EPBC Act referral

Australian Government
Department of Agriculture, Water and the Environment

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Title of proposal	2020/8838 - Viva Energy Gas Terminal Project

Section 1

Summary of your proposed action

1.1 Project industry type Energy Generation and Supply (non-renewable)

1.2 Provide a detailed description of the proposed action, including all proposed activities

Viva Energy is planning to develop a gas terminal using a Floating Storage and Regasification Unit (FSRU), located in Corio Bay, Geelong. The gas terminal would be located adjacent to Viva Energy's Geelong Refinery and would leverage synergies between the facilities such as reuse of the FSRU discharge within the refinery. The Viva Energy Gas Terminal Project (the Project) comprises:

•Construction of an extension to the existing Refinery Pier and ancillary jetty infrastructure including high pressure gas unloading arms;

•Continuous mooring of an FSRU, up to 300m in length, at the new berth;

•Construction of ~ 2.5 km of aboveground gas pipeline connecting the FSRU to new nitrogen and odorant injection facilities on refinery premises; and

•Construction of an underground gas transmission pipeline, ~ 4 km in length, connecting to the South West Pipeline (SWP) at Lara.

The FSRU would receive Liquefied Natural Gas (LNG) from visiting LNG carriers (LNGC) (that would moor directly adjacent to the FSRU), store the LNG and regasify it as required to meet south-eastern Australian gas market demand. The Project life is anticipated to be a minimum of 20 years.

The FSRU would be continuously moored at an extension to the existing Refinery Pier. The FSRU would remain as an operational ship and able to be moved as required. The new jetty arm, located north-east of Refinery Pier No. 1, would be connected to the existing wharf by a new trestle. Jetty head infrastructure would include high pressure gas unloading arms and a firefighting system.

LNG would be sourced from suppliers in Australia and globally. Depending on demand, 25 - 45 LNGCs per year would moor alongside the FSRU to resupply the FSRU with LNG. LNG would be offloaded via flexible hoses between the vessels over a period of 24 - 36 hours, and then the LNGC would depart. LNG would be stored on the FSRU at ~ -160°C in cryogenic storage tanks which keep the LNG in a liquid state. LNG would be vapourised in a regasification system on board the FSRU, as required to meet demand. The heat required to return the LNG to a gaseous state would be supplied by seawater from Corio Bay. When operating at maximum capacity a daily volume of up to ~468,000 m3 of seawater would be drawn into the FSRU through the vessel sea chest or dedicated water inlet ports in the hull and circulated through heat exchangers (vapourisers). The FSRU would be unlikely to operate at maximum capacity unless there was a requirement to fill short term shortfalls in the gas market. The seawater intake volume required for the proposed design regasification of 500 TJ/day would be ~312,000 m3/day. The Geelong Refinery currently uses a similar volume of seawater for cooling purposes. The cooled (5° C below ambient temperature) seawater from the FSRU regasification system would be directed to the existing refinery seawater intake for reuse within the refinery cooling water system, and would replace the seawater intake volume currently extracted by the refinery. Following reuse the water would be discharged from the existing licensed refinery discharge points at an average of 4°C above ambient temperature, ~ 5°C closer to ambient temperature than the current discharge waters. To prevent marine growth in the FSRU heat exchange system, the seawater intake would be subject to an electrolysis process i. e. chlorinated. Seawater discharged from the FSRU after it has been used in the heat exchange process would contain short-lived residual chlorine. If this seawater is directed into the refinery (as a replacement for its current seawater usage) then Viva Energy would need to manage the chlorine in the refinery. However, this is not seen as an issue as Viva Energy's current EPA discharge licence allows for chlorine in discharge waters. Further assessment is being undertaken to evaluate the potential for the discharge to be maintained at levels permissible under the existing refinery EPA licence.

Once in a gaseous form, the gas would be injected under pressure through the loading arms into the connecting pipeline. The total length of the DN600 pipeline (about 600mm or 24" in diameter) from the FSRU to the tie-in point at the South West Pipeline (SWP) would be ~ 6.5 km, in two sections: one an ~ 2.5 km aboveground section from the FSRU to the nitrogen facility, the other an ~ 4 km underground section from the nitrogen facility to the SWP. The aboveground section would run along the new jetty extension in a pipe track to the existing Refinery Pier pipe tracks. Onshore the pipeline would run along the existing pipe trench east of Shell Parade, passing through a road under-crossing to an existing refinery pipe trench. The route would then run north in the refinery pipe trench to an existing laydown area where a nitrogen facility would be located.

It is expected that nitrogen blending would be required to adjust the gas quality (i.e. calorific value) to bring it into specification for the south-eastern Australian gas market. The nitrogen facility could comprise either a nitrogen gas generation package or cryogenic liquid nitrogen storage. The facility would also include odorant storage and injection skid, trim heater, gas analyser, pig launcher and cold vent to enable the pipeline from the jetty to be depressurised during an emergency or for maintenance. This would be the location where the pipeline would change from aboveground to underground. It is intended, as far as practicable, to locate the proposed underground gas pipeline within or adjacent to already disturbed easements or road reserves within existing pipeline corridors. The tie-in point to the existing Victorian transmission network would be within the APA owned and operated Lara City Gate station. Equipment proposed to be located at the tie-in location

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includes a pig receiver and gas custody transfer metering skid.

An estimated 1.1 million m3 of dredging would be required adjacent to the existing shipping channel to provide sufficient water depth at the new berth and within the swing basin. It is planned to deposit the dredged material within the Victorian Regional Channels Authority (VRCA) existing dredged material ground (DMG) in Port Phillip to the east of Point Wilson. Jetty construction and installation of jetty infrastructure and piping from the FSRU would be carried out primarily from the water using barge-mounted cranes. A temporary loading facility on-shore would be located nearby within the boundaries of the site, or at a suitable location within the port. Pipe lengths would either be transported to the jetty via crane and placed in position or alternatively placed in position by a barge-mounted crane. Construction of the injection and tie-in facilities would be undertaken by specialist crews across key distinct phases of works. These would include initial earthworks and civil construction, mechanical installation and electrical and instrumentation works. The underground pipeline would be constructed in a typical 25 - 30m wide construction ROW. Construction would occur as follows:

- •Delineation of the ROW
- •Clearing of vegetation (vegetation removal would be minimised through the appropriate location of additional work areas)
- •Pipe stringing and bending
- •Welding and coating
- •Trench excavation
- •Lowering in and backfilling
- •Testing and commissioning
- •Rehabilitation of the ROW

1.3 What is the extent and location of your proposed action?

See Appendix B

1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland)

The proposed gas terminal would be located within and adjacent to a highly developed port and industrial area on the western shores of Corio Bay, Geelong. The site would incorporate Geelong Refinery and the existing Refinery Pier within the Port of Geelong. Corio Bay is typically between 3 and 6m deep, however the shipping channel is maintained by dredging at a depth of 12.3m. The 120 ha refinery site is highly engineered comprising various petrochemical manufacturing facilities, above and below ground pipelines and storage tanks. North of the refinery the predominantly rural area is generally quite flat and low lying ranging between 7 and 15m ASL. The area has been highly modified and vegetation within the proposed pipeline corridor is comprised almost exclusively of introduced species in the form of exotic grasses and planted native and exotic trees. The gas terminal would be located ~ 7km from the centre of Geelong business district between the suburbs of Corio and North Shore.

1.6 What is the size of the proposed action area development footprint (or work area) including disturbance footprint and avoidance footprint (if relevant)?

The proposed action area development footprint is comprised of:

- A dredged area of 30 ha (Shown as Areas 2 and 3 on map).
- A jetty footprint of 2 ha (including the existing Refinery Pier footprint).
- Aboveground pipeline and associated facilities footprint (within the existing Geelong Refinery footprint) of 2 ha.
- Buried transmission pipeline footprint of 12 ha (The site area is determined by a Construction ROW of 30 m in width for the length of the buried pipeline, which is approximately 4 km).
- A spoil placement area (note: size not yet determined) within the existing dredged material ground (DMG). The total area of the existing DMG is approximately 480 ha.(Shown as Area 1 on map)

1.7 Proposed action location

Lot - Various. Refer to Attachment 1.7.3 Location

1.8 Primary jurisdiction Victoria

1.9 Has the person proposing to take the action received any Australian Government grant funding to undertake this project?

☐ Yes ☑ No

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1.10 Is the proposed action subject to local government planning approval?

☑ Yes ☐ No

1.10.1 Is there a local government area and council contact for the proposal?

☑ Yes ☐ No

1.10.1.0 Council contact officer details

1.10.1.1 Name of relevant council contact officer	[redacted]
1.10.1.2 E-mail	[redacted]
1.10.1.3 Telephone Number	[redacted]

1.11 Provide an estimated start and estimated end date for the proposed action	Start Date	01/09/2022
	End Date	31/12/2044

1.12 Provide details of the context, planning framework and state and/or local Government requirements

Environment Effects Act 1978 (EE Act)

A referral has been submitted to the Victorian Minister for Planning to determine whether an Environment Effects Statement (EES) is required under the EE Act. If an EES is required, the Minister for Planning's assessment of the Project would inform the decisions of other regulatory authorities with statutory approval responsibilities.

Environment Protection Act 1970 (EP Act)

A works approval and licence will be required for the FSRU under the EP Act. Greenhouse gas emissions have been benchmarked against the AGL/APA Gas Import Jetty and Pipeline Project (on the basis of gas fuelled, open loop operation) which indicated the thresholds prescribed for classification as scheduled premises (Type L01 – general emissions to air) would be exceeded for NOx, CO and VOC. A works approval and/or amendment to Geelong Refinery's existing EPA licence may be required for Project works.

Planning and Environment Act 1987

The Project area and its various components are subject to 7 different planning zones and 5 overlays under the Greater Geelong Planning Scheme (GGPS).

Part of the water-based area of the Project falls outside of the GGPS and that issue will need to be addressed to extend the relevant planning controls to all areas of the Project. Although Viva Energy's historical and ongoing operations at the refinery and Refinery Pier give rise to existing use rights under the GGPS, which may mean that some Project works would not trigger the need for a permit for use, those existing use rights would not overcome the need to obtain various permits for buildings and works.

Viva Energy proposes a planning scheme amendment for the Project in order to:

•overcome the complexity raised by the 7 zones and 5 overlays which apply different controls to different areas of the Project;

•avoid the uncertainty around the proponent's assertion of existing use rights;

•address the application of the GGPS to all sections of the Project area; and

•provide certainty and transparency for all parties and stakeholders around the planning controls applicable to this Project through the use of a Specific Controls Overlay.

Marine and Coastal Act 2018 (MACA)

The Project requires consent under the MACA to 'use or develop, or undertake works on, marine and coastal Crown land'. Components of the Project works, including dredging of the new berth and swing basin, construction of the new jetty arm and ancillary infrastructure, mooring of the FSRU and construction of piping from the FSRU to the existing refinery cooling water intake, would require consent.

Aboriginal Heritage Act 2006

The desktop Aboriginal cultural heritage assessment concluded that a CHMP will be required as the Project area intersects with areas of Aboriginal cultural heritage sensitivity. It is anticipated that based on the location of the Project that the CHMP evaluation body will be Wadawurrung Traditional Owners Aboriginal Corporation.

Pipelines Act 2005

Viva Energy will seek a licence under the Pipelines Act 2005 to construct and operate a natural gas pipeline. Viva Energy must prepare a consultation plan and obtain the Minister's approval of the plan before giving notice of intention to enter land or giving notice of a pipeline corridor. The Pipelines Act specifies that approval to construct a pipeline requires development of a Construction Environmental Management Plan (CEMP) and Construction Safety Management Plan (CSMP) and approval to operate requires development of an EMP and SMP. Section 85 of the Pipelines Act provides an exemption from the need to obtain a permit under the Planning and Environment 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.

Gas Safety Act 1997

Viva Energy must submit a safety case to Energy Safe Victoria prior to operation of the natural gas pipeline and associated facilities. The Gas Safety Case and SMP, as required under the Pipelines Act (above), may take the form of a single document.

Occupational Health and Safety Act 2004 (OHS Act)

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WorkSafe has foreshadowed a change to the Occupational Health and Safety Regulations 2017 that would classify the FSRU as a Major Hazard Facility (MHF) when in port for the purposes of the OHS Act. If the OHS Regulations are changed in relation to MHFs, the FSRU operator would be required to submit a safety case before a MHF licence can be granted. FSRUs are not presently classified as a MHF under the OHS Regulations as the definition of a facility specifically excludes facilities that are not on land. The Geelong Refinery may require a revision to its existing MHF safety case.

Flora and Fauna Guarantee Act 1988

The Project may require a Permit to take protected flora and fauna.

Road management Act 2004

Viva Energy may require consent from the coordinating road authority to 'undertake works on, in or under any road'.

1.13 Describe any public consultation that has been, is being or will be undertaken, including with Indigenous stakeholders

Viva Energy's core business values – integrity, responsibility, curiosity, commitment and respect - are the foundation of how we approach our business endeavours. Viva Energy is committed to proactively engaging and consulting with all affected stakeholders throughout the life of the proposed Project to ensure there is a thorough understanding of the project scope, any potential impacts and to ensure there is a transparent feedback process. Consultation will be undertaken in accordance with Viva Energy's Business Principles and Code of Conduct.

In October 2019, Viva Energy commenced preliminary engagement to socialise the Gas Terminal Project as part of the future Geelong Energy Hub concept with individuals and stakeholders that would be directly involved in or impacted if it proceeded. This initial engagement primarily involved Commonwealth, State and local governments as well as key regulators. Subsequent engagement has expanded to include the refinery's closest neighbours, local Geelong associations and businesses and the broader community primarily through the announcement of the Gas Terminal Project as part of the future Geelong Energy Hub concept in the media in June 2020, with information material available on the Viva Energy website.

Communications with Project stakeholders are recorded in a consultation management database. A summary of consultation activities conducted to date is attached.

Viva Energy has developed a stakeholder consultation plan which will satisfy the requirements of all regulatory approvals (and an EES if required). The plan will utilise tools such as a project webpage, 1800 number and email address for public enquiries and responses. Due to COVID-19 restrictions on large gatherings and face to face meetings, Viva Energy is evaluating the use of a Virtual Stakeholder Room platform which enables interested parties to engage with the proponent through a variety of media including information display boards, project videos, interactive materials, chat lines, links to related materials, live stakeholder sessions with technical experts, Q&A responses and the like. The materials incorporated into the room can be updated regularly and, if implemented, would follow the traditional approach to face to face stakeholder engagement sessions at different times in the regulatory approvals process (and the EES process if required). Early materials in the room would engage on topics such as the approvals required, approvals process (and EES process if required), description and rationale for the project, intended environmental studies etc. As the project progresses, materials would move more towards presentation of key study findings, design iterations, sessions with specialists etc. Towards the culmination of the approvals process, details on public exhibition and submissions (and the EES panel inquiry process if required) would be provided as well as links to approvals documentation (and the EES if required).

Viva Energy has also prepared a Pipeline Consultation Plan in accordance with Part 4, Division 1 of the Pipelines Act 2005 and requirements of the Pipelines Regulations 2017 specifically for the pipeline component of this Project.

1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project

On the 6th November 2020 Viva Energy submitted a referral to the Victorian Minister for Planning for advice as to whether an Environment Effects Statement (EES) is required for the Project.

1.15 Is this action part of a staged development (or a component of a larger project)?

☐ Yes ☑ No

1.16 Is the proposed action related to other actions or proposals in the region?

☑ Yes ☐ No

1.16.1 Identify the nature/scope and location of the related action (Including under the relevant legislation)

The Geelong Energy Hub concept proposed by Viva Energy sets out a strategic vision to diversify the use of its Geelong Refinery to help underpin its future viability as well as supporting the renewable energy transformation underway in Victoria and Australia The Energy Hub concept comprises a number of potential projects, including a gas terminal (which is the

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subject of this referral), a solar energy farm, the potential for hydrogen and alternative fuels production, and the opportunity to develop strategic storage to help support Australia's fuel supply security. However, other than the Gas Terminal Project, covered by this referral, the other potential projects associated with the Geelong Energy Hub are only hypothetical at this point. They may be considered in the future, but are conceptual only at this stage. The Gas Terminal Project has no inter-relationship with, or reliance on, any potential future project which may be considered for the Energy Hub.

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Section 2

Matters of national environmental significance

2.1 Is the proposed action likely to have any direct or indirect impact on the values of any World Heritage properties?

☐ Yes ☑ No

2.2 Is the proposed action likely to have any direct or indirect impact on the values of any National Heritage places?

☐ Yes ☑ No

2.3 Is the proposed action likely to have any direct or indirect impact on the ecological character of a Ramsar wetland?

☑ Yes ☐ No

Wetland

Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site:
Intake of between ~ 300 000 - 460 000 m3 seawater per day (dependant on operational demand) at the FSRU ~ 1 km from the Point Wilson/Limeburners Bay component of the Ramsar site.

Impact

Seawater drawn into the FSRU heat exchange system may entrain small marine organisms (very small fish, zooplankton, phytoplankton, eggs and larvae) that are present in the central part of the water column adjacent to the intake. These organisms, once entrained, would not survive as a result of mechanical damage and exposure to chlorine for anti-fouling.

It is important to note that that the existing seawater intake for the refinery cooling water system currently entrains plankton and larvae. The proposal to take the FSRU discharge water into the refinery intake for reuse as refinery cooling water means that the FSRU would not represent a significant additive source of entrainment as it would, in large part, replace the current seawater intake at the refinery.

Publicly available data from other FSRU projects at Port Kembla,NSW (Australian Industrial Energy, 2018) and Crib Point, Victoria (AGL/APA, 2020) 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 presence of plankton and larvae that require local baseline data and modelling. Whilst it is not anticipated tha the project will have adverse impacts on Ramsar values, in October 2020 Viva Energy commenced a monthly plankton and larvae sampling program in Corio Bay to establish baseline data on populations and seasonal aspects of species presence. This data will be used as an input to the proposed hydrodynamic modelling of Corio Bay to estimate the potential magnitude and seasonality of entrainment of plankton and larvae populations as a result of the project.

Wetland

Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site:
Discharge of between ~ 300 000 - 460 000 m3 warm seawater and residual chlorine following reuse of the FSRU cold seawater discharge in the refinery cooling water system, via the existing EPA licensed discharge outlets to the waters of Corio Bay.

Impact

The discharge of seawater at ~ 5 °C below ambient temperature has the potential to impact on the surrounding marine environment as it would sink to the seabed and create a cold water plume. There are a number of mitigation measures available to reduce potential impacts associated with a cold water discharge from a FSRU including use of multiple rather than single discharge points to generate greater mixing, however, the proposed means of managing the discharge for this Project utilises a synergy between the FSRU and existing refinery operations.

Preliminary engineering design has indicated that it would be feasible to reuse the FSRU wastewater in the refinery cooling water system and further detailed engineering studies are in progress which will inform the impact assessment to be conducted as part of the project approvals process. Currently, the refinery inlet takes in seawater at ambient temperature and

discharges the cooling water through the EPA licensed outlets at a warmer temperature. The resulting average temperature of the water discharged through the outlet from the refinery is ~ 9°C above ambient seawater temperature. Diverting the cold water discharge from the FSRU to the refinery inlet reduces the temperature of the water taken in to the refinery by ~ 5°C. This in turn reduces the temperature of cooling water discharged at from the refinery by ~ 5°C. The resulting outlet temperature averaged across the refinery discharge points would then be ~ 4°C above ambient seawater temperature.

To prevent marine growth in the FSRU heat exchange system, the seawater intake would be subject to an electrolysis process i.e. chlorinated. The chlorination of seawater would be done using an electrolytic cell to convert chloride ions, naturally present in seawater salt, into chlorine oxidants. The electrolysis process converts the chloride ions (Cl-) in seawater to hypochlorite ion and hypochlorous acid, which further reacts rapidly with bromine in seawater to form hypobromite ion and hypobromous acid. This series of reactions is rapid and almost complete within 10 seconds. The chlorine and bromine oxidation chemicals used to prevent biological growth in seawater supplies are referred to as chlorine-produced-oxidants (CPO). The electrolysis process on the FSRU would produce an initial CPO concentration. This concentration would decay rapidly in the pipe network and by the time the flow has passed through pumps, pipes and heat exchangers, the residual chlorine concentration in all discharges from the FSRU would be significantly less than the initial concentration.

If, as proposed, the FSRU discharge is directed into the refinery then Viva Energy would need to manage the chlorine in the refinery. As Viva Energy currently chlorinates the seawater taken into the refinery for cooling purposes, further assessment is being undertaken to assess the fate of chlorine after reuse of the FSRU discharge water. Viva Energy's current EPA discharge Licence 46555 allows for discharge of chlorine and the proposed assessment will evaluate the potential for the discharge to be maintained at levels permissable under the current licence.

Previous environmental studies on FSRUs indicate that potential impacts associated with cold water and residual chlorine discharges are localised and restricted to the general vicinity of the FSRU with plumes reaching acceptable background levels over relatively short distances. Based on the distance between the project site and the nearest component of the Ramsar site it is not anticipated that the ecological character of the wetland would be impacted.

Further modelling and assessment will be undertaken to determine the extent of impacts from the FSRU discharge. In October 2020 Viva Energy commenced a marine monitoring program in Corio Bay to establish baseline data for a range of parameters including temperature, currents, benthic fauna and seasonal presence of plankton and larvae to inform hydrodynamic modelling and impact assessment.

Viva Energy also intends to conduct hydrodynamic modelling and impact assessment of the cold water plume which would occur in the event that a direct discharge from the FSRU or from a jetty based diffuser was required rather than discharging into the refinery cooling water intake. This would be undertaken to ensure that a contingency option was in place in the event that the refinery discharge option was interrupted or unavailable for a period of time. This assessment would inform any design elements required to offset potential impacts which could include the need for a diffuser to more efficiently disperse the cold water plume when compared to a single discharge point on the FSRU.

Wetland

Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site:
Dredging of new berth and swing basin at the proposed extension to Refinery Pier ~ 1 km from the Point Wilson/Limeburners Bay component of the Ramsar site.

Impact

The main physical effects associated with dredging in Corio Bay are the resulting turbidity plumes and potential impacts on seagrass, including reduction in light for photosynthesis and potential smothering due to deposition of the suspended material.

The Corio Bay Channel Improvement Program (CBCIP) dredged an estimated 4.5 million m3 of material using primarily a Cutter Suction Dredge and a Trailer Suction Hopper Dredge. During the CBCIP average turbidity within Corio Bay increased slightly, from 0.6 to 1.4 nephelometric turbidity unit (ntu). These turbidity effects were concentrated in the deeper areas of the Corio Bay inner harbour and the spoil grounds (including the Outer Harbour spoil ground ~ 6 km east of Point Wilson) with the shallow seagrass beds around the shoreline being the least affected areas. Monitoring post-dredging in 1998 showed that turbidity levels in Corio Bay returned to pre-dredging levels of less than 1 ntu, with the spoil grounds appearing stable with very little evidence of resuspension (Lawson and Treloar, 1998).

In addition to the turbidity monitoring a study was also undertaken to determine the effect of CBCIP dredging on the health of Zostera nigricaulis seagrass beds in the Geelong Arm (Marine Science & Ecology, 2006). The study involved monthly surveys of the response of seagrass to turbidity at seven sites over three stages, pre-, during and post-dredging. The monitoring program demonstrated that both seagrass cover and biomass were virtually unaffected. Even the sites closest to

dredging operations (within ~ 1 km) which were subject to moderate to high water turbidity and the most persistent sedimentation showed only minor effects (i.e. leaf necrosis).

Prior to the Corio Bay Channel Safety Adjustment Program (CBCSAP) dredging campaigns Cardno (2011) conducted a review of the results of previous plume movement modelling and validation exercises (i.e. monitoring) within Corio Bay and the Outer Harbour and concluded that plumes from dredging will settle relatively quickly with the majority of sediment being settled within 4 hours. Wind and tidal conditions at the time of dredging were found to have an impact on the dispersion and size and location of any associated turbidity plume, and whilst under strong southerly wind conditions wave-driven currents could push plumes in an anti-clockwise direction along the coast it was considered unlikely that there would be significant increases in turbidity over the normal background level which would have already been elevated due to wave action in the shallow areas of the Ramsar site off Avalon Beach.

In a low tidal current environment, as exists in Corio Bay, sediment travel distance during settling time is short and it is considered unlikely that a turbid plume from dredging would reach the seagrass beds of the Ramsar site. Based on the findings of past studies conducted into sediment mobilisation during dredging in Corio Bay, as outlined above, development of a suitable dredging methodology and mitigation measures (such as silt curtains) as part of the project approvals process would ensure protection of sensitive habitats.

The data from the sediment sampling and analysis program (Coffey, 2020) will be used to inform the dredging and spoil disposal strategy in consultation with the Victorian Regional Channels Authority (VRCA), DELWP and EPA and will also be used to assess potential environmental impacts associated with turbidity and contaminant mobilisation on benthic and other marine communities.

Wetland

Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site:
Construction and operation (e.g. shipping berthing, departing, loading and unloading operations) of the proposed extension to Refinery Pier and gas terminal facility ~ 1 km from the Point Wilson/Limeburners Bay component of the Ramsar site.

Impact

Potential impacts to the Ramsar site would be predominantly associated with the operation of the project, rather than as a result of construction activities, if any such impacts occurred. Aspects of the project which could potentially impact on the wetland's values, other than those described in the sections above, include noise and vibration, lighting, unplanned introduction of marine pests and accidental release of contaminants (e.g. fuels, oils, etc) from leaks or spills. As there is no physical construction or location of infrastructure on the Ramsar site, the proposed facility being located ~ 1 km from the Point Wilson/Limeburners Bay component, and comprehensive management plans and practices would be in place, it is unlikely that the project would impact on the ecological character of the wetland.

Potential impacts during the construction phase would be temporary and most likely associated with short term noise generation or lighting during the construction of the jetty extension at Refinery Pier. Any potential impacts will be mitigated through the development and implementation of a Construction Environment Management Plan and activity-specific work method statements prior to the commencement of works.

Operational noise from the FSRU and LNG carriers has the potential to create disturbance to birds that utilise the Ramsar site. The intertidal mudflats, seagrass beds and saltmarshes of the Ramsar site support a large and diverse range of migratory wading birds and other marine and water birds. However, potential noise impacts vary due to various factors including distance to sensitive receptors, duration of work, intensity of noise levels and the time at which works are undertaken. It should also be noted the existing refinery and wharf are in an industrial port setting that already generates significant operational noise. Publicly available information from other FSRU projects suggests that operating noise from the facility would be unlikely to have adverse impacts on birdlife at the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site which is ~ 1 km from the project site.

Lighting associated with the operation of the FSRU may also potentially impact on migratory marine birds. Artificial lighting has potential to affect birds by altering visual cues for orientation, navigation or other purposes, resulting in behavioural responses, which can alter natural distribution and dependencies. However, the FSRU would be situated ~ 1 km distant from the Ramsar site in an area with very high levels of lighting associated with the refinery, port and other industrial facilities and is unlikely to cause significant impact.

The FSRU (only once upon entry) and visiting LNG carriers would contribute to the risk of introduced marine pests to Corio Bay, however there is already considerable vessel traffic visiting the Port of Geelong. The potential contribution of the FSRU and visiting LNG carriers to these impacts will be managed through strict operational controls and applicable legislation

including ballast water and biofouling requirements, and biosecurity management measures for visiting LNG carriers.

There will be potential for discharge of contaminants to the marine environment (e.g. fuels, oils, etc) from leaks or spills, however this is considered unlikely with strict control measures in place. Also LNG carriers and FSRUs typically use natural gas to fuel their engines therefore reducing the risk of spills (methane is lighter than air and therefore cannot form a slick if released).

2.3.2 Do you consider this impact to be significant?

☐ Yes ☑ No

2.4 Is the proposed action likely to have any direct or indirect impact on the members of any listed species or any threatened ecological community, or their habitat?

☑ Yes ☐ No

Species or threatened ecological community

A PMST search identified 36 listed threatened bird species that may occur within 5 km of the project area:
Regent Honeyeater
Australasian Bittern
Red Knot
Curlew Sandpiper
Great Knot
Greater Sand Plover
Lesser Sand Plover
Antipodean Albatross
Southern Royal Albatross
Wandering Albatross
Northern Royal Albatross
Grey Falcon
Painted Honeyeater
White-throated Needletail
Swift Parrot
Bar-tailed Godwit (baueri)
Northern Siberian Bar-tailed Godwit
Southern Giant Petrel
Northern Giant Petrel
Orange-bellied Parrot
Eastern Curlew
Fairy Prion
Plains-wanderer
Sooty Albatross
Gould's Petrel
Australian Painted Snipe
Australian Fairy Tern
Buller's Albatross
Northern Buller's Albatross
Shy Albatross
Grey-headed Albatross
Campbell Albatross
Black-browed Albatross
Salvin's Albatross
White-capped Albatross
Hooded Plover

Impact

According to the PMST database these species or species habitat are either known to, likely to or may occur, or there is foraging, feeding or related behaviour likely to occur within the area. The degree to which any of these listed threatened bird species may use the project area or the surrounding area has not yet been assessed, however the project area is located within and adjacent to a heavily developed port and industrial complex and based on the extent and nature of vegetation, and the associated habitat, there is a low likelihood of these species occurring within the project area.

Vegetation along the proposed pipeline corridor has been highly modified and comprises primarily exotic grasses and

planted exotic and native trees. Ecological surveys conducted in February and October 2020 did not observe the presence of any threatened species or species habitat within or adjacent to the proposed pipeline corridor.

Further studies will be undertaken to assess potential impacts on threatened bird species.

Species or threatened ecological community

A PMST search identified two listed threatened fish species that may occur within 5 km of the project area:
Dwarf Galaxias
Australian Grayling

Impact

Dwarf Galaxias is a freshwater species. It is a mid-water, free-swimming species, with its entire life cycle completed in freshwater. The species is known to inhabit slow flowing and still, shallow, permanent and temporary freshwater habitats such as swamps, drains and the backwaters of streams and creeks (Saddlier et al., 2020 in DAWE, 2020). As none of these habitats occur within either the project area or the surrounding area, it is highly unlikely the project would impact on this species.

The Australian Grayling is diadromous, spending part of its lifecycle in freshwater and at least part of the larval and/or juvenile stages in coastal seas (Miles et al., 2013 in DAWE, 2020). The Barwon River estuary, part of the Port Phillip (Western Shoreline) and Bellarine Peninsula Ramsar site, is an important migratory route for Australian Grayling, where the species migrates through the Barwon River estuary into the Southern Ocean as part of its lifecycle. Australian Grayling has not been identified as an ecological value present within the Point Wilson/Limeburners Bay section of the Ramsar site (DELWP, 2018). Suitable habitat for Australian Grayling would not be present within the project area or within the closest component of the Ramsar site at Point Wilson/Limeburners Bay located approximately 1 km away. The project is therefore highly unlikely to impact on this species.

Species or threatened ecological community

A PMST search identified one listed threatened frog species that may occur within 5 km of the project area:
Growling Grass Frog

Impact

This species is found mostly amongst emergent vegetation in or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds and farm dams (Robinson, 1993 and NSW DEC, 2005a in DAWE, 2020). As none of these habitats occur within the project area, it is highly unlikely that this species would be present within the project area and therefore would not be impacted.

Species or threatened ecological community

A PMST search identified one listed threatened insect species that may occur within 5 km of the project area:
Golden Sun Moth

Impact

A preliminary ecological survey conducted in February 2020 (Eco Logical Australia, 2020a) concluded that the only potential habitat for the Golden Sun Moth would be located within the two paddocks either side of Shell Parade, referred to as Corio Native Grassland Reserve.

A subsequent detailed assessment (AECOM, 2020) of the proposed pipeline corridor was conducted in October 2020 by two AECOM ecologists (one zoologist, and one DELWP-accredited Vegetation Quality Assessor (botanist)). AECOM paid particular attention to the existence of Matters of National Environmental Significance, and in particular to the potential habitat for the Golden Sun Moth. The vegetation within the study area was dominated by exotic graminoids. Of these, Phalaris was the most dominant. The ground within the road reserves surveyed was found to have been historically disturbed as a result of the laying of a number of pipelines that follow the route of the proposed new pipeline. Significant compaction has occurred since, and regular on-going maintenance and management from weed control and slashing/mowing has further reduced the habitat value. The ‘grassland’ reserve managed by council (Corio Native Grassland Reserve) contains significant biomass, dominated by Phalaris - not a known food source for the species. Native grasses were completely absent from this area of the site. The privately-owned farmland along Rennies Road (north of the Princes Freeway) is also dominated by Phalaris. All ground-layer vegetation within the study area was dominated by exotic species, with no Wallaby grass Rhytidosperma spp or Spear Grass Austrostipa observed. No grassland surveyed presented with the open tussock structure necessary for the male moth to identify females within the grass sward. Whilst very small areas of Chilean Needle-grass Nassella neesiana (a known

food source for the species) were recorded, no patches were considered large enough to support a population of Golden Sun Moth.

There are no nearby records for this species on the DELWP Victorian Biodiversity Atlas (VBA), with the closest historic Golden Sun Moth record located some 8 km north of the study area, and dating from 2009.

It is therefore very unlikely that the Golden Sun Moth would be impacted by the project as no habitat for this species is present within the project area.

Species or threatened ecological community

A PMST search identified five listed threatened mammal species that may occur within 5 km of the project area:
Swamp Antechinus
Spot-tailed Quoll
Grey-headed Flying-fox
Southern Right Whale
Humpback Whale

Impact

Ecological surveys conducted in February and October 2020 did not observe the presence of any threatened species or species habitat, including that of the Swamp Antechinus, Spot-tailed Quoll and Grey-headed Flying-fox, within or adjacent to the proposed pipeline corridor. Vegetation along the proposed pipeline corridor has been highly modified and comprises primarily exotic grasses and planted exotic and native trees. Indigenous grassland vegetation was only observed in small fragmented patches in two paddocks either side of Shell Parade, referred to as Corio Native Grassland Reserve, and more than 50 m from the road.

It is therefore highly unlikely that the Swamp Antechinus, Spot-tailed Quoll and Grey-headed Flying-fox would be present within the project area or would be impacted.

Individual Southern Right Whales and Humpback Whales may be found in Corio Bay on a few occasions each year for short periods. As a result, it is unlikely these species would be significantly impacted by the FSRU seawater discharge as they would have very low exposure time. There is also the potential for visiting LNG carriers (25 - 45 per year) to strike whales that may be in the deeper waters of the Port of Geelong shipping channel, however, the channel supports an existing port with over 1200 vessel movements every year hence the increased risk of ship strike is very small. The main shipping channel within Corio Bay has speed restrictions on vessels of such size which would significantly reduce the likelihood of whale strike incidents. Piling during construction of the Refinery Pier extension and operation of the FSRU at the new berth may lead to additional noise being generated, including underwater noise which may impact on marine mammals, although the likelihood of the two listed threatened whale species being so close to the shoreline and existing port and industrial infrastructure is considered low.

Studies will be undertaken to assess potential impacts on threatened marine fauna. Further modelling and assessment will be undertaken to determine the extent of impacts from the FSRU discharge on marine ecosystem components. In October 2020 Viva Energy commenced a marine monitoring program in Corio Bay to establish baseline data for a range of parameters including temperature, currents, benthic fauna and seasonal presence of plankton and larvae to inform hydrodynamic modelling and impact assessment.

Viva Energy also intends to conduct hydrodynamic modelling and impact assessment of the cold water plume which would occur in the event that a direct discharge from the FSRU or from a jetty based diffuser was required rather than discharging into the refinery cooling water intake. This would be undertaken to ensure that a contingency option was in place in the event that the refinery discharge option was interrupted or unavailable for a period of time.

Species or threatened ecological community

A PMST search identified five listed threatened reptile species that may occur within 5 km of the project area:
Loggerhead Turtle
Green Turtle
Leatherback Turtle
Striped Legless Lizard
Grassland Earless Dragon

Impact

As with the notes for Golden Sun Moth (above), the entire study area presents as either historically disturbed (through the laying of pipework) or is currently disturbed through slashing and mowing activities, or both. The dominance of Phalaris throughout the study area reduces the potential for Striped Legless Lizard habitat as the dense biomass and structure present, not preferred by the species. In addition to the sub-optimal vegetation structure and species composition, no buried or surface rock was observed, and nor was the cracking soils that are known to be favoured by the species.

There are no nearby records for this species on the DELWP Victorian Biodiversity Atlas (VBA), with the closest historical record of the species is from ~7 km north of the study area, and dating from 1992.

The Grassland Earless Dragon is also a specialist inhabitant of native temperate grasslands (DAWE, 2020). Ecological surveys conducted in February and October 2020 did not observe the presence of any threatened species or species habitat, including that of the Grassland Earless Dragon, within or adjacent to the proposed pipeline corridor. It was noted during the preliminary February survey that beyond the area of paddock surveyed the Natural Temperate Grassland of the Victorian Volcanic Plan ecological community may be present however this would be outside of the proposed pipeline corridor and therefore not impacted by the project.

Individuals of these turtle species may be found in Corio Bay on a few occasions each year for short periods. Nesting for all three species does not occur in Victoria, with nesting generally occurring in tropical waters (DAWE, 2020). As a result, it is unlikely these species would be significantly impacted by the FSRU seawater discharge as they would have very low exposure time. Piling during construction of the Refinery Pier extension and operation of the FSRU at the new berth may lead to additional noise being generated, including underwater noise which may impact on marine reptiles.

Studies will be undertaken to assess potential impacts on threatened marine reptiles. Further modelling and assessment will be undertaken to determine the extent of impacts from the FSRU discharge on marine ecosystem components. In October 2020 Viva Energy commenced a marine monitoring program in Corio Bay to establish baseline data for a range of parameters including temperature, currents, benthic fauna and seasonal presence of plankton and larvae to inform hydrodynamic modelling and impact assessment.

Viva Energy also intends to conduct hydrodynamic modelling and impact assessment of the cold water plume which would occur in the event that a direct discharge from the FSRU or from a jetty based diffuser was required rather than discharging into the refinery cooling water intake. This would be undertaken to ensure that a contingency option was in place in the event that the refinery discharge option was interrupted or unavailable for a period of time.

Species or threatened ecological community

A PMST search identified one listed threatened shark species that may occur within 5 km of the project area:
Great White Shark

Impact

Individuals of this shark species may be found in Corio Bay on a few occasions each year for short periods. As a result, it is unlikely these species would be significantly impacted from the FSRU seawater discharge as they would have very low exposure time. Piling during construction of the extension to Refinery Pier and operation of the FSRU at Refinery Pier may lead to additional noise being generated, including underwater noise which may impact on sharks.

Studies will be undertaken to assess potential impacts on threatened shark species. Further modelling and assessment will be undertaken to determine the extent of impacts from the FSRU discharge on marine ecosystem components. In October 2020 Viva Energy commenced a marine monitoring program in Corio Bay to establish baseline data for a range of parameters including temperature, currents, benthic fauna and seasonal presence of plankton and larvae to inform hydrodynamic modelling and impact assessment.

Viva Energy also intends to conduct hydrodynamic modelling and impact assessment of the cold water plume which would occur in the event that a direct discharge from the FSRU or from a jetty based diffuser was required rather than discharging into the refinery cooling water intake. This would be undertaken to ensure that a contingency option was in place in the event that the refinery discharge option was interrupted or unavailable for a period of time.

Species or threatened ecological community

A PMST search identified 15 listed threatened flora species that may occur within 5 km of the project area
River Swamp Wallaby-grass
Dwarf Spider-orchid
Small Golden Moths Orchid
Trailing Hop-bush
Clover Glycine

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Adamson's Blown-grass
Hoary Sunray
Spiny Rice-flower
Maroon Leek-orchid
Green-striped Greenhood
Leafy Greenhood
Button Wrinklewort
Large-fruit Fireweed
Metallic Sun-orchid
Swamp Everlasting

Impact

Vegetation along the proposed pipeline corridor has been highly modified and comprises primarily exotic grasses and planted exotic and native trees. Indigenous grassland vegetation was only observed in small, fragmented patches in two paddocks either side of Shell Parade, referred to as Corio Native Grassland Reserve, and more than 50 m from the road. Ecological surveys conducted in February and October 2020 did not observe the presence of any threatened flora species within or adjacent to the proposed pipeline corridor. Threatened flora species are therefore not considered likely to be present within the project area.

Species or threatened ecological community

A PMST search identified five listed threatened ecological communities that are known or likely to occur within the 5 km radius search area:
Grassy Eucalypt Woodland of the Victorian Volcanic Plain
Natural Temperate Grassland of the Victorian Volcanic Plain
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains
Subtropical and Temperate Coastal Saltmarsh
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

Impact

Vegetation along the proposed pipeline corridor has been highly modified and comprises primarily exotic grasses and planted exotic and native trees. Ecological surveys conducted in February and October 2020 did not record the presence of any threatened ecological communities within or adjacent to the proposed pipeline corridor. Indigenous grassland vegetation was only observed in small, fragmented patches in two paddocks either side of Shell Parade, referred to as Corio Native Grassland Reserve. The patches were found to be more prevalent in the central areas of the paddocks, more than 50 m from the edge, and not observed near the roadside. It was noted that beyond the area of paddock surveyed the Natural Temperate Grassland of the Victorian Volcanic Plan ecological community may be present however this would be outside of the proposed pipeline corridor and therefore not impacted by the project.

No other listed threatened ecological communities occur within the project area.

2.4.2 Do you consider this impact to be significant?

☐ Yes ☑ No

2.5 Is the proposed action likely to have any direct or indirect impact on the members of any listed migratory species or their habitat?

☑ Yes ☐ No

Migratory species

The PMST search identified 19 listed migratory marine bird species that may occur within 5 km of the project area (i.e. study area):

- Common Noddy
- Fork-tailed Swift
- Flesh-footed Shearwater
- Sooty Shearwater
- Antipodean Albatross
- Southern Royal Albatross
- Wandering Albatross
- Northern Royal Albatross
- Southern Giant-Petrel
- Northern Giant Petrel

- Sooty Albatross
- Little Tern
- Buller's Albatross
- Shy Albatross
- Grey-headed Albatross
- Campbell Albatross
- Black-browned Albatross
- Salvin's Albatross
- White-capped Albatross

Impact

The Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site, a component of which is located approximately 1.3 km to the north-east of Refinery Pier, is known to regularly support a number of migratory bird species.

Potential impacts to migratory bird species and other wader and waterbird species that may utilise the study area, would be predominantly associated with the operation of the project rather than as a result of construction activities if such impacts occurred. Impacts during the construction phase would be temporary and most likely associated with short term noise generation or lighting during the construction of the extension to Refinery Pier.

A potential impact on waders and waterbirds associated the FSRU seawater discharge could be adverse effects on habitat and food sources as a result of the temperature or residual chlorine. However, as the discharge plume is likely to be localised (based on other FSRU studies) impacts on regional habitats and food sources for waders and waterbirds are considered unlikely. The proposed reuse of the FSRU cold water discharge in the refinery cooling process would result in a discharge an average of 4 °C above ambient seawater temperature compared with the current 9 °C discharge from the refinery meaning the proposed discharge is closer to normal conditions than the current discharge.

Noise generated during operation of the project has the potential to create disturbance to birds that utilise the surrounding area, particularly the Ramsar site. The intertidal mudflats, seagrass beds and saltmarshes of the Ramsar site support a large and diverse range of migratory birds. Therefore, operational noise from the FSRU and associated onshore facilities may potentially impact migratory species within the study area. However, potential noise impacts vary due to various factors including distance to sensitive receptors, duration of work, intensity of noise levels and the time at which works are undertaken. It should also be noted the existing refinery and wharf are in an industrial setting that already generates significant operational noise.

Publicly available information from other FSRU projects suggests that operating noise from the facility would be unlikely to have adverse impacts on birdlife at the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site which is 1.3 km distant from the refinery and project site.

Lighting associated with the operation of the FSRU may also potentially impact on migratory marine birds. Artificial lighting has potential to affect birds by altering visual cues for orientation, navigation or other purposes, resulting in behavioural responses, which can alter natural distribution and dependencies. However, the FSRU and land based infrastructure would be located in an area with very high levels of lighting associated with the refinery, port and other industrial facilities and is unlikely to generate significant impacts.

Studies will be undertaken to assess potential impacts on migratory marine birds, including noise modelling and impact assessment and lighting impact assessment. Further modelling and assessment will also be undertaken to determine the extent of impacts from the FSRU discharge on marine ecosystem components. In October 2020 Viva Energy commenced a marine monitoring program in Corio Bay to establish baseline data for a range of parameters including temperature, currents, benthic fauna and seasonal presence of plankton and larvae to inform hydrodynamic modelling and impact assessment.

Viva Energy also intends to conduct hydrodynamic modelling and impact assessment of the cold water plume which would occur in the event that a direct discharge from the FSRU or from a jetty based diffuser was required rather than discharging into the refinery cooling water intake. This would be undertaken to ensure that a contingency option was in place in the event that the refinery discharge option was interrupted or unavailable for a period of time.

Migratory species

The PMST search identified nine listed migratory marine species that may occur within 5 km of the project area:

- Southern Right Whale
- Pygmy Right Whale
- Great White Shark

- Loggerhead Turtle
- Green Turtle
- Leatherback Turtle
- Dusky Dolphin
- Mackerel Shark
- Humpback Whale

Impact

Individuals of these migratory marine species may be found in Corio Bay on a few occasions each year for short periods. As a result, it is unlikely these species would be significantly impacted from the FSRU seawater discharge as they would have very low exposure time. There is also the potential for visiting LNG carriers (25 - 45 per year) to strike whales that may be in the deeper waters of the Port of Geelong shipping channel, however, the channel supports an existing port with over 1200 vessel movements every year hence the increased risk of ship strike is very small. The main shipping channel within Corio Bay has speed restrictions on vessels of such size which would significantly reduce the likelihood of whale strike incidents. Piling during construction of the Refinery Pier extension and operation of the FSRU at the new berth may lead to additional noise being generated, including underwater noise which may impact on marine mammals, although the likelihood of the two listed threatened whale species being so close to the shoreline and existing port and industrial infrastructure is considered low.

Studies will be undertaken to assess potential impacts on migratory marine fauna. Further modelling and assessment will be undertaken to determine the extent of impacts from the FSRU discharge on marine ecosystem components. In October 2020 Viva Energy commenced a marine monitoring program in Corio Bay to establish baseline data for a range of parameters including temperature, currents, benthic fauna and seasonal presence of plankton and larvae to inform hydrodynamic modelling and impact assessment.

Viva Energy also intends to conduct hydrodynamic modelling and impact assessment of the cold water plume which would occur in the event that a direct discharge from the FSRU or from a jetty based diffuser was required rather than discharging into the refinery cooling water intake. This would be undertaken to ensure that a contingency option was in place in the event that the refinery discharge option was interrupted or unavailable for a period of time.

Migratory species

The PMST search identified five listed migratory terrestrial species that may occur within 5 km of the project area:
- White-throated Needletail
- Black-faced Monarch
- Yellow Wagtail
- Satin Flycatcher
- Rufous Fantail

Impact

According to the PMST database these species or species habitat are likely, or known, to occur within the area. The degree to which any of these species may use the surrounding area has not yet been assessed, however the project area is located within and adjacent to a heavily developed port and industrial complex and based on the extent and nature of vegetation, and the associated habitat, there is a low likelihood of these species occurring within the project area.

Vegetation along the proposed pipeline corridor has been highly modified and comprises primarily exotic grasses and planted exotic and native trees. Ecological surveys conducted in February and October 2020 did not observe the presence of any threatened species or species habitat within or adjacent to the proposed pipeline corridor.

Migratory species

The PMST search identified 27 listed migratory wetland species that may occur within 5 km of the project area (i.e. the study area):
- Common Sandpiper
- Ruddy Turnstone
- Sharp-tailed Sandpiper
- Red Knot
- Curlew Sandpiper
- Pectoral Sandpiper
- Red-necked Stint
- Long-toed Stint

- Great Knot
- Double-banded Plover
- Greater Sand Plover
- Lesser Sand Plover
- Latham's Snipe
- Broad-billed Sandpiper
- Bar-tailed Godwit
- Black-tailed Godwit
- Eastern Curlew
- Opsrey
- Red-necked Phalarope
- Ruff (Reeve)
- Pacific Golden Plover
- Grey Plover
- Grey-tailed Tattler
- Wood Sandpiper
- Common Greenshank
- Marsh Sandpiper
- Terek Sandpiper

Impact

Potential impacts to migratory wetland bird species that may utilise the study area, would be predominantly associated with the operation of the project rather than as a result of construction activities if such impacts occurred. Impacts during the construction phase would be temporary and most likely associated with short term noise generation or lighting during the construction of the extension to Refinery Pier.

A potential impact on waders and waterbirds associated the FSRU seawater discharge could be adverse effects on habitat and food sources as a result of the temperature or residual chlorine. However, as the discharge plume is likely to be localised (based on other FSRU studies) impacts on regional habitats and food sources for waders and waterbirds are considered unlikely. The proposed reuse of the FSRU cold water discharge in the refinery cooling process would result in a discharge an average of 4 °C above ambient seawater temperature compared with the current 9 °C discharge from the refinery meaning the proposed discharge is closer to normal conditions than the current discharge.

Noise generated during operation of the project has the potential to create disturbance to birds that utilise the surrounding area, particularly the Ramsar site. The intertidal mudflats, seagrass beds and saltmarshes of the Ramsar site support a large and diverse range of migratory bird species. Therefore, operational noise from the FSRU and associated onshore facilities may potentially impact waterbirds within the study area. However, potential noise impacts vary due to various factors including distance to sensitive receptors, duration of work, intensity of noise levels and the time at which works are undertaken. It should also be noted the existing refinery is an industrial setting that already generates operational noise.

Publicly available information from other FSRU projects suggests that operating noise from the facility would be unlikely to have adverse impacts on birdlife at the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site which is 1.3 km distant from the refinery and project site.

Lighting associated with the operation of the FSRU may also potentially impact on migratory wetland birds. Artificial lighting has potential to affect birds by altering visual cues for orientation, navigation or other purposes, resulting in behavioural responses, which can alter natural distribution and dependencies. However, the FSRU and land based infrastructure would be located in an area with very high levels of lighting associated with the refinery, port and other industrial facilities and is unlikely to generate significant impacts.

Studies will be undertaken to assess potential impacts on migratory wetland birds, including noise modelling and impact assessment and lighting impact assessment. Further modelling and assessment will also be undertaken to determine the extent of impacts from the FSRU discharge on marine ecosystem components. In October 2020 Viva Energy commenced a marine monitoring program in Corio Bay to establish baseline data for a range of parameters including temperature, currents, benthic fauna and seasonal presence of plankton and larvae to inform hydrodynamic modelling and impact assessment.

Viva Energy also intends to conduct hydrodynamic modelling and impact assessment of the cold water plume which would occur in the event that a direct discharge from the FSRU or from a jetty based diffuser was required rather than discharging into the refinery cooling water intake. This would be undertaken to ensure that a contingency option was in place in the event that the refinery discharge option was interrupted or unavailable for a period of time.

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Migratory species

The PMST search identified 19 listed migratory marine bird species that may occur within 5 km of the project area (i.e. study area):

- Common Noddy
- Fork-tailed Swift
- Flesh-footed Shearwater
- Sooty Shearwater
- Antipodean Albatross
- Southern Royal Albatross
- Wandering Albatross
- Northern Royal Albatross
- Southern Giant-Petrel
- Northern Giant Petrel
- Sooty Albatross
- Little Tern
- Buller's Albatross
- Shy Albatross
- Grey-headed Albatross
- Campbell Albatross
- Black-browned Albatross
- Salvin's Albatross
- White-capped Albatross

Impact

The Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site, a component of which is located approximately 1.3 km to the north-east of Refinery Pier, is known to regularly support a number of migratory bird species.

Potential impacts to migratory bird species and other wader and waterbird species that may utilise the study area, would be predominantly associated with the operation of the project rather than as a result of construction activities if such impacts occurred. Impacts during the construction phase would be temporary and most likely associated with short term noise generation or lighting during the construction of the extension to Refinery Pier.

A potential impact on waders and waterbirds associated the FSRU seawater discharge could be adverse effects on habitat and food sources as a result of the temperature or residual chlorine. However, as the discharge plume is likely to be localised (based on other FSRU studies) impacts on regional habitats and food sources for waders and waterbirds are considered unlikely. The proposed reuse of the FSRU cold water discharge in the refinery cooling process would result in a discharge an average of 4 °C above ambient seawater temperature compared with the current 9 °C discharge from the refinery meaning the proposed discharge is closer to normal conditions than the current discharge.

Noise generated during operation of the project has the potential to create disturbance to birds that utilise the surrounding area, particularly the Ramsar site. The intertidal mudflats, seagrass beds and saltmarshes of the Ramsar site support a large and diverse range of migratory birds. Therefore, operational noise from the FSRU and associated onshore facilities may potentially impact migratory species within the study area. However, potential noise impacts vary due to various factors including distance to sensitive receptors, duration of work, intensity of noise levels and the time at which works are undertaken. It should also be noted the existing refinery and wharf are in an industrial setting that already generates significant operational noise.

Publicly available information from other FSRU projects suggests that operating noise from the facility would be unlikely to have adverse impacts on birdlife at the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site which is 1.3 km distant from the refinery and project site.

Lighting associated with the operation of the FSRU may also potentially impact on migratory marine birds. Artificial lighting has potential to affect birds by altering visual cues for orientation, navigation or other purposes, resulting in behavioural responses, which can alter natural distribution and dependencies. However, the FSRU and land based infrastructure would be located in an area with very high levels of lighting associated with the refinery, port and other industrial facilities and is unlikely to generate significant impacts.

Studies will be undertaken to assess potential impacts on migratory marine birds, including noise modelling and impact assessment and lighting impact assessment. Further modelling and assessment will also be undertaken to determine the extent of impacts from the FSRU discharge on marine ecosystem components. In October 2020 Viva Energy commenced a marine monitoring program in Corio Bay to establish baseline data for a range of parameters including temperature, currents,

benthic fauna and seasonal presence of plankton and larvae to inform hydrodynamic modelling and impact assessment.

Viva Energy also intends to conduct hydrodynamic modelling and impact assessment of the cold water plume which would occur in the event that a direct discharge from the FSRU or from a jetty based diffuser was required rather than discharging into the refinery cooling water intake. This would be undertaken to ensure that a contingency option was in place in the event that the refinery discharge option was interrupted or unavailable for a period of time.

Migratory species

The PMST search identified nine listed migratory marine species that may occur within 5 km of the project area:
- Southern Right Whale
- Pygmy Right Whale
- Great White Shark
- Loggerhead Turtle
- Green Turtle
- Leatherback Turtle
- Dusky Dolphin
- Mackerel Shark
- Humpback Whale

Impact

Individuals of these migratory marine species may be found in Corio Bay on a few occasions each year for short periods. As a result, it is unlikely these species would be significantly impacted from the FSRU seawater discharge as they would have very low exposure time. There is also the potential for visiting LNG carriers (25 - 45 per year) to strike whales that may be in the deeper waters of the Port of Geelong shipping channel, however, the channel supports an existing port with over 1200 vessel movements every year hence the increased risk of ship strike is very small. The main shipping channel within Corio Bay has speed restrictions on vessels of such size which would significantly reduce the likelihood of whale strike incidents. Piling during construction of the Refinery Pier extension and operation of the FSRU at the new berth may lead to additional noise being generated, including underwater noise which may impact on marine mammals, although the likelihood of the two listed threatened whale species being so close to the shoreline and existing port and industrial infrastructure is considered low.

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Migratory species

The PMST search identified five listed migratory terrestrial species that may occur within 5 km of the project area:
- White-throated Needletail
- Black-faced Monarch
- Yellow Wagtail
- Satin Flycatcher
- Rufous Fantail

Impact

According to the PMST database these species or species habitat are likely, or known, to occur within the area. The degree to which any of these species may use the surrounding area has not yet been assessed, however the project area is located within and adjacent to a heavily developed port and industrial complex and based on the extent and nature of vegetation, and the associated habitat, there is a low likelihood of these species occurring within the project area.

Vegetation along the proposed pipeline corridor has been highly modified and comprises primarily exotic grasses and planted exotic and native trees. Ecological surveys conducted in February and October 2020 did not observe the presence of any threatened species or species habitat within or adjacent to the proposed pipeline corridor.

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Migratory species

The PMST search identified 27 listed migratory wetland species that may occur within 5 km of the project area (i.e. the study area):

- Common Sandpiper
- Ruddy Turnstone
- Sharp-tailed Sandpiper
- Red Knot
- Curlew Sandpiper
- Pectoral Sandpiper
- Red-necked Stint
- Long-toed Stint
- Great Knot
- Double-banded Plover
- Greater Sand Plover
- Lesser Sand Plover
- Latham's Snipe
- Broad-billed Sandpiper
- Bar-tailed Godwit
- Black-tailed Godwit
- Eastern Curlew
- Opsrey
- Red-necked Phalarope
- Ruff (Reeve)
- Pacific Golden Plover
- Grey Plover
- Grey-tailed Tattler
- Wood Sandpiper
- Common Greenshank
- Marsh Sandpiper
- Terek Sandpiper

Impact

Potential impacts to migratory wetland bird species that may utilise the study area, would be predominantly associated with the operation of the project rather than as a result of construction activities if such impacts occurred. Impacts during the construction phase would be temporary and most likely associated with short term noise generation or lighting during the construction of the extension to Refinery Pier.

A potential impact on waders and waterbirds associated the FSRU seawater discharge could be adverse effects on habitat and food sources as a result of the temperature or residual chlorine. However, as the discharge plume is likely to be localised (based on other FSRU studies) impacts on regional habitats and food sources for waders and waterbirds are considered unlikely. The proposed reuse of the FSRU cold water discharge in the refinery cooling process would result in a discharge an average of 4 °C above ambient seawater temperature compared with the current 9 °C discharge from the refinery meaning the proposed discharge is closer to normal conditions than the current discharge.

Noise generated during operation of the project has the potential to create disturbance to birds that utilise the surrounding area, particularly the Ramsar site. The intertidal mudflats, seagrass beds and saltmarshes of the Ramsar site support a large and diverse range of migratory bird species. Therefore, operational noise from the FSRU and associated onshore facilities may potentially impact waterbirds within the study area. However, potential noise impacts vary due to various factors including distance to sensitive receptors, duration of work, intensity of noise levels and the time at which works are undertaken. It should also be noted the existing refinery is an industrial setting that already generates operational noise.

Publicly available information from other FSRU projects suggests that operating noise from the facility would be unlikely to have adverse impacts on birdlife at the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site which is 1.3 km distant from the refinery and project site.

Lighting associated with the operation of the FSRU may also potentially impact on migratory wetland birds. Artificial lighting has potential to affect birds by altering visual cues for orientation, navigation or other purposes, resulting in behavioural responses, which can alter natural distribution and dependencies. However, the FSRU and land based infrastructure would be located in an area with very high levels of lighting associated with the refinery, port and other industrial facilities and is unlikely to generate significant impacts.

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Studies will be undertaken to assess potential impacts on migratory wetland birds, including noise modelling and impact assessment and lighting impact assessment. Further modelling and assessment will also be undertaken to determine the extent of impacts from the FSRU discharge on marine ecosystem components. In October 2020 Viva Energy commenced a marine monitoring program in Corio Bay to establish baseline data for a range of parameters including temperature, currents, benthic fauna and seasonal presence of plankton and larvae to inform hydrodynamic modelling and impact assessment.

Viva Energy also intends to conduct hydrodynamic modelling and impact assessment of the cold water plume which would occur in the event that a direct discharge from the FSRU or from a jetty based diffuser was required rather than discharging into the refinery cooling water intake. This would be undertaken to ensure that a contingency option was in place in the event that the refinery discharge option was interrupted or unavailable for a period of time.

2.5.2 Do you consider this impact to be significant?

☐ Yes ☑ No

2.6 Is the proposed action to be undertaken in a marine environment (outside Commonwealth marine areas)?

☑ Yes ☐ No

2.6.1 Is the proposed action likely to have any direct or indirect impact on the Commonwealth marine environment?

☐ Yes ☑ No

2.7 Is the proposed action likely to be taken on or near Commonwealth land?

☐ Yes ☑ No

2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?

☐ Yes ☑ No

2.9 Is the proposed action likely to have any direct or indirect impact on a water resource from coal seam gas or large coal mining development?

☐ Yes ☑ No

2.10 Is the proposed action a nuclear action?

☐ Yes ☑ No

2.11 Is the proposed action to be taken by a Commonwealth agency?

☐ Yes ☑ No

2.12 Is the proposed action to be undertaken in a Commonwealth Heritage place overseas?

☐ Yes ☑ No

2.13 Is the proposed action likely to have any direct or indirect impact on any part of the environment in the Commonwealth marine area?

☐ Yes ☑ No

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Section 3

Description of the project area

3.1 Describe the flora and fauna relevant to the project area

A preliminary flora and fauna assessment was undertaken by Eco Logical Australia (2020a) for two pipeline routes initially proposed for the project. That assessment involved database and literature reviews as part of a desktop assessment, as well as a field survey undertaken in February 2020. Vegetation within the vicinity of the project area was found to be almost entirely comprised of introduced species, predominantly exotic grasses and planted native and exotic trees. Indigenous vegetation was only identified in two paddocks either side of Shell Parade, to the south of Bell Road, referred to as Corio Native Grassland Reserve. Remnant Plains Grassland EVC (EVC 132) vegetation was observed in small fragmented patches throughout these two paddocks which were otherwise dominated by exotic grasses. These patches were more prevalent in the central areas of the paddocks more than 50 m from the edge, and were not observed near the roadside. Although not recorded in the study area the EPBC Act-listed Natural Temperate Grassland of the Victorian Volcanic Plain threatened ecological community may be present within the Corio Native Grassland Reserve beyond the area assessed.

A subsequent ecological field survey was undertaken by AECOM in October 2020 (AECOM, 2020). The study area included the proposed pipeline corridor and a 50 m buffer either side. No threatened flora species, threatened fauna species or suitable habitat were recorded in the study area during this field assessment. No threatened ecological communities were recorded within the study area. The survey confirmed the earlier finding that the area is almost entirely dominated by exotic grassy species, with the exception of a few scattered native species noted in the Corio Native Grassland Reserve.

The seabed in the area around the proposed extension to Refinery Pier consists of soft unconsolidated mud and silty mud which provides habitat for a range of invertebrate animals that live on the surface of the seabed (epifauna) and that burrow within the seabed (infauna). Epifauna in the area surrounding the proposed jetty extension are likely to include sponges, tube worms, sea pens, sea-cucumbers and ascidians. The seabed infauna community would comprise worms, bivalves, snails, shrimps, sand fleas, sea-cucumbers and heart urchins as well as a range of other animals. Ecological assessments were undertaken by ERM in 2009 (ERM, 2009) within Corio Bay north of Refinery Pier. Eighty- three benthic species were identified in the sediment samples collected from the sub-tidal study area. Polychaetes dominated the benthic community assemblage (59% of species), followed by other worm phyla such as nematodes, oligochaetes and hirudinea (23%), crustaceans (10%), molluscs (7%) and other phyla such as echinoderms (1%). Epibenthic organisms colonise hard substrates such as wharf pilings and vertical surfaces of the Refinery saltwater cooling inlet. Diver-captured video transects of intertidal to sub-tidal areas adjacent to the refinery show abundant aquatic vegetation and biota such as starfish and mounds created by burrowing organisms, e.g. shrimps and crabs (URS/CSIRO, 2007). Dense seagrass beds are present along the northern shores of Corio Bay. Beds of Zostera nigricaulis are present at a depth of up to 4 m extending to within 1 km of the proposed jetty extension.

The planktonic community in Corio Bay comprises a range of microscopic plants (phytoplankton), microscopic and macroscopic animals (zooplankton), as well as eggs and larvae of fish and large invertebrates. EPA (State of the Bays Report 2016) has collected monthly samples at eight sites across Port Phillip Bay between 2008 and 2016 to monitor long term trends of phytoplankton species and abundance. Fewer than 10 % of samples collected over this period have total phytoplankton numbers exceeding 2 million cells/L (where 1-2 million cells/L is considered a ‘bloom’). Most samples that exceeded 2 million cells/L were collected during summer months, with the exception of Corio Bay, where increased phytoplankton activity was observed in March and April.

3.2 Describe the hydrology relevant to the project area (including water flows)

The project area is located within proximity to one surface waterway, Hovells Creek, which flows south into Limeburners Bay on the northern shore of Corio Bay. The proposed pipeline would connect to the SWP at Lara City Gate, which is located within approximately 500 m of Hovells Creek.

The Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar wetland is located on the western shoreline of Port Phillip Bay between Melbourne and Geelong and on the Bellarine Peninsula and covers 22,650 hectares. The Point Wilson/Limeburners Bay area of the Ramsar wetland is located approximately 1.3 kilometres to the north-east of the existing Refinery Pier outside the project area.

Corio Basin is a shallow basin with an area of 44 km2. There is a low water exchange rate between Corio bay and the main body of Port Phillp due to the presence of a shallow bar. The flushing time (where all the water is replaced by new water) is in the order of six months (Jenkins and Keough, 2015 in DELWP, 2018). Tidal currents within Corio Bay are very low (in the order of 0.1 m/s) (Cardno, 2011).

The shallow aquifer system in the foreshore and intertidal areas adjacent to the refinery is typically composed of a thin layer (0.1 to 0.3 metres) of gravely beach sand underlain by a sequence of grey silty clay. A thin, discontinuous calcareous cemented sand (limestone) feature has been reported on the lower unit, which may be a discharge feature. Data from terrestrial groundwater bores shows that the groundwater flows from beneath the refinery, into the foreshore area and then

south-westerly into Corio Bay.

The seawater and groundwater interface occurs in the intertidal region of the foreshore but is not well defined. The extent of mixing between groundwater and seawater varies with tidal condition. During high tide, seawater tends to move inwards towards the groundwater near the high tide mark. During low tide, groundwater moves into the intertidal and subtidal sediments. Discharge rates are generally low in the environment, ranging between 10-2 and 10-1 L/m2/day in the southern end of the foreshore in the vicinity of the saltwater intake, and 10 L/m2/day in the northern foreshore area.

3.3 Describe the soil and vegetation characteristics relevant to the project area

The Geological Survey of Victoria's 1:63,360 scale map sheet for Geelong (Map 857 Zone 7) indicates that the project area is underlain by Tertiary Fyansford Clay typically consisting of calcareous sands, silts and clays with limestone layers. A thin, but widespread succession of calcareous sands, sandy limestones, sands and sandstones named the Moorabool Viaduct Sands, blankets the Tertiary sedimentation. It overlies the Fyansford Clay with a slight angular disconformity. At the disconformity there is a discontinuous but very widespread phosphatic nodule bed containing nodules eroded from the underlying sediment. This formation is intermittently overlain by Quaternary age deposits consisting of sandy clays and clays with carbonate concretions.

Geotechnical investigations at Refinery Pier (Coffey, 2020) in the area to be dredged for the proposed new berth pocket and swing basin encountered very soft to firm recent marine sediments (sandy silt and sandy clay/clay) typically 2.0 m thick, but up to depths of 4.3 m below the seabed, overlying Moorabool Viaduct Sands comprising sands and clays. Cemented bands encountered within the Moorabool Viaduct Sands exhibited medium to high rock strength.These two distinct layers were also described in previous geotechnical investigations in the Refinery Pier area conducted for the CBCSAP (Worley Parsons, 2011) which encountered up to 2.0 m of "very soft dark grey to black silt and silty clay" overlying " stiff to hard ...silts and clays .. containing occasional cemented horizons".

Recent coastal deposits consisting of sands, silts, shell grit and mud edge Hovells Creek, Limeburners Bay and the adjacent shoreline of Corio Bay. The foreshore opposite the Geelong Refinery stretches for approximately 2.5 km and is comprised of a narrow shoreline that descends into Corio Bay. At the foreshore's southern end, the shoreline has been cut back by high tides to reveal a sequence of natural deposits. These deposits include a base layer of yellow clay, followed by a thick band of naturally occurring shell material, topped with a loose grey silty soil.

The Victorian Resources Online Geomorphic and soil landform units Map T7721 Geelong indicates that the area to the north of the refinery can be classified as Volcanic Western Plains. The plains of the 'Newer Volcanic' basalts that formed in the Late Pliocene and during the Pleistocene are generally characterised by thinner regolith development and poorly developed drainage. Associated soil types are sodic and non-sodic texture contrast (moderately deep to deep) soils and some gradational (shallow to moderately deep) soils. Coastal acid sulphate soils have been identified along Hovells Creek but not within the project area.

The landside component of the project area is located within the Victorian Volcanic Plain bioregion. The area has been highly modified and vegetation within the vicinity of the project area is almost entirely comprised of introduced species, predominantly exotic grasses and planted native and exotic trees. Indigenous Remnant Plains Grassland (EVC 132) vegetation, in small fragmented patches, was only identified in areas either side of Shell Parade, to the south of Bell Road within the Corio Native Grassland Reserve.

Coastal Saltmarsh is the dominant native community within the foreshore area adjacent to the eastern boundary of the refinery. This community represents Coastal Saltmarsh on the Victorian Plains Bioregion (EVC 9). A saltbush zone, dominated by Coast Saltbush occurs above the high tide level in a narrow strip along the sandy backshore zone. The remainder of the foreshore area is covered by grassland which is dominated by exotic species, although some native species would previously have been present. The majority of this area is or once would have been, consistent with Estuarine Flats Grassland (EVC 914), which is not a threatened EVC.

3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the project area

There are no outstanding natural features or important or unique values relevant to the project area.

3.5 Describe the status of native vegetation relevant to the project area

The project are has been highly modified and vegetation is almost entirely comprised of introduced species, predominantly exotic grasses and planted native and exotic trees.

A preliminary flora and fauna assessment was undertaken by Eco Logical Australia (2020a). Indigenous vegetation was only identified in two paddocks either side of Shell Parade, to the south of Bell Road, referred to as Corio Native Grassland

Reserve. Remnant Plains Grassland EVC (EVC 132) vegetation was observed in small fragmented patches throughout these two paddocks which were otherwise dominated by exotic grasses. These patches were more prevalent in the central areas of the paddocks more than 50 m from the edge, and were not observed near the roadside. A subsequent survey of the proposed pipeline corridor and a 50 m buffer either side confirmed the earlier finding that the area is almost entirely dominated by exotic grassy species, with the exception of a few scattered native species noted in the Corio Native Grassland Reserve.

A coastal vegetation assessment was undertaken in 2013 by ERM (ERM, 2013). The assessment covered an area ~ 1 km long and 80 m wide located north of Refinery Pier and parallel with the refinery's eastern boundary. Coastal Saltmarsh on the Victorian Plains Bioregion EVC (EVC 9) was found to be the dominant native community within the foreshore area but located predominantly in the north of the study area. Dominant species within the Coastal Saltmarsh community include Beaded Glasswort Sarcocornia quinqueflora subsp. quinqueflora, Pigface Disphyma crassifolium subsp. clavellatum and Austral Seablite Suaeda australis. Coastal Saltmarsh is an important habitat for fauna including bird species listed as threatened and migratory under the EPBC Act, including the Orange-bellied Parrot which is listed as critically endangered under the EPBC Act. This habitat provides potential winter foraging resources for this species as it is known to forage on saltmarsh vegetation throughout the Port Phillip Bay region. Vegetation dominated by Coast Saltbush Atriplex cinereal occurs above the high tide level in a narrow strip along the sandy backshore zone, extending for the majority of the study site (except immediately north of the salt water intake). This area of saltbush plays an important role in stabilising the margin between marine and terrestrial environments, as well as providing protection for the coastal saltmarsh on the landward side. Patches of planted shrubs and small trees, including Golden Wattle Acacia pycnatha and Coast Banksia Banksia integrifolia, occur along Shell Parade. Despite a largely exotic understory the planted area offers some ecological value by providing shelter and foraging resources. The southern section of the study area, north of the salt water intake and adjacent to an existing pipetrack is covered by grassland which is dominated by exotic species. Temporary access to the southern foreshore area may be required during construction to facilitate pipe lay activities, however heavy equipment would remain on existing access tracks distant from saltbush vegetation and no impact to native species is anticipated.

3.6 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area

Corio Bay is located at the western end of the Geelong Arm of Port Phillip Bay. A review of the Port of Geelong chart, AUS 153, shows that the approach channel and berths at the Refinery Pier have a maintained depth of 12.3 m. At the proposed location for the extension to Refinery Pier the swing basin has a current depth of 8 m, and the berth pocket has a current depth of 7 m.

Much of the shoreline of Corio Bay has been modified since European settlement. Bird (1993) notes that, while most of the western shores of Corio Bay are artificially boarded by sea walls, 'north of Cowies Creek valley are cliffs and sloping shore platforms cut into yellow brown stratified sandstones...then the land declines towards the shell oil refinery (now Viva Energy) and the Geelong Grammar School (north of the project area), where a narrow beach runs in front of a low grassy bluff'.

Inland from the coast the project area is generally quite flat and low lying ranging between 7 and 15 m above sea level.

3.7 Describe the current condition of the environment relevant to the project area

The project area is located in and adjacent to a heavily developed port and industrial area on the north-west shore of Corio Bay between the Geelong suburbs of Corio and North Shore. The site would incorporate the existing Refinery Pier within the Port of Geelong, and Geelong Refinery located adjacent to the jetty. The project site is a brownfield site, the landside area is disturbed (by extensive industrial, transport and agricultural related infrastructure development) and the seafloor has been modified by construction of the existing jetty and channel dredging.

Vegetation within the project area is almost entirely comprised of introduced species, predominantly exotic grasses and planted native and exotic trees. To the north of the refinery along the proposed pipeline corridor the land is predominantly agricultural. Despite its degraded nature due to the dominance of exotic species, Corio Native Grassland Reserve, located in two paddocks either side of Shell Parade retains small, remnant patches of native vegetation. The proposed pipeline corridor contains a high cover of weeds, including African Boxthorn, Serrated Tussock and Chilean Needle-grass (Eco Logical Australia, 2020b).

Along the foreshore adjacent to the eastern boundary of the refinery weed species were found to be common. Within the Coastal Saltmarsh community weeds were however found to be dominant only in marginal habitat. Prevalent weed species included Ribwort, Curled Duck and Paspalum. The extent of weed incursion in the southern area of the foreshore adjacent to the refinery saltwater intake was found to be extensive, dominated by Chilean Needle-grass (ERM, 2013).

'Shell Creek' receives an EPA licensed discharge from the Geelong Refinery cooling water processes and drains into Corio Bay to the south of the refinery. Other Refinery infrastructure present within Corio Bay includes the saltwater intake for Refinery cooling water and discharge pipes which release Refinery cooling water and surface water runoff under EPA licence conditions.

Corio Bay has a history of receiving contaminants from a variety of sources, including sewage and industry, rivers and creeks, drains and stormwater, shipping and dredging (ERM, 2009). Historically, a number of major industries have bordered Corio Bay including phosphate fertiliser manufacturing, Ford car manufacturing plant, Shell Oil Refinery (now Viva Energy) and Alcoa's aluminium smelter. Discharges from these industries have been sources of a wide range of contaminants including trace metals, organic contaminants and nutrients that have entered Corio Bay's water and sediments. The Port of Geelong is a major shipping port with a large number of vessels visiting Corio Bay annually. The Port has been in operation for over 150 years and historically, contaminants such as oil and hydrocarbons from bilge water and tributyltin (TBT) from antifouling paints would have been released into the Corio Bay receiving environment.

The interim results of sediment contaminant sampling and analysis undertaken by Coffey (2020) in the area to be dredged for the proposed new berth pocket and swing basin are entirely consistent with previous investigations of the Refinery Pier area conducted for the VRCA CBCSAP dredging campaigns. Concentrations of arsenic, lead, mercury and nickel were found to be above National Assessment Guidelines for Dredging (NAGD) screening levels. However, as found previously, concentrations of arsenic and nickel were similar in all sediment and natural soil domains, indicating that the concentration range represents naturally occurring background levels and is not indicative of contamination. The concentrations of lead, mercury and zinc were elevated in the shallow marine sediments (although zinc concentrations did not exceed screening levels) and are indicative of anthropogenic contamination, in line with previous findings. As measured in sediments previously (at Refinery Pier No. 4), elevated concentrations of TBT (above the screening levels but below NAGD Sediment Quality High Values) were identified in two isolated samples of shallow marine sediments.

3.8 Describe any Commonwealth Heritage places or other places recognised as having heritage values relevant to the project

No Commonwealth Heritage Places or other places recognised as having heritage values have been identified relevant to the project area.

One listed heritage place was identified within proximity to one of the initial pipeline route options assessed as part of the preliminary Aboriginal and historic cultural heritage assessment (Eco Logical Australia, 2020b). The study area for that pipeline route intersected with the place extent of H7721-0065 (Bluestone Cobbles and Artefact Scatter) listed on the Victorian Heritage Inventory. However, that pipeline route was not been included in the options for further consideration and is outside the proposed pipeline corridor.

3.9 Describe any Indigenous heritage values relevant to the project area

A preliminary Aboriginal and historical cultural heritage assessment was undertaken by Eco Logical Australia in February 2020 (Eco Logical Australia, 2020b). The project area is located within the traditional country of Wathaurong. The proposed pipeline corridor is located within proximity to defined areas of Aboriginal cultural heritage sensitivity, namely Hovells Creek, a registered Aboriginal cultural heritage place and coastal land. One registered Aboriginal cultural heritage place is located approximately 250 m north of the proposed of the pipeline corridor, VAHR 7721-0872, this place is an artefact scatter comprising a single surface artefact.

Portions of areas of Aboriginal cultural heritage sensitivity within proximity to the pipeline corridor do not appear to have been subject to significant ground disturbance. Disturbance across much of these areas of sensitivity appears to have been limited to ploughing. Prior disturbance within the pipeline corridor includes installation of subsurface utilities and road construction. The Registered Aboriginal Party for the area is the Wadawurrung Traditional Owners Aboriginal Corporation.

A Cultural Heritage Management Plan (CHMP) for environmental remediation works on the foreshore adjacent to the Geelong Refinery was undertaken in 2012 (ERM, 2012). The assessment identified one shell deposit (Shell Parade Midden 1 (VAHR 7721-1229) within an eroded bluff adjacent to a rocky beach platform along the shoreline. The shell deposit was considered to be of low scientific significance due to its eroded and disturbed nature. However, the shell deposit was considered useful for demonstrating Aboriginal occupation in the area. The aboveground pipeline would traverse the coastal land in an existing pipetrack from Refinery Pier to the refinery premises. The foreshore reserve is outside the project area.

3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the project area

Refinery Pier is located on Crown land, with a seabed lease from DELWP to Ports Pty Ltd. Viva Energy is seeking a seabed lease for the proposed new jetty arm as well as the piping from the FSRU to the refinery cooling water intake.

The proposed aboveground pipeline is primarily located on Viva Energy owned land, however, between Refinery Pier and the refinery premises boundary it would be located in an existing pipetrench on land owned by Ports Pty Ltd. Viva Energy holds a Licence for Use of Refinery Pier with GeelongPort which includes this adjoining land. (Note: GeelongPort Pty Ltd is the operator of the port of Geelong under a long-term agreement with Ports Pty Ltd.).

Where a pipeline easement (or licence) is not present, negotiations with the landholders to secure an easement (or licence) would be required. If these negotiations prove unsuccessful, Viva Energy will seek acquire an easement or licence

under the provisions in the Pipelines Act 2005.

3.11 Describe any existing or any proposed uses relevant to the project area

The project area is located within and adjacent to a highly developed port and industrial area on the shores of Corio Bay. The port has been in operation for over 150 years and is the largest industrial bulk cargo port in Victoria attracting over 600 ship visits and handling more than 14 million tonnes of product annually (VRCA 2018). The port environs embrace a substantial area of Geelong, extending from School Road in the north to Osborne House, North Geelong in the south and the port encompasses much of Corio Bay's western shoreline. The port environs can be categorised into four main precincts based on the wharf and berth assets, Refinery Pier, Lascelles Wharf, Corio Quay and Bulk Grain Pier.

Geelong's shipping channels extend 18 NM through Corio Bay from Point Richards through to Refinery Pier. The channels are man-made having been deepened and widened through periodic dredging to support port trade development. Refinery Pier is the primary location within the port of Geelong for movement of bulk liquids. Vessels up to 265 m in length currently utilize the four Refinery Pier berths servicing Viva Energy operations.

The petroleum refinery, formerly the Shell Refinery, has been in operation since 1954. Viva Energy's refinery and the co-located Lyondell Bassell plant are licensed Major Hazard Facilities. A range of industrial activities are located in the port environs including woodfibre processing and chemical, fertiliser and cement manufacture.

'Shell Creek' receives an EPA licensed discharge from the Refinery cooling water processes and drains into Corio Bay at the southern boundary of the refinery. Other Refinery infrastructure present within Corio Bay include the saltwater intake for Refinery cooling water and discharge pipes which release Refinery cooling water and surface water runoff under EPA licence conditions

Viva Energy owns and operates the WOPL (White Oil Pipeline) and the BOPL (Black Oil Pipeline) pipelines to transfer much of its production and any imported product to its Newport Terminal for distribution by road. The refinery is also connected to the Westernport – Altona - Geelong (WAG) pipeline, which conveys crude and condensate from Western Port. Where practicable the new gas pipeline would be located within these existing pipeline corridors.

The Geelong Refinery also includes a road gantry where some refined product is trucked to western Victoria and Avalon airport. State route M1 Princes Freeway provides connection from the port to Melbourne and the states north and to Colac and South Australia in the west. Additionally, Shell Parade on the refinery's eastern boundary extends the gazetted Higher Productivity Freight Vehicle access within the Port of Geelong.

The gas terminal would be located ~7 km from the centre of Geelong business district. The closest residential areas are Corio ~ 1.4 km to the west on the northern side of the Princes Freeway and North Shore ~ 1.7 km to the south which sits within the port environs between Corio Quay and Lascelles Wharf. Geelong Grammar School is located approximately 2 km north of Refinery Pier.

To the north of the refinery along the proposed pipeline route, the area is predominantly rural. The undeveloped paddocks owned by Viva Energy immediately north of the refinery have been planted with native trees in windrows. The vacant land further north, referred to as the Corio Native Grassland Reserve, is a fornmer subdivision now protected from development and managed by City of Greater Geelong. Beyond this the land on both sides of the Princes Freeway appears to be actively cultivated for crops or animal farming.

The Lara City Gate gas transfer station, owned by APA, provides a connection to the South West Pipeline (SWP) and is located adjacent to the Princes Freeway, ~ 4 km north-west of the Geelong Refinery.

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Section 4

Measures to avoid or reduce impacts

4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action

Design and development of the project will continue to occur as further site and environmental assessments are undertaken. Mitigation of potential impacts has been considered in the initial design stages with particular emphasis on:.

•Selection of the Geelong Refinery as the location for the project as the environment has been highly modified and is within a heavily developed port and industrial area.

•Reuse of the FSRU cold water discharge in the refinery cooling water process which replaces the current refinery seawater intake and improves the quality of the current refinery cooling water discharge.

With respect to the FSRU discharge, the refinery has a cooling water flowrate of ~ 300 T/d, which could be offset by the FSRU cold water discharge flow rate of ~ 312 T/d (at a design gas send out of 500 TJ/d) being taken directly into the refinery seawater intake. The FSRU would be located ~ 500 m southeast of the refinery intake and it is proposed that export piping would run along the seabed and discharge close to, or within, the existing intake race via a diffuser. Currently, the refinery takes in seawater at ambient temperature and discharges the cooling water at a warmer temperature via several EPA licensed discharge points. The resulting average temperature of the water discharged from the refinery is ~ 9°C above ambient seawater temperature. Diverting the cold water discharge from the FSRU to the refinery seawater intake would reduce the temperature of the water taken in to the refinery by ~ 5°C. This in turn would reduce the temperature of cooling water from the refinery outlet by ~ 5°C. The resulting outlet temperature averaged across the refinery discharge points would then be ~ 4°C above ambient seawater temperature, compared to the existing ~ 9°C above ambient temperature from current refinery operations.

Using the cold water discharge from the FSRU as the source of the refinery cooling water would provide the following benefits:

•Reduces the potential impact associated with discharging cold water from the FSRU into a single location below the vessel that is 5°C below the ambient seawater temperature

•Reduces the potential impact at the refinery cooling water outlets by lowering the temperature from ~9°C to ~4°C above ambient seawater temperature

•Reduces the potential impact by spreading the FSRU discharge across the three refinery outlets resulting in a more diffuse and lower concentration of warm temperature water being discharged.

•Replaces the current refinery seawater intake meaning that the FSRU would not represent a significant additive source of entrainment of plankton and larvae.

Reuse as refinery cooling water also provides the opportunity to further evaluate integration with current chlorination processes in the refinery and the potential to manage FSRU chlorine discharges within the current refinery EPA licence conditions.

Mitigation of potential effects on indigenous flora and fauna has been a consideration in the project design process to date and is reflected in key project decisions, such as the location of the underground pipeline as far as practicable within or adjacent to already disturbed easements or road reserves within the existing pipeline corridor.

In addition to the above measures already incorporated into the project design, further mitigations will be identified in the studies required to support the project approvals process. Viva Energy has committed to a monthly survey of plankton and larvae in Corio Bay and a benthic survey to establish baseline conditions for an assessment of project impacts on marine ecology and the component of the Ramsar wetland located ~ 1 km north of the project site.

The FSRU would operate in a manner consistent with the Victorian Marine Safety Act and Regulations. The FSRU and visiting LNG carriers would also be compliant with oil spill response plans in operation in the Port of Geelong. Adherence to the GeelongPort and VRCA joint 'Port Emergency Plan' and Port Phillip Region Marine Pollution Contingency Plan (prepared under the Victorian and National Plans for Maritime Environmental Emergencies (VICPLAN and NATPLAN)) would also be required. As a core member company of the Australian Marine Oil Spill Centre (AMOSC), Viva Energy has access to both oil spill response personnel and the oil spill response equipment stockpile located at the Port of Geelong and is an active participant of maritime emergency response preparedness in line with NATPLAN.

Other studies to support project approvals covering issues such as noise, air quality and lighting will assess potential impacts on EPBC Act protected matters and mitigations developed if required. However, given the substantial buffers around the project site, distance to the Ramsar site and absence of EPBC Act-listed species on the project site, it is anticipated that these issues will not generate unacceptable impacts.

4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved

The project is not anticipated to have significant impacts on any matter protected by the EPBC Act. Data searches indicate that EPBC Act-listed species or ecological communities may be found within 5 km of the project site. However, two ecological

surveys during 2020 of the proposed pipeline corridor and the refinery site where infrastructure is to be located found no EPBC Act-listed species or ecological communities present. Viva Energy has commenced marine sampling of plankton and larvae in Corio Bay as a basis for assessing potential FSRU entrainment impacts (expected to be a very small percentage of overall populations based on other FSRU studies) and will conduct modelling of discharge plumes to verify that EPBC Act-listed species and habitats will not be adversely impacted.

These assessments will inform the development of mitigation measures for the project to ensure effects on any EPBC Act protected matters, including listed threatened species and ecological communities, listed migratory species and Ramsar wetlands are prevented or maintained at acceptable levels.

As outlined above, initial measures to mitigate potential environmental impacts have already been incorporated into the project design. Based on previous studies, on dredging programs in Corio Bay and FSRU discharges, it is considered unlikely that risks such as dredging activity or discharges from the FSRU, would have a material impact on the nearest component of the Ramsar site some 1 km distant, or any threatened species, listed ecological communities or listed migratory species protected under the EPBC Act.

The Project is not anticipated to have major effects on the health or biodiversity of marine ecosystems over the long term. Mitigation measures will be implemented if required to manage risks and will ensure there are no long-term major effects on the health of these ecosystems.

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 5

Conclusion on the likelihood of significant impacts

5.1 You indicated the below ticked items to be of significant impact and therefore you consider the action to be a controlled action

- ☐ World Heritage properties
- ☐ National Heritage places
- ☐ Wetlands of international importance (declared Ramsar wetlands)
- ☐ Listed threatened species or any threatened ecological community
- ☐ Listed migratory species
- ☐ Marine environment outside Commonwealth marine areas
- ☐ Protection of the environment from actions involving Commonwealth land
- ☐ Great Barrier Reef Marine Park
- ☐ A water resource, in relation to coal seam gas development and large coal mining development
- ☐ Protection of the environment from nuclear actions
- ☐ Protection of the environment from Commonwealth actions
- ☐ Commonwealth Heritage places overseas
- ☐ Commonwealth marine areas

5.2 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action

The gas terminal would be located within and adjacent to a heavily developed port and industrial area on the shores of Corio Bay. The Project site would incorporate the existing Refinery Pier within the Port of Geelong, and Geelong Refinery located adjacent to the jetty. The Port has been in operation for over 150 years and is the largest industrial bulk cargo port in Victoria.

The landside component of the project area is highly disturbed and has very limited environmental values. Two ecological surveys conducted during 2020 found no significant flora and fauna species in the proposed pipeline corridor or on the refinery site where infrastructure would be located. It is therefore highly unlikely the project will significantly impact on native vegetation or terrestrial species that rely on this area for habitat. The project will not have any direct impact on the Ramsar site ~ 1 km to the north-east, and it is unlikely any aspect of the project would affect population size; area of occupancy; population continuity; critical habitat, breeding cycle; or species recovery of any listed threatened or listed migratory species that may use the Ramsar site. Recent environmental studies of FSRUs indicate that discharge plumes (chlorine and variable temperature) from the vessel are highly localised and entrainment of plankton and larvae into the seawater intake is an extremely small percentage of overall populations.

Environmental studies to be conducted to support the project approvals process will assess potential impacts on the Ramsar wetland ecological character, as well as listed threatened species, listed migratory species and listed threatened ecological communities that may occur within proximity to the project.

Viva Energy has committed to a survey of plankton and larvae in Corio Bay and a benthic survey to establish baseline conditions for an assessment of project impacts on marine ecology and the component of the Ramsar wetland located ~ 1 km north of the project site. Based on previous studies, on dredging programs in Corio Bay and FSRU operations, it is considered unlikely that risks such as disturbance of sediments from dredging activity, discharges from the project or operational activities would have a material impact on matters protected under the EPBC Act.

Detailed environmental assessments will be undertaken to ensure the project does not significantly impact on any matters protected under the EPBC Act.

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 6

Environmental record of the person proposing to take the action

6.1 Does the person taking the action have a satisfactory record of responsible environmental management? Explain in further detail

Viva Energy has a dedicated and experienced team of in-house environmental professionals and leverages the specialist technical expertise of environmental consultants. We have a long history of operating MHFs and executing significant projects in an environmentally responsible manner.

Most notably, we recently completed the Clyde Terminal Conversion Project. The site and surrounding wetlands provide habitat for the EPBC Act-listed Green and Golden Bell Frog and actions were implemented to protect the frogs and restore their habitat. This included monthly targeted pest control campaigns, regular surveys to monitor population and habitat conditions, wetland improvement (including weed removal and planting) and constructing purpose-designed breeding ponds.

In 2020, our Pinkenba Terminal was recognised with an ecoBiz Star Partner award from the Queensland Government for waste and energy reductions across its fuel storage and distribution, lubricants and bitumen operations.

6.2 Provide details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against either (a) the person proposing to take the action or, (b) if a permit has been applied for in relation to the action – the person making the application

In 2019, the Land & Environment Court of NSW convicted Viva Energy of two offences of water pollution and licence contravention (failure to maintain equipment) in breach of the Pollution of the Environment Operations 1997 following a marine fuel oil leak from a pipeline which resulted in about 500L of oil entering the waters of Gore Bay.

In 2018, Viva Energy was found guilty without conviction of four offences of exceeding the Geelong Refinery licence flouride emission limit between December 2015 and March 2016 in breach of the Environment Protection Act 1970.

6.3 If it is a corporation undertaking the action will the action be taken in accordance with the corporation's environmental policy and framework?

☑ Yes ☐ No

6.3.1 If the person taking the action is a corporation, provide details of the corporation's environmental policy and planning framework

Viva Energy Australia conducts its operations under an integrated Health, Safety, Security & Environmental Management System (HSSE MS). The HSSE MS has been designed to facilitate compliance with the Australian regulatory regimes of the relevant jurisdictions within which the company operates. It is also consistent with the Viva Energy Business Principles and Code of Conduct.

Viva Energy has a systematic approach to health, safety, security & environmental (HSSE) management in order to achieve continuous performance improvement. To this end, Viva Energy manages these matters as critical business activities, sets standards and targets for improvement, measures, appraises and reports on performance, and supports active discussion to promote learning and continuous improvement. This is further supported by the Viva Energy "Commitment to HSSE", as expressed in the HSSE Policy, which is provided as an attachment.

Across all businesses, Viva Energy has adopted a HSSE Management System which provides an essential reference document for personnel in the planning, implementation and operation of business activities, with references to the relevant processes that are in place to meet our HSSE objectives and obligations.

Business Managers, in conjunction with the HSSE Environmental Team, ensure the activities and facilities that they are responsible for meet the requirements of the:

- Regulatory requirements (e.g. Licence conditions);
- Viva Energy Environmental Manuals and subsidiary guidance; and
- Facility Environmental Management Manuals

Environmental Management Manuals describe the facility's environmental compliance requirements, control barriers that are in place to meet compliance requirements, how these barriers are documented and sets out responsibilities for maintaining these barriers. Each operating facility, or group of facilities is to have an Environmental Management Manual. The manual provides links to other documents e.g. Local Operating Procedures.

6.4 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

☑ Yes ☐ No

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

6.4.1 EPBC Act No and/or Name of Proposal

2013/6878 Shell Clyde Terminal Expansion, NSW. To convert the former Clyde Refinery in western Sydney into a fuel import terminal, the proposed action involved removal of redundant refining infrastructure and assets, and improvements to other remaining infrastructure. The referral was made by The Shell Company Of Australia Limited. Approval of the controlled action (subject to conditions specified) was given on 17 April 2014. Approval to vary the conditions of approval was given to Viva Energy Australia Pty Ltd (formerly The Shell Company of Australia Limited) on 2 April 2019. .

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 7

Information sources

Reference source

AECOM, 2020. Project Vega Export Pipeline Ecological Assessment. Flora and Fauna Assessment - Existing Conditions. 2 December 2020.

Reliability

Reliable - prepared for the project by a reputable consultant with appropriate expertise - contains further references to source information

Uncertainties

Relevant limitations and uncertainties are described within the report.

Reference source

Eco Logical Australia, 2020a. Project Vega – Preliminary Flora and Fauna Constraints Assessment. 10 February 2020.

Reliability

Reliable - prepared for the project by a reputable consultant with appropriate expertise - contains further references to source information

Uncertainties

Relevant limitations and uncertainties are described within the report.

Reference source

Eco Logical Australia, 2020b. Project Vega – Preliminary Aboriginal and Historical Cultural Heritage Assessment. 6 February 2020.

Reliability

Reliable - prepared for the project by a reputable consultant with appropriate expertise - contains further references to source information

Uncertainties

Relevant limitations and uncertainties are described within the report.
Desktop based. Further field work to be undertaken as part of preparation of a CHMP.

Reference source

DAWE, 2020. Species Profile and Threats Database.

Reliability

Reliable

Uncertainties

None

Reference source

DELWP, 2018. Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site Management Plan.

Reliability

Reliable

Uncertainties

None

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Reference source

URS/CSIRO, 2007. Work Plan for the Shell Geelong Refinery Ecological Risk Assessment of Corio Bay. Prepared for Shell Refining. 13 December 2007.

Reliability

Moderately reliable - prepared by a reputable consultant with appropriate expertise, but more than 10 years old.

Uncertainties

Information may be outdated.

Reference source

Worley Parsons, 2011. Corio Bay Channel Safety Adjustment Program. Factual Report on Geotechnical Investigation 301010-0076-SS-REP-0001. Prepared on behalf of Victorian Regional Channels Authority

Reliability

Moderately reliable - prepared by a reputable consultant with appropriate expertise, but almost 10 years old and for a different dredged area.

Uncertainties

Information may be outdated or not directly applicable.

Reference source

ERM, 2013. Shell Geelong Refinery Coastal Vegetation Assessment. Report 0169835_CVA_Final. Prepared for Shell Refining. 28 February 2013.

Reliability

Moderately reliable - prepared by a reputable consultant with appropriate expertise, but more than 5 years old.

Uncertainties

Information may be outdated.

Reference source

ERM, 2012. Cultural Heritage Management Plan for Environmental Remediation Works at Shell Geelong Refinery, Corio Bay Foreshore. Report 0169835CHMP. AAV Management Plan Identifier: 12322. Prepared for Shell Refining. 14 December 2012.

Reliability

Report was prepared by suitably qualified persons and is considered accurate and reliable.

Uncertainties

Relevant limitations and uncertainties are described within the report.

Reference source

AGL/APA, 2020. Gas Import Jetty and Pipeline Environmental Effects Statement, July 2020

Reliability

Moderately reliable - prepared by a reputable consultant(s) with appropriate expertise, but for a different gas terminal project (Crib Point, Victoria).

Uncertainties

Relevant limitations and uncertainties are described within the report.
Information may not be directly applicable.

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Reference source

Coffey, 2020. Sediment Contamination Assessment - Interim Report. Report to Viva Energy. 4 November 2020.

Reliability

Reliable - prepared for the project by a reputable consultant with appropriate expertise

Uncertainties

Relevant limitations and uncertainties are described within the report.
As this is an interim report the interpretation of the findings and overall conclusions and recommendations are subject to change in the final report to be issued.

Reference source

Cardno, 2011. Corio Bay Channel Safety Adjustment Program. Turbidity from Dredging RM2274/LJ5691. Prepared for Victorian Regional Channels Authority

Reliability

Moderately reliable - prepared by a reputable consultant with appropriate expertise, but almost 10 years old and for a different dredging location.

Uncertainties

Information may be outdated or not directly applicable.

Reference source

Lawson and Treloar, 1998. Corio Bay Channel Improvement Program Turbidity Monitoring Post Dredging Final Report. Report #RM1033/J5125. Report to Victorian Channels Authority. November 1998

Reliability

Moderately reliable - prepared by a reputable consultant with appropriate expertise, but over 10 years old and for a different dredging location.

Uncertainties

Information may be outdated or not directly applicable.

Reference source

Marine Science & Ecology, 2006. Review of Impacts of Dredging Turbidity Plumes on Seagrasses in the Geelong Arm Channel Improvement Program, 1997. Report to Maunsell and VRCA. September 2006.

Reliability

Moderately reliable - prepared by a reputable consultant with appropriate expertise, but over 10 years old and for a different dredging location.

Uncertainties

Information may be outdated or not directly applicable.

Reference source

Australian Industrial Energy, 2018. Port Kembla Gas Terminal Environmental Impact Statement, November 2018.

Reliability

Moderately reliable - prepared by a reputable consultant(s) with appropriate expertise, but for a different gas terminal project (Port Kembla, NSW).

Uncertainties

Relevant limitations and uncertainties are described within the report.
Information may not be directly applicable.

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Reference source

ERM, 2009. Sub-tidal Ecological Risk Assessment Shell Refinery, Corio Bay. Report 082251 ERA_R01. Prepared for Shell Manufacturing. March 2009.

Reliability

Moderately reliable - prepared by a reputable consultant with appropriate expertise, but more than 10 years old.

Uncertainties

Information may be outdated or not directly applicable.

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 8

Proposed alternatives

Do you have any feasible alternatives to taking the proposed action?

Yes ☑ No

Australian Government
Department of Agriculture, Water and the Environment

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 9

Person proposing the action

9.1.1 Is the person proposing the action a member of an organisation?

☑ Yes ☐ No

Organisation

Organisation name	Viva Energy Gas Australia Pty Ltd
Business name	
ABN	
ACN	645450059
Business address	Level 16, 720 Bourke Street, Docklands, 3008, Victoria, Australia
Postal address	
Main Phone number	+61 3 8823 4444
Fax	
Primary email address	energyhub@vivaenergy.com.au
Secondary email address	

9.1.2 I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

☐ Small business
☑ Not applicable

9.1.2.2 I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations *

☐ Yes ☑ No

9.1.3 Contact

First name	Robert
Last name	Mackie
Job title	Project Manager: Viva Energy Gas Terminal Project
Phone	+61 3 5273 8513
Mobile	+61 (0) 433711566
Fax	
Email	robert.mackie@vivaenergy.com.au
Primary address	Level 16, 720 Bourke St, Docklands, 3008, Victoria, Australia
Address	

Declaration: Person proposing the action

I, Robert Mackie **, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf or for the benefit of any other person or entity.**

Signature: ..... **Date:** 7th December 2020

I, Robert Mackie **, the person proposing the action, consent to the designation of** Robert Mackie **as the proponent for the purposes of the action described in this EPBC Act Referral.**

Signature:.....**Date:** 7th December 2020

Australian Government
Department of Agriculture, Water and the Environment

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Proposed designated proponent

9.2.1 Is the proposed designated proponent a member of an organisation?

☑ Yes ☐ No

Organisation

Organisation name	Viva Energy Gas Australia Pty Ltd
Business name	
ABN	
ACN	645450059
Business address	Level 16, 720 Bourke St, Docklands, 3008, Victoria, Australia
Postal address	
Main Phone number	+61 3 8823 4444
Fax	
Primary email address	energyhub@vivaenergy.com.au
Secondary email address	

9.2.2 Contact

First name	Robert
Last name	Mackie
Job title	Project manager: Viva Energy Gas Terminal Project
Phone	+ 61 3 5273 8513
Mobile	+61 (0) 433711566
Fax	
Email	robert.mackie@vivaenergy.com.au
Primary address	Level 16, 720 Bourke St, Docklands, 3008, Victoria, Australia
Address	

Declaration: Proposed Designated Proponent

I, Robert Mackie **,the proposed designated proponent, consent to the designation of myself as the proponent for the purposes of the action described in this EPBC Act Referral.**

Signature: ..... **Date:** 7th December 2020

Australian Government
Department of Agriculture, Water and the Environment

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Referring party (person preparing the information)

9.3.1 Is the referring party (person preparing the information) a member of an organisation?

☑ Yes ☐ No

Organisation

Organisation name	Viva Energy Gas Australia Pty Ltd
Business name	
ABN	
ACN	645450059
Business address	Level 16, 720 Bourke St, Docklands, 3008, Victoria, Australia
Postal address	
Main Phone number	+61 3 8823 4444
Fax	
Primary email address	energyhub@vivaenergy.com.au
Secondary email address	

9.3.2 Contact

First name	Laura
Last name	Bishop
Job title	LNG Approvals Lead
Phone	+61 3 8823 4741
Mobile	
Fax	
Email	laura.bishop@vivaenergy.com.au
Primary address	Level 16, 720 Bourke St, Docklands, 3008, Victoria, Australia
Address	

Declaration: Referring party (person preparing the information)

I, Laura Bishop **, declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence.**

Signature: ..... **Date:** .....7th December 2020

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Appendix A

Attachment

Document Type	File Name
action_area_images	F1_Location_Overview.pdf
action_area_images	F2_Site_and_Surrounding.pdf
action_area_images	F3_Seawater_Intake_Discharge.pdf
action_area_images	F4_Pipeline_Corridor.pdf
action_area_images	Photograph 1.pdf
action_area_images	Photograph 2.pdf
action_area_images	Photograph 3.pdf
action_area_images	Photograph 4.pdf
action_area_images	Attachment 1_7_3 Location.pdf
public_consultation_reports	Consultation attachment.pdf
supporting_tech_reports	PMST_LMQE5L.pdf
supporting_tech_reports	Attachment A Eco Logical Australia 2020a.pdf
supporting_tech_reports	Attachment B Eco Logical Australia 2020b.pdf
supporting_tech_reports	AECOM 2020.pdf
supporting_tech_reports	Cardno 2011.pdf
supporting_tech_reports	Worley Parsons 2011.pdf
supporting_tech_reports	Marine Science and Ecology 2006.pdf
supporting_tech_reports	Lawson and Treloar 1998.pdf
supporting_tech_reports	Coffey 2020.pdf
flora_fauna_investigation	ERM 2009.pdf
flora_fauna_investigation	ERM 2012.pdf
flora_fauna_investigation	ERM 2013.pdf
flora_fauna_investigation	URS CSIRO 2007.pdf

Appendix B

Coordinates

Area 1
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Area 2
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