments?**  r NYD r No r **Yes** If yes, specify types of discharges and which environments.  The offshore component of the Project would involve the discharge of wastewater to the marine environment when operating in open loop mode. The FSRU would take on seawater as part of the open loop regasification process which would subsequently be discharged back into Port Phillip Bay. Based on desktop assessments, at its highest regasification rate, the Project is anticipated to discharge up to 13,000 m3/hr. This volume would be further qualified through design development.  The seawater discharge from the regasification process is at temperatures of between 5 and 7 ºC below ambient water temperature and would contain short-lived residual chlorine which would have the potential to impact on the surrounding marine environment. Refer to Section 4 to this referral for a description of FSRU open and closed loop operating modes.  Further hydrodynamic and ecotoxicity modelling of the potential impacts on the marine environment would be undertaken as part of the studies to support the approvals process.    Stormwater runoff from disturbed areas of the onshore Project construction would be managed using standard practices for erosion and sediment control on construction sites. |
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| **Are any waterways, wetlands, estuaries or marine environments likely to be affected?**  r NYD r No **r** **Yes**  If yes, specify which water environments, answer the following questions and attach any relevant details. |
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| Waterways  As described in Section 7, there are limited natural waterways intersecting the Project area. The powerline would run over the Hovells Creek however the poles would be located outside the embankments and channel and therefore no impacts are anticipated. Little River is also located 800 m north of the GRS and pipeline Project area. As the river occurs a distance from the Project area no direct or indirect impacts are anticipated.  Any indirect impacts (e.g. dust, spills) are routinely managed during installation of overhead power lines and in this case would be undertaken in accordance with the environmental management plans approved for the Project in accordance with the conditions of statutory approvals.  Wetlands, estuaries and coastal habitats  No planned construction activities would be conducted on the Ramsar wetland, coastal saltmarsh, Lake Borrie or foreshore and therefore direct impacts to important habitat areas and significant values that form part of the ecological character of the Ramsar site are not anticipated.  Indirect effects to these areas would be managed under the approved environmental management plans for the Project that would stipulate mitigation measures to be implemented, such as erosion and sediment control, management of acid sulfate soils, to minimise potential impact on the wetlands and coastal habitats within and adjacent to the Project area.  Marine Environments  As described in Section 11, the effects of the Project on marine environments include benthic habitat disturbance, or removal, due to disturbance of the seabed during construction (i.e. piling for foundations for the FSRU, platform(s) and mooring dolphins and trenching / jetting for laying subsea pipeline). Impacts such as changes to localised water quality from FRSU seawater discharge (short durations events, intermittently over the life of the Project and occurring more often during peak period), and above/below water noise generation, may occur as a result of the operation of the Project.  These aspects could affect marine water and sediment quality, change the composition of benthic communities that inhabit the seabed and affect mobile marine fauna behaviour such as breeding, foraging, resting or migrating.  Further assessment (i.e. baseline studies and modelling) would be undertaken to determine potential impacts on water environments which would also help inform the development of appropriate mitigation measures to minimise adverse effects on water environments. |
| **Are any of these water environments likely to support threatened or migratory species?**  r NYD r No **r**  **Yes**  If yes, specify which water environments. |
| The wetlands and coastal habitats around WTP are known to contain significant habitat for important populations of threatened and migratory wetland and migratory shorebirds. The shoreline and littoral zone adjacent to WTP are regular and important foraging sites for migratory shorebirds, and nearby conservation lagoons within WTP are managed to provide other foraging sites for birds during high tide. The nearby wetlands provide habitat for threatened waterfowl populations.  Refer to Section 12 for discussion on threatened or migratory species likely to be present in water environments relevant to the Project. The presence of these important populations of threatened and migratory species in the adjacent water environments has been considered in siting and project development to avoid direct impacts and minimise indirect impacts as much as possible. |
| **Are any potentially affected wetlands listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'?**  r NYD r No **r** **Yes**  If yes, please specify.  Part of the Project area intersects with the boundary of the Ramsar listed wetland; *18.* *Port Phillip Bay (Western Shoreline) and Bellarine Peninsula.* This Ramsar site supports a variety of wetland types and associated habitat values for several threatened flora and fauna species including the Orange-bellied Parrot, Striped Legless Lizard and Growling Grass Frog.  The Western Treatment Plant is managed by Melbourne Water. Management of wetland values includes the provision of recycled water to conservation lagoons through a three-phase cycle. This cycle provides extensive areas of wetland habitats for waterfowl, large wading birds, shorebirds and Growling Grass Frog. The permanency and availability of wetland habitat make the site highly important. This site is listed as having international significance due to the regular presence of these species as well as migratory shorebirds (listed as the most important wetland for migratory waders in Victoria).  The original Ramsar nomination considered the Port Phillip Bay and Bellarine Peninsula met four of the criteria at the time of listing (Table 13).  **Table 13** Criteria for Identifying Wetlands of International Importance as of listing date in 1982   |  |  |  | | --- | --- | --- | | **Basis for listing** | **Criteria** | **Description** | | Criteria for waterfowl | 1a | It regularly supports 10,000 ducks, geese and swans: or 10,000 coots or 20,000 shorebirds | | 1b | It regularly supports 1% of the individuals in a population of one species or subspecies of waterfowl | | 1c | It regularly supports 1% of the breeding pairs in a population of one species or subspecies of waterfowl | | Criteria based on plants and animals | 2a | It supports an appreciable number of rare, vulnerable or endangered species or subspecies of plant or animal | | 2b | It is of special value for maintaining the genetic and ecological diversity of a region because of the quality and peculiarities of its flora and fauna | | 2c | It is of special value as the habitat of plants or animals at a critical stage of their biological cycle | | 2d | It is of special value for one or more endemic plant or animal species or communities | | Representative wetlands | 3 | It is a particularly good example of a specific type of wetland characteristic of its region. |   Areas of high ecological importance for Ramsar values would be avoided by trenchless buried construction methods, with 1.5km of subterranean pipeline inserted via HDD, allowing for avoidance of direct impacts to the wetlands. Nevertheless, the potential remains for works to indirectly impact species utilising the wetland as habitat and potentially impacting areas of international significance as defined under the wetland’s Ramsar listing. These impacts include sedimentation into waterways and wetland habitats, the introduction of weeds and pathogens, and disruption from construction light and noise. These impacts will be further investigated and mitigation measures designed further during project development. |
| **Could the project affect streamflows?**  r NYD  **r** **No**  r Yes  If yes, briefly describe implications for streamflows. |
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| As mentioned above Hovells Creek is the only natural surface waterways (rivers, streams etc.) within the Project area and would not be affected by the Project as no project infrastructure would be located within the embankment of the creek.    As outlined above, only stormwater discharged is proposed from the onshore site and would be managed using well understood environmental management practices. |
| **Could regional groundwater resources be affected by the project?**  r NYD **r** No r Yes  If yes, describe in what way.  No, it is unlikely that regional groundwater resources would be affected by the Project. Based on preliminary assessments potential impacts to groundwater are anticipated to be localised and temporary along the pipeline, powerline and electricity cables alignment.  The groundwater table in the Project area is anticipated to be in a shallow profile (5 mbgl). Given the likely shallow presence of groundwater there is the potential to intersect groundwater during construction works. Typically, the potential for interaction with groundwater during Project construction would be as a result of shallow excavations (i.e. less than 2 m) associated with the installation of the pipeline, powerline and electricity cables. There is also the potential for interaction with groundwater due to the trenchless shore crossing bores (pipeline and electricity cables) at deeper levels under surface within the Western Treatment Plant land.  Further detailed assessment of groundwater across the Project area would be undertaken as the Project progresses to assess potential impacts, including the development of procedures to safeguard against accidental spills and determine appropriate action to remediate any impacts to groundwater quality. |
| **Could environmental values (beneficial uses) of water environments be affected?**  r NYD r No **r Yes** If yes, identify waterways/water bodies and beneficial uses (as recognised by State Environment Protection Policies) |
| The EPA Victoria Environment Reference Standard characterises ground and surface water, which informs the environmental values of ground and surface water that need to be protected.  Based on a review of publicly available data for Total Dissolved Solids (TDS), groundwater salinity is likely to range between 3,500- 7,000 mg/L across 80% of the Project area and 7,000-13,000mg/L across the remaining 20% (VVG, 2018). Using the lowest TDS concentration, as a conservative approach, groundwater in the Project area falls within the C Segment. Associated beneficial uses to be protected include:   * Water dependent ecosystems and species * Potable mineral water supply * Agriculture and irrigation (stock watering) * Industrial and commercial * Water-based recreation (primary contact recreation) * Traditional Owner cultural values * Buildings and structures * Geothermal properties   The surface water segments are divided into geographical regions. The Project area is  located within the Port Phillip Bay Segment, further defined as being within the Geelong Arm subsegment. Protected environmental values for the Geelong Arm subsegment include:   * Human consumption of aquatic foods. * Industrial and commercial. * Water-based recreation (primary, secondary contact and aesthetic enjoyment). * Traditional owner cultural values. * Navigation and Shipping   The construction and operation of the Project is anticipated to directly impact marine ecosystems locally, with the magnitude of this impact to be assessed further during subsequent detailed assessment. It is acknowledged however, that the Geelong Arm subsegment is considered slightly to moderately modified as a result of human activity. Past and present coastal and marine activities include historical fishing, anchoring, agricultural land use, water treatment plant, port activities, dredging.  When the LNG vessels enter the bay, they would result in increased vessel movement affecting water-based recreation; however, such interactions would be transient in nature.  The FSRU, platform(s), dolphins and LNG vessels (when sitting next to the FSRU) could be protected by an exclusion area. This area could prohibit entry of any vessels other than LNG vessels or other vessels required by the Project. The subsea pipeline could also be protected by an area restricting any anchoring. These areas and restrictions would be agreed in consultation with Ports Victoria. Restricted areas would impact water-based recreation by limiting movement (within the exclusion zone) and activities (anchoring within the restricted area).  Further to this, the trenchless construction method adopted for the shoreline crossing is not expected to significantly impact the quality of the water environment. Any drilling fluid material used as part of the trenchless shore crossing would be environmentally stable and non-toxic (e.g. bentonite).  Onshore, potential effects to the operation of beneficial uses onshore such as, potable mineral water supply, agriculture and industry are unlikely due to the distance of the Project from dwellings, buildings and waterbodies associated with these land uses.  Any potential impacts to Traditional Owner cultural values would be managed under the preparation of a mandatory CHMP. |
| **Could aquatic, estuarine or marine ecosystems be affected by the project?**  r NYD r No **r Yes**  If yes, describe in what way.  Detailed marine ecology studies are yet to be completed for the Project to determine potential impacts to marine ecosystems. However, an overview of the potential effects on aquatic, estuarine or marine ecosystems have been identified below.  For benthic communities and species such as microphytobenthos, marine worms, and holothurians; direct impacts may occur through habitat disturbance, limited mostly to the seabed clearing required for the installation of subsea infrastructure (such as piles, subsea pipeline and electricity cables). The indirect impacts along the subsea pipeline and electricity cables for such benthic species include temporary and localised changes in water quality from marine sediment disturbances, and potentially food availability depending on foraging habits. Breeding and settling of benthic and sessile species may also be impacted by reduced availability of egg/larval stages of such species becoming entrapped in the FSRU regasification intake pipe.    Pelagic species such as fish, cepaholopods and cetaceans have the ability to move away from unfavourable environments (e.g. changes in water quality, suboptimal habitat). Smaller pelagic fish and the eggs and larvae of pelagic species have the potential to become entrained at the intake of the FSRU water intake pipe for regasification. For some pelagic species, in particular cetaceans, underwater noise during piling to install dolphins and platform(s) represents a potential impact. Such impact may be localised, temporary and would occur for short durations.  A detailed assessment on the potential noise and vibration impacts on the marine environment (inclusive of underwater noise) would be undertaken as part of the studies to support the approvals process. |
| **Is there a potential for extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems over the long-term?**  r No r **Yes**  If yes, please describe. Comment on likelihood of effects and associated uncertainties, if practicable.  The operation of an open loop FSRU has the potential to cause a significant effect on the marine environment through the entrainment of small marine organisms and the discharge of cold water with residual chlorine. The extent and magnitude of the potential effects from the FSRU operating (open loop mode) on the health and biodiversity of aquatic, estuarine or marine ecosystems require further detailed assessment which would be undertaken as part of the studies to support the approvals process.  Construction  Construction impacts on marine ecology species are anticipated to be of short duration and localised and can be undertaken under seasonal restrictions to avoid impacts on marine ecology species.  *Water Quality*  Localised impacts to water quality and turbidity are anticipated due to disturbance of the seabed (such as piling for foundations for FSRU, riser platform and mooring dolphins and trenching / jetting for laying subsea pipeline) during the construction phase of the Project. Temporary decreases in water transparency associated with increased concentrations of suspended sediments has the potential to impact light sensitive organisms or those that require clear water to navigate.  *Underwater noise*  During the construction, localised impacts from underwater noise have the potential to affect marine fauna passing through or near to the Project area. Underwater noise from piling for FSRU moorings and subsea pipeline construction would be expected to create a temporary, localised continuous noise source which could affect marine fauna such as fish and marine mammals. During operation the FSRU onboard pumps, machinery and plant, and visiting vessels may also generate noise.  Operation  *Entrainment*  During operation, an open loop FSRU may entrain smaller marine organisms (such as small fish, zooplankton and phytoplankton, drifting eggs and larvae) that are present in the water column adjacent to the intake. These marine organisms once entrained as part of the intake water from the FSRU would not be expected to survive the mechanical processes of the FSRU.  Publicly available data from other FSRU projects suggests that entrainment levels as a  percentage of overall populations may be very low, noting however, that each location has unique  characteristics such as water depth, currents and species presence that require  local baseline data and modelling.  The extent and magnitude of the potential effects on marine fauna species as a result of the entrainment of smaller marine organisms from the operation of the open loop FSRU would require further detailed assessment.  *Residual chlorine in seawater discharge*  During operation of the open loop FSRU, the regasification process would take on seawater as part of the exchange process to turn LNG into a gas. Chlorine is expected to be used to control biofouling in the pipes, pumps and heat exchangers. Seawater discharged from the FSRU would contain low levels of short-lived residual chlorine which may have a potential effect on the marine biota in close proximity to the seawater discharge.  *Cold water discharge*  During operation of the open loop FSRU, cold water may be discharged from the FSRU into the marine environment as part of the regasification process. A cold water plume may have a potential effect on the marine biota in close proximity to the cold water discharge.  The extent and magnitude of the potential effects on marine biota as a result of cold water with residual chlorine discharged from open loop FSRU would require further detailed assessment. |
| **Is mitigation of potential effects on water environments proposed?**  r NYD r No r **Yes**  If yes, please briefly describe. |
| In line with best practice environmental management hierarchy, mitigation measures to minimise impact on water environments for the Project have been proposed including the following:  Avoidance  *Offshore Siting*  Five potential locations in Victoria have been explored for the offshore section of the Project; Portland, Longford, Geelong Port, Altona and Avalon.  One factor contributing to the selection of Avalon as the preferred location was the potential impacts to marine ecology in comparison to the alternative sites. Specifically, Geelong Port posed a greater potential marine ecology (than Avalon) as it required dredge to create a suitable marine berth and Corio Bay is an embayment with limited water exchange to Port Philip Bay meaning marine impacts of the open loop mode were likely to be greater.  *Onshore powerline*  As described in Section 7 (above), the overhead powerline alignment intersects with Hovells Creek. However, the poles would be located to outside the embankment of the waterway and therefore avoid potential impacts to the waterway.  *Construction methodology*  The trenchless method to bring the pipeline from the FSRU to the onshore facilities is designed to avoid direct impact on marine and coastal environments in vicinity of the coastline and to migratory and threatened fauna habitat.    The positioning of the offshore element to the Project minimises disruption to other marine users. Depending on demand (typically the highest in winter), the FSRU would be moored at the marine berth during winter and leave the berth during summer to be used for separate operations outside Port Philip Bay. This would result in peak LNG vessel movement (in winter) and therefore reduce interactions with recreational users during the peak period of late spring / summer.  Minimisation and Mitigation  Specific minimisation and mitigation measures for the Project is subject to detailed design and would be determined following marine monitoring and surveys and further environmental studies of direct and indirect impacts related to entrainment, wastewater discharge, underwater noise and other potential impacts to water environments.  Implementation of minimisation and mitigation measures would be documented in an Environmental Management Framework (EMF) (or equivalent) with specific management plans to manage different aspects of construction and operation of the Project. Such management plans would comply with ISO 14001: 2015 and Vopak’s general environmental duty under the *Environment Protection Act 2017* and as such be regularly updated to encourage adaptive environmental management measures for the Project. |
| **Other information/comments?** (eg. accuracy of information) |
| N/A |
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# 14. Landscape and soils

**Landscape**

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| **Has a preliminary landscape assessment been prepared?**  r **No** r Yes  If yes, please attach.  No, a preliminary landscape assessment has not been prepared. Further assessment on the potential impacts of the Project on landscape values would be undertaken during subsequent stages of project development. |
| Is the project to be located either within or near an area that is:   * **Subject to a Landscape Significance Overlay or Environmental Significance Overlay?**   r NYD r No r **Yes**  If yes, provide plan showing footprint relative to overlay.  As outlined Section 7 of this referral, the onshore Project area east of the Princess Freeway (pipeline and electricity cable corridors) is affected by ESO2. The areas included within this overlay are considered significant because they include areas of high value wetlands and ecological habitat. The Project area west of the Princess Freeway (powerline corridor) intercepts with the ESO4. The purpose of this overlay is to protect the native vegetation of the Victorian Volcanic Plain bioregion.  The onshore powerline is affected by the SLO1 which protects the You Yangs and treeless foothills and plains at the base of the You Yangs. The SLO1 refers to the You Yangs as the most prominent landscape feature in the northern area of the City of Greater Geelong, providing panoramic views of Geelong.  Although there may be some clearing of vegetation required, within the ESOs and SLO1, predominately within and adjacent to road reserves or adjacent private properties. The design would be further refined to avoid impacts to vegetation as far as practicable minimising potential impacts to the objectives of these overlays which is to protect existing habitat and landscape values.  Refer to Attachments 5 for detailed overlay maps. |
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| * **Identified as of regional or State significance in a reputable study of landscape values?**   r NYD r **No** r Yes  If yes, please specify.  The Project area is not within an identified area as having regional or State significant landscape values, however the nearby the Bellarine Peninsula has been recently declared as a Distinctive Area and Landscape under the *Planning and Environment Act 1987.* This declaration triggered a requirement to prepare a Statement of Planning Policy. The final Statement of Planning Policy is expected late 2022; this will confirm whether the landscape values are of regional or State significance.  The Draft Bellarine Peninsula Statement of Planning Policy prepared by DELWP (2021) refers to the Bellarine Peninsula’s Northern Coast and Central Hills landscape as regionally significant. The policy aims to conserve the landscape character, biodiversity and environment, Aboriginal cultural heritage and historic heritage of the Bellarine Peninsula Distinctive Area and Landscape and ensure that development responds appropriately to its landscape values and attributes.  Given the Project’s distance from the Bellarine Peninsula Distinctive Area (approximately 12.6 km from the nearest point of the marine berth to the Portarlington Pier), the Project aligns with the policy’s objective, avoiding impacts to the landscape values and attributes of the Distinctive Area and Landscape. |
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| * **Within or adjoining land reserved under the *National Parks Act 1975* ?**   r NYD r **No** r Yes  If yes, please specify. |
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| * **Within or adjoining other public land used for conservation or recreational purposes?**   r NYD r No r **Yes**  If yes, please specify.  The onshore Project works proposed are underneath the shoreline (via trenchless shoreline crossing) located within the PCRZ which is Crown land permanently reserved for the management of wildlife.  The powerline is adjacent to the You Yangs and Serendip Sanctuary zoned PCRZ. |
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| **Is any clearing vegetation or alteration of landforms likely to affect landscape values?**  r NYD r **No** r Yes  If yes, please briefly describe.  No alterations to landforms are proposed as part of the Project, however there may be some clearing of vegetation required predominately within and adjacent to road reserves or adjacent private properties. However, the design would be further refined to avoid impacts to vegetation as far as practicable to minimise potential impacts to landscape values.  The onshore GRS and substation site, pipeline and electricity cables (if underground) are not expected to impact landscape values.  At the GRS and substation site, potential impacts to mature roadside vegetation along the Princess Freeway would be avoided as far as practicable in order to assist in screening the GRS when viewed from the surrounding road network.  The pipeline and electricity cables (if underground) would be trenched along road reserves, existing easements and fringe agricultural land and therefore unlikely to involve the removal of trees which may affect landscape values. The trenchless shoreline crossing outlined in Section 3 of this referral, ensures the sensitive Ramsar site values and landscape character along this section of coastline remain unaffected.  The electricity cables (if overhead) is unlikely to affect landscape values as it would be commensurate size to other electricity cables along the road reserves within the Western Treatment Plant.  The powerline has the potential to impact landscapes values as it would be permanent and above ground. Where possible the powerline would be located adjacent to other existing powerlines to minimise visual impacts. The powerline would be located in predominantly cleared open grazing land. Vegetation adjacent to the roadside could be impacted by the Project, however, would be to the minimum extent necessary and unlikely to significantly impact landscape values maintaining the open character of the area contrasting the adjacent You Yangs. |
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| **Is there a potential for effects on landscape values of regional or State importance?**  r NYD r **No**  r Yes Please briefly explain response.  The Project area is not within an area identified as having regional or State significant landscape values. The nearest area of state importance is the Bellarine Peninsula Distinctive Area (approximately 12.6 km from the nearest point of the marine berth to the Portarlington Pier). Noting this Statement of Planning Policy is in draft and its finalisation will confirm whether the landscape values are of regional or State significance.  The key features of the Bellarine Peninsula Distinctive Area are its pockets of endangered flora and fauna, the Heads at Point Lonsdale, Historical built heritage, the Bellarine winery area between Clifton Springs and Portarlington and Queenscliff and Portarlington Harbour.  Given the Project’s distance from the key features of the Bellarine Peninsula Distinctive Area (approximately 12.6 km from the nearest point of the marine berth to the Portarlington Pier), the Project aligns with the policy’s objective, avoiding impacts to the landscape values and attributes of the Distinctive Area and Landscape. |
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| **Is mitigation of potential landscape effects proposed?**  r **NYD** r No r Yes  If yes, please briefly describe.  The need for mitigation of potential landscape effects would be determined as project planning advances and based on the results of the detailed landscape and visual assessment.  Notwithstanding, views looking towards the FSRU out into Port Phillip Bay from the coastline would naturally be mitigated by distance, however further measures (e.g., muted and non-reflective colour scheme for the FSRU) are potential mitigation measures subject to further assessment.  In addition, permanent above ground infrastructure such as the powerline (overhead) and electricity cables (if overhead) would be designed to avoid and minimise the extent of vegetation and tree removal to further minimise potential impacts to landscape values. |
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| **Other information/comments?** (eg. accuracy of information)  N/A |
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**Note:** A preliminary landscape assessment is a specific requirement for a referral of a wind energy facility. This should provide a description of:

* The landscape character of the site and surrounding areas including landform, vegetation types and coverage, water features, any other notable features and current land use;
* The location of nearby dwellings, townships, recreation areas, major roads, above-ground utilities, tourist routes and walking tracks;
* Views to the site and to the proposed location of wind turbines from key vantage points (including views showing existing nearby dwellings and views from major roads, walking tracks and tourist routes) sufficient to give a sense of the overall site in its setting.

**Soils**

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| **Is there a potential for effects on land stability, acid sulphate soils or highly erodible soils?**  r NYD r No **r**  **Yes** If yes, please briefly describe.  The nature of the works onshore are generally shallow (to 2m) excavation associated with trenching of the pipeline and electricity cables (if underground), site grading and preparation for the GRS and substation, powerline and electricity cables (if overhead) foundations intermittently within and adjacent to road reserves, and soil and rock extracted for the HDD or micro tunnelling trenchless shoreline crossing. These works are relatively standard infrastructure works that occur across the state and are considered unlikely to affect land stability.  The primary sources of contamination are associated with the presence of imported fill sporadically across the Project area, agricultural practices (potential use of pesticides/herbicides) and possibly use of recycled/ treated wastewater for irrigation. It is considered unlikely that contamination is present at a level that would preclude the proposed works. However, further intrusive investigation would be required to confirm this, particularly in relation to the potential presence of asbestos.  The high probability of the presence of coastal acid sulfate soils (across the south eastern portion of the Project area) has the potential to impact the proposed infrastructure and requires further investigation to assess (confirm or otherwise) the potential risk, the required mitigation measures and management of excavated soils.  Any soil disturbed, or soil requiring offsite disposal as part of the construction works would be managed in accordance with the relevant EPA Victoria waste guidance. The assessment of soils would be undertaken in accordance with EPA Publication 702 ‘Soil Sampling’ (2009) and Publication 1828.3 ‘Waste disposal categories – characteristics and thresholds’ (2021). These publications list specific methodologies and criteria against which certain wastes are intended to be assessed to determine which waste disposal category applies, in accordance with the *Environment Protection Act 2017*. |
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| **Are there geotechnical hazards that may either affect the project or be affected by it?**  r NYD r No r **Yes**  If yes, please briefly describe.  Potential geotechnical hazards that may affect the Project or be affected by it include:   * Presence of rock head close to or at ground surface * Variable strength materials * Shallow groundwater * Presence of buried channels within the offshore Quaternary deposits underlying the FSRU. These could contain softer sediments or pockets of biogenic gas * Acid sulphate soils * Seismic hazard and liquefaction * Data gaps, insufficient ground investigation data   Geotechnical investigations (onshore and offshore) would continue during project development along the proposed alignment to identify and inform environmental and engineering assessment of any hazards. |
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| **Other information/comments?** (eg. accuracy of information) |
| Data on soils informing this referral is based solely on desktop assessment. At a minimum an intrusive soil and groundwater investigation in areas where soil disturbance or excavation is proposed would be undertaken to inform the design. Following investigation, spoil would be classified for reuse or disposal according to EPA Publication 1828.2. |
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# 15. Social environments

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| **Is the project likely to generate significant volumes of road traffic, during construction or operation?**  r NYD **r No** r Yes  If yes, provide estimate of traffic volume(s) if practicable.  No, the Project is unlikely to generate significant volumes of road or maritime traffic during the construction or operation of the Project.  Construction  Onshore, road traffic during the construction phase of the Project would be typical of construction of a large linear infrastructure project and would occur over a period of 12 months, noting the duration of construction activities may vary across the type of infrastructure, i.e pipeline, electricity cables GRS, substation and powerline.  Road traffic type and volume during construction are yet to be determined, however the Project is expected to result in increased movements of heavy vehicles transporting equipment and material and may require the temporary closure or traffic management of public and private roads for the safe passage of heavy vehicles.  Where practicable, some onshore construction materials and vehicles may be transported via vessel reducing potential impacts to the local road network.  Offshore, equipment and materials would be transported via vessels and coordinated with the Port of Melbourne and other relevant authorities.  Potential onshore and offshore transport impacts are expected to be localised surrounding the Project area and intermittent supporting key construction activities.  A construction traffic impact assessment and maritime safety and operation assessment would be prepared during detailed design to confirm the potential impacts of the Project on the existing road network and marine operations.  Operation  Onshore traffic movement during operation would be limited to intermittent maintenance and therefore expected to be negligible.  Offshore, there would be an increase of marine traffic in Port Philip Bay as a result of the movement of LNG vessels (higher in winter) and the FSRU (depending on demand may leave the berth during summer).An increase in vessels may impact recreational and commercial ship operations in the Bay. Consultation would be undertaken with the Ports Victoria to understand potential commercial and recreational operation. A maritime safety and operation assessment, in conjunction with Ports Victoria, would be undertaken to confirm potential impacts on marine operations. |
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| Is there a potential for significant effects on the amenity of residents, due to emissions of dust or odours or changes in visual, noise or traffic conditions?  r NYD **r No** r Yes  If yes, briefly describe the nature of the changes in amenity conditions and the possible areas affected. |
| The GRS, pipeline, electricity cables (overhead and underground) and FSRU would not result in significant effects to the amenity of residents due to the distance of these Project components from residential areas. The pipeline and electricity cables (if underground) would be underground and therefore have no potential for above ground visual impacts. The GRS is approximately 0.7 km from the nearest dwelling with view lines interrupted by the Princess Freeway on and off ramps and roadside vegetation. The FSRU is approximately 10 km from the nearest section of the Portarlington shoreline and 8 km from residential areas adjacent to Werribee South beach.  The powerline would be located adjacent to the road reserve in a rural area however some residential dwellings are expected to be nearby and might be able to view the powerline from their property. There may be changes in traffic, increased noise, dust or visual impacts, however, these impacts would be localised and intermittent and could be managed through standard mitigation measures in accordance with and Vopak’s general environmental duty under the *Environment Protection Act 2017*.  Air quality  Air emissions may be caused from the construction and operation phases of the Project.  *Construction*  The construction of the Project and its associated activities such as earthworks, drilling, trenching and vehicle movement are likely to result vehicle emissions and dust. However, the distance of the construction activities from residential areas and dwellings, the dominant wind direction (south and southeast, away from residential areas in the north and northeast) and the implementation of standard good practice mitigation measures, suggests that potential air quality impacts are unlikely to cause significant effects on the amenity of residents.  *Operation*  The operation of the Project, specifically the FSRU and the GRS, would likely to result air, odour and dust emissions. Similar to potential air emission impacts from construction the distance of the Project area from residential areas and dwellings minimises the likelihood of potential impacts. The GRS is approximately 0.7 km from the nearest dwelling and the FSRU is approximately 10 km from the nearest section of the Portarlington shoreline and 8 km from residential areas adjacent to Werribee South beach. In addition, potential air quality impacts from the FSRU would likely be negligible due to the mostly transient nature of existing boating activities and the requirement; based on safety, for an exclusion zone from port operations.  Noise and vibration  *Construction*  Noise and vibration from construction activities would vary as different tasks are carried out. Based on a preliminary assessment, the construction of the GRS and powerline are the only construction activities expected to potentially result in reduced amenity at nearby dwellings and schools. However, potential noise and vibration impacts would be determined through confirmation of construction techniques and methodologies.  The timing of works (day /night) would be confirmed during detailed design, however, would comply with requirements outlined in EPA Civil Construction Building and Demolition Guide Publication 1834. In addition, night works would be avoided near sensitive receptors where practicable.  The construction methodology would seek to mitigate potential noise and vibration impacts through a range of measures, such as using smaller construction equipment, alternative techniques and the timing of works  *Operation*  No operational noise and vibration impacts are anticipated for underground infrastructure including the pipeline and electricity cables.  During operation, noise may be generated by above ground infrastructure including the FSRU, LNG vessels, GRS, pipeline laydown area, electricity cables (if overhead) and powerline. Given the distance of the marine infrastructure and electricity cables (if overhead) from sensitive receivers, including residential areas, schools, childcare centres or campgrounds, no noise impacts are anticipated. Prior to the application of mitigation measure and detailed design, the GRS and powerline may have the potential to exceed noise limits for the nearest dwellings, further assessment is required to determine the level of impact. Further to this, given noise exceedance is a well understood impact it is likely any exceedance may be managed through standard mitigation measures.  No vibration impacts to residents are anticipated for above ground infrastructure during operation.  Traffic and Transport  The Project is unlikely to cause significant effects on the amenity of residents as a result of changed traffic conditions. While the Project would result in changed traffic conditions during construction (refer to question above), the distance of the Project from residential areas means such impacts are unlikely to result in significant effects on the amenity of residents. Public and private roads that may temporarily closure or experience increased traffic are within the Western Treatment Plant (south of the Princess Freeway) or on local roads with limited traffic, and the closest residential areas, Little River and Lara are north of the freeway.  Visual Amenity  The Project may result in potential visual impacts to residents as a result of above ground or sea level infrastructure including the GRS, electricity cables (if overhead), powerline, FSRU and associated infrastructure. While some residential properties would experience a change in permanent views, the visual change that would be experienced is considered low. The highest point of the GRS is proposed to be 30 m, with the closest residents approximately 500 m from the nearest point of the Project area, this distance means the visual change in permanent views is likely to be low. The electricity cables (if overhead) would be located within the Western Treatment Plant, further from residential areas than the GRS and therefore unlikely to impact visual amenity. Similarly, due to the distance of the FSRU from land, the visual change is considered to be low.  The powerline would be located adjacent to the road reserve in a rural area however some residential dwellings are expected to be nearby and might be able to view the powerline from their property, where possible the powerline would be collocated with other existing transmission or distribution lines to minimise visual impacts. |
| **Is there a potential for exposure of a human community to health or safety hazards, due to emissions to air or water or noise or chemical hazards or associated transport?**  r NYD r **No** r Yes  If yes, briefly describe the hazards and possible implications.  It is unlikely that the Project would result in exposure of a human community to health or safety hazards, due to emissions to air, water, noise, chemical hazards or associated transport. This is primarily due of the distance of the Project from sensitive receivers including residential dwellings, community, commercial and industrial buildings.  The GRS substation and electricity cables are located within road reserves and agricultural land of the Western Treatment Plant approximately 0.7 km from the nearest dwelling. The powerline would be located adjacent to the road reserve in a rural area with large lots with low density of dwellings reducing the potential for impacts to the community.  The FSRU is approximately 10 km from the nearest section of the Portarlington shoreline, 8 km from residential areas adjacent to Werribee South beach and 23 km from the Explosives Ordinance Pier. Offshore, whilst the FSRU and pipeline would be adjacent to commercial and recreational activities, impacts are unlikely as the activities are mostly transient nature and would be distanced from the FSRU and pipeline due to the safety exclusion zone.  In addition, potential impacts due to emissions to air, water, noise, chemical hazards or associated transport are well understood and may be managed through standard mitigation measures. |
| **Is there a potential for displacement of residences or severance of residential access to community resources due to the proposed development?**  **r NYD** rNo rYes  If yes, briefly describe potential effects.  The onshore components of the Project are located predominantly in rural areas and would not permanently displace residences. The powerline would require a permanent easement which may be located on private property an impose certain restrictions on development and/or access. The size and nature of the easement are subject to further design refinement. Further consultation is required to landholders to determine the potential effects of the easement. |
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| Are non-residential land use activities likely to be displaced as a result of the project?  r NYD **r** No r **Yes**   If yes, briefly describe the likely effects.  The onshore Project area includes several non-residential land uses, e.g., agriculture, recreation and conservation. It is not expected that there would be displacement of these activities during operation of the Project for works within the Western Treatment Plant however, there may be isolated and temporary restrictions to some activities during construction. There may also be restrictions to access for residents during construction of and for the operation of the powerline.  Offshore, localised interruption to recreational marine users (e.g., fishing, boating, diving and other leisure activities) is likely during both construction and operation. Similarly, commercial fishing which occurs within the offshore Project area may be impacted during the construction and operation of the Project.  Additional assessment on potential construction impacts of the Project on the shellfish aquaculture adjacent to the Project area and blue mussel aquaculture Crown lease sites located near the offshore Project area (i.e., approx. 500 m south from the subsea pipeline route) would be undertaken during subsequent stages of project development and environmental assessment. |
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| Do any expected changes in non-residential land use activities have a potential to cause adverse effects on local residents/communities, social groups or industries?  r NYD r No r **Yes**  If yes, briefly describe the potential effects.  See stated above, commercial fishing and aquaculture and recreational activities occur within the offshore Project area and is likely to be impacted during the construction and operation of the Project.  Additional assessments on potential impacts of the Project on recreational marine users and engagement with the commercial fishing/aquaculture operators would be undertaken during subsequent stages of project development.  As agreed with the Ports Victoria, the offshore infrastructure described above would be protected by an exclusion area restricting access of any vessel other than those required for the Project. The size and location of this area is still to be confirmed in consultation with Ports Victoria.  There could be temporary restriction to farming activities during the construction of the powerline, these impacts would be minimised where possible and would be temporary. The operation of the powerline could have impacts to the to some farming activities for safety reasons. |
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| **Is mitigation of potential social effects proposed?**  r NYD r No r **Yes**  If yes, please briefly describe.  The social impacts of the Project would be managed through early and regular engagement with the community and regulators and compliance with the relevant environmental legislation and management plans that would be required to be developed under the statutory approval conditions. This could include but is not limited to:   * Traffic operations and disruptions managed through the preparation of Traffic Management Plan(s). * Development and implementation of a Community and Business Disruption Plan. * Air quality management in accordance with Civil Construction, Building and Demolition Guide (EPA, 2020b). |
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| **Other information/comments?** (eg. accuracy of information) |
| N/A |
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Cultural heritage

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| **Have relevant Indigenous organisations been consulted on the occurrence of Aboriginal cultural heritage within the project area?**  r No If no, list any organisations that it is proposed to consult.  **r Yes**  If yes, list the organisations so far consulted. |
| The majority of the Project is within the WTOAC RAP area. WTOAC, has been consulted between September 2019 and December 2022. The consultation was undertaken to introduce the Project and to seek feedback on appropriate siting.  Two small offshore sections of the Project are located within the First Peoples State Relations (non-RAP) area and the BLCAC RAP Area. These stakeholders are yet to be consulted. |
| **What investigations of cultural heritage in the project area have been done?**  (attach details of method and results of any surveys for the project & describe their accuracy)  The Project requires a mandatory CHMP under the *Aboriginal Heritage Act 2006*.  The Project is preparing three CHMPs for each statutory boundary the Project intersects with: the WTOAC area, the First Peoples State Relations area and BLCAC area. The NoI to prepare a Cultural Heritage Management Plan for the WTOAC area was lodged on 17 November 2022. The NoIs for the First Peoples State Relations area and BLCAC area are in preparation.  Further assessments and surveys would be undertaken through the CHMP process in consultation with the WTOAC, BLCAC and First Peoples State Relations. |
|  |
| **Is any Aboriginal cultural heritage known from the project area?**  r NYD r No **r Yes**  If yes, briefly describe:   * Any sites listed on the AAV Site Register * Sites or areas of sensitivity recorded in recent surveys from the project site or nearby * Sites or areas of sensitivity identified by representatives of Indigenous organisations |
|  |
| Yes, there is known Aboriginal cultural heritage in and within 50 m of Project area.  The Project area intersects with areas of CHS associated with:   * being located within 50 m of a VAHR place. * being located within 200 m of a declared Ramsar wetland. * being located within 200 m of a waterway (Hovells Creek). * being located within Crown coastal land. * being located within the Koo Wee Rup Plain. * being located within 200 m of the high-water mark of the coastal waters of Victoria.   A map of Cultural Heritage Sensitivity Areas is provided in Attachment 9.  A search of the VAHR shows that sixteen (16) Aboriginal places occur in, or within, 50 m of the Project area with 16 of these places occurring in the Project area:  *Within the Project area*   * VAHR 7721-1248-7 to -12 (Avalon Airport LDAD) * VAHR 7721-1354 (Avalon Airport Southern Artefact Scatter 1) * VAHR 7721-1355-2 to -12 (Avalon Airport Southern LDAD 1) * VAHR 7721-1363 (Avalon LDAD 1) * VAHR 7721-1381-1 to -8, -10 to -30 (Avalon Airport Eastern LDAD\_1) * VAHR 7721-1453-1 to -10 (Avalon Airport South West LDAD) * VAHR 7721-1454-1 to -4 (UNPROVENANCED Avalon LDAD 1) * VAHR 7721-1479-1 (Avalon Airport Southern LDAD 2) * VAHR 7722-0499 (ANAKIE EAST 1) * VAHR 7722-0576 (BARWON PRISON 3) * VAHR 7722-0582 (LARA PRISON 9) * VAHR 7722-0746 (MELBOURNE-GEELONG INTERCONNECTOR 3) * VAHR 7722-0747-1 and -3 (MELBOURNE-GEELONG INTERCONNECTOR 4) * VAHR 7722-1090-1 to -14 (Peak School Road LDAD) * VAHR 7822-2044 (POINT WILSON RD 1)   *Within 50 m of the Project area*   * VAHR 7721-1479-2 (Avalon Airport Southern LDAD 2) * VAHR 7822-1074-1 & 2 (LITTLE R/PRINCES FWY SAS 1)   It is noted that whilst VAHR 7721-1479-1 is located within the Project area, one component belonging to the low density artefact distribution (VAHR 7721-1479-2) is located outside of the Project area, within 50 metres and therefore is mentioned twice in the lists above.  These places include 6 artefact scatters, eight LDADs, one multicomponent artefact scatter/object collection and one multicomponent artefact scatter/earth feature.  As Project is located within areas of CHS and is considered a ‘high impact activity’, a mandatory CHMP is required under the *Aboriginal Heritage Act 2006*.  The Project is preparing three CHMPs for each statutory boundary the Project intersects with: the WTOAC area, the First Peoples State Relations area and BLCAC area. The Notice of Intention (No) I to prepare a Cultural Heritage Management Plan for the WTOAC area was lodged on 17 November 2022. The NoIs for the First Peoples State Relations area and BLCAC area are in preparation. |
| **Are there any cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the *Heritage Act 1995* within** **the project area?**  r NYD r **No**  r Yes   If yes, please list.  No, the Project area does not intersect with any VHR or VHI places protected under the *Heritage Act 2017*. |
|  |
| **Is mitigation of potential cultural heritage effects proposed?**  r **NYD**  r No r Yes  If yes, please briefly describe.  Specific mitigation measures of potential Aboriginal cultural heritage effects are not yet determined. Development of the CHMP would involve consultation with WTOAC, BLCAC and First Peoples State Relations to develop appropriate mitigation measures for potential impacts to cultural heritage. |
|  |
| **Other information/comments?** (eg. accuracy of information)  N/A. |
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# 16. Energy, wastes & greenhouse gas emissions

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| What are the main sources of energy that the project facility would consume/generate? |
| r **Electricity network**. If possible, estimate power requirement/output ................... |
| r **Natural gas network**. If possible, estimate gas requirement/output … …... |
| r Generated on-site. If possible, estimate power capacity/output ………………………. |
| r Other. Please describe. |
| Please add any relevant additional information.  The aim of the Project is to provide access to a competitive new source of natural gas (peak rate of 650 TJ (600 mmscf/d) output for households, businesses and industries in Victoria and across south-eastern Australia. It would underpin energy supply security by providing access to a large international gas market to complement local production in south-eastern Australia as Victoria transitions to a renewable energy future.  The main source of energy consumed by the FSRU would be shore based power transmitted via the Moorabool terminal station. The Project would be powered using onshore renewable energy. The use of electrical steam boilers (powered from onshore) would replace the use of gas fired boilers and greenhouse gas emissions associated with using gas. Energy requirements for the proposed facility are still being assessed and would be refined during design development, and when FSRU operational mode is finalised. Refer to the Greenhouse Gas section of this referral for detail on emissions. |
|  |
| What are the main forms of waste that would be generated by the project facility? |
| r **Wastewater**. Describe briefly. |
| r Solid chemical wastes Describe briefly. |
| r  **Excavated material**. Describe briefly. |
| r **Other**. Describe briefly. |
| Please provide relevant further information, including proposed management of wastes. |
| Wastewater  The main form of waste in relation to the operation of the FSRU facility would be the discharge of cool seawater (colder than ambient seawater) resulting from the heat exchange process on the FSRU.  Under an open loop system on the FSRU seawater is continuously drawn in via intakes, passes once through a heat exchange system and is then returned directly to Port Phillip Bay at temperatures of between 5 - 7 ºC below ambient water temperature and contains short-lived residual chlorine.  Around 500 m3 of seawater would be required to fill the FSRU heat exchange piping under a closed loop system. Instead of being regularly discharged from the FSRU as per open loop mode, the seawater is continually circulated in the process. The seawater-glycol mix would only be discharged when maintenance is required (anticipated to be annually) but would be treated onshore and not discharged back into the marine environment.    Regassification methodology is discussed in more detail earlier in this referral (Section 4).  Excavated material  Given the nature of the Project, it is not envisaged the construction would require substantial volume of excavated material. Waste generated during construction would be managed in accordance with the standard measures of the CEMP and relevant EPA Victoria waste guidance (i.e., Publication 1828.3 ‘Waste disposal categories – characteristics and thresholds’ (2021).  Other  FSRU operations would result in the generation of other waste streams. These could include sewerage and grey water, accidental spill of hazardous waste from FSRU, LNG carrier or support vessel (e.g., hydrocarbons, hydraulic oils and lubricants, contaminated PPE etc.), and bilge water and deck drainage. Appropriate waste management measures would be developed and implemented to ensure the discharge of waste streams does not impact on the surrounding marine environment. |
| What level of greenhouse gas emissions is expected to result directly from operation of the project facility?  r Less than 50,000 tonnes of CO2 equivalent per annum  r Between 50,000 and 100,000 tonnes of CO2 equivalent per annum  **r Between 100,000 and 200,000 tonnes of CO2 equivalent per annum**  r More than 200,000 tonnes of CO2 equivalent per annum |
| Please add any relevant additional information, including any identified mitigation options. |
| A preliminary Greenhouse Gas Assessment was undertaken by Edge Group Pty Ltd (November 2022) to assess the potential scope 1 and 2 greenhouse gas emissions for the construction and operational phases of the Project in accordance with the Victorian EPA methodology. Potential scope 3 greenhouse gas emissions would be considered following further design development and confirmation of commercial arrangements. The preliminary Greenhouse Gas Assessment is provided in Attachment 15.  Onshore renewables energy would be used to power the Project, reducing the greenhouse gas emissions associated with using gas to produce energy.  The assessment determined annual emissions from the Project (comprising the FSRU, subsea and onshore pipeline, GRS, substation, electricity cables and powerline) are expected to account for less than 1% of State (0.02 to 0.03) and Federal (0.002-0.006) annual emissions for both the construction and operational (open and closed loop) phases.  Construction  Expected GHG emissions generated during construction range between 8,314 and 9,000  tCO2-e.  Operation  *Open loop mode*  Expected GHG emissions generated during operation for open loop mode would be approximately 132 tCO2-e annually.  *Closed loop mode*  Expected GHG emissions generated during operation for open loop mode would be approximately 21,068 tCO2-e annually. |

# 17. Other environmental issues

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| Are there any other environmental issues arising from the proposed project?  **r No**  r Yes  If yes, briefly describe. |
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# 18. Environmental management

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| What measures are currently proposed to avoid, minimise or manage the main potential adverse environmental effects? (if not already described above) |
| r **Siting**: Please describe briefly  The siting and proposed location of the Project onshore and offshore has been developed to avoid, minimise and manage potential adverse environment effects (refer to Section 4 Project alternatives for further detail).  Further assessments are being undertaken to ensure the powerline corridor has limited environmental impacts, and siting is co-located with utility type land uses, as far as practicable.  The siting and route selection of the Project is discussed in detail in Section 3 of this referral. |
|  |
| r **Design:** Please describe briefly  As documented earlier in the referral, the design of the Project has evolved with a strong emphasis on minimising potential effects on the environment. This is demonstrated by:   * Selection of a shore powered scheme, rather than use of gas or diesel, to power the FSRU with electricity from the existing network, in order to reduce greenhouse gas emissions. * Selecting construction methods such as the trenchless shore crossing, to avoid impact to the sensitive ecological character of the Ramsar wetland. * Reduced impact to existing Western Treatment Plant operations including processing facilities, conservations areas, farmland and proposed expansion.   Further work would be done to refine the design and construction method of the Project following design development, site investigations and environmental assessment, including but not limited to geotechnical, bathymetric, ecological and archaeological assessments. A preliminary list of further investigations to be carried out for the Project is provided at Section 20 of this referral. |
|  |
|  **Environmental management:** Please describe briefly.  Vopak’s Environmental Management System is included in Vopak’s internal standards (as part of our Environmental Impact Assessment and Soil & Groundwater Management). Vopak are committed to protecting the environment by applying the ALARP principle for minimising the environmental impact of construction and operational activities.  Through the life of the Project, Vopak propose to implement an ISO 14001-certified Environmental Management System to identify and control the environmental impact of the activities, products and services and to continually improve environmental performance.  It is anticipated that an EMF would be prepared during the approval process and would be informed by environmental impact assessments and relevant legislative requirements including Vopak’s general environmental duty under the *Environment Protection Act 2017*. The EMF would provide transparent governance of the environmental aspects of design, construction and operation of the Project. The framework would include the roles and responsibilities for the Project, the environmental management requirements for the approvals, the compliance and monitoring requirements and would provide further information on the relevant sub plans that would need to be prepared.  The subplans would be put in place to help avoid, minimise and manage potential adverse environment effects through:   * Site visits and reviews of the Project land pre-construction, during and post construction. * Management measures for planning the design of permanent and temporary works in accordance with regulatory approval conditions * Site inspections to be undertaken at all active work fronts to ensure that implemented controls (from subplans) are complied with. * Regular audits to be conducted for compliance with management measures in the subplans. |
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| r Other: Please describe briefly |
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# 19. Other activities

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| Are there any other activities in the vicinity of the proposed project that have a potential for cumulative effects?  r NYD r  **No** r Yes  If yes, briefly describe. |
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| There is an FSRU proposed at Refinery Pier, Geelong by Viva Energy, however this Project does not have planning or environmental approvals in place at time of writing so this is not considered a confirmed activity or project. |

# 20. Investigation program

Study program

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| Have any environmental studies not referred to above been conducted for the project?  r **No**  r Yes  If yes, please list here and attach if relevant. |
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|  |
| Has a program for future environmental studies been developed?  r No r **Yes**  If yes, briefly describe. |
| Vopak has appointed Aurecon as the lead environmental consultant to conduct environmental studies for the Project as design and construction is developed and approvals are sought. Future studies are likely to include:   * Aboriginal cultural heritage (archaeology) * Terrestrial ecology including field and targeted surveys * Marine studies including marine ecology surveys and hydrodynamic and ecotoxicity modelling * Noise and vibration (environmental and marine) * Greenhouse gas emissions * Contamination and acid sulphate soils * Groundwater and surface water * Landscape and visual assessments * Land use impact * Social and community (including business disruption) * Traffic and transport * Air quality   Vopak has also appointed other technical consultants to carry out investigations to inform engineering and constructability that would be utilised for more detail environmental assessments. These include:   * Geotechnical * Bathymetry and metocean * Safety, hazard and risk studies * Lighting |

Consultation program

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| Has a consultation program conducted to date for the project?  r No r **Yes**   If yes, outline the consultation activities and the stakeholder groups or organisations consulted. |
|  |
| Vopak recognises the importance of early, consistent and ongoing engagement. The Project’s engagement approach has been considered and targeted to develop a credible project that understands and incorporates stakeholder feedback and the social, environmental and cultural impact of the Project.  The Project’s engagement objectives have been to provide genuine opportunities for stakeholders to be involved and influence the design of the Project during the development and approvals phase.  The first phase of engagement for the Project ran from September 2019 to December 2020. The Project team undertook extensive one-on-one engagement with regulatory bodies, land occupiers/managers, government representatives and Traditional Owners to help identify an appropriate site within Victoria for the Project, ascertain project feasibility and develop the business case. By the end of 2020, the Project had determined through its engagements and studies that Avalon was the most suitable.  The second phase of engagement ran from January 2020 to May 2022. The project team continued one-on-one engagements with stakeholders from phase one, widening its engagement to include government authorities, elected representatives, commercial fishing operators, businesses and special interest groups. The purpose of this engagement was to inform a pipeline route, investigations on the Southwest pipeline capacity and tie-in locations, and land tenure negotiations.  In July 2022, the Project held the first community information ‘pop-up’ sessions in Portarlington, Geelong and Werribee. The purpose was to discuss the process and reasons for selecting Port Phillip Bay, explain the approvals process and project timeline, and discuss the relevance of the Project for the Victorian community. The objectives of these consultations were to introduce the Project, seek feedback and understand concerns to inform the Project’s development.  In September 2022, the Project held a second round of community information ‘pop-up’ sessions in Portarlington, Geelong and Werribee. The purpose of the consultation was to provide the community another opportunity to introduce the Project, timelines, approvals process and to seek feedback on the Project to inform the Project’s development.  The consultations were advertised in The Geelong Times, The Bellarine Times, The Geelong Advertiser, Wyndham Star, Geelong radio (Bay 93.9 and KRock and through a letter-box drop distributed to residential homes in North Geelong, Norlane, Corio, Portarlington and Werribee.  In November 2022, first contact was made with landholders within or near the Powerline Corridor to introduce the Project.  To help unpack the complexities of the Project, the team prepared detailed communication materials, including:   * Fact sheets, distributed at the consultations and available on our website * Visual perspective maps (printed and videos) showing the distance and line of sight of the floating facility from shorelines in Portarlington, Werribee River, Wyndham Harbour and Beaumaris, displayed at the consultations and available on our website   Preliminary issues raised by stakeholders through consultation to date has assisted in influencing the Project design and its location. Issues raised by the community at the information sessions, not already considered by the Project, would be incorporated into the development of the design moving forward.  Stakeholders engaged between 2019 and 2022 are listed in Table 14.  **Table 14** List of stakeholders consulted between 2019 and 2022   |  |  | | --- | --- | | Stakeholder | Relevance to Project | | AEMO | Government agency | | APA Group | Infrastructure and utilities providers | | AusNet | Infrastructure and utilities providers | | Australian Consumer & Competition Commission (Cth) | Government agency | | Australian Energy Council (Cth) | Infrastructure and utilities providers | | AEMO (Cth) | Government agency | | Australian Energy Regulator (Cth) | Government agency | | Australian Marine Safety Authority (Cth) | Government agency | | Australian Transport Safety Bureau (Cth) | Government agency | | Avalon Airport | Business | | Bellarine Birdlife Australia | Non-profit organisation (NGO) | | Biodiversity and Conservation Advisory Council | Crown land conservation managers | | CFA | Regulator | | City of Greater Geelong | Government agency | | Civil Aviation Safety Authority | Government agency | | Committee for Geelong | Community Group | | Corangamite and Port Phillip Catchment Management Authorities | Referral Authority | | DCCEEW | Regulator | | Department of Defence (Cth) | Government agency | | DELWP (Energy, Impact Assessment and Barwon Southwest). | Regulator | | Department of Industry and Technology (Cth) | Government agency | | Department of Treasury & Finance (Economic Development) (Vic) | Government agency | | Department of Transport, Safety Resilience & Emergency Coordination | Government agency | | Energy Safe Victoria (Vic) | Regulator | | Engage Marine | Business | | Environment Victoria | NGO | | EPA Victoria (Vic) | Regulator | | Federal Ministers & MPs | Elected representatives | | Fire Rescue Victoria (Vic) | Government agency | | Freight Victoria | Government agency | | Department of Transport (Freight Victoria) (Vic) | Regulator | | Geelong & District Anglers Club & Fish Protection Society | Community Group | | Geelong Arm Aquaculture Fisheries Reserves operator | Business | | Geelong Chamber of Commerce | Business | | Geelong Fly Fishing Club | Business | | Geelong Grammar | Business | | Geelong Port | Government agency | | Geelong Renewables Not Gas | NGO | | Local Government/Mayor & Councilors (Geelong and Wyndham) | Elected representatives | | Maritime Safety Victoria (Vic) | Government agency | | Melbourne Water | Landowner | | MPH | Land manager | | Myti Blue (Sea Bounty) | Business | | Parks Victoria | Landowner and conservation manager | | Port of Melbourne | Government agency | | Port Phillip Ferry Services | Business | | Port Phillip Sea Pilots | Government agency | | Portarlington Community Association | NGO | | Ports Victoria | Government agency | | Powercor | Infrastructure and utilities providers | | SETFIA | Business and industry | | State Ministers & MPs | Elected representatives | | Transport Safety Victoria | Government agency | | Victorian Fisheries Authority (Vic) | Regulator | | Victorian National Parks Association | NGO | | Victorian Ports Corporation |  | | Victorian Regional Channels Authority (Vic) | Government agency | | WTOAC | Regulator | | Worksafe Victoria (Vic) | Regulator | | Wyndham City Council | Government agency | |
| Has a program for future consultation been developed?  r NYD r No r **Yes**  If yes, briefly describe. |
|  |
| Engagement over the next twelve months aims to build on established relationships with stakeholders to support the approval processes, promote opportunities for community consultations, and incorporate feedback into the Project design.  Engagement activities would continue throughout the duration of the Project with a preliminary program of consultation activities provided in Table 15 below.  **Table 15** Preliminary program of consultation activities   |  |  |  | | --- | --- | --- | | Project Phase | Indicative timing | Engagement activities | | Development | 2019 – 2025  (subject to approval requirements) | * Community pop-up sessions and workshops with communities along Port Phillip Bay. * Webinars. * Deliberative forums and town halls. * Meetings with landholders. * Establishing an engagement ‘hub’. * Briefings and presentations to key stakeholders. * Engagement as required under the relevant approvals. | | Construction | 2025 - 2026 | * Briefings and presentations to key stakeholders. * Meetings with landholders. * Communications including e-updates, regular website updates, fact sheets * Community drop-in sessions. * Engagement as required under the relevant approvals. | | Operation | 2027 - Minimum 20 years | * E-updates as required. * Briefing with key stakeholders as required. * Engagement as required under the relevant approvals. | |

**Authorised person for proponent:**

I, Gary Constantine (full name),

Project Director (position), confirm that the information contained in this form is, to my knowledge, true and not misleading.

Signature 

Date 06/12/2022

**Person who prepared this referral:**

I, Rob Marks (full name),

Associate, Environment and Planning (position), confirm that the information contained in this form is, to my knowledge, true and not misleading.

Signature

Date 06/12/2022