Viva Energy Gas Terminal

Minister's Assessment under the Environment Effects Act 1978

April 2025

VICTORIA State Government | Department of Transport and Planning

Contents

Abbreviations

ACH	Aboriginal cultural heritage
CEMP	Construction environment management plan
CFA	Country Fire Authority
CHMP	Cultural heritage management plan
CVA	Cultural values assessment
DEECA	Department of Energy, Environment and Climate Action
DELWP	Department of Environment, Land, Water and Planning
DGVs	Default guideline values
DL	Development licence
DMG	Dredged material ground
DTP	Department of Transport and Planning
EES	Environment effects statement
EMF	Environmental management framework
EPA	Environment Protection Authority Victoria
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EVC	Ecological vegetation class
FFG Act	*Flora and Fauna Guarantee Act 1988* (Vic)
FSRU	Floating storage and regasification unit
GED	General Environmental Duty
GGS	Geelong Grammar School
GHG	Greenhouse gas
IAC	Inquiry and Advisory Committee
LNG	Liquefied natural gas
MHF	Major hazard facility
MMs	Mitigation measures
MNES	Matters of national environmental significance
OEMP	Operation environmental management plan
PSA	Planning scheme amendment
RHM	Regional hydrodynamic model
SCO	Specific controls overlay
SEES	Supplementary environment effects statement
WTOAC	Wadawurrung Traditional Owners Aboriginal Corporation

Executive summary

It is my assessment that the potential environmental effects of the Viva Energy Gas Terminal Project (the project) are acceptable and can managed with the effective implementation of the EMF and recommendations of this assessment.

The Viva Energy Gas Terminal proposes development of a floating storage and regasification unit (FSRU) terminal. The FSRU would be continuously moored at Refinery Pier in Corio Bay, in the City of Greater Geelong, 75 kilometres south-west of Melbourne. The purpose of the project is to facilitate the supply of a new source of natural gas for the south-eastern Australian gas market where there is a projected supply shortfall in coming years.

On 28 December 2020, the former Minister for Planning decided under the *Environment Effects Act 1978*, an environment effects statement (EES) was required for the project to provide an integrated, robust and transparent process to assess the project's effects. The EES was exhibited for public comment from 28 February to 11 April 2022, receiving 2,043 written submissions. Following exhibition, a combined inquiry and advisory committee (IAC) that I appointed held a public hearing over 29 days to assess the project's environmental effects and draft planning scheme amendment (PSA). I received the IAC's report on 5 October 2022.

Consistent with the IAC's findings, I required further assessment via a supplementary EES of marine impacts, terrestrial ecology, noise, air quality, as well as intangible and underwater Aboriginal cultural heritage. The supplementary EES was exhibited from 12 September to 24 October 2024, receiving 387 submissions. A new IAC (supplementary IAC) was appointed to consider the supplementary EES, updated draft PSA and the submissions. The supplementary IAC held a 15-day public hearing before submitting its report on 12 March 2025. The EES, supplementary EES, associated IAC reports, together with submissions and documents tabled at the hearings have informed my assessment of the environmental effects of the project.

The project is a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to potential significant impacts on matters of national environmental significance (MNES). As the EES is an accredited assessment under the EPBC Act, my assessment examines impacts on MNES and will be provided to the Commonwealth Minister for the Environment and Water to inform the decision about whether and under what conditions EPBC Act approval should be granted.

I am satisfied that, with implementation of the proposed environmental management framework (EMF), including the refined mitigation measures (MMs), the project can proceed with acceptable environmental outcomes. I make this assessment subject to the EMF and MMs being implemented in accordance with this assessment and legislative requirements. The proposed environmental management regime I have considered as part of this assessment is to be given statutory weight through the proposed amendment to the Greater Geelong Planning Scheme, and an incorporated document. The project also requires consents under the *Marine and Coastal Act 2018* for dredging and use of marine and coastal Crown land, a pipeline licence under the *Pipelines Act 2005*, an approved cultural heritage management plan under the *Aboriginal Heritage Act 2006* and development and operating licences for the FSRU under the *Environment Protection Act 2017*. Additionally, various permits and consents are needed under the *Gas Safety Act 1997*, *Occupational Health and Safety Act 2004*, and *Flora and Fauna Guarantee Act 1988*.

The supplementary EES satisfactorily addressed the further assessment I required, including updated hydrodynamic and entrainment modelling offering more accurate simulations of tidal dynamics and discharge behaviour in Corio Bay. These revisions informed re-modelling of wastewater discharge, entrainment, and sediment transport assessments, which in turn supported updated assessments of impacts

on marine habitats and water quality. The revised modelling allowed for a more accurate assessment of potential seagrass loss from dredging activities. Additional studies were undertaken to assess the effects of chlorine by-products, air and noise emissions which included sensitivity testing and worst-case scenario modelling. Likewise, the potential effects on threatened and migratory bird species were re-evaluated, with peer-reviewed species lists and revised habitat use analysis providing confidence in the impact predictions.

I support the conclusion of the supplementary IAC that project construction and dredging works are not expected to significantly affect Corio Bay or the ecological character of the Ramsar-listed Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Wetland. I consider that residual operational impacts, including those from the FSRU, are unlikely to be significant and can be acceptably managed under the revised suite of marine MMs and monitoring regimes.

Impacts on native vegetation and terrestrial fauna are also unlikely to be significant and can be acceptably managed, and I support the supplementary IAC's view that the project will not significantly affect the food availability for migratory birds. The targeted survey work, design refinements to reduce vegetation loss, and updated MMs—including those relating to threatened species —are sufficient to ensure that residual ecological impacts are acceptable.

The supplementary EES applied an appropriate method for the assessment of noise and vibration impacts from construction and operational phases of the project. I acknowledge there is the potential for cumulative noise impacts from existing industries in the project area combined with the noise emissions from the project during the night at nearby sensitive receivers. However, I also note the location of the project within an area with existing industrial noise sources. These effects can be managed through the regulatory framework and the implementation of the MMs including monitoring of the project's noise emissions against the adjusted project noise criteria. These conditions should be formalised in the incorporated document and supported through the EMF. Vibration risks during construction are considered low and manageable.

I note the risks posed by the project on underwater Aboriginal cultural heritage values and find the additional underwater Aboriginal cultural archaeological study sufficient to inform the examination of these impacts. I support the inclusion of an underwater archaeological sampling program, as required by updated MMs given the proposed dredging activities. I am satisfied that the risk to Aboriginal cultural heritage due to the project is manageable, subject to the preparation and approval of Cultural Heritage Management Plans under the Aboriginal Heritage Act. I acknowledge Viva Energy's engagement with the Wadawurrung Traditional Owners Aboriginal Corporation and support the ongoing engagement and preparation of the Cultural Values Assessment.

The project's greenhouse gas emissions, both from construction and operation, can be managed to acceptable levels, subject to full adoption of the updated MMs. The project is consistent with Victoria's broader energy and climate policy objectives and does not undermine the state's net zero emissions target for 2045. I acknowledge community concerns about the project's compatibility with emissions reduction efforts but consider that the project can serve a transitional role in energy supply, supporting system reliability and affordability, provided it does not delay investment in renewable energy infrastructure. Transparency and ongoing monitoring of emissions performance will be essential.

I recognise that some uncertainty remains as to whether the project will deliver gas to the Victorian market in a reliable and affordable manner. However, I agree with the IAC that, if appropriately managed, the project can deliver net community benefit. The proposed pipeline infrastructure has the potential to strengthen energy supply during the transition away from coal and towards renewables.

My assessment supports the majority of the recommendations made by the IAC and supplementary IAC, either in full or with refinements. I have recommended that the project's implementation be governed by a robust environmental management plan approved by the relevant statutory authorities, and that there be ongoing stakeholder and community engagement throughout the construction and operational phases.

On balance, I find that the environmental effects of the project can be acceptably managed and can proceed with appropriate environmental outcomes, subject to the full implementation of the recommended MMs, EMF, and relevant statutory approvals. This conclusion has been informed by the thorough and independent analysis undertaken by both IACs, the extensive community and stakeholder input received, and the detailed technical assessments provided by Viva Energy.

1. Introduction

On 28 December 2020, the former Minister for Planning determined under the *Environment Effects Act 1978* (Environment Effects Act) that Viva Energy Gas Australia Pty Ltd (Viva Energy) needed to prepare an environment effects statement (EES) for the proposed Viva Energy Gas Terminal Project (the project).

The procedures and requirements for the EES specified that the EES was to document the investigation and avoidance of potential environmental effects of the project, including for feasible alternatives, as well as the feasibility of associated environmental mitigation and management measures. The EES was to address the project's potential effects on the marine environment and ecosystem of Corio Bay from:

- dredging works;
- mobilisation of sediment and associated contaminants, such as arsenic and zinc;
- construction at, and around Geelong Refinery Pier (the Refinery Pier);
- seawater intake to and cold water/residual chlorine discharges from the floating storage and regasification unit (FSRU); and
- re-use of FSRU intake seawater within the Geelong Refinery (the Refinery) and warm water/residual chlorine discharges from the Refinery.

The procedures and requirements also specified that the EES was to incorporate an integrated assessment of the broader environmental effects of greenhouse gas emissions from FSRU operation, as well as potential environmental effects on air quality, noise, agriculture, land use, native vegetation, habitat for listed threatened species, groundwater, Aboriginal and historic cultural heritage, landscape and visual amenity, and transport.

Viva Energy prepared an EES, which was publicly exhibited from 28 February 2022 to 11 April 2022. A draft planning scheme amendment C442ggee (the draft PSA), two development licence (DL) applications (APP013874 and APP013841), and a pipeline licence application were also published with the exhibited EES.

On 19 April 2022, the former Minister for Planning appointed an inquiry and advisory committee (IAC) to consider the EES, draft PSA, DL applications and pipeline licence application in accordance with terms of reference approved on 20 March 2022. The Viva Energy Gas Terminal EES IAC (EES IAC) provided its EES IAC Report No. 1 and 2 (EES IAC report) to the former Minister for Planning on 5 October 2022.

Consistent with the EES IAC report and recommendations, on 6 March 2023, I determined that a Supplementary EES (SEES) was required for specific matters not sufficiently assessed in the EES. I required the SEES to further assess the project's effects on the marine environment, noise, air quality and Aboriginal cultural heritage (the SEES relevant environmental effects). I detailed the further work required to address the SEES relevant environmental effects within my 'Minister's Directions for Viva Energy Gas Terminal Project Supplementary Environment Effects Statement' (SEES directions) - these detailed the objectives and procedures of the SEES. My SEES directions were published on 6 March 2023.

Viva Energy prepared a SEES, which was publicly exhibited from 12 September 2024 to 24 October 2024. The draft PSA was updated based on the EES IAC report and SEES assessments and was also published with the exhibited SEES (referred to as updated draft PSA).

On 29 October 2024, I appointed an IAC to consider the SEES (SEES IAC) and updated draft PSA in accordance with terms of reference I approved on 8 September 2024. The SEES IAC provided its report (SEES IAC report) to me on 12 March 2025.

The EES IAC and the SEES IAC reports together with the EES and SEES, and their supporting technical reports, public submissions, tabled documents, and relevant legislation, policy and guidelines, have informed my assessment of the environmental effects of the project under the Environment Effects Act.

I thank both the EES IAC and the SEES IAC for their considered reports and advice. I also thank everyone who invested their time to make submissions and participate in the public hearings. I have considered all matters relevant to the environmental assessment of the project.

1.1 Purpose of this document

This document constitutes my assessment of the environmental effects of the project under the Environment Effects Act. This assessment represents the final step in the EES process and provides authoritative advice to decision-makers, Viva Energy and all other stakeholders on the likely environmental effects of the project, their acceptability. It sets out recommendations on how the effects should be addressed in relevant statutory decisions and delivery of the project.

This assessment will inform the decisions required under Victorian law for the proposal to proceed. As the EES was undertaken as an accredited assessment process under the bilateral agreement with the Commonwealth under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), my assessment will also inform the approval decision needed under the EPBC Act.

1.2 Structure of the assessment

The structure of my assessment is as follows:

- Section 2 provides a brief description of the project;
- Section 3 refers to key relevant legislation and processes;
- Section 4 addresses key matters for this assessment, as well as the project's proposed planning controls, environmental management framework (EMF), and other post-approval matters;
- Section 5 assesses the environmental effects of the project by environmental discipline;
- Section 6 presents my conclusions, including responses to the recommendations of the EES IAC and SEES IAC;
- Appendix A contains my recommendations about the mitigation measures (MMs); and
- Appendix B contains a consolidated assessment of impacts on matters of national environmental significance (MNES).

2. Project description

Viva Energy is proposing the development of a FSRU terminal. in Corio in the City of Greater Geelong, 75 kilometres south-west of Melbourne. The project involves an FSRU being continuously moored at Refinery Pier in Corio Bay. The purpose of the project is to facilitate the supply of a new source of natural gas for the south-eastern Australian gas market where there is a projected supply shortfall in coming years.

The EES described the project as comprising the following main components (Figure 1):

- extension of Refinery Pier, with an approximately 570-metre-long angled pier arm, new berth and ancillary pier infrastructure including high pressure gas marine loading arms and transfer lines connecting the FSRU's seawater discharge points to the Refinery's seawater intake;
- continuous mooring of the FSRU at the new berth to store and convert liquefied natural gas (LNG) into natural gas – LNG carriers would moor alongside the FSRU and unload the LNG;
- construction and operation of a new treatment facility the Refinery site, including injection of odorant and nitrogen (if required) into the natural gas;
- construction and operation of approximately 3 kilometres of aboveground gas pipeline (aboveground gas pipeline) on the pier and within the Refinery site, connecting the FSRU to the new treatment facility;
- construction and operation of an underground gas transmission pipeline (underground gas transmission pipeline), approximately 4 kilometres in length, connecting to the existing South West Pipeline at Lara.
- a temporary storage and loadout facility constructed and located in the existing Lascelles Wharf at Geelong Port (to be confirmed with GeelongPort); and
- the seawater transfer pipeline, extending for 500 metres from the proposed Refinery Pier extension to the Geelong Refinery seawater intake channel.

Dredging of approximately 490,000 cubic metres of seabed sediment from a 12-hectare area adjacent to the existing shipping channel would be required for the new berth and swing basin. The dredging program is expected to occur for 8 weeks. The berth and swing basin would be dredged to a depth of 13.1 metres and 12.7 metres respectively.

Approximately 8,800 cubic metres of sediment would be excavated from the seabed to create a 2 metres deep trench to install the seawater transfer pipe. Sediment will be placed adjacent to the trench and once the pipeline is laid, the trench would be backfilled with this spoil. The seawater transfer pipeline trench would extend for 500 metres from the proposed Refinery Pier extension to the Refinery seawater intake channel. Construction of the pipeline is expected to take 2 months.

Piling will be required for pier and temporary storage and loadout facility construction. Pile driving activities to install piles will likely occur via a barge. Piling for the temporary storage and loadout facility is proposed to take 4 weeks, with piling for pier construction proposed for around 6-months.

Construction and commissioning of the project is estimated to take up to 18 months. The project is anticipated to operate for approximately 20 years.

The project location and project components for the proposal assessed in the EES and SEES are shown in Figure 1. The project is described in more detail in Chapter 4 of the EES. Section 4.3 of this assessment discusses project alternatives.

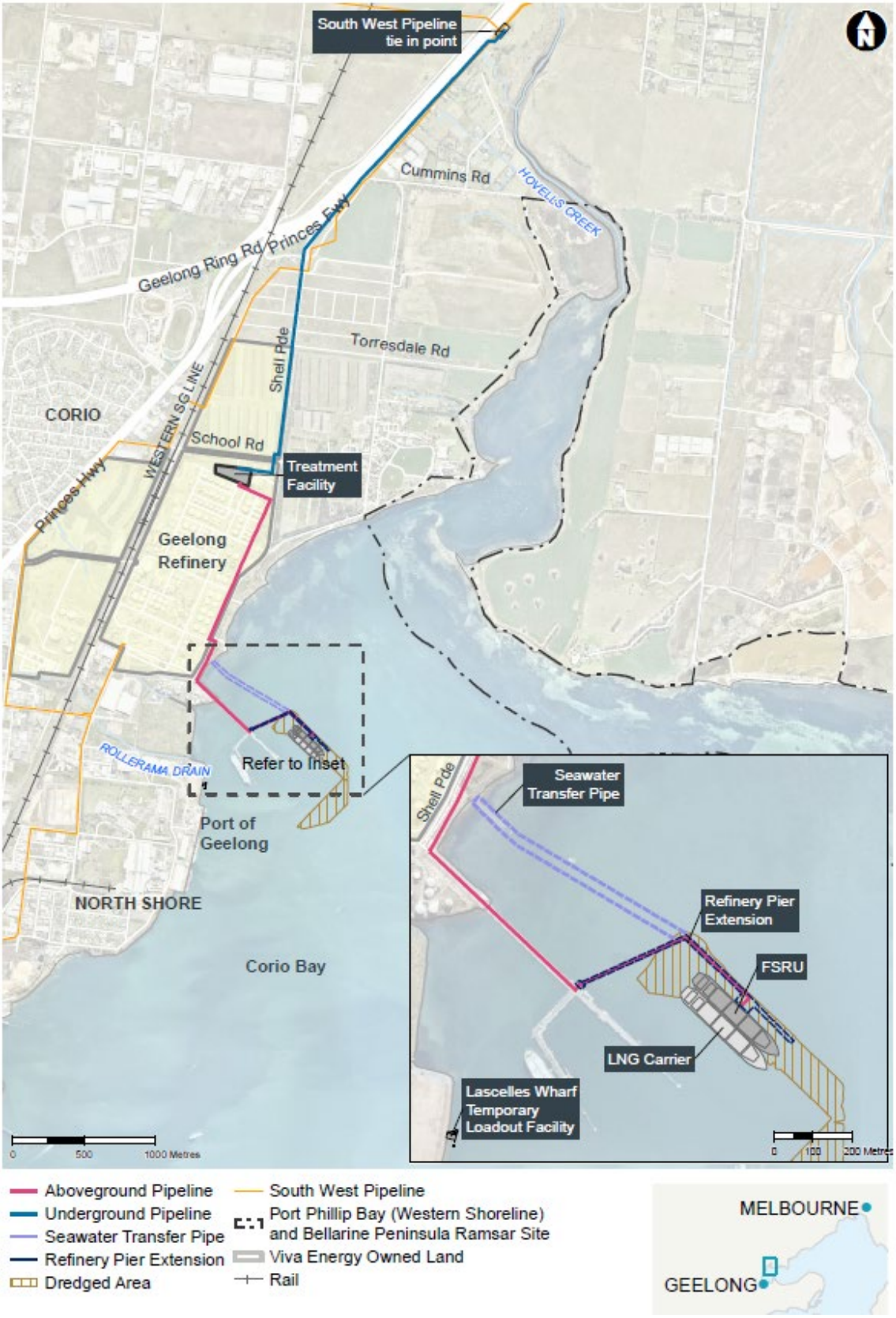

Figure 1: Project location and components (sourced from SEES Chapter 1).

3. Statutory processes

This section refers to key legislation relevant to my assessment and delivery of the project. Viva Energy requires a variety of statutory approvals under Victorian and Commonwealth law before it can proceed with the project. My assessment under the Environment Effects Act will inform approval decisions under the *Pipelines Act 2005* (Pipelines Act), *Environment Protection Act 2017* (Environment Protection Act), *Planning and Environment Act 1987* (Planning and Environment Act) and *Aboriginal Heritage Act 2006* (Aboriginal Heritage Act), as well as a range of other consents and permits. The project is also a controlled action requiring approval under the EPBC Act.

3.1 Environment Effects Act

The Environment Effects Act provides for assessment of proposed projects that are capable of having a significant effect on the environment. This project required assessment via an EES. Therefore, section 8C of the Environment Effects Act applies and requires the relevant, notified decision-makers to consider my assessment before making approval decisions about the project.

In July 2021, the former Minister for Planning issued final scoping requirements (dated June 2021) specifying the matters to be addressed in the EES. The former Department of Environment, Land, Water and Planning (DELWP) convened a technical reference group for the project, in accordance with standard EES practice, to provide advice to Viva Energy and DELWP on the preparation of the EES.

As outlined in Section 1, the EES was prepared by Viva Energy and placed on public exhibition from 28 February to 11 April 2022, with supporting draft approval documentation. Planning Panels Victoria received 2,043 submissions on the exhibited EES, draft PSA, DL applications and pipeline licence application.

On 19 April 2022, the former Minister for Planning appointed a joint inquiry, under section 9(1) of the Environment Effects Act, and advisory committee under part 7, section 151(1) of the Planning and Environment Act. The EES IAC was appointed to inquire into, and report on, the project and its environmental effects and the draft PSA in accordance with its published terms of reference. On 29 April 2022, the Minister for Energy, Environment and Climate Change appointed the IAC as a panel under section 40 of the Pipelines Act.

The EES IAC held a directions hearing on 5 May 2022, followed by a public hearing, held from 20 June to 8 August 2022. The EES IAC provided the EES IAC report to the former Minister for Planning on 5 October 2022. Having considered this report, on 6 March 2023 I determined that a SEES was required for specific matters not sufficiently assessed in the EES, and as such, were unable to be analysed within the EES IAC report. I issued and published my SEES directions for Viva Energy to complete a SEES for this project on 6 March 2023,

The process of preparing and considering the SEES formally commenced in June 2023, when the Department of Transport and Planning (DTP; formerly DELWP) received an adequate draft SEES study program and proposed schedule from Viva Energy. DTP convened and chaired a targeted TRG, to provide advice on the technical adequacy of the SEES technical studies and SEES documentation. DTP also appointed an independent peer reviewer, consistent with my SEES directions, to review and provide advice on the scope and adequacy of the draft SEES study program and technical adequacy of relevant SEES technical studies, specifically for the marine environment (including hydrodynamic modelling) and assessment of threatened and migratory birds.

The SEES was placed on public exhibition from 12 September to 24 October 2024 along with the updated draft PSA. Planning Panels Victoria received 387 submissions on the exhibited SEES and draft PSA.

On 29 October 2024, I appointed a joint inquiry, under section 9(1) of the Environment Effects Act, and advisory committee under part 7, section 151(1) of the Planning and Environment Act. The SEES IAC was appointed to inquire into, and report on, the likely environmental effects of the project and consider the updated draft PSA, in accordance with its published terms of reference.

The SEES IAC held a directions hearing on 12 November 2024, followed by a public hearing, held from 9 December 2024 to 20 January 2025. The SEES IAC provided the SEES IAC report to me on 12 March 2025.

3.2 Victorian statutory approvals

The project requires several Victorian statutory approvals, including, but not limited to:

- an amendment to the Greater Geelong Planning Scheme to apply a Specific Controls Overlay (SCO) and incorporated document in accordance with the Planning and Environment Act;
- a pipeline licence under the Pipelines Act;
- two DLs and subsequent operating licences under the Environment Protection Act; and
- an approved cultural heritage management plan (CHMP) under the Aboriginal Heritage Act.

Planning and Environment Act

The Planning and Environment Act sets out processes for the amendment of Victorian planning schemes. Approval under the Planning and Environment Act will be required for the project via an amendment to the Greater Geelong Planning Scheme. Viva Energy is seeking a SCO with an incorporated document. The incorporated document would allow the use and development of land for the project to be undertaken in accordance with specific conditions.

The draft PSA was included with the exhibited EES as Attachment VII, and the updated draft PSA was included with the exhibited SEES as Attachment III. This provided opportunities for the community and other stakeholders to comment on the draft planning controls. The EES IAC considered the draft PSA. The SEES IAC considered the updated version of this draft PSA. The updated draft PSA incorporated outcomes of the SEES and EES IAC report.

Pipelines Act

The Pipelines Act is the primary legislation governing the construction and operation of pipelines in Victoria. The project will require a pipeline licence for the construction and operation of the 7-kilometre pipeline, comprising the 3-kilometre aboveground gas pipeline and the 4-kilometre underground gas transmission pipeline sections. The Department of Energy, Environment and Climate Action (DEECA) and Energy Safe Victoria administer the Pipelines Act.

The pipeline licence application was included with the exhibited EES as Attachment VI. The EES IAC considered the pipeline licence application. No amended or additional pipeline licence was exhibited with the SEES.

Environment Protection Act

Two DL applications and supporting documentation were included with the exhibited EES as Attachment V Parts 1 to 6:

- DL application ID: APP013874 applies to the operation of the FSRU and associated emissions and discharges from the FSRU.

- DL application ID: APP013841 applies to the reuse of FSRU discharge water at the Refinery, for cooling water purposes.

The EES IAC considered the DL applications. The SEES IAC also considered the DL applications in regard to my SEES directions.

Aboriginal Heritage Act

The Aboriginal Heritage Act requires an approved CHMP for works for which an EES is required. The project is situated on land for which the Wadawurrung Traditional Owners Aboriginal Corporation (WTOAC) is the Registered Aboriginal Party under the Aboriginal Heritage Act.

A draft CHMP (No. 17816) is being prepared for the project. The CHMP will be evaluated and requires approval by WTOAC.

3.3 Other Victorian statutory consents

The project also requires a range of consents and permits including:

- consent to use, develop and undertake works on marine and coastal Crown land under the *Marine and Coastal Act 2018* (Marine and Coastal Act);
- gas safety case for natural gas transmission infrastructure under the *Gas Safety Act 1997* (Gas Safety Act*)*;
- major hazard facility (MHF) safety case for the FSRU and amendment to the current Refinery MHF safety case for the treatment facility under the *Occupational Health and Safety Act 2004* (Occupational Health and Safety Act); and
- permits for the removal of species listed under the *Flora and Fauna Guarantee Act 1988* (FFG Act) on public land.

Marine and Coastal Act

Consent is required under the Marine and Coastal Act for 'use or develop, or undertake works on, marine and coastal Crown land' and applies to some project components. Dredging works, as well as dredged sediment disposal associated with the project, will require consent, as this requires the project to undertake works on marine and coastal Crown land. Consent will also be required for installation and continuous mooring of the FSRU and construction of the temporary storage and loadout facility, new pier arm, aboveground gas pipeline and seawater transfer pipe.

Gas Safety Act

A gas safety case is required under the Gas Safety Act for the licenced pipeline, and the odorant and nitrogen injection equipment at the treatment facility, as these are considered natural gas transmission infrastructure.

Occupational Health and Safety Act

A MHF safety case for the FSRU is required under the Occupational Health and Safety Act. An amendment to the current Refinery MHF safety case for the treatment facility is also required under this Act for the storage of odorant within the treatment facility.

Flora and Fauna Guarantee Act

Permits under the FFG Act will be required to remove protected and listed threatened flora and listed threatened ecological communities from public land. In consultation with DEECA, permits to remove components of listed threatened fauna habitats may be required.

3.4 Commonwealth statutory approval

In December 2020, Viva Energy referred the project to the Commonwealth Government (referral 2020/8838) for a determination on whether the project was a controlled action under the EPBC Act.

On 21 January 2021, the project was determined to be a controlled action requiring assessment and approval under the EPBC Act because of its likely significant impacts on MNES. Relevant MNES for this project include Ramsar wetlands (sections 16 and 17B), listed threatened species and communities (sections 18 and 18A) and listed migratory species (sections 20 and 20A). The project's impacts on MNES are assessed by this accredited EES process, in accordance with the bilateral agreement under section 45 of the EPBC Act. Therefore, decisions about whether, and under what conditions, to approve the project under the EPBC Act are to be informed by this assessment.

My conclusions on the assessment of the potential impacts on MNES are set out in Appendix B.

4. Overview of environmental assessment and the environmental management framework

This section outlines the context and approach for assessing the project's environmental effects, including key information used to assess specific matters and the proposed environmental management and planning controls.

I have also set out my core findings on the project's effects, the project alternatives considered, and key approvals needed.

4.1 Supplementary EES

On 6 March 2023, I directed that a SEES was required for the project, consistent with recommendations of the EES IAC, which found there was insufficient information in the EES to advise on the acceptability of specific environmental effects. I required the SEES to further assess the project's effects on the marine environment, noise, air quality as well as Aboriginal cultural heritage (the SEES relevant environmental effects). My SEES directions included procedures and requirements to apply to the SEES. This included the use of independent peer review (Stantec) to look at the hydrodynamic model calibration and the list of threatened and migratory bird species, as documented in Attachment I of the SEES.

My assessment considers and consolidates the findings in the EES and the EES IAC report in regard to the SEES relevant environmental effects, along with the additional findings about these effects in the SEES and the SEES IAC report.

The SEES IAC was satisfied that impacts on the SEES relevant environmental effects were adequately assessed through the SEES process. The SEES IAC noted that its role is not to approve the project, however, considering the EES and SEES information before it, it found no reason not to recommend approval of the project. The SEES IAC outlined that 'other effects' outside of the SEES relevant environmental effects can be effectively managed to the meet the evaluation objectives, and subject to changes it has recommended on the EMF. A detailed discussion is provided in Section 5 of this assessment.

4.2 Overall findings on environmental effects

All available information, including the EES, SEES, the EES IAC and SEES IAC reports, have assisted in informing my assessment on the significance and acceptability of the potential effects of the project. On balance, it is my assessment that the project will have environmental impacts that are largely not significant and that these impacts can be mitigated or effectively managed, considering their nature, extent, and expected duration. The project presented in the EES and SEES would have acceptable effects on the environment with the effective implementation of the proposed EMF including MMs through the regulatory framework discussed below.

It is evident from the EES IAC and SEES IAC reports, and from the submissions received, that stakeholder groups and the community held a range of views. I would like to thank all those involved in the IAC processes for taking the time and effort to contribute to the environmental assessment process.

The EES IAC noted that there is uncertainty regarding whether the project will be able to deliver gas into the Victorian market reliably and affordably. However, I agree with the EES IAC that the project can deliver net community benefit, as the potential benefits of the project's gas supply to Victoria outweigh its impacts.

The project offers benefits due to its synergies with the Refinery, where seawater used in the FSRU to regasify the LNG is proposed to be piped to the Refinery's seawater intake for reuse as cooling water in the Refinery. The net seawater intake and discharge, currently 350 megalitres per day for the Refinery, would be approximately the same for the project. Project discharges would also have around the same chlorine levels as Refinery discharges but would be closer to ambient temperatures.

The SEES IAC summarised concerns from submitters about risks to marine ecology and the navigational studies to be required for the project by Ports Victoria, including the potential need for further dredging. My assessment examines the project proposed by Viva Energy in the EES and SEES, and it therefore assesses the impacts of dredging Viva Energy has identified as necessary for this form of the project. If navigational studies required by Ports Victoria indicate a need for any additional dredging of the shipping channels, beyond that proposed in the EES and SEES, this would be subject to appropriate assessment and approvals. Ports Victoria would need to consider the potential for environmental effects (see Section 5.4) from this additional dredging and the relevant statutory requirements, including under the EE Act.

My detailed assessment is outlined in Section 5. However, I support the SEES IAC's finding that there are no unacceptable environmental effects for the proposed project, considering the additional assessment information provided through the SEES process and with implementation of the environmental management regime examined below (Section 4.4).

4.3 Consideration of project alternatives

As set out in the scoping requirements and the EES procedures and requirements issued by the former Minister for Planning under the Environment Effects Act, the EES was required to describe and assess effects of project alternatives. This needed to include a comparative assessment of the environmental effects of relevant feasible alternatives, as well as an explanation of why the preferred alternative was selected.

Viva Energy provided its reasoning for selecting Corio Bay as its preferred site for the FSRU in Chapter 2 of the EES. Chapter 3 of the EES sets out Viva Energy's consideration of alternatives for the preferred regasification mode (i.e. open loop, closed loop or combination), the comparison for gas terminal locations and for the proposed pipeline route from Refinery Pier to the proposed South West Pipeline tie-in point.

The investigation of environmental effects presented in the EES focussed on Viva Energy's preferred options. This assessment responds to the environmental effects of the Viva Energy's preferred form of the project, refined from the alternatives that they considered, as presented in the EES and at the EES IAC hearing.

The EES IAC was satisfied that the EES's assessment of alternatives broadly met the scoping requirements and noted Viva Energy's reasoning for preferring an open loop operating mode for the FSRU. The EES IAC accepted that there are environmental advantages to reusing the FSRU discharge water as cooling water in the Refinery.

4.4 Management of environmental effects

The project will generate both positive and negative environmental effects. A sound regulatory framework and environmental management regime is needed to ensure that adverse effects of the project are effectively mitigated and managed. I have considered key elements of that regime when assessing the project's environmental effects. This section describes this framework and regime including planning controls and environmental governance arrangements proposed for the project and my findings in relation to these.

The EES proposed an environmental management regime to be given statutory effect through the various approvals referred to in Section 3.

Planning controls

Viva Energy is proposing an amendment to the Greater Geelong Planning Scheme to facilitate and control the project. Viva Energy prepared draft PSA C442ggee in consultation with relevant agencies and exhibited it with the EES. The draft PSA was subsequently updated and exhibited with the SEES. The updated draft PSA proposes to introduce an incorporated document through a schedule to a SCO. The SCO will apply to works on land and waters to permit use and development for the project and associated infrastructure without the need for additional planning permits.

In broad terms, the updated draft PSA seeks to:

- apply the SCO to allow the use and development of land for the project without a permit, provided the specific controls in the incorporated document are complied with;
- extend the Port Zone to reflect the extended Refinery Pier and the new berth for the FSRU and LNG carriers because that part of the proposed project area currently sits outside the planning scheme and has no zoning controls; and
- make the Minister for Planning the responsible authority for the project.

The EES IAC and SEES IAC were appointed both as an inquiry under the Environment Effects Act to assess the environmental effects of the project and as an advisory committee under the Planning and Environment Act to provide me with advice about the content and structure of the draft PSA.

Strategic assessment of the draft PSA

Ministerial Direction No. 11 (MD No. 11) – Strategic Assessment of Amendments requires a planning authority (or proponent) to evaluate and document how an amendment addresses specific strategic considerations. Whilst Planning Practice Note 46 (PPN46) – Strategic Assessment Guidelines provides a consistent framework for preparing and evaluating a proposed PSA consistent with MD No. 11. The updated draft PSA published with the exhibited SEES included an Explanatory Report for the proposal addressing the purpose, effect and strategic basis for the amendment and address the matters set out in MD No. 11.

The Explanatory Report describes why the amendment is needed. My assessment of the PSA process and its consistency with State and local planning policy is provided in Section 5.8 on land use and planning. I generally support the SEES IAC's views on both the merit and approach to the PSA for this component of the project noting, the final form and content of the updated draft PSA, will be considered in due course under the Planning and Environment Act.

Incorporated document

In this assessment, I have considered the EES IAC and SEES IAC's recommendations on the draft incorporated document in the context of the environmental effects associated with the proposed project, their acceptability and how those environmental effects might be avoided or mitigated. My decision on whether, and on what terms, the planning approval of the project should proceed, is still required under the Planning and Environment Act.

The EES IAC was generally satisfied that the draft PSA provided a consistent planning framework across the project area, noting that various submitters including the City of Greater Geelong supported the use of the SCO and the incorporated document. The EES IAC noted that Viva Energy accepted various drafting changes

proposed through submissions. The EES IAC endorsed Viva Energy's version of the draft PSA[1] and recommended several additional changes to provide for expanded consultation with the local community and Geelong Grammar School (GGS). Viva Energy exhibited the updated draft PSA, which incorporated these changes for the SEES process.

When Viva Energy submits the final version of the PSA, this assessment will inform my formal consideration under the Planning and Environment Act, on whether or not that planning approval should proceed. The SEES IAC has made recommendations on the updated draft PSA. I have considered those recommendations as part of this assessment of the environmental effects of the proposed works and the manner in which those environmental effects should be mitigated. In principle, I support the changes to the conditions of the incorporated document recommended by the SEES IAC, as described below which relate to a new clause at 4.6.6 for a project-wide risk register.

In summary, I consider the planning framework recommended by the EES IAC and the SEES IAC, subject to changes in accordance with my assessment of the environmental effects, is appropriate to facilitate the project, while minimising and managing environmental effects.

Environmental management framework

Viva Energy's proposed EMF was presented in Chapter 14 of the EES and updated for the SEES (Chapter 9). The EMF outlined the key environmental management documentation proposed to be developed for the project and associated governance arrangements including review and environmental reporting requirements (as summarised in Figure 2). The EMF also provided a consolidated list of the proposed MMs and identified the key project approvals and compliance requirements. MMs are an important element of the EMF as they explain how Viva Energy proposes to avoid, mitigate and manage environmental effects over the life of the project. For this project, the MMs will be given statutory weight through either conditions of approval or various environmental plans required to be approved by a statutory authority. Other key elements of the EMF are an overarching Environmental Management Plan approved under the incorporated document, which will include a Construction Environment Management Plan (CEMP), and an Operation Environment Management Plan (OEMP) approved under the Pipeline Licence.

[1] EES IAC Tabled Document 457: Viva Energy – Part C Incorporated Document.

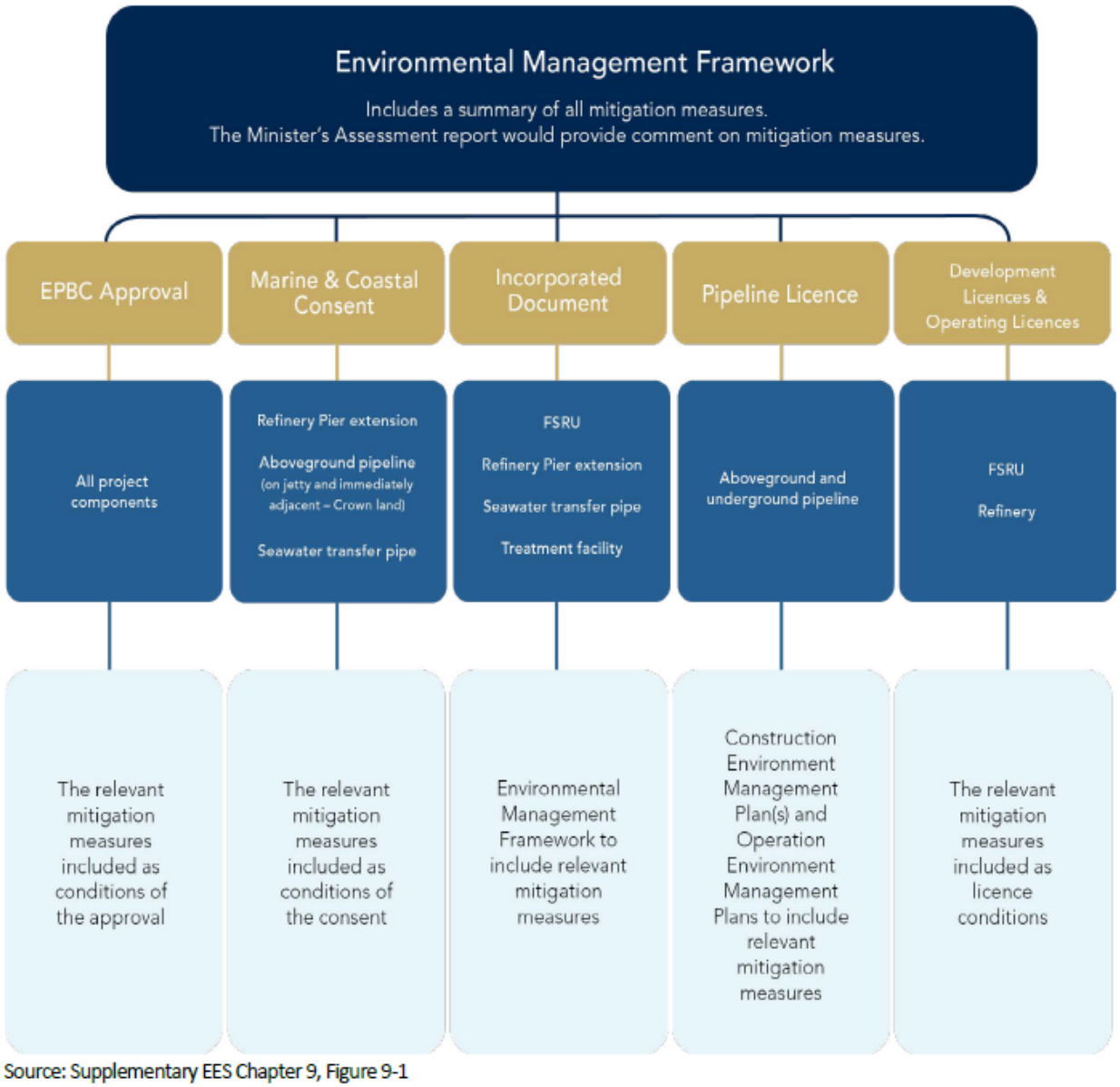

Figure 2: Viva Energy Gas Terminal EMF (sourced from Figure 9-1 of the SEES).

The EES IAC found that the EMF proposed in the EES and the draft PSA subject to its recommendations, offers a solid framework for effectively managing environmental impacts to an acceptable level. Viva Energy made updates to specific MMs in the proposed EMF in response to submissions prior to the EES IAC hearing and provided a tracked-changes version to the EES IAC[2]. Viva Energy then made further updates to the EMF during the EES IAC hearing[3]. The EES IAC recommended changes, and these are outlined in Appendix A.

Further, whilst the EES IAC summarised its findings on the EES EMF that the overarching framework was appropriate for the project, it found that the EMF did not fully meet the EES Scoping Requirements because

[2] EES IAC Tabled Document 34: Viva Energy – Part A Submissions Annexure 1 – Proposed Changes to Mitigation Measures.

[3] EES IAC Tabled Document 456: Viva Energy – Mitigation Register.

the EES lacked a sufficient baseline assessment of the existing marine and noise environments. It also found that a project-wide risk register should be established and maintained that follows the approach outlined in the EPA's standard condition for development and operation licences.

Upon consideration of the SEES, the SEES IAC was satisfied that deficiencies in the EES documentation related to establishing baseline environmental conditions had been adequately addressed in the SEES and the EMF. In particular, the SEES IAC found that the additional marine and noise environment assessments in the SEES sufficiently established baseline conditions that could be compared to future compliance monitoring data. Overall, the SEES IAC found that incorporating the SEES IAC's recommended MMs, establishes appropriate monitoring, auditing, and reporting requirements, ensuring accountability and transparency in managing the project's environmental impacts throughout all project phases. The MMs are a crucial element of the EMF, and they will primarily be implemented through the incorporated document (clause 4.6.2 states the Environmental Management Plan must include the MMs outlined in the Minister's assessment). The MMs should also inform the conditions of other statutory approvals for the project. The SEES IAC has recommended several changes to Viva Energy's MMs tabled at the SEES IAC hearing[4,5] to minimise project impacts. Section 5 discusses a range of specific changes to MMs recommended by the EES IAC and SEES IAC. These recommended changes and my responses to the MMs with those changes are provided in Appendix A. I find that, subject to the MM changes, the requirements in the EMF are generally appropriate and should ensure accountability and transparency throughout the construction and operation of the Project.

Finally, the SEES IAC found that the revised SEES EMF still lacked a requirement to establish the project-wide risk register. The SEES IAC found that a project-wide risk register would enhance effective risk management for project construction and operation and should be established. I agree with the SEES IAC and consider that the project-wide risk register should be used to inform other regulatory requirements such as for the Development and Operating Licence, recommending the incorporated document include a new clause to mandate this requirement.

Pipeline licence

The EES IAC's task as a panel under the Pipelines Act was set out in the Minister for Energy, Environment and Climate Change's letter of appointment and in the provisions of the Act. The panel was to prepare a report making recommendations about the action to be taken with respect to the pipeline licence application. Matters to be considered included:

- potential environmental, social, economic and safety impacts of the proposed pipeline;
- potential impact of the proposed pipeline on cultural heritage (including Aboriginal cultural heritage); and
- benefit of the proposed pipeline to Victoria relative to its potential impacts.

The key environmental impacts of the proposed pipeline are because of construction of the pipeline including impacts on terrestrial ecology, air quality, surface water and groundwater, contamination and acid sulfate soil impacts.

The EES IAC found that these impacts can all be readily managed through applying the EMF and associated MMs. The EES IAC also found that safety risks from the pipeline have been assessed appropriately for this stage of the project's development. It noted that a detailed safety case will be required under the Gas Safety

[4] SEES IAC Tabled Document: 101: Viva Energy – Day 2 Environmental Mitigation Measures (EMF) (All Mark Up).

[5] SEES IAC Tabled Document 102: Viva Energy – Day 2 Environmental Mitigation Measures (EMF) (Day 2 Mark Up).

Act and a safety management plan will be required under the Pipelines Act. I agree with the EES IAC that these regulatory processes will manage safety risks of the pipeline to an acceptable level.

The potential impacts of the pipeline on Aboriginal and non-Aboriginal heritage can be acceptably managed by implementing an onshore unexpected finds protocol and an approved CHMP. It is my assessment that MMs and recommended changes (Appendix A) will satisfactorily address impacts of the pipeline. Further, these MMs should be reflected in the CEMP and OEMP approved under any pipeline licence issued for the project.

Development licence

As part of its terms of reference, the EES IAC was asked to provide advice that can be used to inform EPA's consideration of Viva Energy's DL applications. The EES IAC's report was to contain recommendations with respect to the DL applications, including recommendations about conditions that might appropriately be attached to the DLs if issued.

The EES was exhibited with DL applications and supporting documentation for:

- operation of the FSRU and associated emissions and discharges from the FSRU (Scheduled Categories K01 - Power generation and L01 - General emissions to air) (Application ID: APP013874); and
- reuse of FSRU discharge water in the Refinery (Scheduled Category A04 - Industrial wastewater treatment) (Application ID: APP013841).

The EES IAC was unable to advise the EPA on whether a DL should be granted for FSRU operation. The EES IAC considered approval of the DL associated with reuse of FSRU discharge water in the Refinery to also be dependent on the further marine environment assessment it recommended. The EES IAC did, however, make several recommendations for additional conditions to be included on any DLs issued for the project, as summarised below and in Table 4:

- a condition adopting default guideline values for chlorine of 7.2 micrograms per litre in Corio Bay generally (including the Project area) and 2.2 micrograms per litre at the Ramsar site) (see Section 5.1 and Table 4);
- a condition setting the seawater intake consistent with expected gas production rates at times when the Refinery is not operating (see Section 5.3);
- a condition requiring Viva Energy to report on how it has preferenced the lowest net embodied emissions LNG cargoes to be processed in the FSRU as far as reasonably practical (see Section 5.3)
- a condition limiting operation of the FSRU in closed loop mode (see Section 5.3)
- a condition requiring Scope 1, 2 and 3 greenhouse gas (GHG) emissions within Viva Energy's control to be offset with verified GHG offsets (see Section 5.3)
- conditions about the configuration of the FSRU should the revised air quality modelling indicate that this is required, and minimising odorant emissions (see Section 5.6).

Viva Energy did not re-exhibit the DL applications with the SEES. Therefore, the SEES IAC terms of reference required them to only *'consider new information in the Supplementary EES that is relevant to the EPA Development Licence applications that were exhibited with the original EES'*.

Section 5 provides my assessment of the SEES relevant environmental effects including any update to recommendations about related MMs relevant to inform EPA's consideration of the DLs. The EES IAC recommended that, to the extent necessary, these are included as conditions of any DLs. The SEES IAC recommended further changes to the MMs (see Appendix A) as relevant to the EPA and their role in assessing any DL applications. The SEES IAC highlighted three key recommendations for the EPA to:

- Specify a combination of stack specific limits and an annual bubble limit for air emissions on the DL for the FSRU (see Section 5.6).

- Consider the potential presence and management of other contaminants in the wastewater when assessing the DL applications (see Section 5.1).
- Review and consult on the development of monitoring thresholds for the dredging monitoring program in the project's EMF (see Section 5.1).

It is my recommendation that EPA consider the EES IAC and SEES IAC findings, along with the recommended MMs and refinements to those (see Appendix A), when progressing the DL applications for the project.

Marine and Coastal Act consent

The Marine and Coastal Act, under which the project expects two key approvals, outlines that planners and decision makers should apply an ecosystem-based approach to marine and coastal planning and management as a guiding principle (section 9(2)(a). The EES IAC found that the EES should have provided greater assessment of ecosystem-wide impacts across the marine and terrestrial environment. As a result, the EES IAC recommended the EMF include a requirement to develop a "…conceptual model for coordinated ecosystem-based management…" to address impacts and risks to the marine environment, across all project phases, including detailed design, construction and dredging, operation and decommissioning.

It was not the scope of the SEES IAC to interrogate the type of approach that should be adopted for the Marine and Coastal Act processes and decisions. However, a new conceptual model of the Corio Bay ecosystem was provided in the SEES marine assessment. The SEES IAC was satisfied that this model provided adequate information to understand the marine ecosystem of northern Corio Bay (see Section 5.1). The SEES IAC did reinforce the importance of an ecosystem-based approach to sufficiently monitor and manage the project's effects on the marine environment. The SEES IAC expressed that marine environment MMs in the SEES reflected this, as the monitoring MMs had been expanded to require a wider range of ecosystem components.

I support the SEES IAC's conclusion that an ecosystem-based approach is an important component to monitor and manage the project's effects on the marine environment and should be considered to inform the baseline and operation monitoring programs described in the EMF. The SEES marine environment MMs incorporate broader ecosystem considerations. However, I have recommended in Section 5.1 that key MMs, such as MM-ME06 and MM-ME19, are enhanced to explicitly support an ecosystem-based and integrated approach to mitigation management. The Marine and Coastal Act consents will provide a mechanism for further developing and addressing an ecosystem-based approach. This is discussed further in Section 5.1 of my assessment.

Cultural Heritage Management Plan

The EES IAC noted that a CHMP was the appropriate mechanism to manage cultural heritage impacts from the project. A CHMP (No.17816) is being prepared for the project and will be updated based on the further Underwater Aboriginal cultural archaeological assessment and the Cultural values assessment (CVA) being undertaken in line with my SEES directions.

The EMF contains commitments by Viva Energy to ensure impacts on Aboriginal cultural heritage are avoided and minimised and are acceptable (AH01 – AH04). The SEES IAC noted that the CHMP was to be updated to outline any necessary management requirements as determined by WOTAC, in consultation with Viva Energy, particularly in relation to project construction (MM-AH01) and completion of the cultural. The EMFs MM-AH01 commits to updating the CHMP (which needs to be approved by the WTOAC) in light of the CVA and the findings of the Underwater cultural archaeological assessment, with MM-AH02 to MM-AH04 supporting continued development and consultation around these assessments and mitigation measures. This is discussed further in Section 5.10 of my assessment.

5. Assessment of environmental effects

This section details my examination of the project's potential effects on each aspect of the environment in the context of relevant evaluation objectives, which are set out below. My assessment draws on the EES, SEES, public submissions, evidence and information presented to the EES IAC and SEES IAC, the EES IAC and SEES IAC reports, and other relevant sources.

Legislation, policy, strategies and guidelines, and the objectives and principles of ecologically sustainable development, also contextualise my assessment. To provide an integrated structure for this assessment, key aspects of legislation and statutory policy are reflected in evaluation objectives that were set out in the EES scoping requirements. My assessment has been made in reference to these evaluation objectives (Table 1).

These objectives were derived from the evaluation objectives included in the scoping requirements for the EES and used by Viva Energy in its assessment of environmental effects within the EES. The EES IAC and SEES IAC also considered the project's effects having regard to these evaluation objectives.

Table 1: Assessment evaluation objectives.

Evaluation objective	**Relevant section of this assessment**
Energy efficiency, security, affordability and safety - To provide for safe and cost-effective augmentation of Victoria's natural gas supply having regard to projected demand and supply in context of the State's energy needs and climate policy	5.4
Biodiversity - To avoid, minimise or offset potential adverse effects on native flora and fauna and their habitats, especially listed threatened or migratory species and listed threatened communities as well as on the marine environment, including intertidal and marine species and habitat values.	5.1, 5.2
Water and catchment values - To minimise adverse effects on water (in particular wetland, estuarine, intertidal and marine) quality and movement, and the ecological character of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site	5.1, 5.2, 5.7, 5.11
Cultural heritage - To avoid or minimise adverse effects on Aboriginal and historic cultural heritage	5.10, 5.11
Social, economic, amenity and land use - To minimise potential adverse social, economic, amenity and land use effects at local and regional scales	5.5, 5.6, 5.8, 5.9, 5.11
Waste management - To minimise generation of wastes by or resulting from the project during construction and operation, including dredging and accounting for direct and indirect greenhouse gas emissions	5.1, 5.3, 5.11

The EES IAC and SEES IAC made several findings and recommendations in relation to the project and its effects. My response to the EES IAC and SEES IAC findings and recommendations, along with my assessment of the environmental effects of the project are detailed in the sections below.

Section 6 summarises my main conclusions and recommendations about the environmental effects of the project and responds to the EES IAC and SEES IAC key recommendations. Appendix A summarises my recommendations for the MMs. My findings in relation to MNES are provided in Appendix B.

5.1 Marine environment

Evaluation objectives

To avoid, minimise or offset potential adverse effects on native flora and fauna and their habitats, especially listed threatened or migratory species and listed threatened communities as well as on the marine environment, including intertidal and marine species and habitat values.

To minimise adverse effects on water (in particular wetland, estuarine, intertidal and marine) quality and movement, and the ecological character of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site.

To minimise generation of wastes by or resulting from the project during construction and operation including dredging.

Assessment context

Marine environment effects were addressed in Chapter 8 and Technical Report A of the EES, and Chapter 7 and 8 of the EES IAC report. Further assessment was addressed in Chapter 3 and Technical Report A of the SEES, and Chapter 5 and 6 of the SEES IAC report. Attachment I and Attachment II of the SEES contained Stantec's peer review advice and MNES assessment respectively.

There were a total of 22 MMs proposed to manage impacts on the marine environment (MM-ME01 to MM-ME21, including MM-ME05a and MM-ME17a), with interrelated MMs across light spill (MM-LS01 and MM-LS02) and underwater noise (MM-UN01 to MM-UN04). The SEES IAC recommended a new MM, ME17a, and recommended updates to 10 of the 22 MMs as discussed below. The EES presented 18 MMs, with the EES IAC recommending the addition of MM-ME19, which was adopted by Viva Energy as part of the SEES process.

Potentially significant impacts to the marine environment were identified as one of the key aspects of the EES scope for this project. The EES characterised the study area of Corio Bay and the section of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site (now referred to as the Ramsar site) nearest to the project. As noted by the EES and SEES, the existing environment of Corio Bay has been subject to regular seawater discharges from the Refinery for over 60 years, including chlorinated and heated (8-10 degrees above ambient) wastewater discharge.

The key issues relating to the potential impacts on the marine environment (including marine conservation reserves and the Ramsar site), considered through the EES and SEES and examined in this assessment are:

- associated changes in hydrodynamics and coastal processes and seawater quality;
- short and long-term impacts to marine biota, due to entrainment of organisms in seawater for regasification or due to variable water temperature discharges or pollutants, including chlorine;
- reduced availability of food sources;
- adverse effects to the marine environment from dredging and sediment mobilisation, including increased turbidity and contaminant disturbance;
- increased shipping activity on marine species, including acoustic effects and potential collisions; and
- potential impacts from accidental or unintended leaks or spills arising from construction or operation, including unintended introduction of exotic species.

The EES assessed the potential effects of the project relating to construction and operation of the FSRU facility, including impacts from dredging, entrainment, wastewater discharge, increased underwater noise and additional shipping traffic. Other relevant environmental impacts on the marine environment included surface water run-off, underwater noise, light spill, and potential effects on water quality and primary productivity.

The EES IAC found potential effects from additional underwater noise, surface water run-off into Corio Bay and the Ramsar site, additional shipping traffic and light spill could be acceptably managed and mitigated through the EMF. However, the EES IAC found it difficult to assess potential effects on marine birds and shorebirds[6], concluding that the significance and acceptability of the environmental effects on the marine environment could not be fully determined based on the EES. Therefore, the EES IAC recommended further investigation, including further assessment of the existing marine environment, the effects of current discharges from the Refinery and revised modelling to better understand marine environment impacts.

As discussed in Section 4, based on the EES IAC conclusions, I required a SEES be prepared and issued directions on what the further information and investigations the SEES needed to include, being:

- field monitoring of the Refinery discharges, including temperature and chlorine plume monitoring;
- field mapping of seagrass;
- further investigation of fish species in Corio Bay; and
- re-investigation of ocean currents and wave effects of Corio Bay.

The SEES recalibrated and revised the regional hydrodynamic model (RHM) using newly gathered existing condition data. Verified predictions from the RHM were used to re-run the models for fish egg entrainment, wastewater discharge and sediment transport during operational FSRU scenarios. The SEES included an integrated assessment of effects on the marine environment using the revised and recalibrated RHM model. The SEES also presented a new conceptual model of the Corio Bay ecosystem. Together, this supplementary work informed the assessment of potential effects of the project on the marine environment articulated in the SEES. The SEES did not re-assess potential effects on higher order marine species or mammals and did not reconsider underwater noise, shipping traffic or light spill in line with my SEES directions.

Seagrass mapping identified three primary species, including the FFG Act-endangered *Heterozostera nigricaulis*, with no significant difference in seagrass cover between Refinery discharge and reference sites. For the Refinery, the SEES demonstrated the existing discharge plumes did not exceed Default Guideline Values (DGVs) for the Ramsar site, and chlorine byproducts were not having a significant effect on Corio Bay. The revised RHM indicated, with operation of the project, temperature and chlorine plumes would remain within DGVs and not reach the Ramsar site. Thermal plumes were also expected to be smaller than the existing discharge plume from the Refinery.

The revised entrainment model predicted 0.12 percent (%) entrainment for both the project and the Refinery at the Ramsar site, with higher levels in Corio Bay (0.34% vs. the Refinery's 0.25%). The SEES deemed these effects negligible compared to natural losses.

As part of the EES the project had assessment the potential impacts of dredging. Dredging is required for the new berth pocket and swing basin, consisting of a 12 hectares area adjacent to the existing shipping channel (i.e. approximately 490,000 cubic metres of dredged material). The SEES presented a revised sediment transport model, predicting temporary increases in suspended solids during an 8-week dredging period, with

[6] Refer to Section 5.2 of this assessment.

a median rise of less than 2 mg/L at the Ramsar site, and some variability depending on weather conditions modelled on weather recorded between August - September 2020. The SEES found that the proposed dredging was unlikely to cause significant impacts to seagrass, including within the Ramsar site, or to the broader marine environment. This conclusion was primarily due to the short duration of dredging, the expected natural recovery of seagrass within 3 years of dredging and the implementation of MMs, such as silt curtains (MM-ME04) to mitigate the effects during dredging.

Underwater noise modelling in the EES showed effects from pile driving may extend into the Ramsar site, however, these impacts would be short term. The EES noted that underwater noise effects would occur where there is already a high ambient soundscape, associated with the existing port and industrial operations in the Bay. The assessment found that noise levels during construction would essentially remain consistent with current levels. The EES also found additional shipping movements could be acceptably managed under existing regulations and management arrangements associated with the Refinery, as well as through the proposed MMs.

My SEES directions required 12 months of baseline monitoring data to better understand the existing environment and the impacts of existing wastewater discharged from the Refinery. Viva Energy stated this would be undertaken in the year immediately prior to dredging to account for marine condition variability. This is addressed below within the discussion section. The SEES assessment of marine birds and shorebirds is detailed within Section 5.2 of this assessment.

Discussion

The key marine environment issues considered by the EES IAC and SEES IAC, and discussed in this assessment are presented across two project phases; construction and operation, with the potential effects of the dredging program presented separately. These issues are mostly discussed below in the same order of presentation as in the SEES IAC report. Findings on the effects to the Ramsar site, as a MNES, are found in Appendix B.

Operational impacts on the marine environment

The SEES IAC considered the main issues relating to the operational aspects of the project as the adequacy of the revised RHM and if it was appropriate to address wave effects and ocean current directions of Corio Bay.

Regional hydrodynamic modelling

The SEES IAC provided detailed analysis of the revision and re-calibration of the RHM as presented in the SEES, including the Stantec feedback process and cross-examination of the updated model outputs (predictions) in comparison to field measurements. The RHM was revised to include updated wind data, tidal conditions, and enhanced resolution. The revised model aligned with field measurements and as such, was deemed by Viva Energy as more reflective of the existing Corio Bay environment.

Stantec's peer review of the model calibration found it was sound for the purposes of the assessment, but noted the SEES did not include all details on the model's calibration metrics.

Submitters asserted there was a lack of transparency over the revised RHM, noting the absence of information on the updated wave and current direction inputs. The SEES IAC raised this as a concern, as the

RHM report was not exhibited with the SEES. However, additional information was provided during the hearings, including two versions of the RHM report[7,8] and the Coastal Modelling Technical Note by Jacobs[9].

Experts and submitters highlighted the importance of adequately modelling wave effects and current direction in the RHM to sufficiently predict resuspension of sediments and sediment plumes from dredging. Specific concerns about wave effects related to how the waves and currents of Corio Bay were represented in the RHM, as well as the validation methods of the wave model presented in the SEES. Similarly, the joint expert witness statement on hydrodynamics[10] raised discrepancies in the model's ability to replicate existing conditions in Corio Bay, being that current directions at low current speeds appeared inaccurate. Experts at the hearing suggested that recalibration of wave speeds in the RHM was required to address these concerns.

The SEES IAC accepted Viva Energy's statement that my SEES directions (recommendation 2) did not request re-evaluation of the wave component of the RHM and rejected the request to recalibrate the RHM. The SEES IAC found the modelling calibration was acceptable, noting advice at the hearing that the simplified wave representation in tabled documents[11] was appropriate for Corio Bay. The SEES IAC accepted that due to low currents and wave energy, further refinements to current direction inputs were unlikely to improve accuracy. The SEES IAC found the revised RHM was appropriate to inform the assessment of the project's potential effects on the marine environment. I support the findings of the SEES IAC and confirm that the February 2024 RHM report[12] was peer reviewed by Stantec.

Existing condition of the marine environment

The SEES IAC evaluated further work undertaken by Viva Energy to understand the existing marine environment of Corio Bay, in the context of the following key issues that emerged from the EES hearing:

- whether the marine assessments should have adopted an ecosystem- based approach;
- whether the updated seagrass mapping is adequate and fit for purpose;
- whether the extent and impact of temperature and chlorine plumes from existing Refinery discharges; have been appropriately characterised; and
- further assessment chlorine byproducts in mussels.

The EES IAC found that the marine impact assessment failed to undertake an ecosystem-based approach, noting this as a key requirement under the Marine and Coastal Act. The EES IAC recommended the EMF included a requirement to develop a "...conceptual model for coordinated ecosystem-based management..." to address impacts and risks to the marine environment but did not specify exact MMs to adjust. The EES IAC also recommended an 'ecological coordinator' should be appointed to manage the ecosystem-based approach to ensure integration of the marine environment and terrestrial ecology outcomes. The EES IAC proposed this approach was applicable at all project phases, including detailed design, construction and dredging, operation and decommissioning, as well as relevant to the further assessment work it proposed. SEES Technical Report A did present a conceptual model of the Corio Bay ecosystem, with seagrass utilised as

[7] SEES IAC Tabled Document 13: Viva Energy – Hydronumerics Report: Refinement of Hydrodynamic Model (February 2024).

[8] SEES IAC Tabled Document 14: Viva Energy – Hydronumerics Report: Refinement of Hydrodynamic Model (November 2024).

[9] SEES IAC Tabled Document 133: Viva Energy – Jacobs: Viva SCW Intake Upgrade, Coastal Modelling Technical Note (March 2020).

[10] SEES IAC Tabled Document 79: Viva Energy – Joint Expert Statement (Hydrodynamics).

[11] SEES IAC Tabled Document 133: Viva Energy – Viva SCW Intake Upgrade, Coastal Modelling Technical Note.

[12] SEES IAC Tabled Document 13: Viva Energy – Hydronumerics Report: Refinement of Hydrodynamic Model (February 2024).

an indicator species for the impact assessment, as seagrass was a key component of the ecosystem and was more sensitive to disturbance. Viva Energy did not present a new MM to address the EES IAC's findings on this.

GGS submitted that the SEES did not consider the principles of ecosystem- based management, as required under the Marine and Coastal Act, although in line with the SEES IAC's conclusion, GGS also recognised that this topic was out of scope for the SEES.

The SEES IAC heard concerns about the characterisation of temperature and chlorine plumes from the existing Refinery discharges. Submitters highlighted the limited scope of environmental assessments beyond updated seagrass mapping, despite additional studies on fish species and chlorine byproducts in mussels. Issues included Viva Energy's response to peer review gaps, limitations in seagrass mapping methods and statistical analyses and short field assessment periods. Concerns were also raised about the adequacy of monitoring methods for temperature and chlorine plumes, particularly due to the monitoring timeframe.

The SEES IAC noted some limitations in the mussel study used to assess existing chlorine uptake in marine species from Refinery discharge. Although determined that the assessment did not indicate significant bioaccumulation of chlorine byproducts from Refinery discharge, concluding the mussel study informed inputs into the operational FSRU modelling scenarios of wastewater discharge. The SEES IAC found that due to the limitations of detecting very low concentrations of chlorine by Australia Laboratories, further testing of other species was unnecessary unless detection limits improved to meet international standards. There are ethical constraints of testing higher-order species, and the SEES found no published chlorine limits for these species. The SEES also noted that chlorine concentrations are more difficult to detect in higher order marine species, compared to mussels. I support the SEE IAC conclusion that further chlorine testing in these species is not feasible or necessary for this assessment.

EPA and DEECA Regions submitted the marine studies adequately addressed matters within their remits. Stantec's peer review report determined that the existing conditions presented in the SEES were generally accurate and comprehensive but did not agree with the statistical analysis method used to compare seagrass cover between Refinery discharge sites and reference sites.

Following review of the evidence provided at the hearing, the SEES IAC was satisfied that the SEES did present an ecosystem-based approach, which provided information to form a sufficient understanding of the marine ecosystem of northern Corio Bay for the SEES and an updated assessment on food source availability. The SEES IAC found that the use of seagrass as an indicator species to inform the marine environment impact assessment was acceptable, with the seagrass mapping at an adequate level to inform the assessment of the project's impacts. The SEES IAC, again, recommended the EMF could take an ecosystem-based approach to managing the effects of the project on the marine environment, which could be facilitated by an ecological coordinator, as recommended in the EES IAC reports.

Refinery discharge was also found to be sufficiently characterised for the purposes of the assessment. The SEES IAC found that the marine MMs already reflected an ecosystem approach as monitoring requirements looked at a broad range of ecosystem components. However, it recommended that MM-ME06 and MM-ME19 could be strengthened to more clearly identify that an ecosystem-based approach would be taken. Relating to this topic, the EES IAC also stated that monitoring requirements should include what is necessary to address impacts to benthic habitats and communities to cover broader ecosystem elements. I support this EES IAC recommendation, noting Viva Energy are to ensure this wastewater monitoring at MM-ME19 adequately considers relevant benthic habitats and communities.

Overall, I support the findings of the SEES IAC, where the residual concerns around the ecosystem-based approach can be worked through in later considerations under the Marine and Coastal Act. However, I support

the SEES IAC recommendations to update MM-ME06, MM-ME19 and the EMF to require an ecological coordinator to manage a coordinated approach across future project stages, noting it's particularly relevance for the implementation of the environmental monitoring program prior to and during construction and operation. The SEES integrated some outcomes of the terrestrial ecology and marine environment assessments, with an update to the extent of native vegetation removal[13] following the further SEES work.

While recognising some limitations in the SEES methods and statistical analyses the SEES IAC noted that the issues could be resolved through the monitoring program required by MM-ME05a, MM-ME06, MM-ME 19 and MMME17a. I support the SEES IAC findings and conclusions on these matters.

The SEES IAC noted that the outcomes of the SEES demonstrated seagrass cover within the existing Refinery plumes were ultimately similar to those at reference sites, stating there were no obvious ecological effects other than minor localised disturbances. The SEES IAC accepted there were no significant impacts on seagrass within the study area from the Refinery discharges.

Operational impacts

The EES and SEES looked at potential operational effects of the project on the marine environment, including FSRU discharge, underwater noise and additional shipping movements. The SEES presented revised modelling of the potential effects of the FSRU, including for wastewater discharge and entrainment. Key issues identified by the SEES IAC related to operational effects were:

- revised wastewater discharge modelling;
- revised entrainment modelling; and
- proposed monitoring of operational impacts.

Issues raised in submissions included the length of the assessment and methodology used in the marine assessment, particularly for the revised wastewater discharge model's exclusion of measures beyond chlorine and temperature and the mussel study's approach to assessing chlorine byproducts. Other submissions related to the omission of a recruitment shadow at the FSRU in the revised entrainment model, and the use of eDNA analysis for identifying fish species in Corio Bay.

As noted above, the SEES IAC found that the RHM was appropriate for predicting the effects of wastewater discharges from the FSRU. It found the outputs of the RHM could be reliably used to revise the models assessing the projects operational impacts. I support the conclusions made by the SEES IAC in regard to the adequacy of the RHM for wastewater discharges from the FSRU.

For the revised wastewater discharge model for operation of the FSRU, the SEES IAC highlighted Stantec's peer review, which found that the revised wastewater discharge model improved understanding of how the FSRU effects discharge dispersion. The SEES found that discharges from the FSRU diffuser would likely dilute to below the DGVs and plumes would not enter the Ramsar site. It also noted that consideration of discharge chemicals would occur further through the DL application process. I support the conclusions made by the SEES IAC that discharges from the FSRU operations will have negligible impact on the marine environment and can be acceptably managed with the implementation of the MMs

The SEES IAC accepted Dr Wallis' (Viva Energy expert witness) evidence that a recruitment shadow from the FSRU was unlikely and therefore, did not require input into the revised entrainment model. The SEES IAC

[13] Refer to Section 5.2; Terrestrial ecology.

endorsed the results of the revised entrainment modelling, which showed the FSRU would have minor effects on entrainment of ichthyoplankton. Entrainment levels would be slightly greater than the existing Refinery, including when considered cumulatively with natural causes of mortality. The SEES IAC found the FSRU intake was not expected to have a significant impact on Corio Bay fish populations from entrainment of fish eggs. I support this conclusion.

The SEES IAC noted submitter concerns on the potential for the FSRU diffuser to cause seabed erosion. The SEES IAC determined seabed erosion could be managed through an amendment to MM-ME10, to ensure seabed stability and erosion potential are considered in the design of the diffuser. I support this amendment to MM-ME10.

The EPA submitted to the SEES IAC that the operational monitoring program in the SEES failed to address potential effects to plankton and seagrass. However, following modifications to MM-ME19 and MM-ME 21 proposed by Viva Energy at the SEES hearing, the EPA was satisfied that these concerns were addressed. The EPA also recommended that water quality measurements be taken during plankton monitoring and that chlorophyll (Chl a) fluorescence monitoring be conducted, if necessary. The SEES IAC accepted these proposed changes to MM-ME19, as well as the newly added MM-ME21, recommending these water quality measures as advised by the EPA, also be included at MM-ME21. I support the SEES IAC's recommendations and amendments to these MMs, noting the changes would ensure appropriate monitoring methodology is implemented for the project.

Baseline monitoring

The SEES IAC investigated the suitability of the baseline dredging monitoring program proposed by Viva Energy, along with the timing of monitoring commencement. Viva Energy proposed to begin baseline monitoring 12 months prior to the commencement of dredging. However, the SEES IAC found inconsistencies across the monitoring program MMs, with some parameters proposed to be monitored for less than 12 months (e.g. MM-ME05a, MM-ME06 and MM-ME07). The SEES IAC were also concerned the monitoring program omitted monitoring of other operational effects outside of dredging, particularly wastewater discharge of the FSRU (MM-ME17 and MM-ME19). As such, the SEES IAC proposed to add MM-ME17a. I support this inclusion, as it strengthens the operational monitoring program and should result in appropriate management of wastewater discharge of the FSRU during operation.

Submitters considered that monitoring should have begun during the SEES and extended over a longer period to account for natural environmental variability. Most concerns focused on the proposed monitoring methods in the SEES (Technical Report A) and the MMs. The EPA recommended 12 months of baseline monitoring before dredging (MM-ME05a and MM-ME21). The SEES IAC agreed, stating 12 months before construction and dredging was required to account for natural variability. The SEES IAC also supported Dr Edmunds (GGS expert witness) recommendation for intertidal seagrass to form part of the baseline monitoring. The SEES IAC recommended additional MM updates to strengthen the proposed baseline monitoring programs

I support the SEES IAC's findings and MM recommendations, reiterating the need for the project to further develop more appropriate baseline data and methodologies to confirm predicted model outcomes during construction and operation of the project. These baseline monitoring requirements would aid appropriate development of adaptive management thresholds, working to ensure residual environmental effects on the marine environment were minimised.

Construction impacts on the marine environment

The primary potential impact on the marine environment during project construction is sediment plumes and accretion from dredging 490,000 cubic metres of sediment over a 12-hectare section of seabed for the pier

and swing basin. Dredging is expected to take 8 weeks, reaching depths of 13.1 metres for the berth and 12.7 metres for the swing basin. The dredged material will be transported to the existing Point Wilson dredged material ground (DMG) disposal site The EES IAC determined that disposal to Point Wilson DMG was appropriate, and that onshore disposal was not required. I support this finding. The SEES confirms that no additional dredging is proposed for other components of the project.

Other construction activities with the potential to impact the marine environment include pile driving for the pier and berth, surface water run-off due to trenched construction of the underground gas transmission pipeline and installation of the seawater transfer pipe. The EES IAC determined that contamination from the trenched seawater transfer pipe could be managed readily via the CEMP, which I support, and note is stated in MM-ME20. The SEES IAC described the seawater transfer pipeline installation as minor in nature, requiring a small, trenched area that would be progressively backfilled once laid. I support this conclusion, with potential construction effects to be acceptably managed via the MMs.

The main impact associated with surface water run-off was the trenched crossing of the underground gas transmission pipeline across the unnamed tributary of Hovells Creek. The tributary of Hovells Creek enters Corio Bay and the unnamed tributary occurs upstream of the Ramsar site. As such, there was potential for construction run-off to be received by Hovells Creek, Corio Bay and the Ramsar site. As it was evident that the unnamed tributary was ephemeral and construction could, therefore, occur during 'no flow' conditions, the EES IAC found that impacts would be sufficiently mitigated through MM-SW03 and its recommended amendment. I support this amendment, determining effects on the receiving waters of Corio Bay and the Ramsar site, during construction, are likely to be minor and can be acceptably managed through the surface water MMs, subject to the update to MM-SW03.

Specific considerations related to pile driving and underwater noise, as well as dredging and its potential effects on the marine environment are discussed below.

Sediment transport modelling

The further work recommended by the EES IAC, and subsequently undertaken for the SEES, involved revising the sediment transport modelling to understand likely plumes and effects of dredging on the marine environment. This work was necessary to verify the extent and behaviour of sediment plumes, particularly in relation to the nearby Ramsar site, among other potential impacts. Submitters raised concern about the proximity of the dredging area to the Ramsar site. In its assessment the SEES IAC considered the dredging history of Corio Bay as useful context, noting that past dredging had involved larger volumes and extents than currently proposed. The SEES IAC considered this as part of their assessment of significance and acceptability of impacts of proposed dredging.

The main submitter concerns included whether the modelling properly accounted for potential variability in sediment plumes from dredging, the appropriateness of assuming a constant background suspended solids concentration, and the use of median values rather than 95th percentile results in the mapping of sediment plumes.

Stantec's Peer Review of the modelling undertaken for the SEES noted it failed to examine the potential effects of dredging on hydrodynamics or wave action, and therefore, shoreline stability along Corio Bay. Viva Energy, however, addressed this in the SEES, highlighting that Corio Bay generally had low wave heights, and therefore dredging would not alter waves on the north shore or for the Ramsar site.

The SEES IAC found that the assessment of the worst-case scenario could have been better, but it acknowledged that the safeguards in the EMF would ensure dredging impacts were monitored and managed appropriately if exceedances did occur (e.g. MM-ME05, MM-ME05a and MM-ME06). The SEES IAC was

therefore satisfied that the use of average suspended solids concentrations were appropriate. As the 75th percentile map demonstrated the potential for plumes to extend into the Ramsar site without mitigation, the SEES IAC did not expect this outcome following implementation of mitigation. Overall, the SEES IAC determined that the revised modelling was adequate for assessing dredging impacts on seagrass, particularly in light of the comprehensive monitoring program, inclusive of adaptive management 'actions,' proposed in the EMF. I support the SEES IAC's finding on the appropriateness of the sediment transport modelling.

Revised assessment of dredging impacts on seagrass

The SEES IAC examined submitter concerns regarding the methodologies used to assess impacts of dredging on seagrass. It found that the light availability calculations were consistent with the Victorian Dredging Guidelines and the SEES did assess the maximum likely impacts on light availability for the Ramsar site. However, the SEES IAC, found the SEES did not demonstrate the 10 percent light threshold for seagrass, required by my SEES directions, would be achieved in Corio Bay as a result of dredging. As such, the SEES IAC recommended MM-ME06 be updated to require monitoring at additional sites to assess any impacts on seagrass during dredging and to confirm seagrass recovery where impacts occur. More broadly, the SEES IAC determined that, based on the revised sediment transport modelling, the project is not expected to have significant impacts on seagrass. I support this conclusion of the SEES IAC and the proposed amendment to MM-ME06.

Given the short duration of dredging activities, the SEES IAC considered an assessment of seagrass productivity to be unnecessary. The SEES IAC accepted expert evidence from Dr Wallis that any temporary reduction in seagrass productivity, should it occur, would not be significant for the marine ecology of either the Ramsar site or Corio Bay. This conclusion was underpinned by the short-term nature of the works and the fact that dredging would not take place during ecologically sensitive months (September to January), as outlined in MM-ME02[14]. I support this conclusion.

The SEES IAC also found the SEES' examination of impacts on intertidal seagrass was limited, recommending that MM-ME06 be updated to require inclusion of intertidal seagrass in the dredging monitoring program. I support this determination and also note that updated seagrass mapping showed intertidal seagrass to be absent along the seawater transfer pipe. Therefore, currently, no direct impact to intertidal seagrass is expected. The potential for changes in seagrass presence, including intertidal seagrass, over time was addressed by Viva Energy via MM-ME20, where field survey will occur prior to construction to confirm overall seagrass loss. The SEES IAC supported the addition of MM-ME20, and I also support its inclusion.

The SEES identified a new impact to seagrass, involving the direct loss of 0.5 hectares due to the construction of the seawater transfer pipeline. A total of 0.05 hectares of this area was found to be Australian Grass-wrack; an FFG Act endangered species.[15] The SEES noted that the loss is likely to be temporary, and recovery is expected to occur within 3 years post-dredging. It also outlined, for context, that Corio Bay contains approximately 1,050 hectares of seagrass, with the conclusion that, therefore, the expected loss would not be regionally significant, nor significant for Australian Grass-wrack. The proposed MM-ME20 also included measures for less invasive construction methods, seagrass transplantation and a rehabilitation program. The SEES IAC supported MM-ME20, and I agree that with the addition of MM-ME20, new seagrass loss does not alter the overall findings on seagrass impacts.

[14] Refer to Section 5.2 for further assessment of MM-ME02.

[15] Refer to Section 5.2 of this assessment for further information.

Whilst the SEES IAC acknowledged there were opportunities for alternative methods and approaches for the seagrass impact assessment, the SEES IAC determined that any remaining uncertainties in the revised sediment transport model and, therefore, the assessment of seagrass impacts, could be addressed through the dredging monitoring program and associated adaptive management (i.e. threshold triggers and exceedance actions at MM-ME05). MMs associated with baseline monitoring (MM-ME05a), operation monitoring (MM-ME05, MM-ME06, and MM-ME07) and construction (MM-ME04) were discussed at the SEES hearing in relation to methods, with the SEES IAC recommending updates to these MMs in relation to seagrass. SEES IAC recommendations included additional monitoring sites (MM-ME06), the requirement for monitoring to include intertidal and subtidal seagrass (MM-ME06), monitoring of seagrass at (MM-ME19) and the requirement of 12 months of baseline monitoring (MM-ME05, MM-ME05a).

The SEES IAC recommended the development of turbidity thresholds and associated exceedance actions be undertaken in reference to existing condition data (MM-ME5a) and in consultation with EPA (MM-ME05). I support this recommendation and suggest consultation with EPA should explore all relevant monitoring values to threshold development for the dredging monitoring program. As recommended by the SEES IAC, light availability calculations should be consistent with the Victorian Dredging Guidelines, which should be considered during the development of light attenuation thresholds at MM-ME05.

Based on the revised model predictions, updated MMs and effective implementation of the EMF, the SEES IAC found that the impacts of construction and dredging could be managed to acceptable levels. It highlighted the importance of the monitoring programs, as well as development of appropriate trigger and exceedance thresholds. As such, The SEES IAC determined residual impacts of construction and dredging were unlikely to be significant on the marine environment. I support these findings of the SEES IAC and support the recommendations to the baseline, construction and operational monitoring measures (MM-ME05a, MM-ME05a, MM-ME06, MM-ME19).

Seagrass was used as an indicator species to assess potential effects on food sources and availability. The SEES considered the food web, including the potential for bioaccumulation of chlorine and the potential impacts of entrainment on productivity and the food chain. Following the revised modelling, the SEES determined that impacts on plankton and larvae populations, productivity, the food chain and food availability for migratory shorebirds were expected to be negligible. Based on this assessment and the use of seagrass as the indicator species, significant impacts to food availability are not expected within Corio Bay or the Ramsar site. Should any impacts arise, they can be acceptably managed through implementation of the baseline, construction and operational programs outlined in the EMF.

Marine mammals

The EES identified the potential for marine mammals, including some species of whale and dolphin, to frequent Corio Bay on occasion. One FFG Act critically endangered species, Burrunan Dolphin *Tursiops australis*, was found to frequent the Bay. Assessment of project effects on marine mammals was undertaken during the EES for three main construction and operation factors; spills and unexpected events, underwater noise and additional shipping movements. As such, the EMF included parameters for visual monitoring of marine animals during construction and related protocols during operations The EES IAC determined that Viva Energy and Ports Victoria had a well-established spill management plan for existing port operations, which would be applied to the project and as such, increased impact of the project on the marine environment from unexpected events or spills was not expected. It is my assessment that spills within the marine environment could be adequately managed through MM-ME14.

The SEES did not integrate any key outcomes in relation to marine mammals. However, as the project is not expected to significantly impact the marine environment in relation to entrainment, wastewater discharge

and sedimentation, I conclude that marine mammals are unlikely to be significantly affected by these construction and operational processes.

Potential effects of underwater noise and additional ship movement are discussed below.

Underwater noise

The EES IAC examined whether existing underwater ambient noise levels had been properly assessed. The EES assessment was informed by baseline acoustic monitoring and modelling of potential noise impacts, which included modelling scenarios for pile driving, dredging, FSRU operation and LNG carrier movements. In addition to marine mammals, the assessment also considered model predictions in relation to fish, marine invertebrates and 'diving' birds. However, the modelling did not incorporate scenarios that reflected implementation of MMs.

Several EES submitters were concerned about the methods and data used to define existing acoustic conditions and to establish model thresholds. Submitters also considered there to be a lack of information on the local abundance and densities of marine organisms provided in the EES.

Viva Energy responded during the EES IAC hearing[16,17] summarising that the project did not materially alter existing underwater noise conditions, with the effects more so associated with the existing Port and shipping activities of Corio Bay.

The EES IAC highlighted that due to existing underwater noise in the Bay, the noise levels presented were "inherent" rather than residual, and as such, residual noise levels were not quantified in the EES. The EES IAC found that further assessment was not required, determining that a reasonable alternative approach would be to amend MM-UN04 to require that noise levels remain below the existing baseline levels as presented in the EES. The EES IAC also supported Mr McPherson's (Viva Energy expert witness) recommended updates to MM-UN04, adding the requirement of a protocol when noise limits were exceeded during construction. The EES IAC also recommended two changes to the underwater noise MMs, at MM-UN01 and MM-UN02. I support the EES IAC's recommended updates to the underwater noise MMs, and due to these MM refinements, consider that the potential effects of noise on the underwater marine environment could be acceptably managed.

The EES IAC also accepted that noise thresholds were not known for many local species. The EES IAC accepted the use of international guidelines for this assessment, recommending a precautionary approach to managing potential noise effects was essential in the absence of local data. This approach was captured in the EES IAC's recommended amendments to MM-UN01 and MM-UN02. Additionally, the EES IAC accepted the uncertainty in the suitability of FSRU noise reference data could be managed through MM-UN04. I support these findings and MM updates.

Additional shipping movements

The EES IAC identified the several key potential effects of additional shipping movements on the marine environment; including the introduction and spread of marine pests, vessels striking wildlife, increased turbidity from tug operations and leaks and spills from vessel groundings and collisions. EES submitters

[16] EES IAC Tabled Document 453: Viva Energy – Closing Submissions.

[17] EES IAC Tabled Document 495: Viva Energy – Transcript for Hearing Day 32.

shared these concerns and also raised the issue that the impacts of increased shipping movements could extend beyond the defined project area.

The EES and SEES indicated up to 45 LNG deliveries are expected each year to the proposed FSRU facility, resulting in 90 additional shipping movements per year. Around 280 vessels currently berth at Refinery Pier each year (EES Technical Report A), with Viva Energy stating 3,600 vessels currently use the Ports of Geelong and Melbourne. As such, Viva Energy determined the additional shipping movements from the project would be a relatively minor change for this marine environment.

The EES IAC found additional shipping movements would likely increase risks of marine pests, vessel strikes, elevated turbidity from tug operations and the risk of leaks and spills. The EES IAC, however, determined that likely effects associated with marine pests could be managed effectively, as MM-ME12 relied on measures within the Commonwealth Government's regulatory framework for biosecurity, marine pests and ballast water management. The EES IAC also accepted the potential for increased vessel-fauna strikes, which was not only applicable to whales, but other marine species, such as dolphins. The EES IAC recommended an update to MM-ME15 accordingly, which I support. I do note the EES' observation that threatened turtle species, such as Leatherback/Leathery Turtle (FFG Act Critically endangered), as having the potential to reside in Corio Bay. As such, I recommend MM-ME15 also lists turtles.

In relation to the use of tugs to lead vessels, the EES IAC found this would lead to increased suspension of sediment and tug operations would occur closer to the Ramsar site compared to existing operations. The EES IAC advised there were no MMs proposed to address this effect, but understood, based on Dr McCowan's (GGS expert witness) evidence, that there was no practical mitigation available. However, the EES IAC found the risks associated with additional shipping movements were already largely managed through existing port operations and management frameworks, and as such any effects from the project could be satisfactorily mitigated though these existing procedures and via the project's MMs. I support the EES IAC determination on impacts and support the proposed MM amendments.

In summary, the SEES IAC found that construction and dredging impacts could be managed to acceptable levels. It also noted that the project's operational impacts on the marine environment were unlikely to be significant and could be addressed through the amended MMs, with no further design changes or modifications required for the project. I support the findings of the SEES IAC on these matters.

Assessment

It is my assessment that:

- The SEES addressed concerns arising from the EES IAC process, including required modelling revisions. The re-calibrated and revised RHM provided an adequate basis to re-run the sediment transport and fish egg entrainment modelling to confirm predicted project effects.
- The approach to revising the wastewater discharge, sediment transport and entrainment models addressed my SEES directions.
- Construction, including dredging, of the project is not expected to significantly impact the marine environment of Corio Bay or the Ramsar site and residual impacts can be acceptably managed through changes to the MMs (MM-ME05a, MM-ME05 and MM-ME20), particularly via the implementation of adaptive management actions, a part of the EMF monitoring programs.
- Operation of the FSRU is not likely to have a significant impact on the marine environment in relation to regasification, entrainment, wastewater discharge and sedimentation. Residual impacts can be acceptably managed through the changes to MMs (i.e., MM-ME07, MM-ME05, MM-ME05a, MM-ME06, MM-ME17, and MM-ME19), recommended by the SEES IAC and supported by me, including the addition of MM-ME17a.

- MM recommendations relating to the baseline (e.g. MM-ME17a), dredging (e.g. MM-ME05 and MM-ME05a) and operational monitoring (e.g. MM-ME19 and MM-ME21) programs are supported. These recommendations serve to strengthen an already comprehensive suite of monitoring requirements, covering the 'before, during and after' stages of the project. These MMs will play a key role in appropriately managing potential impacts across all phases of the project.

5.2 Terrestrial ecology

Evaluation objective

To avoid, minimise or offset potential adverse effects on native flora and fauna and their habitats, especially listed threatened or migratory species and listed threatened communities as well as on the marine environment, including intertidal and marine species and habitat values.

To minimise adverse effects on water (in particular wetlands, estuarine, intertidal and marine) quality and movement, and to the ecological character of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site.

Assessment context

Effects on terrestrial ecology, including shorebirds and marine birds, were addressed in Chapter 10, Technical Report A, Technical Report D, Technical Report I, and Appendix A to Technical Report J of the EES, and Chapter 9 of the EES IAC report. Effects on threatened and migratory birds were further addressed in Chapter 4 and Technical Report B of the SEES, and Chapter 7 of the SEES IAC report.

Viva Energy proposed nine MMs to deal with terrestrial ecology effects (MM-TE01 to MM-TE03 and MM-TE07 to MM-TE12). Two other MMs related to terrestrial ecology effects (MM-LS01 and MM-LS03) and several other MMs were also relevant to the management of impacts on threatened and migratory birds via effects on habitat, food resources and disturbance.

Two MMs (MM-LS03 and MM-TE06) were the subject of recommendations by the EES IAC. The EES IAC also noted that the EES EMF did not include MMs numbered MM-TE04 to MM-TE06. The numbering of the terrestrial ecology MMs was updated as part of the SEES process by Viva Energy, with the final MMs numbered suitably; MM-TE01 to MM-TE09. The number of light spill MM, MM-LS03, was also updated as part of the SEES process by Viva Energy to MM-LS02. The SEES IAC did not recommend changes to terrestrial ecology MMs.

The study area for the terrestrial ecology impact assessment consisted of an onshore and an offshore component. The onshore study area included an area within a 50-metre buffer of the proposed underground gas transmission pipeline route. The offshore study area included parts of Corio Bay, Limeburners Bay, and the Avalon Beach component of the Ramsar site, where impacts could occur for shorebirds using intertidal habitats.

The SEES updated the native vegetation removal extent resulting from the project to incorporate additional loss of seagrass, which was completed in consultation with DEECA. Based on the SEES, the project proposed to remove 0.603 hectares of native vegetation from the Victorian Volcanic Plain bioregion, including 0.5 hectares of seagrass removal and 0.098 hectares of the endangered ecological vegetation class (EVC), *Heavier soils* Plains Grassland. No trees are proposed to be removed. Considering the use of horizontal directional drilling and the implementation of the proposed terrestrial ecology and marine environment MMs, the SEES proposed the total likely vegetation loss was predicted to be 0.603 hectares, subject to the finalisation of the design. The EES and SEES considered this to be a minor impact, noting that state offsets will be required and secured once the full extent of vegetation clearance is confirmed at detailed design.

The EES noted that no threatened terrestrial flora species listed under the EPBC Act or FFG Act were likely to occur in the study area. However, the SEES identified Australian Grass-wrack during further seagrass assessment. Approximately 0.05 hectares of this species is expected to be removed. The EES also noted that no EPBC Act-listed ecological communities would be impacted by the construction of the project. However, the FFG Act Community, Western (Basalt) Plains Grassland, was found to be present where patches of the EVC, *Heavier soils* Plains Grassland were present in the study area. As such, 0.098 hectares of the FFG Act community, Western (Basalt) Plains Grassland, was expected to be removed due to project activities. The SEES stated that a permit under the FFG Act would be required for the removal of both Australian Grass-wrack and the Western (Basalt) Plains Grassland Community, where removal occurs on public land. The EES identified 19 fauna species listed under the EPBC Act and/or FFG Act with a 'possible' (or higher) likelihood of occurring within the study area, as detailed below in Table 2. The likelihood of occurrence for Golden Sun Moth was considered 'unlikely,' however, the EES assumed presence of this species.

Table 2: EPBC Act and/or FFG Act listed fauna with a 'possible' or higher likelihood of occurrence within the study area.

Name	EPBC Act status	FFG Act status
Grey-headed Flying-fox *Pteropus poliocephalus*	VU	vu
Fork-tailed Swift *Apus pacificus*	Mi, Ma	
Black Falcon *Falco subniger*		cr
Little Eagle *Hieraaetus morphnoides*		vu
White-throated Needletail *Hirundapus caudacutus*	VU, Mi, Ma	vu
Swift Parrot *Lathamus discolor*	CR, Ma	cr
Plumed Egret *Ardea intermedia plumifera*	Ma	cr
Eastern Great Egret *Ardea modesta*	Ma	vu
Hardhead *Aythya australis*		vu
Musk Duck *Biziura lobata*		vu
Little Egret *Egretta garzetta nigripes*		en
Latham's Snipe *Gallinago hardwickii*	Mi, Ma	
White-bellied Sea-eagle *Haliaeetus leucogaster*	Ma	en
Caspian Tern *Hydroprogne caspia*	VU, Mi, Ma	vu
Blue-billed Duck *Oxyura australis*		vu
Eastern Osprey *Pandion cristatus*	Mi, Ma	
Australasian Shoveler *Spatula rhynchotis*		vu
Little Tern *Sternula albifrons*	Ma	cr

Name	EPBC Act status	FFG Act status
Fairy Tern *Sternula nereis*	VU, Ma	cr
*Golden Sun Moth *Synemon plana*	VU	vu

Key: CR/cr = critically endangered, En/en – endangered, VU/vu = vulnerable, Mi = migratory species, Ma = marine species.
**The likelihood of occurrence for Golden Sun Moth was considered 'unlikely', however, assumed present*

The EES explained that construction of the underground gas transmission pipeline would impact on marginal or potential habitat for three EPBC Act-listed species (i.e., Swift Parrot, Grey-headed Flying-fox, and Golden Sun Moth), consisting of planted eucalypt trees and Chilean Needle-grass. However, the EES found that no significant impacts are expected on these species. The EES also noted that the project is unlikely to have significant impacts on shorebirds or the Ramsar site.

The EES IAC found it difficult to assess the project's impacts on shorebirds and marine birds due to the EES not identifying all conservation-significant aquatic bird species potentially inhabiting the study area. The EES IAC recommended the project undertake further work to form a complete list of threatened and migratory bird species that could potentially be affected by the project (including the Black Swan) and required the list to be peer reviewed prior to completing the impact assessment. Further analysis of targeted shorebird survey data was also recommended by the EES IAC to determine whether the surveyed sites individually or collectively supported enough individuals of any particular migratory bird species, to be an important site for that species in Australia or the East Asian-Australasian Flyway. The EES IAC also recommended further assessment should consider outcomes of the revised marine modelling on threatened and migratory birds.

As discussed in Section 4 of this assessment, following consideration of the EES IAC report, a SEES was required to ensure sufficient assessment and information for relevant environmental effects, including the further work for threatened and migratory bird species was assessed.

The SEES presented a consolidated list of threatened and migratory bird species, including Black Swan, that could be affected by the project. The list was peer reviewed and confirmed by Stantec. Over 70 species of threatened and migratory birds potentially occurred in the project area or surrounding environment. Of these 70, a total of 45 species were listed as threatened under the FFG Act. Nineteen species were listed as threatened, 54 species were listed as migratory, and 45 species were listed as marine, all under the EPBC Act.

The SEES also presented further analysis of the targeted shorebird surveys undertaken for the EES. Four EPBC Act listed migratory shorebird species were recorded in the targeted shorebird surveys undertaken for the EES: Sharp-tailed Sandpiper (EPBC Act Vulnerable, marine and migratory), Red-necked Stint (EPBC Act marine and migratory), Curlew Sandpiper (EPBC Act Critically endangered, marine and migratory, FFG Act critically endangered) and Common Sandpiper (EPBC Act marine and migratory, FFG Act vulnerable). The further analysis did not find that any of the survey sites were individually or collectively internationally important for any of these four shorebird species. It did find that one survey site supported enough Sharp-tailed Sandpiper to be an important site for that species in Australia and the East Asian-Australasian Flyway.

The SEES reviewed the revised marine modelling in relation to the consolidated list of threatened and migratory bird species. It reported that sediment mobilisation during construction and discharge or entrainment during operation of the FSRU were unlikely to impact the ecological character of the Ramsar site, seagrass, or food availability for threatened and/or migratory birds, including Black Swan. The SEES found that threatened and migratory bird species potentially in the project area or offsite environment are unlikely to be significantly impacted by the project.

Discussion

The key terrestrial ecology issues considered by the EES IAC and SEES IAC, and discussed in my assessment, relate to terrestrial vegetation, non-aquatic terrestrial fauna, and birds.

Terrestrial vegetation

The EES IAC noted that the native vegetation assessment for the onshore study area was appropriate and acknowledged the removal of 0.098 hectares of the FFG Act listed community, Western (Basalt) Plains Grassland (rather than 0.091 hectares, as indicated in the EES). No EPBC Act listed threatened ecological communities will be directly impacted by the project. The EES IAC considered the total loss of native vegetation (originally 0.098 hectares) to be minor and able to be offset through the Victorian native vegetation removal regulations as noted in the EES.

The SEES IAC did not comment on the updated native vegetation removal (0.603 hectares), nor threatened terrestrial, flora species, but did acknowledge the additional direct loss of 0.5 hectares of seagrass in relation to potential impacts to the Ramsar Site. The SEES IAC stated that this seagrass loss was not expected to have implications for the Ramsar site.[18]

The EES IAC also noted that, while the EES stated that no threatened flora species are likely to occur in the project area, a peer review by Nature Advisory showed that one FFG Act listed threatened flora species, Fragrant Saltbush *Rhagodia parabolica* was present. Four individuals of this species was determined to be removed during construction and a permit under the FFG Act will be required for their removal.

The EES IAC found there were some omissions between the terrestrial ecology MMs proposed in Chapter 10 and Technical Report D of the EES and the nine consolidated MMs proposed in the EES EMF. It recommended changes to EES MM-TE08 (now MM-TE05), EES MM-TE09 (now MM-TE06), and EES MM-TE10 (now MM-TE07) to ensure that the EMF includes:

- management of noxious weeds;
- implementation of protection measures recommended by an arborist; and
- monitoring and maintenance requirements during construction.

I support the findings of the EES IAC and SEES IAC and the recommended amendments to EES MM-TE08 (now MM-TE05), EES MM-TE09 (now MM-TE06) and EES MM-TE10 (now MM-TE07). I note that Viva Energy adopted the amendments as part of the SEES process.

It is my assessment that the likely impacts to native vegetation are low and can be acceptably managed through the implementation of MM-ME-20, including further reduction in vegetation loss through detailed design.

Non-aquatic terrestrial fauna

The EES IAC found that, with the implementation of the proposed MMs, the project is unlikely to have a significant impact on Grey-headed Flying-fox, Swift Parrot, Fork-tailed Swift, White-throated Needletail, Black Falcon and Golden Sun Moth. The EES IAC considered that targeted surveys should be undertaken for Little Eagle to avoid disturbance to nests during the breeding season and recommended amending MM-TE09 to

[18] Refer to Section 5.1 of this assessment for further information.

include this requirement. The numbering of this MM was updated by Viva Energy as part of the SEES process to MM-TE06.

I support the findings of the EES IAC and the recommended amendments to EES MM-TE09 (now MM-TE06), which have been adopted by Viva Energy as part of the SEES process.

Birds

The EES IAC examined whether all relevant shorebird and marine bird species were identified and if impacts on these species, including from lighting and noise, were adequately considered. The EES IAC noted that the unresolved issues regarding the EES noise assessment[19] may have implications for birds, as well as human receivers. The EES IAC recommended amending MM-LS03 to require a lighting report to be commissioned at the detailed design stage to ensure the project complies with relevant standards.

I support the findings of the EES IAC and the recommended amendments to EES MM-LS03 (now MM-LS02) and note that Viva Energy adopted the amendments as part of the SEES process.

The further work undertaken for SEES was important to ensure comprehensive assessment of the project's likely impacts on shorebirds and marine birds due to the EES's incomplete identification of impacted conservation-significant aquatic birds. The SEES IAC was satisfied that the updated assessment of impacts on threatened and migratory birds was appropriate, and met the requirements outlined in the EES IAC's recommendations. The SEES IAC considered that the list of threatened and migratory bird species relevant to the project included in the SEES was comprehensive and accurate. It also noted that, based on the further analysis of the targeted shorebird surveys, the Avalon Coastal Reserve shoreline is nationally important habitat for the Sharp-tailed Sandpiper, a migratory shorebird. However, no significant impact on this species is expected.

The SEES IAC found that the project is not expected to have significant impacts on threatened and migratory bird species, and that the residual impacts could be acceptably managed with the implementation of the recommended MMs.

Viva Energy proposed changes to MM-ME02 during the SEES hearing, to alter the seasonal restrictions on dredging. However, for MM-ME02, I support the EES IAC version of this MM, as the intent of the EES IAC's recommended update was to mitigate impacts to shorebirds, migratory birds and the Ramar site, with the EES IAC recommending dredging not take place from September to March (inclusive) as these months are important for intertidal feeding. Following the reversion of MM-ME02 to the EES IAC version, I consider that the impacts to threatened or migratory birds, including shorebirds, such as Black Swan, are unlikely to be significant. I support the findings of the SEES IAC and its other associated MM recommendations.

Assessment

It is my assessment that:

- The likely impacts to native vegetation are low and can be acceptably managed through the implementation of MMs, including further reduction in vegetation loss through detailed design.
- The project implements refinements to MMs, including the changes to EES MM-TE08 (now MM-TE05), EES MM-TE09 (now MM-TE06) and EES MM-TE10 (now MM-TE07) recommended by the EES IAC, supported by me.

[19] Refer to Section 5.5 for further discussion on this topic.

- The project implements refinements to MM-ME02, relating to the EES IAC version of this MM.
- The effects on non-aquatic terrestrial fauna are low and can be acceptably managed through the implementation of the MMs, including the changes to EES MM-TE09 (now MM-TE06) recommended by the EES IAC, supported by me.
- The effects on shorebirds and marine birds, including threatened and migratory birds are low, and can be acceptably managed through the implementation of the MMs, including the changes to EES MM-LS02 (now MM-LS03) recommended by the EES IAC, supported by me.

5.3 Greenhouse gas emissions

Evaluation objective

To minimise generation of wastes by or resulting from the project during construction and operation, including dredging and accounting for direct and indirect greenhouse gas emissions.

Assessment context

GHG emissions were addressed in Chapter 9 and Technical Report C of the EES, and in Chapter 10 of the EES IAC report. Viva Energy has proposed 11 MMs to deal with GHG emissions. Two MMs (MM-GG01 and MM-GG11) and the DL applications have been the subject of recommendations by the EES IAC. The EES included a climate change risk assessment (Attachment II) which addressed the risks associated with severe weather events on the project's infrastructure and operations in the context of climate change scenarios to develop adaptation measures to minimise the project's climate change risk.

The EES used the *Greenhouse Gas Protocol (Corporate Accounting and Reporting Standard)* (Corporate Standard) to estimate the project's emissions. It estimated the generation of GHG emissions during construction and operation from scope 1, 2 and 3 emissions[20] within the project's operational boundary (i.e., emissions from activities over which Viva Energy would have operational control).

The total GHG emissions from construction were estimated to be 62,168 tonnes of carbon dioxide equivalent. For operation, the estimation for the total annual GHG emissions differed depending on the operational mode of the FSRU:

- 47,906 tonnes of carbon dioxide equivalent in open loop mode;
- 178,985 tonnes of carbon dioxide equivalent in closed loop mode; and
- 65,280 tonnes of carbon dioxide equivalent in combined loop mode.

Scope 3 emissions outside the project's operational boundary were not included in the GHG inventory for the project. Project emissions would equate to 0.05 percent (open loop), 0.19 percent (closed loop), or 0.07 percent (combined loop) of Victoria's annual GHG emissions.

The EES proposed several MMs to avoid, minimise and manage GHG emissions, including offsetting scope 1 and 2 emissions. It found that with the implementation of the proposed MMs, GHG emissions would be avoided and minimised where possible, and any additional contributions to Victoria's annual GHG emissions would be minor and acceptable.

[20] Refer to EES IAC Report, Chapter 10.2, for description of the 'scopes.'

Discussion

The key GHG emission issues considered by the EES IAC, and discussed in my assessment, relate to:

- the appropriateness of the GHG standard used;
- the scope 3 and fugitive GHG emissions;
- the minimisation of project's GHG emissions; and
- the consistency of the project's GHG impacts with climate policy.

Appropriateness of the GHG standard used

The EES IAC examined whether the Corporate Standard was the appropriate standard to assess the project's GHG emissions. The EES IAC noted that the Corporate Standard does not require emissions outside the operational boundary of a project to be included in the GHG inventory for a project.

Submitters to the EES IAC raised concerns about the appropriateness of using the Corporate Standard to assess the project's GHG emissions, in the context of an EES excluding the upstream emissions generated by the extraction of gas and the transport of LNG to the project. Mr Sullivan-Kilgour, expert witness for the Australian Conservation Foundation Community Geelong considered the use of the *GHG Protocol for Cities (Global Protocol for Community-Scale Greenhouse Gas Emission Inventories)* (Cities Protocol) to be more appropriate. Many other submitters to the EES IAC also supported the use of the Cities Protocol, as it would have provided a more holistic view of the overall GHG impacts associated with the project and would improve their ability to influence Viva Energy to reduce emissions.

Dr Hume, a GHG impact expert witness for Viva Energy and author of EES Technical Report C, gave evidence that the Corporate Standard is the internationally accepted guidance for compiling project-based inventories. He said that the Cities Protocol would not be appropriate for assessing the project's emissions because it is intended for larger geographical areas (cities, regions) as distinct from projects, and is not sufficiently granular to estimate the emissions of a particular project.

EPA was generally satisfied with the GHG impact assessment for the purpose of quantifying direct and indirect emissions associated with the project and its activities that will inform the DL applications.

Having reviewed both the Corporate Standard and the Cities Protocol and considered the evidence before it, the EES IAC accepted that the Corporate Standard is the appropriate and usual standard used to estimate project-based GHG emissions. The EES IAC found that it would not be appropriate to use the Cities Protocol to assess the project's GHG emissions. I support the findings of the EES IAC that the Corporate Standard is appropriate to assess the project's GHG emissions.

Scope 3 and fugitive GHG emissions

Regarding scope 3 and fugitive GHG emissions, the EES IAC examined:

- whether the upstream and downstream scope 3 emissions are within Viva Energy's operational control;
- the impacts of scope 3 emissions on achieving emissions reduction targets; and
- whether fugitive emissions and the warming potential of emissions have been properly considered and accounted for.

Inclusion of upstream and downstream scope 3 emissions

As noted above, Scope 3 emissions outside the project's operational boundary (i.e., emissions associated with the production of the gas, transporting the LNG to the project, and the end use of the gas) were not included in the GHG inventory for the project. Viva Energy submitted that excluding emissions generated by the

transport of LNG to the project was appropriate because this activity is outside its operational control, given that Viva Energy will not source the gas. While these emissions are not included in the project's inventory, they are presented in Appendix A of Technical Report C of the EES.

Submitters to the EES IAC argued that upstream transport emissions should have been included as LNG transport emissions would meet the Corporate Standard's relevance criteria for size, influence, risk, stakeholders, outsourcing and sector guidance. The EES IAC considered that the approach taken in the EES is generally consistent with the Corporate Standard including presenting estimates for scope 3 emissions in Appendix A of Technical Report C. The EES IAC considered that the GHG emissions associated with the upstream production and transport of LNG are outside the project boundary and, therefore, appropriately excluded from the project's GHG inventory. The EES IAC found that Viva Energy would not have operational control over upstream and downstream scope 3 emissions, including LNG transport emissions.

EPA requested an addition to MM-GG01 to explicitly include 'preference for cargoes with lowest net embodied emissions, so far as reasonably practicable', which Viva Energy accepted. The EES IAC supported EPA's proposed MM-GG01 encouraging Viva Energy to preference LNG cargoes with lowest net embodied emissions so far as reasonably practicable, backed up with a reporting requirement.

With the addition of this requirement, the EES IAC recommended further amending MM-GG01 to apply it to the operations phase of the project as well as the construction phase. I support the EES IAC amendment to MM-GG01 and note that Viva Energy has adopted the amendment through the SEES process.

Should the DLs be issued, the EES IAC also recommended including a condition on the DL for the FSRU requiring Viva Energy to report annually on how it has preferenced lowest net embodied emissions LNG cargoes to be processed in the FSRU in accordance with MM-GG01. In principle I support the idea of EPA considering this recommendation further as part of the DL application, and in association with my assessment outcomes.

Impacts of scope 3 emissions on achieving emission reduction targets

Mr Sullivan-Kilgour gave evidence that the project's upstream transport emissions would make it harder for both state and local governments to meet their emissions reduction targets, as they would form part of the City of Greater Geelong's municipal wide emissions inventory and Victoria's emissions inventory.

The EES IAC questioned Dr Hume on how the project's scope 3 emissions would be accounted for by various levels of government. He explained that: at a municipal level, half of the upstream transport emissions would be attributed to the City of Greater Geelong and the other half to the originating city from which the LNG was sourced; at a state level, the Victorian Government would have to account for the upstream transport emissions related to the project in a similar way; and, at a federal level, upstream transport emissions related to the project would partially come within national GHG accounting.

The EES IAC accepted that at least some of the project's upstream and downstream scope 3 emissions will need to be accounted for at a federal, state and local government level, and that the scope 3 emissions will make it harder for government emissions reduction targets to be met. I acknowledge that the project's scope 3 emissions will influence government emissions reduction targets. As discussed below, I support the recommendation of the EES IAC to require scope 3 emissions within the operational boundary of the project to be quantified and offset, which will assist in reducing this effect. I also agree with the EES IAC that the project does not preclude the Victorian Government from achieving its GHG emissions reduction targets.

Fugitive emissions factors

For estimating GHG emissions, the EES used the Corporate Standard and associated tools, which rely on current fugitive emissions factors. The EES estimations are expressed in tonnes of carbon dioxide equivalent, which accounts for the different warming potentials of several GHGs, including methane and carbon dioxide.

Several submitters to the EES IAC raised concerns that the EES underestimated fugitive emissions and the warming potential of methane. The EES IAC considered that, while the current fugitive emissions factors are not as accurate as they could be, the project must be assessed based on current approved methodologies. I accept the EES IAC's findings that the EES used the appropriate factors.

Minimisation of the project's GHG emissions

The EES IAC examined:

- whether MM-GG11, which requires Viva Energy to offset the project's scope 1 and 2 emissions is appropriate;
- whether the operation of the FSRU in closed loop mode should be limited; and
- whether additional GHG minimisation measures should be included.

The EES proposed to quantify and offset the scope 1 and 2 emissions associated with the project to compensate for emissions produced during construction and operation, noting that offsets would only be considered after measures aimed to avoid or minimise project emissions have been adopted (MM-GG11).

Submitters to the EES IAC raised concerns about the project's use of offsets, including efficacy and legitimacy concerns. Some submitters considered that the project should be required to offset emissions associated with upstream LNG transport. Dr Hume did not support offsets being required for emissions outside Viva Energy's operational control, however, supported the project's scope 1 and 2 emissions being offset using independently verified carbon offsets.

The EES IAC found that under the GED and the waste hierarchy, Viva Energy must prioritise minimisation of GHG emissions over offsetting them. It accepted Dr Hume's evidence that it is appropriate for Viva Energy to be required to offset only the GHG emissions over which it has operational control. While such emissions are mainly scope 1 and 2 emissions, the EES IAC noted that the operational boundary of the project includes some scope 3 emissions (e.g., emissions associated with the delivery of odorant and nitrogen, employee commuting, embodied emissions, operational waste to landfill, and grid-supplied electricity use). The EES IAC found that it is appropriate that the project be required to offset its scope 1 and 2 emissions, together with the scope 3 emissions over which it has control, using verified offsets.

The EES IAC recommended amending MM-GG11 to require the project to first avoid or minimise GHG emissions as far as reasonably practicable and then offset the remaining, actual emissions annually, including scope 3 GHG emissions within Viva Energy's operational control. I support the EES IAC recommended changes to MM-GG11, noting that, as part of the SEES process, Viva Energy partially adopted the amendments to MM-GG11 recommended by the EES IAC and supported by me. However, I note that Viva Energy has not adopted the recommended amendment to quantify and offset scope 3 GHG emissions produced during construction and operation within the operational boundary of the project. I support the EES IAC recommended changes to MM-GG11, to quantify and offset scope 3 emissions within the operational boundary of the project.

Should the DLs be issued, the EES IAC also recommended EPA include a condition for the FSRU that requires scope 1, 2 and 3 GHG emissions within Viva Energy's control to be offset annually by surrender of verified GHG offsets. I generally support idea of a condition of this kind as part of the DL.

The EES IAC noted that the project relies on synergies with the Refinery that will enable it to operate the FSRU in open loop mode. The EES IAC noted that operating the FSRU in open loop mode would reduce the annual operational GHG emissions compared to closed loop mode by almost a four-fold difference and therefore considered it reasonable to limit the operation of the FSRU in closed loop mode as a condition of the DL for the FSRU. EPA suggested that this could be in the form of confining the circumstances in which higher GHG impact operating scenarios (e.g., closed loop) would be permissible.

The EES IAC found that it is appropriate to impose a limitation on the operation of the FSRU in closed loop mode. Should the DLs be issued, the EES IAC recommended including a condition on the DL for the FSRU limiting closed loop operation of the FSRU. In principle I support the idea of EPA considering this recommendation further as part of the DL application, and in association with my assessment outcomes.

Consistency of the project's GHG impacts with climate policy

The EES IAC examined whether the project's GHG impacts are consistent with Victoria's climate policy. It noted that the vast majority of the ~2,000 submissions received on the EES were against the project and that most raised concerns about climate change. Submitters were concerned that the project would create 'carbon lock-in', making it more difficult to move to carbon-free pathways.

The EES IAC found that the project is broadly consistent with state climate and energy legislation and policy because it could contribute to Victoria's energy security, reliability and affordability. I support the findings of the EES IAC that the project is generally consistent with state climate and energy legislation and policy, as it does not hamper the state's efforts to achieve net zero emissions by 2045. Moreover, the project offers a resilient market response to the role of natural gas in supporting the transition toward a renewables-based energy system. The GHG emissions associated with the project are acceptable, provided that the impacts are appropriately managed through the full adoption and implementation of the recommended MMs.

Assessment

It is my assessment that:

- GHG emissions from construction and operation can be managed to acceptable levels through the implementation of the proposed MMs, subject to the full adoption of the changes to MM-GG01 and MM-GG11.
- The project is generally consistent with state climate and energy legislation and policy subject to the changes to MM-GG11 to ensure that scope 3 emissions within the operational boundary of the project are offset.

5.4 Safety, hazard and risk

Evaluation objective

To provide for safe and cost-effective augmentation of Victoria's natural gas supply having regard to projected demand and supply in context of the State's energy needs and climate policy.

Assessment context

Safety, hazard and risk were addressed in Chapter 12 and Technical Report N of the EES, and in Chapter 11 of the EES IAC report.

Viva Energy proposed 10 MMs to deal with safety, hazard and risk. The EES IAC recommended a new MM (SHR11) requiring consideration of hazard, risk, and safety expert advice made at the EES IAC hearing.

Safety, hazard and risk assessments were undertaken as part of the EES, including hazard identification workshops, hazard and operability studies, a pipeline safety management study and a quantitative risk assessment. It described that the risk assessments undertaken for the project identified a range of risks and design features, and controls to reduce the impact of the project on vessel navigation and port operations safety. The FSRU will be continuously moored at the proposed Refinery Pier extension, which would be Refinery Pier No. 5. The FSRU will require a major hazard facility (MHF) safety case to enable a MHF licence to be granted. The pipeline and treatment facility will be subject to a pipeline licence and gas safety case, which will build on existing safety studies already undertaken.

The main risk identified for the pipeline is rupture and loss of containment with subsequent ignition causing fire and explosion. The main risk associated with the treatment facility is also loss of containment, leading to fire and explosion. The treatment facility will store quantities of odorant and nitrogen which could be accidentally released.

The EES also examined navigation safety risks. It anticipated a maximum of 90 LNG carrier movements per year delivering LNG to the project, reaching up to 300 metres long. The ships currently accepted by the Port of Geelong are 265 metres long. The EES noted that navigating the Corio Bay channels can be challenging due to tidal influence, which may at times result in insufficient under keel clearance for safe passage of an LNG carrier, potentially delaying entry or departure while awaiting sufficient tide. The EES considered the risk of a release of LNG from an LNG carrier collision, allision or grounding to be minimal.

The EES proposed several MMs to avoid, minimise and manage safety risks associated with the project, with the purpose of reducing the level of risk to as low as reasonably practicable. It found that safety, hazards and risks from the project can be effectively managed through detailed design and implementation, and in accordance with the regulatory framework.

Discussion

The key safety, hazard and risk issues considered by the EES IAC, and discussed in my assessment, relate to:

- the overall approach to risk assessment;
- the FSRU and Refinery Pier;
- the incidents associated with LNG carriers;
- the navigation and mooring issues; and
- the pipeline and treatment facility.

Overall approach to risk assessment

The EES IAC examined whether the risk assessments undertaken to date have been undertaken in accordance with accepted practice and are adequate for the project's current stage. It also considered whether the proposed MMs and future regulatory approvals can reduce risks to the community to an acceptable level.

Many individual and community group submitters to the EES IAC raised significant concerns about project safety and the potential for harm to the Geelong community. The EES IAC noted that the submissions from the Australian Conservation Foundation Community Geelong and the North Shore Residents Group represented many of the safety, hazard and risk concerns shared by the broader community. The North Shore Residents Group submission was critical of Viva Energy's community engagement regarding safety and considered that there is limited information regarding the quantitative risk assessment inputs, emergency response and security. The Australian Conservation Foundation Community Geelong was critical of the documentation of safety studies in the EES.

Viva Energy submitted that the EES IAC's role in the assessment of safety, hazard and risk is limited as it will be subject to significant and stringent regulation, with multiple regulators assessing the safety and risk of the project through further regulatory processes. It noted that significant detailed work will be required to satisfy regulators such as Energy Safe Victoria and WorkSafe as the project design is refined. WorkSafe submitted that the work done to date had been done in accordance with accepted standards and to a level commensurate with the stage of project development.

Mr Mathers, a safety, hazard and risk expert witness for Viva Energy and author of Technical Report N of the EES, gave evidence that the studies have identified all events leading to a potential major incident, allowing for the development of safeguards and controls consistent with those adopted by hazardous industries and accepted by regulators. He noted that the studies and safeguards would continue to be refined and subject to approval from the relevant regulatory authorities after detailed design.

Mr Mathers and Mr Cann, process safety risks independent expert witness for GGS, agreed that the quantitative risk assessment had been undertaken in accordance with industry standards. Mr Cann accepted that the risk from the FSRU and LNG carriers would not impact GGS due to the separation distance.

Dr Pillay, a safety, hazard and risk expert witness for GeelongPort, suggested that he would have expected several additional risk assessments to have been done at the time of EES development. He also noted that the risk MMs were generic and made no reference to specific measures and that emergency response planning lacked detail. Dr Pillay provided a list of recommended actions to address gaps in the analysis to date[21].

The EES IAC found that the safety, hazard and risk assessments for the key project components have been adequately undertaken for this stage of the project. It noted that the EES and Technical Report N represent an assessment of the project's risks at a point in time, and that further examination of risks and controls will occur through the:

- pipeline licence (required under the Pipelines Act),
- gas safety case (required under the Gas Safety Act) and;
- MHF safety case for the FSRU and amendment to the current Refinery MHF safety case for the treatment facility (required under the Occupational Health and Safety Act).

The EES IAC considered that future examination of risks should be informed by the issues presented to the EES IAC through submissions and evidence, particularly the issues raised by and recommendations of Dr Pillay and Mr Mannion[22] (a maritime and port operations safety expert witness for GeelongPort, whose evidence is discussed in the following sections).

The EES IAC recommended including a new MM (SHR11) requiring consideration of hazard, risk, and safety expert advice made at the EES IAC hearing, which I support. I note that Viva Energy has adopted the recommendation through the SEES process, however, has listed the gas safety case as the relevant statutory approval instead of the MHF safety case for the FSRU, as recommended by the EES IAC. I recommend this be revised to state the relevant statutory approval.

The EES IAC also noted the submissions suggesting that community engagement around safety has not been to the level many in the community desire and considered this should be addressed going forward. It recommended putting in place arrangements that allow the community to be made aware of safety

[21] EES IAC Tabled Document 69: Expert Statement of Anand Pillay – Safety, hazard and risk.

[22] EES IAC Tabled Document 70: Expert Statement of Martin Mannion – Port planning and operations.

considerations and how they are being addressed in project implementation, as well as be involved in community emergency response where appropriate. I support the EES IAC recommendation and note that a consultative mechanism for information and enquiries, including to inform the community about safety considerations regarding the project, is already required to be developed under MM-SB01.

FSRU and Refinery Pier

The EES IAC examined whether the separation distances between the FSRU and nearby sensitive uses are appropriate, and whether the risk assessments for the FSRU and Refinery Pier are adequate for this stage in the project's development and have been undertaken in accordance with accepted practice.

Viva Energy submitted that risks associated with the FSRU are primarily managed through its location and separation distances to sensitive uses. The EES IAC was satisfied that the location of the FSRU on Refinery Pier is appropriate in terms of separation from residential communities and from GGS.

Submitters to the EES IAC were concerned that there was a lack of clarity about exclusion zones at the FSRU. The EES IAC regarded the permanent exclusion zone around the FSRU to be appropriate and in accordance with standard international practice for FSRUs. It noted that the details of the exclusion zone will need to be finalised once the FSRU is selected, and the further risk assessments and navigation and mooring studies for the project are completed. Concerns were also raised about the potential for cascading incidents involving the FSRU, the adjacent Refinery and other onshore industries. Viva Energy stated that the FSRU would be positioned to prevent incidents at one facility from impacting the other, with safety measures incorporated into vessel design and operations. The EES IAC noted that the safety cases for both facilities as MHFs will need to further address the potential for incidents on the FSRU affecting the Refinery and vice versa, to ensure that cumulative or cascading risks are minimised.

Additionally, in response to evidence raised at the EES hearing the EES IAC recommended that that future safety and risk assessments explicitly analyse the risks associated with unloading LNG to the FSRU, as this aspect was not covered in the original fire and explosion analysis. I support this recommendation.

Concerns were also raised during the EES hearing, regarding emergency relocation procedures for the FSRU or an LNG carrier from Berth No. 5. The EES IAC recommended that this issue be addressed in the project's future development. If any modifications, such as dredging or an offshore temporary mooring, are required, this will need to be subject to further assessment. I support this recommendation as part of the newly introduced MM-SHR11.

The EES IAC found that, while a number of uncertainties remain, safety, hazard and risk assessments for the FSRU to date have been undertaken to an acceptable level for this stage of the project. The EES IAC also found that further assessment and risk controls will be through the regulatory processes for the FSRU and for the gas pipeline along Refinery Pier. I support the findings of the EES IAC.

Incidents associated with LNG carriers

The EES IAC examined:

- whether collision risks involving LNG carriers have been adequately considered;
- whether the EES's 'credible threat' and hull breach scenarios are too limited; and
- the extent of the hazard zone from an LNG spill from an LNG carrier in transit.

Submitters raised concerns about the safety risks associated with importing LNG, including potential external threats to LNG carriers, the adequacy of risk scenarios considered in the EES, and the assessment of maritime incidents based on past international events. Some submitters argued that the EES did not sufficiently

address the risks of an LNG release on water or accurately convey the potential impact on the community. Questions were also raised about the credibility of threat scenarios, particularly regarding larger hull breaches caused by intentional acts.

Concerns were also expressed about the risks of collisions involving LNG carriers, the potential consequences of such incidents, and security threats. In response, expert evidence indicated that LNG carriers are designed with multiple layers of protection to prevent significant loss of containment. It was also noted that security is managed through a Maritime Security Plan, approved by the relevant Commonwealth agency, to minimise risks during transit.

The EES IAC accepted that more detail would need to be developed in further risk planning regarding the risk of an LNG release from an LNG carrier in transit as part of port security arrangements and more detailed navigation studies required for the project. It noted that all the risks identified by submitters, including collisions or other accidents and terrorism, need to be considered in the ongoing risk assessments that will be undertaken as project development progresses. The EES IAC considered that mitigation, such as the security arrangements described by Viva Energy and navigational directions, should reduce the risk to an acceptable level.

The EES IAC considered that the risks associated with the transit of LNG carriers have been assessed adequately for this stage in the project. It found that the risk of LNG release from a vessel in transit is low and that it is likely that residual risk can be reduced to an acceptable level through the application of MMs such as port security arrangements and more detailed navigation studies (as discussed next). I support the findings of the EES IAC.

Navigation and mooring issues

The EES IAC examined whether LNG carriers can safely navigate the shipping channels, and whether the FSRU and LNG carriers can be safely moored at Berth No. 5.

Viva Energy submitted at the EES hearings that, while further detailed navigational safety and mooring work needs to be done, the assessment to date is suitable to demonstrate the feasibility of the project from a navigational perspective. Ports Victoria submitted to the EES IAC that the marine risk assessments to date were suitable for initial project design and assessment, noting that further marine risk assessment is required regarding the movement and deployment of vessels involved in the regassification operations and interaction with other vessels using the port. It noted that modelling and simulation results of vessel movement and the risk assessment will enable Ports Victoria to specify Harbour Masters directions and other maritime controls to mitigate and manage identified risks.

Submitters raised concerns to the EES IAC about the narrow width of the shipping channels and the ability of larger LNG carriers to manoeuvre safely. Expert evidence indicated that the existing channels in Corio Bay may not be wide enough for these vessels and suggested that further assessment is needed. Concerns were also raised about the close separation distance between vessels at the berths, with some submitters questioning whether the EES had demonstrated sufficient space for safe berthing and tug movements. The EES IAC noted different expert opinions on the adequacy of the navigation and mooring assessments conducted so far but acknowledged agreement on the need for a comprehensive navigation simulation and mooring assessment.

The EES IAC considered that the investigation of navigation and mooring of the LNG carriers is a work in progress, with significant detailed investigation to come as part of the relevant statutory approvals required. Nevertheless, it found that the preliminary work done through the EES is acceptable to demonstrate at this stage of the project that safe navigation is technically possible. The EES IAC also noted that extensive

additional work, including a study by the Permanent International Association of Navigation Congresses, is needed to confirm that navigation and berthing can be safely conducted in accordance with the standards set by navigation and maritime safety authorities. However, it was satisfied that the regulatory framework governing this further work is comprehensive. The EES IAC noted that, if any substantive project modifications are required as a result of the further work, decision makers will need to consider how the potential environmental effects of these modifications are assessed. I agree with the EES IAC that the preliminary work on navigation safety done through the EES process is acceptable at this stage of the project. I note that further work is required to confirm that safe navigation and berthing of the FSRU and LNG carriers can be undertaken to required standards, however, this is not unusual at this stage of the project development and the comprehensive regulatory framework governing the further work will sufficiently address navigation and mooring safety considerations.

Subsequently through the SEES hearing, Ports Victoria provided updated correspondence regarding the status of the shipping navigation and mooring assessments required for the project. Concerns were again raised about the proposed project footprint and the result of these further shipping studies potentially requiring project modifications. The SEES IAC made no findings on any potential dredging that may be required for navigational safety purposes. If navigational studies required by Ports Victoria indicate a need for any additional dredging of the shipping channels, beyond that proposed in the EES and SEES, this would be subject to appropriate assessment and approvals.

Pipeline and treatment facility

The EES IAC examined whether the risks and hazards associated with the gas pipeline and treatment facility have been adequately assessed, and whether appropriate risk mitigation has been identified and applied.

Viva Energy submitted that the pipeline and treatment facility had been designed to minimise risk. Mr Mathers gave evidence that the risks of the pipeline and treatment facility have already been reduced through the design of the project, including the location of the treatment facility, the routing of the pipeline and a reduction in the quantities of hazardous materials proposed to be stored at the treatment facility.

GGS raised concerns regarding the proximity of the new treatment facility and parts of the aboveground pipeline to the school grounds and entrance. Mr Cann gave evidence that modelling undertaken by him demonstrated that a methane vapour cloud explosion or odorant release could affect large areas of the school's Corio campus. Following Mr Mathers' questioning of Mr Cann's modelling results, Mr Cann reviewed the modelling. The revised modelling significantly reduced the modelled impact areas and potential impacts on GGS. Mr Cann recommended that part of the above ground section of the pipeline be buried within the Refinery to reduce the risk of it being affected by an incident within the Refinery.

The EES IAC considered the concerns raised by Mr Cann in relation to GGS along with the revised modelling and reduced consequence of both a vapour cloud explosion and an odorant release on the school. The EES IAC was satisfied that the risk to GGS could be reduced to an acceptable level given the low likelihood of these incidents and the proposed MMs and controls on operations. It was not satisfied that Mr Cann's recommendation to bury part of the aboveground section of the pipeline was justified or would provide a superior outcome.

The EES IAC was satisfied that risk can be satisfactorily addressed through detailed design and the regulatory processes including the pipeline safety management study and the Refinery's revised MHF safety case. The EES IAC found that the risk from the pipeline and treatment facility have been satisfactorily assessed and that, with the application of MMs and subject to regulatory approvals, the risk can be managed to an acceptable level. I support the findings of the EES IAC.

Assessment

It is my assessment that:

- Safety, hazard and risk assessments for the project to date have been undertaken to an acceptable level for this stage of project development.
- Safety, hazard and risk from the project are likely to be acceptable with the implementation of the proposed MMs and new MM-SHR11 recommended by the EES IAC and supported by me, and subject to the further assessment to be undertaken through the existing comprehensive regulatory framework.

5.5 Noise and vibration

Evaluation objective

To minimise potential adverse social, economic, amenity and land use effects at local and regional scales.

Assessment context

Noise and vibration effects were addressed in Chapter 11 and Technical Report I of the EES, and Chapter 12 of the EES IAC report. Noise effects were further addressed in Chapter 6 and Technical Report D of the SEES, and Chapter 8 of the SEES IAC report.

Viva Energy proposed eight MMs to deal with noise and vibration effects (MM-NV01 to MM-NV08). EPA proposed an additional MM (MM-NV01a) during the EES IAC process, which was adopted by Viva Energy during the hearings. Several MMs (MM-NV01, MM-NV01a, MM-NV02, MM-NV04, MM-NV05, MM-NV06 and MM-NV07) and the incorporated document were the subject of recommendations by the EES IAC. Further changes to MM-NV01a, MM-NV04 and MM-NV05 were adopted by Viva Energy during the SEES IAC hearings. The SEES IAC recommended a further revision to the incorporated document and the EMF.

The EES described that there are unlikely to be activities during construction or operation that could result in human disturbance or structural damage of surface structures due to vibration. Vibration impacts on above or below ground infrastructure were proposed to be controlled by engineering design requirements.

The EES described that the project would be located within an area of existing industrial noise sources, including the Refinery and nearby industries, with limited sensitive receivers in the vicinity. It identified six noise sensitive receiver areas within 5 kilometres of the FSRU and established six noise monitoring locations to measure the background noise level and the ambient noise level. The EES explained that there was the potential for cumulative noise impacts from the existing industries combined with the noise emissions from the project during the night at Geelong Grammar, Biddlecombe Avenue and School Road dwellings.

The EES noted that project construction was expected to be completed within 18 months. Most of the construction work would be done during the day (Monday to Saturday), with unavoidable out of hours work or work on Sundays and public holidays minimised and requiring specific controls. The operational noise modelling in the EES was based on theoretical plant and equipment (including the FSRU) under six different operating scenarios. The EES found that the project's construction and operational noise impacts could be managed by implementing the proposed MMs.

The EES IAC could not determine whether the project's noise effects could be managed to acceptable levels. It recommended undertaking further assessment of noise impacts set out in the amended MM-NV05, which was agreed upon between noise impact expert witnesses for Viva Energy and GGS during the EES IAC hearings. Further assessment was needed to properly characterise the noise environment in the vicinity of the project, determine the appropriate project noise limits at noise sensitive receiver areas, and establish whether

cumulative noise from the Refinery and the project would be able to comply with those noise limits and the requirements of the General Environmental Duty (GED).

As discussed in Section 4 of this assessment, after considering the EES IAC report, I directed supplementary information for relevant environmental effects. This included further noise impact assessment as recommended by the EES IAC.

The SEES presented a supplementary noise impact assessment, which included additional monitoring of background noise, recalculated project noise limits, and project noise criteria. Existing industrial noise impacts were measured, and an updated construction and operational noise impact assessment was prepared. The SEES found that the construction and operational noise impacts from the project could be managed within the regulatory framework established by the Environment Protection Act, the Environment Protection Regulations 2021 and relevant policy and guidelines.

Discussion

The key noise and vibration issues considered by the EES IAC and SEES IAC, and discussed in my assessment, relate to:

- vibration;
- existing noise environment, noise limits and project noise criteria;
- operational noise;
- construction noise; and
- noise monitoring and management.

Vibration

Submissions to the EES IAC regarding vibration were limited and of a general nature. The EES IAC was satisfied that the recommended MM-NV03 and MM-NV04 could effectively manage any construction vibration effects. It also found that operational vibration was unlikely to lead to any significant effects. I support the findings of the EES IAC.

Existing noise environment, noise limits and project noise criteria

The EES IAC considered that further noise assessment was required, to properly characterise the existing noise environment in the vicinity of the project and therefore use this information to determine appropriate project noise limits at the noise sensitive receiver areas. It considered that further background noise monitoring was required to determine the cumulative noise impacts of the project and existing industry. Using updated monitoring of background noise, the SEES recalculated the project noise limits at the identified sensitive receivers. The regulatory noise limits determined in the SEES applied to the cumulative noise from all industrial sites at the sensitive receiver locations. The SEES identified that, in adverse meteorological conditions, existing industrial noise sometimes exceeded the regulatory noise limits at some of the measurement locations. The SEES adopted project noise criteria, which applied specifically to the noise emissions from the proposed FSRU and treatment plan operations. The project noise criteria adopted in the SEES were 10 decibels below the applicable regulatory noise limits and were selected to ensure that the contribution from the project's noise emissions to the cumulative noise level at the sensitive receivers was negligible and would not cause the regulatory noise limits to be exceeded due to project operation.

In their submission, EPA raised concerns of the selection of representative background noise monitoring locations that were not subject to existing industrial noise. The SEES IAC noted that there are practical challenges to selecting an ideal location for determining representative background noise levels that are not

affected by existing industrial noise. On balance, the SEES IAC found that the SEES provided a reasonable justification for the selection of the monitoring locations.

Mr Tardio, a noise and vibration expert witness for GGS, gave evidence that the SEES addressed many issues identified with the EES noise assessment, particularly regarding the measurement of background noise levels. Mr Tardio noted that the SEES predicted only marginal exceedances of the cumulative noise limit at GGS during adverse weather conditions, however, gave evidence that noise emissions from Refinery operations more significantly exceeded the regulatory noise limit. Mr Tardio recommended that the project be assessed against the cumulative noise limits applicable at the nearest receivers. He noted that the cumulative noise impacts from the project and the existing emissions from the Refinery should be addressed through a commitment from Viva Energy to comply with the cumulative noise limits.

The SEES IAC was satisfied that the updated noise assessment applied an appropriate methodology and met the requirements recommended by the EES IAC. The SEES IAC considered the regulatory noise limits developed in the SEES to be adequate and appropriate for the development of project noise criteria. It found that the project could be evaluated based on the project's ability to comply with the project noise criteria rather than compliance with the regulatory noise limits for cumulative industrial noise at sensitive receivers. I support the findings of the SEES IAC and note that this matter will be considered by EPA when completing the assessment of the DL applications.

Operational noise

The EES IAC found that the modelling of the operational noise from the FSRU, LNG carriers and other sources was appropriate for this stage of the project. The results suggested that the operational noise effects of the project would be able to be managed to an acceptable level. However, the EES IAC noted that the findings depended on further assessment of background and cumulative noise with the Refinery and other industrial sources (as discussed above), as well as assessment of actual FSRU and project components (as opposed to modelling based on typical or possible equipment as done in the EES). Noise MMs were revised during the EES IAC hearing process, providing the framework for the further work presented in the SEES.

The SEES presented noise predictions from the operation of the project, which considered several operational scenarios including open and closed loop operation of the FSRU, LNG carrier berthing, nitrogen injection and unloading at the treatment facility. The revised noise assessment reflected more realistic operating conditions for the FSRU and treatment facility, as along with design optimisations. The SEES presented a suite of additional physical and management noise controls for the FSRU equipment, operations and treatment plant, to allow the project to achieve the project noise criteria for all receivers. It found that the operational noise from the project could comply with the project noise criteria.

The SEES IAC considered that the operational noise targets were likely to be met, although significant noise control works, and operational management procedures would be required. It noted that the project had been required to adopt very stringent noise criteria for the operational noise emissions from the FSRU and the treatment plant, due to existing industrial noise levels being at or above the regulatory noise limit. The SEES IAC also noted that achieving the project noise criteria would require substantial noise control of the plant and equipment, as well as operational management controls to limit concurrent operations at night.

The SEES IAC found the adjusted project noise criteria for operations of the FSRU and the treatment plant (presented in Figure 11 of the SEES IAC report) to be reasonable. It considered the proposed additional noise MMs to be appropriate and noted that noise from the Refinery would also need to be actively managed. The SEES IAC recommended revising the incorporated document to require under Clause 4.6.5(a)(iii) that noise be verified against the adjusted project noise criteria rather than the originally exhibited criteria. It also recommended revising the EMF to make it clear that the project's noise emissions will be monitored and

assessed against the adjusted project noise criteria. I support the findings of the SEES IAC and the recommended revisions to the incorporated document and the EMF.

Construction noise

The EES IAC noted that the largest potential for construction noise impact was for unreasonable noise that may occur during unavoidable out of hours work. The EES IAC was satisfied that construction noise could be managed to an acceptable level with the recommended MMs and the regulatory framework, noting that the MMs were substantially improved through the EES IAC hearing process. I support the findings of the EES IAC regarding general construction noise, noting the relatively short duration of construction works.

The SEES IAC further examined construction noise from dredging. EPA initially submitted that dredging noise should meet the project noise criteria. However, EPA subsequently accepted that dredging noise should be considered a temporary construction impact and be subject to the regulatory noise limits rather than the more onerous project noise criteria. The SEES IAC agreed that dredging noise should be assessed with respect to the appropriate construction site noise and dredging guidelines due to the short-term nature of this impact.

The MMs associated with dredging (MM-NV01a and MM-NV04) were further improved through the SEES IAC hearing process. The SEES IAC was satisfied that noise from dredging could be managed to acceptable levels with the regulatory framework and recommended MMs, which include construction noise monitoring and contingencies. I support the findings of the SEES IAC regarding dredging noise and endorse the rationale of this impact being subject to the relevant regulatory noise limits.

Noise monitoring and management

The SEES IAC requested the noise expert witnesses for Viva Energy and GGS provide recommendations for agreed amendments to the MMs, to ensure that an appropriate noise management monitoring scheme was developed and implemented. The EPA also provided recommendations for amendments to the noise MMs. The experts agreed on revisions to MM-NV01a, MM-NV04 and MM-NV05, relating respectively to the management of dredging noise, construction noise and vibration monitoring, and the establishment and implementation of operational noise controls. The amendments were documented in Viva Energy's MMs tabled at the SEES IAC hearing (refer to Appendix A). The SEES IAC considered the MMs to represent a reasonable and practical approach to managing the project's construction and operational impacts. I support the findings of the SEES IAC and the amendments to MM-NV01a, MM-NV04 and MM-NV05 adopted by Viva Energy through the SEES IAC hearing process. Most construction and operational noise impacts from the project can be effectively mitigated and managed within acceptable levels through the implementation of the amended MMs and compliance with the relevant regulatory framework.

The SEES IAC noted Mr Tardio's view that noise generation at the Refinery had not been sufficiently addressed through the SEES process. It disagreed with Mr Tardio, noting that opportunities to reduce noise emissions at the Refinery had been identified in the SEES. The SEES IAC accepted that more work needs to be done to address existing noise from the Refinery, including preparing a comprehensive noise management plan for the Refinery. However, it noted that this is a matter for EPA as the regulator and made no formal recommendations in this regard. I support the findings of the SEES IAC regarding noise management at the Refinery and encourage Viva Energy to develop and implement a comprehensive noise management plan for the Refinery to address the existing noise experienced by nearby sensitive receivers, which may subsequently support noise mitigation of the project.

Assessment

It is my assessment that:

- Vibration effects from construction of the project are low can be acceptably managed through the implementation of the MMs (MM-NV01 to MM-NV04).
- Construction and operational noise effects can be acceptably managed through the regulatory framework and the implementation of the MMs, subject to the changes to MM-NV01, MM-NV01a, MM-NV02, MM-NV04, MM-NV05, MM-NV06 and MM-NV07 recommended by the EES IAC, and the additional changes to MM-NV01a, MM-NV04 and MM-NV05 adopted by Viva Energy through the SEES IAC hearing process. The incorporated document and the EMF should be further revised as recommended by the SEES IAC, to make it clear that the project's noise emissions will be monitored and assessed against the adjusted project noise criteria.
- The MMs and the regulatory framework provide a suitable basis for enabling the efficient implementation of the project whilst ensuring project related noise is reduced as much as practicable at sensitive receivers.

5.6 Air quality

Evaluation objective

To minimise potential adverse social, economic, amenity and land use effects at local and regional scales.

Assessment context

Air quality effects were addressed in Chapter 11 and Technical Report H of the EES, and in Chapter 13 of the EES IAC report. Air quality effects were further addressed in Chapter 5 and Technical Report C of the SEES, and Chapter 9 of the SEES IAC report.

Viva Energy proposed 11 MMs to deal with air quality effects (MM-AQ01 to MM-AQ11). One MM (MM-AQ07) and the DL applications for the project were the subject of recommendations by the EES IAC. The EES IAC also recommended a new MM (MM-AQ12) be inserted into the EMF to require minimisation of odorant emissions. The SEES IAC recommended further changes to the DL applications for the FSRU operation (APP013874).

The EES characterised sensitive receivers for air quality in proximity to the FSRU, new treatment facility and underground gas transmission pipeline alignment. As modelling predicted pollutant concentrations to be greatest near the FSRU and decreasing over distance from the FSRU, the nearest 31 receivers from the FSRU were included in the assessment. Sensitive receivers were characterised by a mixture of industrial and commercial bodies and some residential dwellings, a school, agricultural and recreational areas. The nearest sensitive receiver was located 1.5 kilometres from the FSRU, with the nearest industrial receiver was located 600 metres from the FSRU. The SEES did not update the determination of sensitive receivers for the air quality assessment.

The EES identified that project construction could affect air quality, particularly due to dust from trenching the underground gas transmission pipeline and building the treatment facility, as well as exhaust emissions from vehicles, barges and support vessels. The EES EMF included requirements for air quality monitoring and protocols to manage these emissions during construction. The EES found that air quality impacts from project construction would be low at sensitive receivers investigated, provided that standard industry dust MMs were implemented through the CEMP.

During project operation, air emissions, primarily from fuel combustion, were expected from the FSRU engines and boilers. Atmospheric dispersion modelling was carried out for six FSRU operating scenarios, including open loop, closed loop, gas-fuelled peak load and liquid-fuelled (~25 percent load of the two engines). The modelling showed no exceedances of air quality criteria at any of the sensitive receivers in the study area. The EMF also included requirements for air quality monitoring and protocols for air quality management during construction and maintenance activities. The DL application for FSRU operation proposed air emission limits (stack-specific limits and bubble limits[23]) for the FSRU engine. The EES found that air quality impacts from FSRU operations would be minor and localised around Refinery Pier and new treatment facility, and compliant with all regulatory requirements.

The EES IAC considered the air quality criteria adopted in the EES to be appropriate and the potential impacts on air quality likely to be acceptable. However, in relation to whether the air quality risks were consistent with the GED, the EES IAC recommended further air dispersion model sensitivity testing, as it was not satisfied the proposed bubble limits, were compliant with the GED. Therefore, I directed further sensitivity testing to assess wake effects[24] from the FSRU, under worst-case emissions scenarios considering both bubble limits and stack-specific limits for sensitive receivers.

The significance of wake effects on ground level air emissions and plume dispersion depends on the configuration and orientation of berthing vessels at the FSRU. In response to my SEES directions, the SEES assessed air emission concentrations at sensitive receivers under various vessel berthing scenarios, including with and without an LNG carrier alongside the FSRU. The modelling showed slightly higher emissions with a berthed LNG carrier, but the SEES air quality assessment determined that wake effects were not significant as a result. It also found all modelled pollutants remained within the regulatory criteria under worst-case emissions scenarios.

The SEES found the updated worst-case emissions scenario to be the 'Esperanza FSRU,' with its bow facing south-east and an LNG carrier berthed alongside the FSRU. The SEES used this to determine that during most operations, pollutant concentrations from FSRU operations would not be discernible from background concentrations. Overall, the SEES found that air quality impacts from the operation of the FSRU would be negligible and localised to the vicinity of the project.

The SEES also proposed a range of stack and bubble limit combinations for FSRU operation, based on updated data. Viva Energy noted the limits were proposed to minimise air emission concentrations, whilst offering flexibility to operate the FSRU at 100 % gas production load if required. The SEES found that stack-specific limits alone would allow engines and boilers to operate at 100 % load continuously. In contrast, bubble limits would cap total annual emissions based on predicted gas demand and a typical operating profile. The SEES found that a combination of stack-specific limits and annual bubble limits was most appropriate for the project, minimising long-term average impacts on sensitive receivers while retaining flexibility to meet peak demand.

Discussion

The key air quality issues identified by the EES IAC and SEES IAC and discussed further in my assessment related to:

- construction impacts;

[23] Refer to SEES IAC Report, Chapter 9.4, for description of 'stack-specific limits' and 'bubble limits.'

[24] Refer to EES IAC Report, Chapter 13.3, for description of 'wake effects.'

- odour from the treatment facility;
- wake effects;
- appropriateness of the worst-case emission modelling scenarios; and
- use of annual bubble and stack-specific emission limits and their appropriateness to control air emissions.

Construction impacts

Submitters to the EES IAC raised concerns about dust emissions during construction and called for stronger MMs with a focus on dust prevention. The EPA sought revisions to MM-AQ06 and MM-AQ07 to enhance dust management during construction, which were adopted by Viva Energy during the EES IAC hearing.

The EES IAC recommended further amendment to MM-AQ07 to require dust suppression for any dust, not only when it presented as a hazard. The EES IAC found that air quality impacts from construction could be acceptably managed with the revised MMs. This MM-AQ07 change was adopted by Viva Energy during the SEES IAC process. I support the findings of the EES IAC and the SEES IAC construction air quality MMs.

Odour from the treatment facility

Submitters to the EES IAC raised concerns about odour impacts, arguing that the air quality assessment was incomplete as it did not model odour emissions from the treatment facility. The EES IAC noted that no intentional releases of odorant are proposed, and that the treatment facility would include filters to capture odorant in the event of minor leaks.

The EES IAC recommended that the EMF include measures to minimise odorant release risks as far as reasonably practicable, along with requirements to monitor and publicly report any releases. To address this Viva Energy adopted a new MM (MM-AQ12) during the SEES IAC process. Noting the SEES IAC did not suggest amendments to MM-AQ12, I support this MM addition.

Should the EPA receive DL applications for the FSRU, the EES IAC recommended that the EPA consider conditions on the DL to minimise odorant emissions during operation. In principle I support the idea of the licencing conditions considering further odorant emission reduction measures.

Wake effects

In general, EES and SEES submitters expressed concerns about the air quality impacts from FSRU emissions and associated human health risks.

The EES IAC examined the atmospheric dispersion modelling and found that, if the project proceeded in line with the modelled assumptions, air quality impacts would be acceptable. However, as discussed above, the EES IAC identified uncertainties in key modelling assumptions and as such, the effect on modelled plume dispersion, particularly in relation to wake effects, as the modelling had only considered one FSRU orientation. Therefore, in response to my SEES directions, Viva Energy undertook further sensitivity testing to investigate the significance of wake effects.

The EES IAC also recommended that, should a DL be issued by the EPA, conditions relating to the configuration of the FSRU, based on the results of further air dispersion modelling and the inclusion of wake effects, should be considered.

Further to the above results, Viva Energy presented at the SEES hearing that the inclusion of wake effects in the model did alter plume behaviour, but ultimately there was no material difference in model outcomes when considering FSRU configurations. Tested scenarios showed variations in vessel configurations and

orientations modified ground level emission concentrations. Although, the SEES demonstrated that the wake effects of the FSRU were not significant, and all modelled scenarios resulted in emission levels that complied with relevant regulatory criteria.

The SEES IAC determined theses SEES outcomes were not significant, as absolute levels of emissions from the modelling were almost negligible and likely indiscernible from background concentrations. The SEES IAC accepted that wake effects did not materially change the project operations air quality modelling, and did not recommend any MM amendments or further DL consideration in relation to wake effects. I support the findings of the SEES IAC and in principle support the idea of considering the FSRU configuration as part of the licencing conditions.

Worst-case emission scenarios

The EES IAC was unable to determine whether the EES air dispersion modelling included a true 'worst case' scenario for air emissions. Consequently, the EES IAC and my SEES directions, recommended that sensitivity testing be undertaken to model a clearly defined 'worst case emissions scenario' representing FSRU operation.

As highlighted above, the worst-case scenario, 'Esperanza FSRU,' was adopted by Viva Energy for the SEES air quality assessment, as it represented the highest predicted ground level emission concentrations during FSRU operation.

The SEES IAC was satisfied that this represented a suitable worst-case emissions scenario and was satisfied that this worst-case scenario had been the basis of the SEES air quality assessment. As the SEES clarified the worst-case scenario, the SEES IAC determined that this scenario did not significantly affect the air quality outcomes at sensitive receivers. I support the findings of the SEES IAC.

Use of stack-specific and bubble emission limits

The DL application for FSRU operation proposed annual bubble limits for air emissions. The EPA raised concerns, during the EES process, that these bubble limits could permit higher emission levels than presented in the assessment, conflicting with the GED principle of waste. The EPA's main concern was that limits prioritised operational flexibility over minimising risks of harm and requested Viva Energy to provide further information regarding stack and bubble limits relevant for the DL application.

As mentioned above, the EES IAC was not satisfied that the proposed bubble limits would comply with the GED and could not determine whether stack-specific limits would offer greater air quality protection over bubble limits. My SEES directions required further investigation of the implications of bubble limits and stack-specific limits for sensitive receivers.

The SEES and Viva Energy's expert evidence continued to propose bubble limits for the annual emissions of the project and considered the combination of stack-specific limits and annual bubble limits were most appropriate for the project. The EPA submitted concerns that the approach was still potentially inconsistent with the GED, again prioritising production over emission reduction. It recommended that longer term stack limits were a more appropriate approach to emission reduction. Community submissions continued to raise concern over the level of assessment as well as a general lack of air quality monitoring of the Refinery and surrounding industrial area.

The SEES IAC agreed with the SEES, finding that combining short-term stack-specific limits with annual bubble limits allowed for operational flexibility, whilst keeping annual emissions to a reasonable level. Regarding the GED, the SEES IAC considered this combination struck an appropriate balance between controlling overall project emissions and operational flexibility. The SEES also found that the stack limits

enabled placement of a limit to monitor project performance on air quality effects, stating that the SEES demonstrated air quality criteria could be achieved if plant operation was at 100 percent loading on a continuous basis.

The SEES IAC recommended that, if the EPA received DL applications for FSRU operation, it should consider conditions specifying a combination of stack-specific limits and an annual bubble limit for air emissions. The SEES IAC did not propose any project modifications or further MM modification to those proposed by the EES IAC (i.e. MM-AQ07 and MM-AQ-12). I support the SEES IAC findings and in principle support the idea of considering stack-specific and bubble limits further as part of DL licencing conditions.

Assessment

It is my assessment that air quality effects from construction and operation, including residual impacts, can be acceptably managed through the implementation of the EMF and Viva Energy's MMs tabled at the SEES IAC hearing, including the amendments to MM-AQ07 and the new MM-AQ12, as supported by me, and adopted by Viva Energy. Viva Energy has worked to minimise the projects potential adverse social and amenity effects on air quality emissions locally and regionally.

5.7 Groundwater and surface water

Evaluation objective

To minimise adverse effects on water (in particular wetland, estuarine, intertidal and marine) quality and movement, and the ecological character of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site.

Assessment context

Groundwater and surface water effects were addressed in Chapter 10, Technical Report E and Technical Report F of the EES, and in Chapter 14 of the EES IAC report.

Viva Energy proposed one MM to deal with groundwater effects (MM-GW01) and four MMs to deal with surface water effects (MM-SW01 to MM-SW04). Five other MMs related to groundwater and surface water effects (MM-CO02, MM-CO03, MM-CO05, MM-CO07, and MM-CO08). Two MMs (MM-CO03 and MM-SW03) had been the subject of recommendations by the EES IAC.

The EES investigated the effects of intrusive works and infrastructure on groundwater levels and flow in the onshore section of the project area. It reported limited potential for groundwater to be intersected during construction, other than where the underground gas transmission pipeline would be constructed using horizontal directional drilling. If groundwater was intersected during trenching, short term dewatering would be required, resulting in temporary localised lowering of the water table. The EES noted that project operation was not expected to have any impacts on groundwater levels or flow.

The project is not located within a floodplain and does not intersect any low lying or flat areas that are subject to flooding. The EES characterised that surface runoff from the project area drains to Hovells Creek and Corio Bay. The proposed underground gas transmission pipeline had one waterway crossing, which was an ephemeral tributary of Hovells Creek and was described as already being significantly modified. Runoff water quality may be impacted by construction activities, such as trench dewatering, water and sediment runoff from disturbed areas and spills. Construction across this tributary of the underground gas transmission pipeline would be by open trenching and the impact was characterised as expecting to be minimal and short-on the waterway. The EES explained that, given the short construction timeframe for the project and short

length of the underground gas transmission pipeline, impacts on surface water and nearby sensitive receivers were unlikely. The impacts of project operation on surface water and nearby sensitive receivers were expected to be limited.

The EES proposed industry standard MMs to mitigate the potential impacts on groundwater and surface water. It found that the impacts of the project on groundwater and surface water would be minor and could be managed through the proposed MMs.

Discussion

Groundwater

The key groundwater issues considered by the EES IAC, and discussed in my assessment, related to the impacts of the underground gas transmission pipeline, treatment facility and Shell Parade culvert construction on groundwater levels and flow.

Submitters to the EES IAC raised concerns about groundwater, including potential impacts on private landholder bores, contamination management and risk, disposal of dewatered trench water and groundwater monitoring arrangements. EPA's submission on groundwater focused on exposure of acid sulfate soils and rock, and management of groundwater contaminant plumes. EPA recommended that the CEMP should include triggers to monitor and manage impacts to groundwater (including groundwater levels, flow and quality) when intercepted. EPA also recommended changes to MM-CO05 to address the impact of acidic groundwater on underground structures and the environment.

The EES IAC found that MM-GW01, which requires the project to confirm the location of potentially affected bores prior to construction and agreeance on make-good arrangements if required, was adequate to manage potential impacts on private landholder bores. The EES IAC agreed with EPA that the CEMP should include triggers to minimise impact associated with groundwater contaminant plumes. It also supported EPA's proposed changes to MM-CO05. I note that Viva Energy adopted the amendment as part of the EES IAC process[25].

The EES IAC also found that dewatering during construction was potentially required. It recommended that MM-CO03, which requires the project to avoid trench dewatering of groundwater or perched water, should apply to project design in addition to construction, particularly to inform decisions regarding the suitability and maximum depth of thrust boring. I support the EES IAC recommended amendment to MM-CO03. I note that Viva Energy adopted the amendment as part of the SEES process.

The EES IAC found that the impacts of project construction on groundwater levels and flow were expected to be minor, and that project operation was not expected to affect groundwater levels or flow. I support the findings of the EES IAC that, with the recommended change to MM-CO03 and the CEMP (MM-CO05) the MMs can acceptably manage the effects on groundwater.

Surface water

The key surface water issues considered by the EES IAC, and discussed in my assessment, relate to:

- local and downstream impacts of pipeline trenching across the unnamed tributary of Hovells Creek;
- dewatering of surface water from open trenches and excavated areas during construction;

[25] EES IAC Tabled Document 456: Viva Energy – Mitigation Register.

- runoff from disturbed areas during construction;
- stormwater runoff from the treatment facility during operation; and
- spills during construction and operation.

Submitters to the EES IAC highlighted the importance of the Ramsar site and the local waterways that feed into it, including Hovells Creek. Concerns were also raised of potential surface water and land pollution resulting from the project.

The EES IAC considered that the most significant issue in relation to surface water is the trenched construction of the underground gas transmission pipeline crossing through an unnamed tributary of Hovells Creek. The tributary joins Hovells Creek upstream of the Ramsar site, so runoff from the construction site could potentially also affect the Ramsar site. The EES IAC noted that risks to Hovells Creek and the Ramsar site would be reduced if the crossing could be constructed during no flow conditions. It recommended amending MM-SW03, which requires construction of the trenched watercourse crossing during a period of no-flow, by removing "when practicable" to ensure stricter compliance with this measure. As the tributary was deemed ephemeral, the EES IAC deemed this to be an acceptable, practical measure to reduce impact. I support the EES IAC recommended amendment to MM-SW03. I note that Viva Energy adopted this amendment as part of the SEES process.

The EES IAC found that the residual surface water impacts of the project were expected to be minor, following MM amendment. It found that the impacts on surface water, including the receiving waters of Hovells Creek, Corio Bay and the Ramsar site, were manageable through implementation of the proposed MMs. The EES IAC also found that the other surface water issues, including trench dewatering, stormwater runoff, and spills, could be adequately managed by applying the proposed MMs. I support the findings of the EES IAC that, with the recommended change to MM-SW03, the MMs are adequate to acceptably manage project effects on surface water.

Assessment

It is my assessment that groundwater and surface water effects are low and can be managed to acceptable levels through the implementation of the proposed MMs, including the amendments to MM-CO03 and MM-SW03 recommended by the EES IAC, supported by me and adopted by Viva Energy.

5.8 Land use

Evaluation objective

To minimise potential adverse social economic, amenity and land use effects at local and regional scales.

Assessment context

Land use planning effects were addressed in Chapter 11 and Technical Report M of the EES and in Chapter 15 of the EES IAC's report. There are no specific MMs for land use effects however the draft PSA includes related conditions.

The EES identified key land use and planning issues including:

- the project's consistency with land use planning; and
- the extent and duration of anticipated land use impacts.

The current land uses within the project area are predominately port, industrial and commercial uses, whilst others include roads, residential, agricultural, conservation, service utilities and infrastructure. The elements

of the project located on Port and Industrial zoned land include the FSRU, berthing infrastructure, sections of the aboveground gas pipeline and underground gas transmission pipeline, the treatment facility and upgrades to Refiner Pier. The proposed gas pipeline easement will be on land zoned Rural Living Zone, Farming Zone, Public Park and Recreation Zone, Public Conservation and Resource Zone. The potential Boil Off Gas line would cross below the road within the Transport Zone.

The Port Zone is proposed to be extended to cover part of the pier extension and Berth 5 via the proposed draft PSA. The purpose of the Port Zone is to implement the planning policy framework and the relevant Port Development Strategies, while providing for shipping access and supporting the development of ports as key strategic areas for the interchange, storage and distribution of goods within the State.

The project is located adjacent to, and on, the Refinery and Refinery Pier in the City of Greater Geelong. The project area is within a heavily developed port and industrial setting on the western shores of Corio Bay between the Geelong suburbs of Corio and North Shore. The Geelong central business district is located approximately 7 kilometres south of the project. The Port of Geelong is the largest industrial bulk cargo port in Victoria and has been in operation for over 150 years. It attracts over 600 ship visits and handles more than 14 million tonnes of product annually. Geelong Port is identified in state and local planning policies, including Plan Melbourne 2017-2050 as a transport gateway of state significance and a vital resource for Geelong's economy. The role of the port is outlined in the Municipal Planning Strategy and the Planning Policy Framework of the Greater Geelong Planning Scheme and the Port of Geelong Port Development Strategy 2018 (Victorian Regional Channels Authority, 2018). These strategic documents highlight the importance of the port's function in shaping the surrounding land uses, as well as its influence on the region's economic, social and environmental qualities.

The EES stated the construction and operation of the project may impact the amenity of the area and existing and future land uses or land use policies. Potential impacts from construction include temporary land use changes from construction activities, impacts to access and amenity impacts to nearby sensitive land uses. The EES assessed these impacts as being short-term. The operational impacts were identified in the EES as being associated with land use changes via the introduction of easements, disruptions from infrastructure maintenance, visual impacts and amenity impacts to nearby sensitive land uses.

Discussion

The EES IAC discussed the projects consistency with key land use and planning objectives and strategies as well as the extent and duration of land use and planning impacts during construction, operation and decommissioning phases.

Strategic assessment of the project

To provide context for my assessment I have considered State and regional plans, State planning provisions, the Greater Geelong Planning Scheme, and the Planning Policy Framework of the Victorian Planning Provisions. The Planning and Environment Act provides the framework for planning the use, development and protection of land in Victoria. The relevant objectives of planning in Victoria are specified in Section 4 of the Act which seek to:

- provide for the fair, orderly, economic and sustainable use and development of the land.
- provide for the protection of natural and manmade resources and the maintenance of ecological process and genetic diversity.
- secure a pleasant, efficient and safe working, living and recreating environment for all Victorians and visitors
- facilitate development in accordance with these objectives; and

- balance the present and future interest of all Victorians.

The EES IAC stated there is significant state and local planning policy support for the use and development of land including the objectives and strategies of Clause 18.02-6S (Ports) and the strategic directions for the Port outlined in Clause 02.03-7 (Economic Development). The EES IAC also stated the project is compatible with and would not materially impact the existing or future functioning of the Port. The withdrawal of Geelong Port's submission gave the IAC confidence the project would not materially impact the existing or future functioning of the Port.

I support the findings of the EES IAC and consider the project is a positive response to the relevant land use policies including the objectives and strategies of Clause 13.07-1S (Land use compatibility). The project would largely support the overarching objectives and strategies of the relevant policy documents for the Port and therefore support its ongoing role as a key economic driver for Geelong. I therefore agree with the EES IAC's conclusion that the project's proposed location is consistent with the planning policy framework as land prioritised for shipping, trade and industrial activity and that it is compatible with the existing port and industrial setting.

Construction impacts

The EES stated that land use impacts during construction would result from the establishment of construction right of way corridors, areas required for stockpiling and laydown, and the establishment of temporary construction access, including access to recreational reserves. These could potentially occur across the full extent of the project area where construction is required. The EES assumed that the project would adopt a staged construction approach, therefore temporary land use changes would be short term in localised areas. Viva Energy proposed a number of MMs to address traffic and transport management, including MM-TP01, which denotes ongoing community consultation and development of an operational management plan (MM-TP07) that considers community consultation outcomes. The EES IAC recommended minor updates to MM-TP01, and I support this amendment (refer to Section 5.11 of this assessment).

The EES also identified construction noise and air emissions as a potential impact on nearby sensitive land uses. Following further assessment, the SEES found that these impacts would be negligible where construction activities are contained within the Refinery due to the presence of established buffers to sensitive receivers. The extent of impacts where construction activities occur outside of the Refinery will need to be managed to avoid unacceptable impacts on sensitive land uses. My assessment of impacts resulting from noise, air quality and other effects are discussed in Section 5.5, 5.6, and 5.11, the subsequent impacts on social and business values are discussed in Section 5.9.

Further, the EES IAC noted that the EMF and EMPs, as proposed in the draft incorporated document, are an appropriate way of minimising potential land use impacts.

I am satisfied that temporary land use and amenity impacts during construction would be mitigated through the preparation and implementation of a CEMP (as outlined in Section 4 of this assessment) with the support of MMs, such as MM-CO01 (contaminated soils), MM-AQ01 (dust suppression), MM-NV06 (construction noise), and MM-CO2 (contaminated groundwater).

Operational impact

With regard to operational impacts the EES identified the key impacts to be land use changes through the introduction of new easements, disruptions associated with ongoing infrastructure maintenance and visual and amenity impacts to nearby sensitive land uses.

The EES stated the introduction of easements across the underground gas transmission pipeline alignment would limit the future use and development of the land whilst still allowing access for ongoing inspections and monitoring of the assets. The location of the easements will be within existing underground gas transmission pipeline easements, road corridors and previously disturbed areas, therefore limiting the impacts to other land uses. The EES IAC did not raise any concerns with the impacts associated with the introduction of the easements and I consider these impacts will not be significant given the nature of land uses affected by the easements.

The visual impacts associated with the operation of the project were identified by the EES to be from new above ground structures. These include the FSRU, LNG carrier, the new Refinery Pier arm, the treatment facility and aboveground gas pipeline section. The aboveground project infrastructure generally sits lower than many of the existing elements and does not obstruct the higher value views of the water or the native vegetation from key viewpoints. The EES stated that MMs to reduce the visual impact of the project from key viewpoints were not considered necessary given the existing industrial context. The EES IAC recommended changes to MM-LV01 to provide more detail in relation to understorey planting to screen the treatment facility. The EES IAC also recommended including a new MM (LV02) requiring the FSRU to be in muted colours to reduce its visual impact, provided this is acceptable from a marine safety perspective.

It is noted the proposed treatment facility is subject to the Design and Development Overlay – Schedule 20 (Industrial 1, 2 and 3 zones). The Design and Development Overlay – Schedule 20 aims to improve the visual appearance of industrial settings through well designed and site responsive developments. I consider conditions of the incorporated document requiring detailed architectural plans for the treatment facility to respond to the design and built form requirements of the Design and Development Overlay – Schedule 20 as an appropriate mechanism to ensure the design objectives of Design and Development Overlay – Schedule 20 are achieved. Further I support the amendments proposed by the EES IAC, adopted by Viva Energy during the SEES process to amend MM-LV01 and introduce MM-LV02. With these changes and the considerations above I am satisfied that effects on landscape and visual amenity will be acceptable.

The EES stated that air and noise emissions from the operation of the project could impact the amenity of nearby sensitive uses. The EES IAC acknowledged that many community groups and residents submitted concerns that the project would create adverse and unacceptable safety and amenity risks, due to the proximity to existing residential communities. Amenity impacts were addressed in sections 5.4, 5.5 and 5.6 of this assessment consolidating the findings of the EES and SEES assessment.

The EES IAC noted that no evidence was presented that the proposed location is inconsistent with planning policies and controls relating to land use regarding the location of MHFs or buffers around MHFs. I also note the conclusion of the EES IAC, that the potential for a high consequence major incident to occur at the port, involving LNG once the FSRU is operational is a low probability and as such the premise for licensing the FSRU as an MHF. I therefore support the EES IAC's conclusion that provided the safety, and amenity impacts of the project are appropriately managed (refer to Section 5.4 of this assessment), the location of the project in relation to GGS or nearby residential areas is appropriate and is largely supported by land use policy.

Assessment

It is my assessment that:

- The project is generally consistent with land use planning policy for the Port of Geelong and the industrial area within which the project is proposed to be located.
- Subject to the project's amenity and safety impacts being managed appropriately through the proposed amendments to relevant MMs, the EMF, incorporated document and subsequent regulatory frameworks I am satisfied that the project is acceptable from a land use planning perspective.

5.9 Social and business

Evaluation objective

To minimise potential adverse social, economic, amenity and land use effects at local and regional scales.

Assessment context

Social and business effects were addressed in Chapter 11 and Technical Report L of the EES, and in Chapter 16 of the EES IAC report.

Viva Energy proposed four MMs to deal with social and business effects (MM-SB01 to MM-SB04). One additional MM was adopted by Viva Energy as part of the EES IAC process (MM-SB05). The EES IAC recommended including a new MM (SB06) requiring the establishment and resourcing of a Community Reference Group.

The project is within the City of Greater Geelong local government area, with key sensitive social receivers being housing and residential areas such as the suburb of Norlane near Corio Bay. The local business environment was identified in the EES to include the Port of Geelong and surrounding industrial areas. The EES identified the key business stakeholders that could be impacted by the project as GeelongPort, Incitec Pivot, Quantem and GGS. The residents of this local area and businesses, such as GGS, will experience localised impacts during construction, which include changes in amenity from project-induced noise, traffic, dust and visual changes. Residents and businesses expressed concerns about project operations including safety, stress from the project location in particular the FSRU, and potential economic impacts, for example, through reduced enrolments or tourism.

The EES found that most of the potential social and business effects would be minor due to the low density of houses and businesses near the project and the existing industrial nature of the project area and surrounds due to the existing port and industrial area. The EES proposed several MMs including creation of social and employment plans (MM-SB03 and MM-SB04) and a consultative mechanism (MM-SB01) to ensure project information particularly during construction was available and a complaints mechanism in place.

Discussion

The key social and business issues considered by the EES IAC, and discussed in my assessment, relate to the:

- extent and adequacy of consultation with the local community and businesses;
- the social impact of fears and anxieties generated by the project;
- impacts on community resources and;
- adequacy and likely effectiveness of proposed MMs.

The EES IAC found that a more thorough engagement process with the local community should have been undertaken to inform the assessment of potential social impacts and identify meaningful and tangible MMs. As part of the SEES Viva Energy refined its approach to consultation activities based on lessons from the EES consultation process. The updated Supplementary Statement Consultation Activities Plan incorporated feedback from stakeholders and the EES IAC, focusing on meaningful engagement and stakeholder involvement in the supplementary assessment process, in line with my SEES directions. The SEES IAC did not comment on the implementation of the SEES engagement program however found that overall, the proposed amended EMF outlined an appropriate approach to consult with key stakeholders during construction and operations of the project. The SEES IAC also noted that the draft incorporated document included conditions to provide a summary of consultation to me as part of the CEMP and OEMP approval. I support both of these

mechanisms, highlighting the importance of adequate and open communication with the community and stakeholders.

There are social and business impacts that cannot be avoided, including those relating to amenity during construction. The extent to which these social impacts will be felt will result from the effectiveness of the MMs implemented to manage environmental impacts, including those that relate to noise and air emissions, as well as safety management. The EES IAC determined that further assessment of impacts on the marine environment, air emissions, noise and safety were required to validate any business or social effects. Following this, the SEES revised the assessment of noise and air quality impacts and therefore the predicted impacts on sensitive receivers. The SEES IAC found that, subject to amendments to the proposed MMs and EMF, the amenity impacts of the project are likely to be acceptably managed. The SEES IAC found that construction and operational noise impacts from the project were unlikely to be significant and could be acceptably managed following the amended MMs and within the existing regulatory framework and relevant policy and guidelines. The SEES IAC was satisfied revised air quality operational modelling did not significantly affect predicted air quality outcomes at sensitive receivers, and as such, air quality effects from construction and operation can be acceptably managed through the implementation of the EES and SEES MM amendments. My assessment of impacts resulting from noise, air quality and other effects are discussed in Section 5.5, 5.6, and 5.11

Intangible social impacts, such as worry, stress, and perceived fears about the project's effects on nearby residents, were acknowledged by the EES IAC as genuine community concerns. To help manage these impacts, the EES IAC highlighted the importance of ongoing, effective community engagement. Recognising this, the EES IAC emphasised the need for MM-SB01 (Consultative Mechanism for Information and Enquiries) and MM-SB05 (Community Program) to be guided and overseen by a dedicated Community Reference Group (CRG). The EES IAC recommended introducing an additional MM (MM-SB6) to formally establish a CRG, stressing that this group should include local community leaders and representatives from well-established organizations such as Norlane Community Initiatives, Northern Futures, and Give Where You Live—each of which has strong community connections and credibility. I fully support the inclusion of MM-SB6 and note that Viva Energy has adopted this amendment through the SEES process. In addition, the updated MM-SB05, would offer community support through continued contributions to Viva Energy's community program offering support to not-for-profit community organisations with the aim of creating a positive community contribution. These social MMs together with engagement requirements of the incorporated document, have the potential to deliver social and community benefits and should be progressed with guidance from the Community Reference Group (MM-SB06). The EES IAC also emphasised the importance of effective community engagement in the successful implementation of the proposed employment and social procurement plans, which would help to provide benefits to the local community (MM-SB03 and MM-SB04). I support the EES IAC findings, including the need for additional effective community engagement and MM amendments adopted by Viva Energy as part of the EES IAC and SEES processes.

The EES IAC was generally satisfied with the business impact assessment noting it was limited but adequate, and that the MMs proposed to minimise business impacts were appropriate. This included potential impacts on tourism operators and aquaculture businesses. However, the EES IAC did note this was subject to the further assessment of impacts associated with amenity and safety. As outlined above, the SEES IAC found that, subject to amendments to the proposed MMs and EMF, the amenity impacts of the project are likely to be acceptably managed (see Sections 5.5,5.6 and 5.11). I note that GeelongPort raised concerns during the EES IAC hearing about potential impacts of the project on GeelongPort's port planning and operations but withdrew its submission during the EES hearing. The EES IAC highlighted that GeelongPort's decision to withdraw its opposing submission reassured it that any project impacts on GeelongPort's operations and functionality can be effectively managed.

The EES IAC supported the business MMs (MM-SB01 to MM-SB04), noting that the proposed Employment Plan (MM-SB03) and Social Procurement Plan (MM-SB04) should provide positive economic and employment outcomes for both local and regional businesses and residents. I agree with the EES IAC that the project is unlikely to have significant effects on the operation of businesses near the project and that the proposed MMs are adequate to manage any effects on businesses to acceptable levels.

Assessment

It is my assessment that:

- Social and business effects relating to amenity during construction are low and can be acceptably managed through the implementation of relevant MMs including those that categorised under noise, air quality, traffic and transport and safety.
- Other social and business effects such as those relating to uncertainty can be managed with the implementation of the proposed social and business MMs, including the consultative mechanisms (MM-SB01) which aims to make information easily available, such as amenity monitoring results and specific health and safety information for key stakeholder groups.
- Business impacts due to the project are limited and can be effectively managed through the proposed MMs (MM-SB01 to MM-SB04).
- That Viva Energy has considered feedback during the SEES process, and I support the inclusion of MM-SB06 to establish and resource a Community Reference Group to oversee the implementation of MMs, MM-SB01, MM-SB03, MM-SB04 and MM-SB05.

5.10 Aboriginal cultural heritage

Evaluation objective

To avoid or minimise adverse effects on Aboriginal and historic cultural heritage.

Assessment context

Aboriginal cultural heritage effects were addressed in Chapter 13 and Technical Report O of the EES, and in Chapter 17.4 of the EES IAC report. Further assessment was addressed in Chapter 7 and 8, along with Technical Report E of the SEES, and Chapter 10 of the SEES IAC report. Technical Report E was provided in full to the SEES IAC but was not exhibited at the request of WTOAC as it contained culturally sensitive information.

Proposed MMs to manage impacts on Aboriginal cultural heritage are MM-AM01 to MM-AH04, MM-AM02 to MM-AH04 were additions included by Viva Energy as part of the SEES process.

The EES project area (41.7 hectares), referred to as the activity area for this assessment, was inclusive of both the onshore and offshore project components, with a 5.5-kilometre buffer applied around the underground gas transmission pipeline alignment from Refinery Pier. The offshore activity area comprised of the existing and proposed piers, the FSRU, the berthing and swing location, the dredging area and seawater transfer pipeline. The defined activity area in the EES represents the spatial extent within which project-related works could potentially impact Aboriginal cultural heritage (ACH) and where assessments were undertaken to identify and manage any ACH considerations. The SEES activity area for assessing underwater ACH values[26]

[26] In this assessment the term 'values' is used to encompass all potential Aboriginal cultural heritage values, including places and artefacts, for example. Those recognised under relevant legislation and otherwise.

was within the EES and the CHMP activity area, covering the dredging area and seawater transfer pipe. The CVA study area can be view in SEES Chapter 8 – Figure 8-1.

The key issues identified through the EES were:

- the adequacy of the Aboriginal cultural heritage investigations; and
- the potential loss of significant Aboriginal cultural heritage values, including underwater values.

Ground disturbance works associated with construction of the project, both onshore and offshore, have the potential to damage or destroy tangible ACH values. The EES found one new Aboriginal place in the onshore activity area during complex assessment. This would not be impacted by the project. The EES determined that the project would not impact any known Aboriginal places and that it was unlikely that any unknown Aboriginal places or values would be present within the onshore and offshore activity areas. The EES deferred residual impacts could be managed through the CHMP (No. 17816).

Through the EES hearing process, it came to the attention of the EES IAC that there were intangible and submerged ACH values present in the activity area that had not been identified in the EES or the CHMP at the time. The EES IAC determined that further assessment was required to evaluate the project's impact on intangible ACH values (both onshore and offshore) and offshore (submerged) tangible ACH values. Specifically, it recommended conducting a CVA to identify intangible ACH values that could be impacted by the project (onshore and offshore in Corio Bay) and an underwater Aboriginal cultural archaeological assessment for the proposed dredging areas. The EES IAC considered that these assessments were needed to inform an updated CHMP.

As discussed in Section 4 of this assessment, after considering the EES IAC report, I directed further assessment of the project's effects on intangible values and underwater ACH values.

The CVA was not completed at the time of SEES exhibition, with the SEES instead providing an update on assessment progress, including commitments by Viva Energy to complete the CVA, in consultation with WTOAC, to inform the projects CHMP (MM-AH02 and MM-AH03).

The SEES Underwater Aboriginal Cultural Archaeological Assessment found the activity area was located within a drowned playa lake, a culturally significant site, with Point Henry Spit to the east of the activity area. The assessment identified submerged landforms, including potentially sensitive terraces along the seawater transfer pipe alignment where past human occupation within 50 metres was possible. However, due to natural environmental processes, the SEES found that these landforms were likely disturbed, with any artefacts displaced from their original locations, resulting in a low risk of impact to tangible underwater ACH during construction. The CHMP will be updated in consultation with WTOAC and Viva Energy to outline management processes, which will be followed during project construction (MM-AH01).

The SEES IAC report noted that culturally sensitive information discussed at the closed session with WTOAC was kept confidential, inclusive of submissions and expert witness statements. As such, my assessment is based on the publicly available information provided by the EES, the SEES and the EES IAC and SEES IAC reports.

Discussion

The key ACH issues identified by the EES IAC and SEES IAC and discussed further in my assessment related to:

- onshore tangible values;
- the adequacy of the Underwater Aboriginal cultural archaeological assessment; and
- the appropriateness of the MMs and EMF to minimise adverse effects on Aboriginal cultural heritage.

The EES IAC considered that, subject to the recommended further assessment, the project would not impact known tangible ACH values and agreed that the potential for the project to impact unknown ACH values could be managed through the CHMP and its associated management conditions once finalised. The EES IAC also recommended an update to MM-AH01, to require Viva Energy to update the CHMP following the further assessment.

Submitters to the SEES IAC were critical that the CVA, required to assess intangible onshore and offshores Aboriginal cultural values, was not completed for SEES exhibition. The SEES IAC supported the views of WTOAC that the CVA is likely to contain culturally sensitive information and as this information belongs to WTOAC, it would be WTOACs decision to make the information public. The SEES IAC was satisfied that Viva Energy had demonstrated effective engagement with WTOAC, that focused on avoiding or minimising project effects on Aboriginal cultural heritage. Based on the information from the SEES IAC, the updated MM-AQ01, and Viva Energy's commitment to ongoing consultation and partnership with WTOAC (MM-AH01-MM-AH04), I support this and the completion of the CVA to inform the CHMP as appropriate.

The SEES IAC determined that the Underwater Aboriginal cultural archaeological assessment was sufficient to inform its recommendations of the projects effects on tangible, underwater ACH values. The SEES IAC determined the study used an appropriate methodology and the investigation for the potential presence of ACH values, including artefacts, in the project area was comprehensive. The SEES IAC accepted the SEES findings that the risk to underwater Aboriginal cultural heritage posed by the project was low and that the project's impacts weren't significant.

Viva Energy's expert witness (Mr Coroneos') provided a written statement to the SEES IAC, recommending extending MM-AH04 to include an archaeological sampling program during project construction to mitigate any potential dredging impacts of the project on any unknown ACH values. The SEES IAC supported this recommendation and included their proposed addition to MM-AH04. The SEES IAC supported the inclusion of the SEES MM-AH02 and MM-AH03 proposed by Viva Energy with no changes. I support these MMs.

I am satisfied that the additional assessment completed by Viva Energy addressed my SEES directions and I support the SEES IAC's view that the risk to underwater, tangible ACH values posed by the project is low. I acknowledge Viva Energy's commitments in the EMF and MMs to ensure that necessary further work, such as the CVA and CHMP, will be finalised in partnership with WTOAC. I consider the MMs (MM-AH01 to MM-AH04) are appropriate to avoid and minimise impacts to onshore and offshore tangible ACH values, including the amendment to MM-AH01, acknowledging that Viva Energy had included this MM update in its MMs tabled at the SEES IAC hearing.

Assessment

It is my assessment that:

- Aboriginal cultural heritage impacts can be effectively managed through the EMF, proposed MMs and CHMP.
- I am satisfied that Viva Energy has actively engaged with WTOAC and will continue this engagement to finalise the CVA, and therefore the assessment of intangible onshore and offshore ACH values, that will inform the CHMP.
- MM-AH04 includes a requirement for an underwater archaeological sampling program during project construction where dredging is to take place, as recommended by the SEES IAC and supported by me.

5.11 Other effects

As noted in the published reasons for requiring an EES and the EES scoping requirements, the EES was to focus on potentially significant effects of the project including those related to the marine environment, greenhouse gas emissions, safety, air quality, noise, land use, Aboriginal and historic cultural heritage, native vegetation, groundwater, traffic and transport, social and business, landscape and visual amenity, and contamination and soils. The EES, submissions and EES IAC carefully examined additional potential effects associated with these aspects. The SEES, submissions and SEES IAC further examined potential effects related to the marine environment, noise, air quality, and Aboriginal cultural heritage. Historic heritage, traffic and transport, landscape and visual, and contamination and soils effects are discussed below.

Table 3 outlines the EES IAC's findings relating to these effects and discusses their overall significance, the proposed EMF and management controls. These effects were not subject to the SEES IAC. Generally, I support the findings of the EES and EES IAC in relation to these effects and consider that they can be effectively managed through well-established practices, including the recommended MMs.

Table 3: Other effects.

EES IAC findings and recommendations	Assessment
Historic heritage	
The EES did not identify any known historical archaeological sites or maritime heritage places within the study area for the Aboriginal cultural heritage and historic heritage impact assessments and considered it highly unlikely that unknown and unrecorded historical archaeological sites or maritime heritage places would be present within the study area. The EES IAC was satisfied that any potential effects on historic heritage could be acceptably managed by implementing onshore and offshore unexpected finds protocols (MM-HH01 and MM-HH02).	I support the findings of the EES IAC that the MMs are adequate to acceptably manage any potential effects on historic heritage.
Traffic and transport	
The EES found that the overall effects on the transport network resulting from the construction and operation of the project would be minor. Effects could be managed through standard traffic management measures typically applied for projects of this scale and nature, including traffic management plans.	I support the findings of the EES IAC and its recommendation to amend MM-TP01. I note that Viva Energy has adopted the recommendation as part of the SEES process.
Some concerns were raised in submissions regarding traffic effects. In response, Viva Energy proposed changes to MM-TP01, MM-TP-02 and MM-TP03, which the EES IAC supported. The EES IAC recommended a further change to MM-TP01 to require consultation with TT-Line (operator of the Tasmanian Ferry Service).	I support the findings of the EES IAC that, with the recommended change, the MMs are adequate to acceptably manage project effects on traffic and transport.

EES IAC findings and recommendations	Assessment
The EES IAC was satisfied that traffic effects could be acceptably managed with the implementation of amended MM-TP01 and proposed MM-TP02 to MM-TP07.	
Landscape and visual	
The EES found that the residual effects of the project on landscape and visual amenity would be low. Some concerns were raised in submissions on landscape and visual amenity effects during operation relating to the proposed landscape screening of the treatment facility, the presence of the permanently (life of the project) moored FSRU and the presence of visiting LNG carriers. The EES IAC recommended changes to MM-LV01 to provide more detail in relation to understorey planting to screen the treatment facility. The EES IAC also recommended including a new MM (LV02) requiring the FSRU to be in muted colours to reduce its visual impact, provided this is acceptable from a marine safety perspective. The EES IAC was satisfied that the landscape and visual effects could be acceptably managed with the implementation of the amended MM-LV01 and new MM-LV02.	I support the findings of the EES IAC and its recommendations to amend MM-LV01 and introduce MM-LV02. I note that Viva Energy has adopted the recommendations as part of the SEES process. I support the findings of the EES IAC that, with the recommended changes, the MMs are adequate to acceptably manage project effects on landscape and visual amenity.
Onshore contamination and soils	
The EES found that risks from soil and groundwater contamination and acid sulfate soils within the Refinery (Zone 1) could be managed through the construction process, and that there was little contamination along the underground gas transmission pipeline route north of the Refinery (Zone 2). The EES IAC was satisfied that any effects resulting from onshore contamination and soils could be acceptably managed with the implementation of proposed MM-CO01 to MM-CO05.	I support the findings of the EES IAC that the MMs are adequate to sufficiently manage any effects resulting from onshore contamination and soils.

6. Conclusions

I consider that the environmental effects of the proposed project have been sufficiently examined through the EES and SEES and are largely not significant and acceptable. The potential effects can be managed with implementation of the proposed EMF and MMs refinements being consistent with the recommendations of this assessment.

As outlined in Section 5 of my assessment, I consider that Viva Energy have satisfactorily addressed the outstanding relevant environmental effects raised by the EES IAC and set out in my SEES directions. My assessment brings together the outcomes of the EES, SEES, the EES IAC and SEES IAC reports, and public submissions from the EES and SEES, to consolidate the assessment of the project's effects.

The SEES IAC found that with the adoption of their recommendations, the project's environmental impacts can be managed effectively throughout all project phases. This included recommended changes to the MMs and the EMF, which help to establish appropriate monitoring, auditing, and reporting requirements, ensuring accountability and transparency around environmental performance. The MMs are a crucial element of the EMF, and they will primarily be implemented through the proposed PSA and incorporated document.

Subject to the recommended changes from the EES IAC and SEES IAC, and as further refined through my assessment, I consider the MMs (as presented in Appendix A), to acceptably manage residual impacts of the project. I recommend minor changes or considerations to 5 MMs (MM-ME19, MM-ME15, MM-ME05, MM-NV05 and MM-SHR11), as shown in Table 5, related to the marine environment, noise, and safety, in addition to supporting the new MMs and amendments recommended by the EES IAC and SEES IAC. For several MMs, I recommend reversion to the EES IAC's versions of these MMs. An example is MM-GG11, where the EES IAC's version should be adopted to ensure scope 3 emissions quantification and offsetting within the operational boundary of the project, generally consistent with state climate and energy legislation and policy. The EES IAC's version of MM-ME02 should be adopted in relation to seasonal restriction of dredging, as the intent of this EES IAC suggested amendment would mitigate impacts to shorebirds, migratory birds and the Ramar site values during important intertidal feeding, as aligned with the MNES assessment.

I am satisfied that the project as proposed in the SEES can proceed with acceptable environmental outcomes. While there are likely to be some environmental impacts, these can be effectively mitigated or managed, considering their extent, nature, and expected duration and given the implementation of the proposed EMF and MMs. This conclusion has been informed by the thorough and independent analysis undertaken by both IACs, the extensive community and stakeholder input to the process, and the technical assessments undertaken by Viva Energy for the EES and SEES.

This Victorian assessment process under the EE Act served as the accredited assessment for this 'controlled action' under the EPBC Act. My assessment is issued to the Commonwealth Minister for Environment and Water to inform the decision about whether and under what conditions to approve the project under the EPBC Act. On balance, I consider that residual impacts on MNES will not be significant, providing sound implementation of the amended EMF, based on the recommendations of the EES IAC and SEES IAC and this assessment. Residual impacts on the Ramsar wetland, listed and migratory species and associated environmental values, can be acceptably managed through implementation of the EMF.

Decision-makers need to consider this assessment before deciding whether and how the project should proceed. As a matter of good practice, I also expect decision-makers to write to me to advise how my assessment was considered and applied.

Table 4 summarises my response to the EES IAC and SEES IAC's key recommendations as provided in the Executive Summary of the EES IAC and SEES IAC reports. My additional recommendations are summarised in Table 5. Further recommendation from the assessment that relate to MMs are outlined in Appendix A.

HON SONYA KILKENNY MP

Minister for Planning

Date: 26/5/2025

Table 4: Response to EES IAC and SEES IAC's key recommendations.

Key recommendation		Minister's response	Section of this assessment
EES IAC Report			
Recommendations for further work			
1	Undertake further survey work to better establish the existing environment and the impacts of existing wastewater discharges from the Refinery to enable better understanding of Project impacts. The survey work should: a) cover intertidal, littoral and subtidal habitats that could potentially be affected by the Project, including the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site b) update seagrass mapping to include the intertidal zone, the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site and information on the different seagrass species c) be carried out over a period of at least 12 months before construction or dredging starts, with a minimum of four sampling runs (one in each season) to address seasonal variability d) establish a better baseline for monitoring during and after the Project to confirm predicted outcomes on shoreline and benthic communities, including seagrasses and macroalgae.	Subject of my SEES directions. Viva Energy satisfactorily undertook and addressed this recommendation as part of the SEES. I support Viva Energy commencing item c) monitoring 12 months prior to construction commencement.	5.1
2	Refine the calibration of the regional hydrodynamic model so that it more accurately reproduces observed water levels, currents, tidal range and tidal exchange in Corio Bay. Consider: a) the selection of the most appropriate wind data b) more detailed horizontal resolution to represent the Hopetoun and North Channels more accurately c) more detailed vertical resolution to represent discharge plumes in shallow waters more accurately	Subject of my SEES directions. Viva Energy satisfactorily undertook and addressed this recommendation as part of the SEES.	5.1

Key recommendation		Minister's response	Section of this assessment
	d) the effects of the presence of the floating storage and regasification unit on currents e) peer review of the model calibration.		
3	Re-run the wastewater discharge modelling with revised inputs based on the refined hydrodynamic model. Consider: a) revising the nearfield modelling of discharges from the diffuser to address the matters raised by Dr McCowan in his written evidence (Document 75) b) the Inquiry and Advisory Committee's recommended default guideline values for chlorine discharges (see Consolidated Recommendation 17).	Subject of my SEES directions. Viva Energy satisfactorily undertook and addressed this recommendation as part of the SEES.	5.1
4	Consider undertaking further targeted investigations into the effects of existing chlorine discharges from the Refinery to confirm likely Project impacts resulting from chlorination by-products, including measurement of chlorination by-product concentrations in: a) seawater b) biota that have high susceptibility to contamination.	Subject of my SEES directions. Viva Energy satisfactorily undertook and addressed this recommendation as part of the SEES.	5.1
5	Re-run the entrainment modelling with revised inputs based on the refined hydrodynamic model.	Subject of my SEES directions. Viva Energy satisfactorily undertook and addressed this recommendation as part of the SEES.	5.1
6	Re-run the sediment transport modelling with revised inputs based on the refined hydrodynamic model. Consider including a 'worst case' scenario for sediment fractions and settling rates which includes the largest expected proportions of fine and very fine materials that have the slowest expected settling velocities.	Subject of my SEES directions. Viva Energy satisfactorily undertook and addressed this recommendation as part of the SEES.	5.1
7	Undertake further assessment of dredging impacts on seagrass based on: a) the revised sediment transport modelling	Subject of my SEES directions. Viva Energy satisfactorily undertook and addressed this	5.1

Key recommendation		Minister's response	Section of this assessment
	b) revised light thresholds of 10 percent to 20 percent surface irradiance (20 percent surface irradiance should be applied to any sediment plumes that extend to the Port Phillip Bay (Western Shoreline) and Bellarine Peninsular Ramsar site) c) the updated seagrass mapping (see Consolidated Recommendation 1(b)).	recommendation as part of the SEES	
8	Confirm the conclusion in the Environmental Effects Statement that dredging will not impact the Port Phillip Bay (Western Shoreline) and Bellarine Peninsular Ramsar site after considering: a) the revised marine modelling b) the revised assessment of impacts on seagrass.	Subject of my SEES directions. Viva Energy satisfactorily undertook and addressed this recommendation as part of the SEES.	5.1
9	Undertake further assessment of impacts on threatened and migratory bird species by: a) establishing a complete list of threatened and migratory bird species that could potentially be affected by the Project (and consider including the black swan) b) having the list peer reviewed c) undertaking further analysis of the targeted shorebird surveys, to determine whether the surveyed sites individually or collectively support enough individuals of any particular migratory bird species to be an important site for that species in Australia or the East Asian-Australasian Flyway d) considering the revised marine modelling.	Subject of my SEES directions. Viva Energy satisfactorily undertook and addressed this recommendation as part of the SEES.	5.2
10	Undertake the further assessment of noise impacts set out in mitigation measure MM-NV05.	Subject of my SEES directions. Viva Energy satisfactorily undertook and addressed this recommendation as part of the SEES.	5.5
11	Undertake sensitivity testing on the air quality modelling to confirm that operational impacts on air quality would be acceptable. Consider:	Subject of my SEES directions. Viva Energy satisfactorily undertook and addressed this	5.5

Key recommendation		Minister's response	Section of this assessment
	a) the significance of the wake effects of the floating storage and regasification unit b) a 'worst case' scenario for air emissions (but based on the use of best available technology) c) the implications of bubble limits and stack specific limits for sensitive receptors.	recommendation as part of the SEES.	
12	Undertake a cultural values assessment to identify intangible values relevant to the Project (both onshore and offshore in Corio Bay) and an underwater Aboriginal cultural archaeological assessment for the proposed dredging areas to inform an updated Cultural Heritage Management Plan. Review and update the mitigation measures and Incorporated Document to include any necessary changes to implement the updated Cultural Heritage Management Plan when approved.	Subject of my SEES directions. Viva Energy satisfactorily undertook and addressed this recommendation as part of the SEES.	5.10
Recommendations for changes to the EMF			
13	Amend the Part C mitigation measures (Document 456) as shown in Appendix G in the EES IAC Report (No. 2).	Generally supported, subject to my amendments following the SEES, as indicated in Appendix A.	Appendix A
14	Consider adding a requirement to the Environmental Management Framework to develop a conceptual model for coordinated ecosystem-based management of environmental impacts and risks to the marine environment in subsequent stages of the Project, including detailed design, construction (including dredging), operation and decommissioning.	Generally supported as an overarching principle for the EMF, subject to recommended strengthening of MM-ME06 and MM-ME19. Overall, these concerns can be worked through under the Marine and Coastal Act consent.	5.1
15	Include a requirement in the Environmental Management Framework to establish a Project-wide risk register to be maintained and updated as required throughout the detailed design, construction, operation and decommissioning phases of the Project. The requirements for the Project-wide risk register should be generally based on the approach outlined in the standard condition for a risk management and monitoring program applied by the Environment Protection Authority Victoria to development and operating licences	Generally supported, with the following recommendations: i. consider that the project-wide risk register should be used to inform other regulatory requirements as practicable. The draft incorporated document should include a new clause to mandate this requirement (see	4.4

Key recommendation		Minister's response	Section of this assessment
	issued under the *Environment Protection Act 2017*.	SEES recommendation #2 of this table).	
16	Include a requirement in the Environmental Management Framework to appoint an ecological coordinator to ensure appropriate coordination of further investigations, including those recommended by the IAC, and for subsequent stages of the Project design and assessment process.	Generally supported, noting it is particularly relevant for the implementation of the environmental monitoring program prior to and during construction and operation.	5.1
Recommendations for conditions on the Development Licences (should EPA issue)			
17	For both Development Licences, adopt the following default guideline values (DGVs) for chlorine discharges: a) 7.2 microgram per litre in Corio Bay generally, including the Project area b) 2.2 microgram per litre at the Ramsar site.	Addressed via the revised RHM, I supported the findings that operation of the FSRU would meet these DGVs. Supported in principle - EPA will consider DGVs further as part of DL and licencing conditions as applicable, and in the context of this assessment.	5.1
18	Include a condition on the Development Licence for the floating storage and regasification unit that when the Refinery is not operating, the floating storage and regasification unit seawater intake limit should be set consistent with seasonal gas production rates, with lower limits in spring and summer, capped at a maximum of 350 megalitres per day.	Supported in principle - EPA will consider this recommendation further as part of the DL application, and in the context of this assessment.	5.3
19	Include a condition on the Development Licence for the floating storage and regasification unit that requires the Proponent to report annually on how it has preferenced lowest net embodied emissions liquified natural gas cargoes to be processed in the floating storage and regasification unit in accordance with mitigation measure MM-GG01.	Supported in principle - EPA will consider this recommendation further as part of the DL application, and in the context of this assessment.	5.3
20	Include a condition on the Development Licence for the floating storage and regasification unit that limits operation of the floating storage and regasification unit in closed loop mode.	Supported in principle - EPA will consider this recommendation further as part of the DL application, and in the context of this assessment.	5.3

Key recommendation		Minister's response	Section of this assessment
21	Include a condition on the Development Licence for the floating storage and regasification unit that requires Scope 1, Scope 2 and Scope 3 greenhouse gas emissions within the Proponent's control to be offset annually by surrender of verified greenhouse gas offsets.	Supported in principle - EPA will consider this recommendation further as part of the DL application, and in the context of this assessment.	5.3
22	Consider whether conditions should be included on the Development Licence for the floating storage and regasification unit regarding: a) the configuration of the floating storage and regasification, based on the results of the further air dispersion modelling that considers wake effects b) minimisation of odorant emissions.	Supported in principle - EPA will consider this recommendation further as part of the DL application, and in the context of this assessment.	5.6
Recommendation for the draft PSA (should it be approved)			
23	Update the exhibited draft Planning Scheme Amendment C442ggee as follows: a) update the exhibited Incorporated Document as shown in Appendix H b) replace Map 1 'Project Land and Special Controls Overlay Extent' in Explanatory Report with the final version of the plan to be included at Appendix 1 of the Incorporated Document.	Considered completed as part of SEES draft PSA update.	4.4
SEES IAC Report			
1	**Revise the Environmental Mitigation Measures as** (SEES IAC Report – Appendix E): **a)** revise AH04 (underwater cultural heritage) to incorporate a requirement to undertake an underwater archaeological sampling program during the construction phase where dredging is to take place **b)** revise ME05a (baseline turbidity and light attenuation monitoring) and ME05 (turbidity and light attenuation monitoring during dredging) to require turbidity and light attenuation to be monitored in the same areas as the monitoring sites for seagrass under ME06	Generally supported, subject to my recommendations for MM-ME02, MM-ME05, MM-ME15, MM-ME19, MM-GG11, MM-NV05 and MM-SHR11.	5.1

Key recommendation	Minister's response	Section of this assessment
c) revise ME05 (turbidity and light attenuation monitoring during dredging) to: • remove the references to the 12 and 15 NTU thresholds • require the thresholds (which will be based on the baseline monitoring undertaken under ME05a) to be established to the satisfaction of Environment Protection Authority Victoria • include 'cessation of dredging' as one of the actions to be taken in response to turbidity thresholds being exceeded **d)** revise ME06 (seagrass and seabed biota monitoring) to require: • consideration of the implications for the Corio Bay ecosystem for any impacts identified through the monitoring • 12 months of baseline monitoring • monitoring of intertidal as well as subtidal seagrass • seagrass monitoring to include the area within the 5 mg/L contour on Figure 10 in this Report, to assess any impacts on seagrass outside the Ramsar site and confirm recovery if there are impacts. **e)** revise ME10 (design of the diffuser) to include a requirement for the design of the diffuser to have regard to effects on the stability of the seabed and minimise risks of erosion **f)** revise ME12 (biosecurity measures on vessels) and ME14 (spill management procedures on vessels) to make them applicable to construction as well as operation **g)** include a new ME17a to require 12 months of baseline monitoring of existing Refinery discharges to assist in the interpretation of data collected under ME19 (monitoring the effects of operational discharges on the marine environment) **h)** revise ME19 (monitoring the effects of wastewater discharges on the marine environment) to require:		

	Key recommendation	Minister's response	Section of this assessment
	• consideration of the implications for the Corio Bay ecosystem for any impacts identified through the monitoring • the monitoring program to be designed to detect potential impacts on water quality and key ecosystem components such as seagrass **i)** revise ME21 (monitoring the effects of entrainment by the FSRU) to include a requirement for relevant water quality data to be collected as part of the monitoring of the effects of entrainment.		
2	**Revise the Incorporated Document as** (SEES IAC Report – Appendix F)**:** a) include a requirement in clause 4.6.5(a)(iii) for Project noise emissions to be verified against the adjusted Project Noise Criteria extracted in Figure 11 of this Report b) include a new clause 4.6.6 to require a Project-wide risk register to be established c) make the minor corrections as shown in SEES IAC Report - Appendix F.	a) Supported as per SEES IAC Report - Appendix F b) Supported as per SEES IAC Report - Appendix F c) Corrections supported	a) 5.5 b) 4.4 c) Editorial updates not specially discussed in the assessment.
3	Revise the Environmental Management Framework to correct references to First Nations State Relations to read First Peoples State Relations.	Supported	Editorial updates not specially discussed in the assessment.
4	Specify a combination of stack specific limits and an annual bubble limit for air emissions on the Development Licence for the FSRU.	Supported in principle - EPA will consider this recommendation further as part of the DL application and licencing conditions, in the context of this assessment	5.6

Table 5: Minister for Planning's additional recommendations.

Additional recommendations		Section of this assessment
MA1	I support the SEES IAC's version of MM-ME19, noting Viva Energy are to ensure this wastewater monitoring program adequately considers relevant benthic habitats and communities, in line with the EES IAC recommendation.	5.1
MA2	MM-ME15 should be expanded to also require consideration of the risk of vessel strike on turtle species.	5.1
MA3	SEES IAC's MM-ME05 is supported in principle, but it should consider incorporating a consultation requirement with EPA for all relevant monitoring values for threshold development in the dredging monitoring program. Threshold development for light attenuation should also consider that light availability calculations be consistent with the Victorian Dredging Guidelines.	5.1
MA4	The EES IAC's version of MM-ME02 should be considered, particularly for the seasonal restriction timeframes for dredging, as the intent of this EES IAC suggested amendment was to mitigate impacts to shorebirds, migratory birds and the Ramar site, as aligned with the MNES assessment.	5.2
MA5	Viva Energy's SEES MM-NV05 is supported but amended to state the adjusted project noise criteria as presented in Figure 11 of the SEES IAC report, as recommended by the SEES IAC.	5.5
MA6	Viva Energy's SEES MM-SHR11 is supported but requires amendment to list the MHF safety case for the FSRU, as the relevant statutory approval, as recommended by the EES IAC.	5.4
MA7	EES IAC's MM-GG11 should be considered to quantify and offset scope 3 emissions within the operational boundary of the project, to ensure the project is generally consistent with state climate and energy legislation and policy.	5.3
MA8	I encourage Viva Energy to develop and implement noise management plan for the existing Geelong Refinery, as recommended by the EES IAC, to address the existing noise experienced by nearby sensitive receivers, as I recognise this may subsequently support noise mitigation of the project.	5.5

Appendix A. Environmental mitigation measures

The EES IAC and SEES IAC recommended changes to the proposed MMs in response to submissions and through their analysis of the issues through the hearing processes. Section 4 of this assessment outlines the key findings and recommendations of the EES IAC and SEES IAC relating to the EMF, the MMs and my responses. Further to this, Section 5 of this assessment sets out where I support and/or recommend further changes to the MMs considered by the EES IAC and SEES IAC.

The EES IAC and SEES IAC's MM recommendations, the MM updates adopted by Viva Energy through the SEES IAC process, and my responses are provided in Table A1, which includes the following columns:

- EES IAC's MM recommendation: This column contains the amendments to MMs recommended by the EES IAC, tracked against Viva Energy's MMs tabled at the EES IAC hearing[27]. If no recommendations were made by the EES IAC on an MM, then the column is blank. Additions are represented in blue, and deletions are represented in ~~red~~.
- Viva Energy's SEES MMs: This column contains Viva Energy's MMs tabled at the SEES IAC hearing[28,29]. If no recommendations were made by the EES IAC on an MM, then the MM was brought by Viva Energy into the SEES with no changes since the EES IAC hearing, unless Viva Energy updated MMs in response to SEES submissions as indicated. Additions are represented in green, and deletions are represented in ~~purple~~.
- SEES IAC's MM recommendation: This column contains the amendments to MMs recommended by the SEES IAC, tracked against Viva Energy's MMs tabled at the SEES IAC hearing. If no recommendations were made by the SEES IAC on an MM, then the column is blank. Additions are represented in orange and deletions are represented in ~~pink~~.

I generally endorse all changes recommended by the EES IAC and SEES IAC, except were qualified in Table A1. Further details regarding my findings and recommendations in this table are contained in Section 5 of this assessment.

[27] EES IAC Tabled Document 456: Viva Energy – Mitigation Register.

[28] SEES IAC Tabled Document: 101: Viva Energy – Day 2 Environmental Mitigation Measures (EMF) (All Mark Up).

[29] SEES IAC Tabled Document 102: Viva Energy – Day 2 Environmental Mitigation Measures (EMF) (Day 2 Mark Up).

Table A1: Recommended changes to the MMs and Minister's responses.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
Aboriginal cultural heritage				
MM-AH01	**CHMP 17816 Conditions** CHMP 17816 will be updated (as necessary) following the undertaking of a cultural values assessment to identify intangible values relevant to the Project (both onshore and offshore in Corio Bay) and an underwater Aboriginal cultural archaeological assessment for the proposed dredging areas. The project will be delivered in accordance with conditions set out in CHMP 17816 to manage any potential harm to known Aboriginal places and values. Typical management conditions include, but are not limited to: - *Conditions for harm avoidance and/or harm minimisation measures* – *Conditions for harm mitigation measures where appropriate, including requirements for surface artefact collection and/or salvage excavations*	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	and appropriate analysis and reporting – *Conditions for the removal, custody, curation and management of Aboriginal cultural heritage (artefacts) identified during the CHMP.* The CHMP will also provide necessary and appropriate mechanisms and processes to manage any potential harm to unknown Aboriginal places and values. Typical management of unknown Aboriginal places and cultural heritage values will include, but not limited to: – *Contingency plans for the management of Aboriginal cultural heritage, including Aboriginal ancestral remains, unexpectedly identified during the construction phase of the project* – *Contingency plans for the removal, custody, curation and management of Aboriginal cultural heritage (artefacts) identified during the project*			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	– *Review and compliance with the CHMP.*			
MM-AH02		**Cultural values assessment** Viva Energy will continue to collaborate with WTOAC in preparation of the cultural values assessment (CVA) and provide support for implementation of appropriate outcomes and recommendations relevant to the project.		Viva Energy's SEES MM supported.
MM-AH03		**Cultural values** If the CVA identifies potential impacts of the project on land and sea country cultural values, Viva Energy will collaborate with WTOAC to identify and adopt appropriate measures to avoid or mitigate impacts of the project on cultural values or to consider alternative programs or support measures.		Viva Energy's SEES MM supported.
MM-AH04		**Underwater cultural heritage** Viva Energy will continue to collaborate with WTOAC to identify appropriate measures to avoid or mitigate any potential impacts of	**Underwater cultural heritage** Viva Energy will continue to collaborate with WTOAC to identify appropriate measures to avoid or mitigate any potential	SEES IAC's MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		the project on underwater cultural heritage values in the project area.	impacts of the project on underwater cultural heritage values in the project area. In order to mitigate the potential impact to the archaeological/scientific values of the stone artefacts that may be present in lag deposits in the study area, undertake an underwater archaeological sampling program during the construction phase where dredging is to take place. The underwater archaeological sampling program will comprise the following components: – *Undertake a high resolution, high density sub-bottom profiling survey prior to dredging to identify optimum locations for sampling.* – *Obtain sub-seabed samples during dredging for sieving ashore.* – *Undertake further geotechnical (piston) coring if it is determined*	

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
			it would aid in the interpretation of the high resolution, high density sub-bottom profiling survey.	
Air quality				
MM-AQ01		**Dust suppression** Dust suppression will be used at construction areas as required using water sprays, water carts or other devices on: – *unpaved work areas* – *sand, spoil and aggregate stockpiles* – *during the loading and unloading of dust generating materials.*		Viva Energy's SEES MM supported.
MM-AQ02		**Restricted vehicle movements** After arrival at the project site, vehicles, plant and equipment will remain within the construction footprint and on public roads and designated tracks.		Viva Energy's SEES MM supported.
MM-AQ03		**Crushed rock on access tracks** Crushed rock will be placed on existing unsealed access tracks if required and as agreed with relevant		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		stakeholders to prevent vehicle movements raising dust. Crushed rock will also be placed on access tracks subject to mud / slippery conditions.		
MM-AQ04		**Speed restrictions** Vehicle speed will be restricted to 40 km/h on the construction right of way (ROW) and unsealed access tracks / work areas.		Viva Energy's SEES MM supported.
MM-AQ05		**Covering vehicle loads** Construction vehicles with potential for loss of loads (such as dust or litter) will be covered when using public roads.		Viva Energy's SEES MM supported.
MM-AQ06		**Weather monitoring** Weather conditions will be monitored for extreme heat and/or wind events using systems such as the Bureau of Meteorology forecasts. Where conditions give rise to risks of air quality impacts at sensitive receptors, construction works will be stopped, or will not start, until the work can be done without such risk arising.		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		Measures in MM-AQ01 will continue as required. The project will use existing refinery weather monitoring processes where appropriate.		
MM-AQ07	**Dust monitoring** Observational monitoring of dust along the construction right of way (ROW) and at the treatment facility will be undertaken. A proactive approach to control or eliminate dust will be followed. If a dust source is observed ~~to be causing a hazard~~, then MM-AQ01 will be implemented. If dust levels cannot be contained with MM-AQ01 works will be modified or stopped until the conditions are attained in which the work can resume without causing a dust hazard.	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.
MM-AQ08		**Odorous soils management** In the event that odorous soils are uncovered during construction, the following measures will be undertaken:		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		– *Cessation of ground disturbance at the location and within the immediate vicinity.* – *Assessment of site contamination and determination of appropriate management actions in consultation with suitably qualified personnel.* If odorous material is found to be contaminated, EPA will be notified if required in accordance with the requirements of the *Environment Protection Act 2017*.		
MM-AQ09		**Equipment maintenance** Plant and equipment will be maintained in good condition to minimise spills and air emissions that may cause nuisance.		Viva Energy's SEES MM supported.
MM-AQ10		**Maintenance of the FSRU burners** Maintenance of the burners in the boilers and engines will be undertaken regularly as per manufacturer's specifications. Scheduling of shutdown maintenance requiring the use of liquid fuel will include weather forecasting and selection of		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		conditions to minimise impacts, as far as reasonably practicable.		
MM-AQ11		**Monitoring FSRU emissions** An air quality monitoring program will be designed and implemented to confirm FSRU emission rates comply with design specifications.		Viva Energy's SEES MM supported.
MM-AQ12	**Minimisation of odorant emissions** The treatment facility will be designed and operated to minimise the risk of odorant releases as far as reasonably practicable. Arrangements will be put in place to monitor, record and publicly report all odorant releases, with a view to assessing and if necessary improving the performance of the odorant management arrangements.	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
Climate change				
MM-CC01		**Implement adaptation measures** Climate projections will be factored into the basis of design, particularly the mooring analysis (alignment of FSRU and other vessels with the pier), materials and coatings choices and site hydrological modelling. This will be done using a risk-based design approach that, rather than simply picking a projection, considers the range of projections, the likely exposure of an asset (considering design life and projection timeframes), its criticality, sensitivity and adaptive capacity, in determining the appropriate design factors. Safety procedures and protocols will be updated to take into consideration severe weather conditions such as storm events and heatwaves.		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
Contamination and acid sulfate soils (onshore)				
MM-CO01		**Contaminated soils** – *Contaminated soils (as identified within Zone 1 – the refinery) will be managed in accordance with:* • Environment Protection Act 2017 • ERS 2021 • PFAS National Environmental Management Plan 2.0 (2020) • EPA Victoria Publication: 1669.4: Interim Position Statement on PFAS (as amended or replaced from time to time) – *Stockpiles of trench spoil will be managed in accordance with APGA Code of Environmental Practice – Onshore Pipelines.* – *Excess soils and HDD screened cuttings for off-site disposal will be sampled and classified in accordance with:* • EPA Victoria Publication IWRG702: Soil Sampling (as amended or replaced from time to time)		Viva Energy's SEES MM supported.

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		• EPA Victoria Publication 1828.2: Waste Disposal Categories - Characteristics and Thresholds (as amended or replaced from time to time) – *Contaminated spoil for off-site treatment/disposal will be managed in accordance with:* • *Environment Protection Act 2017* and Environment Protection Regulations 2021 (as amended or replaced from time to time). – Any material imported for use as backfill will comply with the EPA Victoria Publication 1828.2 Waste Disposal Categories - Characteristics and Thresholds for 'Fill Material' (as amended or replaced from time to time) and the fill material determination. The backfill will be accompanied by relevant documentation confirming its compliance to the 'Fill Material' criteria.		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
MM-CO02		**Contaminated groundwater** – *Management strategies will be incorporated into the CEMP to manage contaminated groundwater in accordance with:* – Environment Protection Act 2017 – Environment Reference Standard 2021 – PFAS National Environmental Management Plan 2.0 (2020). – *A procedure which details the monitoring and management for any impact to the aquifer, human health and environment where groundwater is intercepted will be developed.* – *Management strategies to manage potential contaminated groundwater will be incorporated into the CEMP:* – Disturbance of saturated soil and groundwater within the PFAS affected areas will be minimised (refinery and in vicinity of GW05) and the migration of PFAS into the surrounding soil or surface water will be prevented. Disturbance may be minimised		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		by design of the infrastructure not to extend into the water table or to be bypassed by using HDD techniques. – Water from areas that have been identified as contaminated will not be discharged to the environment (land, waterways, sewer). – Where a wet trench installation approach is not undertaken contaminated water will be sampled and either treated onsite, depending on contaminant encountered (this may require approval from the EPA Victoria) or disposed offsite to an EPA Victoria licensed facility.		
MM-CO03	*EES IAC recommended the MM be applicable to the design phase of the project.*	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.
MM-CO04		**Unknown contamination** In the event that unknown contamination (including asbestos containing material) is encountered during construction:		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		– *Ground disturbance at the unknown contamination location and within the immediate vicinity will be ceased.* – *Site contamination will be assessed, and the appropriate remedial action will be identified.* – *The required remediation will be undertaken.* – *Such material may be identified by visual or olfactory observations, the presence of asbestos and/or other anthropogenic material.*		
MM-CO05		**Acid sulfate soils** Where acid sulfate soil has been identified, or is encountered during construction: – *Management strategies will be incorporated within the Construction Environmental Management Plan (CEMP) to manage potential ASS risk for a 'Medium' ASS hazard (CASS BPMG, 2010) in accordance with:* – Industrial Waste Management Policy (Waste Acid Sulfate Soils)		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		1999 (as amended or replaced from time to time) – EPA Victoria Publication IWRG655.1: Acid Sulfate Soil and Rock (as amended or replaced from time to time) – Victorian Best Practice Guidelines for Assessing and Managing Coastal Acid Sulfate Soils (CASS BPMG, 2010) – National Acid Sulfate Soils Guidance (series of documents) 2018. – *The CEMP must be approved by the Pipeline regulator in consultation with EPA Victoria.* – *Construction works will not occur during wet months unless conditions are such that land degradation and surface water management problems can be avoided, or appropriate mitigation measures implemented.* – *Relevant training will be provided to site-based personnel on the requirements of the ASS management procedure including the recommended time*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		period over which soils may be temporarily stockpiled before treatment commences as recommended by the CASS BPMG (2010). – *The duration of stockpiling will be minimised in accordance with the CASS BPMG (2010).* – *A procedure for managing the unexpected discovery of ASS/PASS will be included in the CEMP.* – *If ASSs are to be stockpiled for an extended time period (exceeding the CASS BPMG (2010) recommended short- term stockpiling durations), the potential generation of acidic leachate will be managed by treating the stockpile and or spreading a guard layer before stockpiling and/or covering the stockpile. The CEMP will include details for when or if the requirements for containment with bund and a leachate collection system is necessary.* – *Capture and manage run-off that has the potential to be impacted by stockpile material in*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		accordance with the CASS BPMG (2010). – *A procedure for management of abstracted groundwater including potentially acidic groundwater will be included in the CEMP.* – *Develop and implement a monitoring program as part of the CEMP in accordance with the CASS BPMG (2010) to measure the effectiveness of the management strategy and to provide an early warning of any environmental degradation or impact to surface water, groundwater and soils.* – *Include management procedure for trench dewatering that will limit PASS activation in accordance with the Victorian Best Practice Guidelines for Assessing and Managing Coastal Acid Sulfate Soils (CASS BPMG, 2010) and the National ASS Guidance 'Guidance for the dewatering of aid sulfate soils in shallow groundwater environments', in the CEMP.*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		– *A procedure for management of the impact of potentially acidic groundwater on underground infrastructure and the environment will be included in the CEMP.*		
MM-CO06		**Drilling mud disposal** Drilling muds will be disposed in accordance: – *The Environment Protection Act 2017 and the Environment Protection Regulations 2021 - Schedule 5 of the Regulations will be used to classify drilling mud for appropriate disposal. Requirements for disposal of drilling mud will be confirmed at the time of construction.* – *APGA Code of Environmental Practice – Onshore Pipelines.*		Viva Energy's SEES MM supported.
MM-CO07		**Hydrotest water** – *Hydrostatic test water will be managed in accordance with ERS 2021 (Water) and APGA Code of Environmental Practice – Onshore Pipelines.* – *Water will be reused where practicable to conserve water*		Viva Energy's SEES MM supported, noting references to legislation require update.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		and minimise the volume of water to be disposed of. – *If water is unable to be reused or recycled, hydrotest water will be treated and disposed within the existing refinery or disposed of in accordance with Environment Protection Regulations 2021.*		
MM-CO08		*Fuel and chemical leaks and spills* – *Bulk fuel will be stored (if required) in self-bunded tanks in accordance with relevant Australian standards (AS1940-2017 and AS1692-2006).* – *Refuelling or maintenance of equipment, machinery and vehicles will be conducted at least 20 metres or as far away as is reasonably practical from any waterway with appropriate measures to contain spills. For sensitive sites (i.e., wetlands), refuelling or maintenance of equipment will be conducted no closer than 50 metres.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		– *Hazardous materials will be stored in ventilated, self- bunded and secured containers in accordance with the Occupational Health and Safety Act 2004 (OHS Act) and Occupational Health and Safety Regulations 2007 (OHS Regulations).* – *Dangerous goods will be stored in accordance with the Dangerous Goods (Storage and Handling) Regulations 2012 and the code of practice for the storage and handling of dangerous goods.* – *Routine and scheduled maintenance of vehicles and plant/machinery/equipment will be undertaken to minimisethe potential for leaks/spills to occur.* – *Spill kits and firefighting equipment will be supplied with thechemicals required by legislation.* – *Dangerous goods and hazardous materials register will be maintained with current SDSs.*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		– *If a chemical leak or spill has occurred, the duty to respondto harm as per, Section 31 of the Environment Protection Act 2017, may be required.*		

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MM-CO09		**Waste management** – *Waste will be managed in accordance with Environment Protection Regulations 2021 and the APGA Code of Environmental Practice – Onshore Pipelines, including establishment of appropriate and secured waste storage locations on-site, as required.* – *Waste management procedures will be developed and implemented.* – *Waste materials will be reused or recycled where practicable.* – *Wastes will be collected and transported by licensed contractors for disposal at appropriately licensed facilities.* – *Waste containers will be provided for different types of waste generated onsite.* – *Refuse containers will be lidded to mitigate fauna access.*		Viva Energy's SEES MM supported.
Greenhouse gas				

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
MM-GG01	*EES IAC recommended the MM be applicable to the operation phase of the project.*	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.
MM-GG02		**Managing quality of materials** Materials that are low maintenance and durable will be selected to avoid unnecessary replacement. The quality of key materials (i.e., pipe and mooring infrastructure) will be inspected before supplying to site to avoid additional transport and handling of materials.		Viva Energy's SEES MM supported.
MM-GG03		**Source local plant and equipment** Locally sourced plant and equipment (i.e., within Victoria) will be considered and used where practicable to reduce emissions associated with transport. Sourcing local plant and equipment where practicable will be included in the selection criteria for tendering of works associated with plant and equipment.		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
MM-GG04		**Coordination of construction activities** Construction activities will be coordinated to reduce unnecessarily extending the construction period and to avoid inefficient use of equipment.		Viva Energy's SEES MM supported.
MM-GG05		**Sustainable procurement and resource management practices** Sustainable procurement and resource management practices will be adopted to avoid the inefficient use of materials, fossil fuels, and electricity. The proponent will refer to ISO 20400:2017 Sustainable procurement which provides guidance on integrating sustainability within procurement.		Viva Energy's SEES MM supported.
MM-GG06		**Local workforce** Local workforce will be engaged where possible. Interstate and international travel will be minimised and where appropriate replaced by virtual engagement. The proponent will complete a transport plan to detail how fuel		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		emissions from employee transport would be minimised.		
MM-GG07		**Plant and equipment fuel efficiency** Selection of plant and equipment will incorporate consideration of fuel efficiency to reduce the consumption of fossil fuels.		Viva Energy's SEES MM supported.
MM-GG08		**Waste – avoid, reduce, reuse** Design will reduce the total quantum of materials required through design refinement and incorporate reuse materials during construction and operation of the project. The proponent will develop a waste management plan that considers waste reduction, segregation of waste, and disposal of waste to ensure that waste is correctly separated and diverted from landfill where appropriate.		Viva Energy's SEES MM supported.
MM-GG09		**Implementation of Energy Management Systems** An energy management system will be implemented in accordance with the International Organisation for Standardisation (ISO) 50001 Energy Management Systems (ISO 50001)		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		for the operation of the FSRU. The ISO 50001 provides a framework for organisations to take a systematic approach to achieve continual improvement of energy performance and efficiency and reductions in greenhouse gas emissions. This framework is considered global best practice, and involves: – *developing energy use baselines* – *developing energy management plans* – *identifying performance indicators* – *setting targets for improvement*. Progress will be regularly monitored, reported, and reviewed. Greenhouse gas emissions reporting will include public reporting under the NGER scheme and Viva Energy's corporate Sustainability reporting. Implementation of this system will also involve external certification by ISO- accredited auditors (typically on a three year cycle) in which both compliance with the ISO standard and performance improvement will need to be demonstrated to maintain certification.		

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MM-GG10		**Emergency management procedures** Safety controls and emergency management practices will be put in place in the case of unplanned activities, incidents, and emergencies (i.e., unplanned maintenance or venting) to minimise the release of fugitive greenhouse gas emissions. Refer to MM-SHR07.		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
MM-GG11	**Certified carbon offsets** Scope 1, ~~and~~ 2 and 3 greenhouse gas emissions within the operational boundary of ~~emissions associated with~~ the project will be quantified and offset to compensate for emissions produced during construction ~~and annual emissions produced during~~ operation. Project emissions must first be avoided or minimised as far as reasonably practicable, with remaining, actual emissions offset annually as above. ~~Note that offsets will only be considered for project emissions after measures that aim to avoid or minimise emissions have been adopted.~~	Not adopted in full, noting exclusion of Scope 3: **Certified carbon offsets*** Scope 1 and 2 ~~and 3 greenhouse gas emissions within the operational boundary of~~ emissions associated with the project will be quantified and offset to compensate for emissions produced during construction and annual emissions produced during operation. Project emissions must first be avoided or minimised as far as reasonably practicable, with remaining, actual emissions offset annually as above. ~~Note that offsets will only be considered for project emissions after measures that aim to avoid or minimise emissions have been adopted.~~		EES IAC's MM supported. Viva Energy's SEES MM not supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
Groundwater				
MM-GW01		**Loss of registered bores** Through continued liaison with landholders the location of potentially affected bores (due to damage, destruction or loss of access) will be confirmed prior to construction and make-good arrangements agreed if required		Viva Energy's SEES MM supported.
Historic Heritage				
MM-HH01		**Onshore unexpected finds protocol** An onshore unexpected finds protocol will be adopted and implemented if an unknown historic heritage site, value or object is discovered onshore during construction. The protocol will be incorporated into the Construction Environmental Management Plan (CEMP). An archaeology induction will be given by a historical archaeologist to all staff and contractors involved in ground disturbance works prior to their commencement. This protocol will include measures to be implemented if an unexpected find		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		is encountered at any stage during construction.		
MM-HH02		**Offshore unexpected finds protocol** An offshore unexpected finds protocol will be adopted and implemented if an unknown historic heritage site, value or object is discovered offshore during construction. The protocol will be incorporated into the Construction Environmental Management Plan (CEMP). A maritime archaeology induction will be given by a maritime archaeologist to all staff and contractors involved in seabed disturbance works prior to their commencement. This protocol will include measures to be implemented if suspected maritime heritage material is encountered at any stage during construction.		Viva Energy's SEES MM supported.
Landscape and visual				
MM-LV01	**School Road screen planting** Large native Eucalyptus trees will be planted along the School Road boundary to screen the treatment facility from the road. Lower level	*EES IAC's MM adopted in full, with a further update.* **School Road screen planting**		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	understorey plantings of shrubs, groundcovers and grasses comprising primarily evergreen species will also be provided to ensure a layered screening effect on School Road. A copy of the landscape plan documenting the proposed screen planting must be reviewed by the relevant health and safety expert so as to assess potential gas safety impacts. The tree and shrub plantings should be indigenous species.	Large native Eucalyptus trees will be planted along the School Road boundary to screen the treatment facility from the road. Lower level understorey plantings of shrubs, groundcovers and grasses comprising primarily evergreen species will also be provided to ensure a layered screening effect on School Road. A copy of the landscape plan documenting the proposed screen planting must be reviewed by the relevant health and safety expert so as to assess potential gas safety impacts. The tree and shrub plantings should be indigenous species.		
MM-LV02	**Colour of FSRU** The FSRU must be in muted colours, to reduce its visual impact as far a reasonably practicable, provided this is acceptable from a marine safety perspective.	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
Light spill				
MM-LS01	*EES IAC recommended the MM be applicable to the design phase of the project.*	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.
MM-LS023	**National Light Pollution Guidelines for Wildlife Including marine turtles, seabirds and migratory shorebirds January 2020 Version 1.0** The National Light Pollution Guidelines for Wildlife describes best practice for wildlife sensitive lighting design. Lighting on the extension to Refinery Pier will be in accordance with the design principles outlined in the guidelines which would result in reduced material requirements and energy use, minimise potential impacts to light sensitive species and lead to a reduction in greenhouse gas emissions. A Lighting Report will be commissioned at the detailed design stage to demonstrate that lighting for the Project is consistent with the National Light Pollution Guidelines for Wildlife and AS 4282: 2019 Control of the	*EES IAC's MM adopted* in full, with a further update to a document reference. **National Light Pollution Guidelines for Wildlife Including marine turtles, seabirds and migratory shorebirds May 2023 Version 2.0** The National Light Pollution Guidelines for Wildlife describes best practice for wildlife sensitive lighting design. Lighting on the extension to Refinery Pier will be in accordance with the design principles outlined in the guidelines which would result in reduced material requirements and energy use, minimise potential impacts to light sensitive species and lead to a reduction in greenhouse gas emissions. A Lighting Report will be commissioned at the detailed design stage to demonstrate that lighting for the project is consistent with the National Light Pollution Guidelines		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	Obtrusive Effects of Outdoor Lighting.	for Wildlife and AS4282:2019 Control of the Obtrusive Effects of Outdoor Lighting.		
Marine ecology and water quality				
MM-ME01		**Reuse of discharge from the FSRU in the refinery** The reuse of discharge from the FSRU in the refinery for cooling water purposes will be maximised to ensure that: – *the volume of seawater withdrawn from Corio Bay is minimised as far as reasonably practicable* – *the seawater discharge volume to Corio Bay is minimised as far as reasonably practicable* – *the residual chlorine discharge to Corio Bay is minimised as far as reasonably practicable* – *there is a reduction in temperature plume from existing refinery discharge.*		Viva Energy's SEES MM supported.
MM-ME02	**Avoid dredging in ~~spring growth season~~ spring, summer and early autumn.**	*Not adopted:*		EES IAC's MM generally supported, as the intent of this MM to

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	The 8-week dredging program will avoid the spring, summer and early autumn seasons (September~~, October and November~~ to March). ~~as t~~This is the period of the year ~~where~~ when: – *there is a high growth of seagrass and phytoplankton ~~and~~,* – *key species of fish are in larval or juvenile stage* – *it is an important time for migratory birds and intertidal feeding.*	**Avoid dredging from ~~spring growth season~~ September to January (inclusive)** The 8-week dredging program will avoid the period from September to January ~~spring season~~ (i.e., September, October, November, December and January) as this is the period of the year where there is a high growth of seagrass and phytoplankton and key species of fish are in larval or juvenile stage.		also mitigate impacts to shorebirds and the Ramar site, as aligned with the MNES assessment (Appendix B).
MM-ME03	**Limit duration of overflow from barges** To limit the extent of the turbidity plume in Corio Bay during dredging, the overflow period for barges associated with a small or medium-size backhoe dredge will be limited to 20 minutes while the overflow period for barges associated with a large size backhoe dredge will be limited to 14 minutes. This will limit the sediment spill rate to below 9	Not adopted		EES IAC's MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	kg/sec and the extent of the turbidity plume. When conditions result in dredge plumes moving toward westward through to northwards (i.e. towards the seagrass beds and Ramsar site), there must be no overflow from barges.			
MM-ME04	**Install a silt curtain ~~between dredging and refinery intake and seagrass~~ enclosing the dredge.** A temporary silt curtain will be installed ~~between the dredging site and the existing refinery seawater intake and seagrass bed~~ enclosing the dredge to ~~minimise the number of days with~~ mitigate the dispersal of ~~elevated~~ suspended solids from dredging ~~concentration~~.	**Install a silt curtain ~~between dredging and refinery intake and seagrass enclosing the dredge~~** A temporary silt curtain will be installed ~~between the dredging site and the existing refinery seawater intake and seagrass bed to minimise the number of days with elevated suspended solids concentration enclosing the dredge to mitigate the dispersal of suspended solids from dredging~~ between the dredging site and the seagrass beds located along the Refinery shoreline to the north-northeast of the dredging site to mitigate the dispersal of suspended solids from dredging.		Viva Energy's SEES MM supported, as aligned with the SEES IAC finding.

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MM-ME05a		**Baseline turbidity and light attenuation monitoring** Baseline monitoring and surveys for TSS, turbidity and light attenuation will be individually derived and used to inform and refine threshold limits in MM-ME05 prior to dredging activities. *Turbidity and light attenuation monitoring at the edges of seagrass* Baseline turbidity (NTU) and light attenuation (PAR) monitoring will be conducted commencing 12 months prior to dredging. Turbidity will be continuously monitored at a minimum of three sites along the 3 m depth contour at the offshore boundary of the main seagrass beds proximate to dredging activity which may be affected by turbidity, including seagrass in the Ramsar site. Light attenuation monitors will be located at the same sites identified for turbidity monitoring. Loggers will be deployed at mid-depth along the 3 m depth contour (approx. 1.5 m). Water samples for TSS analysis will be collected monthly during the	**Baseline turbidity and light attenuation monitoring** Baseline monitoring and surveys for TSS, turbidity and light attenuation will be individually derived and used to inform and refine threshold limits in MM-ME05 prior to dredging activities. *Turbidity and light attenuation monitoring at the edges of seagrass* Baseline turbidity (NTU) and light attenuation (PAR) monitoring will be conducted commencing 12 months prior to dredging. Turbidity will be continuously monitored at a minimum of three sites along the 3 m depth contour at the offshore boundary of the main seagrass beds proximate to dredging activity which may be affected by turbidity, including seagrass in the Ramsar site. Light attenuation monitors will be located at the same sites	SEES IAC's MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		period of baseline monitoring at the turbidity and light attenuation monitoring locations.	identified for turbidity monitoring. Loggers will be deployed at mid-depth along the 3 m depth contour (approx. 1.5 m). Monitoring should be conducted in the same areas as the baseline monitoring of seagrass required by MM-ME06. Water samples for TSS analysis will be collected monthly during the period of baseline monitoring at the turbidity and light attenuation monitoring locations.	
MM-ME05	**Monitor turbidity and light attenuation during dredging, with threshold limits** Manage dredging program to minimise ecological risks associated with elevated turbidity as far as reasonably practicable. *Turbidity monitoring at edges of seagrass* Turbidity will be monitored during the dredging program continuously in north Corio Bay, with a minimum of three sites	Adopted, with further updates: **Monitor turbidity and light attenuation during dredging, with threshold limits** Manage dredging program to minimise ecological risks associated with elevated turbidity as far as reasonably practicable. *Turbidity monitoring at the edges of seagrass* Turbidity (NTU) will be monitored during the dredging program	**Monitor turbidity and light attenuation during dredging, with threshold limits** Manage dredging program to minimise ecological risks associated with elevated turbidity as far as reasonably practicable. *Turbidity monitoring at the edges of seagrass* Turbidity (NTU) will be monitored during the	SEES IAC's MM supported in principle, subject to incorporating a consultation requirement with EPA for particular, relevant monitoring values for threshold development.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	along the 3 m depth contour at the offshore boundary of the seagrass beds proximate to dredging activity which may be affected by turbidity, including seagrass in the Ramsar site. The following limits apply as thresholds for action to restrict turbidity releases: – *12-hour mean concentration above ~~15~~ 5 NTU (trigger warning)* – *24-hour mean concentration above ~~12~~ 5 NTU (action required)* ~~The above limits only apply insofar as turbidity is materially contributed to at the monitoring location by dredging activity (as compared with natural spikes in turbidity caused by storms, wave action and the like).~~ *Turbidity monitoring at disposal ground* Turbidity will be monitored continuously at two sites 600 m inshore of the Point Wilson dredged material ground (DMG) to confirm that there is not regular	continuously in north Corio Bay, with a minimum of three sites along the 3 m depth contour at the offshore boundary of the main seagrass beds proximate to dredging activity which may be affected by turbidity, including seagrass in the Ramsar site. Loggers will be deployed at mid-depth along the 3 m depth contour (approx.1.5 m). The following limits are proposed as thresholds for action to restrict turbidity releases: – *12-hour concentration above ~~5~~15 NTU (trigger warning)* – *24-hour concentration above ~~5~~12 NTU (action required)* The above limits only apply insofar as turbidity is materially contributed to at the monitoring location by dredging activity (as compared with natural spikes in turbidity caused by storms, wave action and the like). *Turbidity monitoring at disposal ground* Turbidity will be monitored continuously at two sites 600 m inshore of the Point Wilson dredged	dredging program continuously in north Corio Bay, with a minimum of three sites along the 3 m depth contour at the offshore boundary of the main seagrass beds proximate to dredging activity which may be affected by turbidity, including seagrass in the Ramsar site. Loggers will be deployed at mid-depth along the 3 m depth contour (approx.1.5 m). Monitoring should be conducted in the same areas as the monitoring of seagrass required by MM-ME06. ~~The following limits are proposed as thresholds for action torestrict turbidity releases:~~ – *12-hour concentration above 15 NTU (trigger warning)* – *24-hour concentration above 12 NTU (action required)*	

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	transport of turbidityfrom barge disposal into shallow water near Point Wilson. *Concurrent light attenuation monitoring* Light attenuation will be monitored at the same sites where turbidity is recorded. *Contingency measures - trigger actions* Where action is required to reduce turbidity these may include, without limitation, reducing the period of overflow from barges to zero, slowing the dredging cycle of the backhoe, changes to use of silt curtains and dredging during current flows favourable to reduced dispersion of sediment towards seagrasses. Such actions will continue until turbidity drops below the trigger warning level.	material ground (DMG) to confirm that there is not regular transport of turbidity from barge disposal into shallow water near Point Wilson. *Concurrent light attenuation monitoring* Light attenuation (PAR) will be monitored at the same six sites where turbidity is recorded. Loggers will be deployed at mid- depth along the 3 m depth contour (approx. 1.5 m). The following limits are proposed as thresholds for action to restrict turbidity releases: – *To be informed by baseline monitoring in MM-ME05a(trigger warning)* – *To be informed by baseline monitoring in MM-ME05a (action required).* The above limits only apply insofar as turbidity is materially contributed to at the monitoring location by dredging activity (as compared with natural spikes in turbidity caused by storms, wave action and the like).	~~The above limits only apply insofar as turbidity is materially contributed to at the monitoring location by dredging activity (as compared with natural spikes in turbidity caused by storms, waveaction and the like).~~ *Turbidity monitoring at disposal ground* Turbidity will be monitored continuously at two sites 600 m inshore of the Point Wilson dredged material ground (DMG) to confirm that there is not regular transport of turbidity from barge disposal into shallow water near Point Wilson. *Concurrent light attenuation monitoring* Light attenuation (PAR) will be monitored at the same six sites where turbidity is recorded. Loggers will be deployed at mid-depth along the 3 m depth contour (approx. 1.5 m).	

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		Contingency measures - trigger actions Where action is required to reduce turbidity these may include,without limitation. aActions that will ~~be taken will most likely involve~~ include the following: reducing the period of overflow from barges to zero, andslowing the dredging cycle of the backhoe review ~~changes to~~the use, location and effectiveness of silt curtains and adjust the silt curtains if needed; and dredging during current flows favourable to reduceddispersion of sediment towards seagrasses. Such actions will continue until turbidity drops below the trigger warning level.	*Turbidity thresholds* Turbidity thresholds (a 'trigger warning' threshold and an 'action required' threshold) are to be established to the satisfaction of the EPA prior to commencement of dredging. The thresholds are to be informed by baseline monitoring in MM-ME05a. ~~The following limits are proposed as thresholds for action to restrict turbidity releases:~~ – *To be informed by baseline monitoring in MM-ME05a(trigger warning)* – *To be informed by baseline monitoring in MM-ME05a (action required).* ~~The above limits only apply insofar as turbidity is materially contributed to at the monitoring location by dredging activity (as compared with natural~~	

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
			~~spikes in turbidity caused by storms, wave action and the like).~~ The ~~above limits~~ turbidity thresholds will only apply insofar as turbidity is materially contributed to at the monitoring location by dredging activity (as compared with natural spikes in turbidity caused by storms, wave action and the like). *Contingency measures* – ~~trigger~~ *action*~~s~~ *required* Where action is required to reduce turbidity these may include~~, without limitation actions that will include the following:~~ a. reducing the period of overflow from barges to zero, and slowing the dredging cycle of the backhoe review the use, location and effectiveness of silt curtains and adjust the silt curtains if needed; and	

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
			dredging during current flows favourable to reduced dispersion of sediment towards seagrasses. cessation of dredging. Such actions will continue until turbidity drops below the trigger warning level.	
MM-ME06	**Seagrass** and ~~s~~Seabed biota monitoring in dredged area and Point Wilson dredged material ground (DMG) Monitoring will be undertaken to assess the effects of dredging on: – *seagrass in the vicinity of the dredged area, including the Ramsar wetland and north-western Corio Bay* – *benthic fauna abundance, diversity and composition in the dredged area and thePoint Wilson DMG (to detect any significant changes to infauna communities in the dredged area and the recovery of the Point Wilson DMG)*	*EES IAC's MM adopted, apart from 'DMG' acronym.*	**Seagrass and seabed biota monitoring in dredged area and Point Wilson dredged material ground** Monitoring will be undertaken to assess the effects of dredging on: – *seagrass in the vicinity of the dredged area, including the Ramsar wetland and north-western Corio Bay. The monitoring sites in north-western Corio Bay should include the area within the 5 mg/L suspended solids increment contour on Figure 10 in the IAC Report No. 3 dated 12 March 2025, to assess*	SEES IAC's MM supported.

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	The monitoring of effects on seagrass will include surveys before, during and after dredging to assess impacts on seagrass. Consideration should be given to the use of monitoring indicators developed by the Western Australian Marine Science Institution (WAMSI). A minimum of t~~T~~wo baseline surveys will be made with a 3-month gap prior to dredging, and ~~four~~ eight post-commissioning surveys in the same locations every 3 months for 2 years of benthic fauna abundance, diversity and composition to detect any significant changes to infauna communities in the dredged area and the recovery of the Point Wilson DMG.		*any impacts on seagrass and confirm recovery if there are impacts.* – *benthic fauna abundance, diversity and composition in the dredged area and the Point Wilson DMG (to detect any significant changes to infauna communities in the dredged area and the recovery of the Point Wilson DMG).* The monitoring of effects on seagrass will include surveys before, during and after dredging to assess impacts on seagrass. The baseline surveys should be undertaken for a period of 12 months prior to dredging. Consideration should be given to the use of monitoring indicators developed by the Western Australian Marine Science Institution (WAMSI). Monitoring must include	

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
			intertidal and subtidal seagrass. ~~A minimum of two baseline surveys will be made with a 3 month gap prior to dredging, and e~~Eight post-commissioning surveys will be undertaken in the same locations every 3 months for 2 years of benthic fauna abundance, diversity and composition to detect any significant changes to infauna communities in the dredged area and the recovery of the Point Wilson DMG. Assess the implications of any impacts detected by the monitoring for the Corio Bay ecosystem.	
MM-ME07	**Monitoring of plankton during and after dredging** Plankton populations will be monitored at four sites in north Corio Bay (as used in the 2020-2021 plankton surveys) before, during and after the dredging period, at two weekly intervals. The	*EES IAC's MM adopted in full.*	**Monitoring of plankton before, during and after dredging** Plankton populations will be monitored at four sites in north Corio Bay (as used in the 2020-2021 plankton surveys) before, during and	SEES IAC's MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	purpose is to identify if there is a bloom of toxic phytoplankton as a result ofrelease of nitrogen or toxic algal spores during dredging. Data on relevant water quality parameters will be collected in conjunction with the biological monitoring to assist in the interpretation of results. The phytoplankton surveys will commence ~~4~~ 8 weeks before dredging and will continue for 8 weeks after dredging has been completed. The standard notifications to EPA and aquaculture will be made in the event that there is a bloom.		after the dredging period, at two weekly intervals. The purpose is to identify if there is a bloom of toxic phytoplankton as a result of release of nitrogen or toxic algal spores during dredging. Data on relevant water quality parameters will be collected in conjunction with the biological monitoring to assist in the interpretation of results. The phytoplankton surveys will commence 8 weeks before dredging and will continue for 8 weeks after dredging has been completed. The standard notifications to EPA and aquaculture will be made in the event that there is a bloom.	
MM-ME08	**Design seawater intake to minimise entrapment** The seawater intake will be designed to keep the intake velocity in the horizontal plane at	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	a speed below 0.15 m/s at the intake screen to minimise capture of small and large fish and other free-swimming biota and provide the same level of protection as the existing refinery intake. The intake will also be provided with a screen with apertures less than 100mm to prevent large objects and seagrass from being carried into the seawater cooling system. When the Refinery is not operating, the FSRU intake volume will be limited to minimise entrainment during late spring/early summer, so far as reasonably practicable.			
MM-ME09		**Locate seawater intake to minimise entrainment** To ensure that a very low percentage of fish larvae are entrained in spring and summer, the seawater intake on the FSRU will be located so that it is at least 2 m below the water surface (to avoid entraining biota from near the surface) and at least 2 m above the seabed (to avoid entraining biota from near the seabed).		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
MM-ME10		**Design diffuser to achieve high dilution** The diffuser for cool water discharge from the FSRU will be designed to achieve a minimum initial dilution of 20:1 to ensure that the chlorine concentration in the diluted discharge is minimised and a temperature change from ambient of less than 0.4°C.	**Design diffuser to achieve high dilution** The diffuser for cool water discharge from the FSRU will be designed to achieve a minimum initial dilution of 20:1 to ensure that the chlorine concentration in the diluted discharge is minimised and a temperature change from ambient of less than 0.4°C. The design of the diffuser should have regard to effects on the stability of the sea bed, and be designed to minimise risks of erosion.	SEES IAC's MM supported.
MM-ME11		**Design lighting to minimise adverse overspill** Best practice will be used in the design of the lights on the pier extension and will meet the requirements of AS 4282: 2019 Control of the Obtrusive Effects of Outdoor Lighting and the National		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		Light Pollution Guidelines for Wildlife May 2023 Version 2.0.		
MM-ME12		**Implement biosecurity measures on all vessels** There are well-established measures to control and minimise the introduction of marine pests in Corio Bay and all applicable measures will be implemented, including: – *Antifoul coating to prevent the encrusting of biota on the hull;* – *Vessels from certain ports will be cleaned before entry;* – *Manage ballast water in accordance with the Australian Ballast Water Management Requirements (DAWR, 2017);* – *Manage vessel activities in accordance with the National System for the Prevention and Management of Marine Pest Incursions.*	Recommended MM is applicable to the Construction phase of the project	SEES IAC's MM supported.
MM-ME13		**Manage cleaning and antifouling system on FSRU to avoid contamination** The anti-foul coating on the FSRU will be cleaned and maintained		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		periodically. There are established procedures to collect scrapings from the hull and prevent them from accumulating on the seabed. Only approved antifoul coatings will be used for maintenance.		
MM-ME14		**Continue to use and upgrade spill management procedures** Viva Energy and Ports Victoria have a well-established spill management plan. The existing plan will be updated as required and implemented. Where new and improved monitoring procedures are identified these will be implemented.	Recommend MM is applicable to the Construction phase of the project	SEES IAC's MM supported.
MM-ME15	**Use pilots, tugs and comply with vessel speed restrictions** All vessels will be under the control of experienced and qualified captains and pilots and will only be operated in the dredged channel or for smaller vessels, within the defined operation area. The dredge spoil transport barges and LNG carriers will adhere to Ports Victoria's vessel speed requirements to limit the risk of ~~whale~~ marine mammal (including	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported, subject to inclusion of turtles: "...the risk of marine mammal (including whale and dolphin) *and turtle* strikes."

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	whale and dolphin) strikes. All vessels and tugs will slow down or stop where necessary if notified of a whale sighting or if a whale is sighted. If a whale is known to be present in the shipping channels, transit will cease until the channel is clear.			
MM-ME16		**Minimise chlorine concentration at the discharge points** The seawater chlorination process at the FSRU and the refinery will be managed to minimise the concentration of chlorine in the seawater discharges, while also achieving the purpose of chlorination (which is to avoid internal biofouling).		Viva Energy's SEES MM supported.
MM-ME17a			**Baseline monitoring of wastewater discharges from the Refinery** Collect and record at least 12 months of baseline data on existing discharges from the Refinery prior to commencement of construction to assist the interpretation of the data collected under MM-ME19.	SEES IAC's MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
			The baseline data should include flow rate, temperature and residual chlorine concentration of all discharges from the Refinery, to be used as a baseline for comparisons with the data collected under MM-ME17 and MM-ME19, and to identify suitable thresholds.	
MM-ME17	*EES IAC recommended a minor editorial change.*	*EES IAC's MM not adopted.*		EES IAC's MM supported to address editorial issue.
MM-ME18		**Avoid backflow between FSRU transfer pipe and refinery inlet** To avoid backflow at the refinery seawater intake, the discharge of seawater from the FSRU to the refinery inlet via the seawater transfer pipe must not exceed the refinery's intake of cooling water. The design of the connection between the seawater transfer pipe and the refinery seawater inlet channel will avoid backflow.		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
MM-ME19	**Monitoring of the effects of wastewater discharges on the marine environment** Monitoring will be undertaken to determine the effects of wastewater discharges from the FSRU (whether via the Refinery or directly from the FSRU into Corio Bay) on marine biota and communities. The monitoring will include but not necessarily be limited to seagrasses, macroalgae and marine fauna (such as mussels and sea squirts). Temperature profiles and chlorine concentrations will be recorded at the ecological monitoring sites. The monitoring will map impacts on the ecosystem including seasonal variations, using the baseline monitoring of the impacts of existing discharges from the refinery undertaken pursuant to the recommendations of the Viva Geelong LNG Import Terminal Inquiry and Advisory Committee in Chapter 7.4 of its Report dated 5 October 2022.	**Monitoring of the effects of wastewater discharges on the marine environment** Monitoring will be undertaken to determine the effects of wastewater discharges from the FSRU (whether via the Refinery or directly from the FSRU into Corio Bay) on marine biota and communities. The monitoring will include but not necessarily be limited to seagrasses, macroalgae and marine fauna (such as mussels and sea squirts). Temperature profiles (and inferred chlorine concentrations) will be recorded at the ecological monitoring sites. The monitoring will map impacts on the ecosystem including seasonal variations, using the baseline monitoring of the impacts of existing discharges from the refinery (undertaken in the Supplementary Statement in accordance with the recommendations in Table 1 of the Minister's Directions) to identify suitable thresholds.	**Monitoring of the effects of wastewater discharges on the marine environment** Monitoring will be undertaken to determine the effects of wastewater discharges from the FSRU (whether via the Refinery or directly from the FSRU into Corio Bay) on marine biota and communities. The monitoring will include but not necessarily be limited to seagrasses, macroalgae and marine fauna (such as mussels and sea squirts). Temperature profiles (and inferred chlorine concentrations) will be recorded at the ecological monitoring sites. The monitoring program should be designed to be sufficiently sensitive to detect potential impacts on ecosystem components such as seagrass, should they occur.	SEES IAC's MM supported, Viva Energy to ensure the monitoring adequately considers relevant benthic habitats and communities, in line with the EES IAC recommendation.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
			The monitoring will map impacts on the ecosystem including seasonal variations~~,~~ ~~using the baseline~~ monitoring of the impacts of existing discharges from the refinery undertaken under MM-ME17a ~~(undertaken in the Supplementary Statement in accordance with the recommendations in Table 1 of the Minister's Directions) to identify suitable thresholds~~. Assess the implications of any impacts detected by the monitoring for the Corio Bay ecosystem.	
MM-ME20		**Minimise direct impacts to seagrass during installation of the seawater transfer pipe.** A seagrass survey of the seawater transfer pipe alignment will be undertaken prior to installation of the seawater transfer pipe. The seawater transfer pipe installation method will minimise the area of seagrass disturbed during		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		excavation as far as practicable and require excavated sediment to be replaced on top of the installed pipe as soon as possible following pipelay. Seagrass will be planted along the centreline of the seawater transfer pipe alignment to facilitate seagrass rehabilitation following the completion of construction. Transplantation of seagrass will be undertaken in accordance with the published Western Australian seagrass transplantation manual. (Transplanting Posidonia Seagrass in Temperate Western Australian Waters: A Practical 'How To' Guide, BMT Oceanica, July 2013). Detail on the seagrass rehabilitation program including but not limited to species to be planted, monitoring for success and actions if unsuccessful will be included in the CEMP.		
MM-ME21		**Monitoring the effects of entrainment by the FSRU on plankton** Monitoring will be undertaken to determine the effects of entrainment by the FSRU on plankton. Twelve months of monthly plankton	**Monitoring the effects of entrainment by the FSRU on plankton** Monitoring will be undertaken to determine the effects of entrainment by the FSRU on plankton.	SEES IAC's MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		monitoring will be conducted prior to, and following, commencement of operation of the FSRU. Plankton monitoring undertaken in the EES will also be used to identify suitable thresholds.	Twelve months of monthly plankton monitoring will be conducted prior to, and following, commencement of operation of the FSRU. Relevant water quality data should be collected alongside the plankton monitoring, including consideration of continuous chlorophyll (Chl a) fluorescence monitoring. Plankton monitoring undertaken in the EES will also be used to identify suitable thresholds.	
Noise and vibration				
MM-NV01	**Managing noise from construction activities** Construction noise and vibration will be managed consistent with Chapter 4 (Noise and vibration) of EPA Publication 1834 – Civil construction, building and demolition guide (November 2020) (as amended or replaced from time to time). This includes the development, prior to the start of	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	any construction works, of a documented constructionnoise and vibration management plan (CNVMP) to manage noise and vibration during construction in consultation with the relevant stakeholders including occupants of noisesensitive areas potentially affected by the construction activities The CNVMP must: – *be prepared based on a documented review of the construction activities considered, of the sensitive receivers at risk of noise exposure, and of the local topography of the sites;* – *demonstrate how construction noise and vibration (including from dredging) andtheir impact will be minimised so far as reasonably practicable, supported by evidence of iterative considerations of works practices, equipment selection and mitigation measures; include contingency measures to address, wherever relevant,*			

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	the risk of impact from noise that could not be sufficiently mitigated at – *source or during propagation; and* – *include a requirement for verifying, via inspections or audits, that all practices and actions to minimise impacts are well adhered-to and that continual improvement is effectively in place.* The CNVMP will include as a minimum the following: – *Avoid the generation of noise and vibration and adopt all mitigation measures to minimise the impact on sensitive receivers, so far as reasonably practicable.* – *All dredging activities to comply with MM-NV01a.* – *For construction activities other than dredging:* – Conduct construction only during EPA normal construction hours (i.e., *Monday to Friday 07:00 am to*			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	6:00 pm, and Saturday 07:00 am to 1:00 pm) unless the works are justified and approved to be low noise impactworks, managed impact works or unavoidable works, as required under MM-NV02. – Adherence with the mitigation and management requirements of Appendix C of the NSW Roads and Maritime Services Construction Noise and Vibration Guidelines for all unavoidable works and works carried outduring normal working hours. – When assessing construction noise, the risk of increased impacts due to intrusive characteristics such as tonality, impulse, intermittency or high energy in the low frequency range must be considered. This includes (but is not limited to) applying adjustments to measured or predicted construction noise levels for tonality, impulse and intermittency determined using the same procedures as those of Part I.B; 3.4 of EPA			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	Publication 1826.4 (Noise Protocol) (as amended or replaced from time to time). – Compliance with the noise requirements of Table 4.3 of EPA Publication1834 (as amended or replaced from time to time) for all low-impact andmanaged-impact works scheduled outside normal working hours. Noise criteria for weekend/evening work hours must be determined from background measurements that represent the background at the location and time of impact, in the absence of industrial, commercial andtrade noise, and are more stringent by 5 dB(A) where the construction programme exceeds 18-months. – Construction noise levels not to exceed an external noise level of 55dB(A) for educational buildings (with internal teaching spaces). While the actions to avoid or otherwise mitigate noise and			

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	vibration and their impacts must include, as a minimum, the measures in MM-NV06 and the following common practice techniques, the CNVMP should also consider alternative, quieter processes and equipment, wherever they are reasonably practicable. Common practice techniques ~~include~~ include (but are not limited to): – *Informing potentially noise-affected neighbours about the nature of construction stages and noise reduction measures.* – *Giving notice as early as possible for periods of noisier works such as excavation. Describing the activities and how long they are expected to take. Keeping affected neighbours informed of progress.* – *Appointing a principal contact person for community queries.* – *Providing 24-hour contact details through letters and site signage. Recording complaints*			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	and following a complaint response procedure suitable to the scale ofworks. – *Within normal working hours, wherever it is reasonably practicable to do so:* – scheduling noisy activities for less sensitive times, (for example, delay arock-breaking task to the later morning or afternoon) – providing periods of respite from noisier works (for example, periodicbreaks from jackhammer noise). – *Using the lowest-noise work practices and equipment that meet the requirementsof the job.* – *Maintaining equipment and vehicles according to manufacturer ~~instructions~~specifications* – *Locating site buildings, access roads and plant such that the minimum disturbanceoccurs to the locality.*			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	– *Limiting times of operation of noisy equipment, vehicles and operations to reducenoise and vibration impacts.* – *Installing broadband reversing alarms on construction vehicles and machinery in preference to 'beeper' reversing alarms. The site will also be planned to minimise the need for reversing of vehicles.* – *Turning off plant and vehicles when not being used.* – *Taking care not to drop spoil, ~~and~~ construction materials and construction equipment that causes peak noise events.* – *All mechanical plant is to be silenced by the best practical means using current technology.* – *Mechanical plant, including noise-suppression devices, will be maintained to the manufacturer's specifications. Internal combustion engines are to be fitted with asuitable muffler in good repair.*			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	– *Fit all pneumatic tools operated near a residential area with an effective silencer on their air exhaust port.* – *Testing of emergency equipment such as warning sirens will be scheduled during day-time hours wherever possible.* – *For works approved outside of normal working hours:* – Plan quieter unavoidable work activities outside normal working hours. – Adopt low-noise or managed impact works. Avoid high noise impactworks such as piling, concrete pours. – Schedule noisy unavoidable work when it is less likely to affect residents'sleep and for shorter periods, wherever possible. – *Schedule respite periods if unavoidable work is near residents. Consult with residents who may be most affected about restricting the number ofnights per week*			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	and/or per calendar month when works are being undertaken. – Stockpile material from unavoidable work activities that occur outside normal hours in, for example, an acoustic enclosure. Also restrict load-out to occur during normal working hours. – Train all workers regarding unavoidable work activities that occur outsidenormal working hours.			
MM-NV01a	**Managing and assessing dredging noise** Dredging noise ~~should~~ must be managed and assessed consistent with EPA Publication 691 (Guidelines for dredging) (as amended or replaced from time to time), assess noise from dredging activities as constituting noise from commercial, industrial and trade premises. A dredging noise management plan (DNMP) ~~should~~ will be prepared and implemented that	*EES IAC's MM adopted in full, with further updates:* **Managing and assessing dredging noise** Dredging noise must be managed and assessed consistent with EPA Publication 691 (Guidelines for dredging) (as amended or replaced from time to time), assess noise from dredging activities as constituting noise from commercial, industrial and trade premises. A dredging noise management plan (DNMP) will be prepared and		Viva Energy's SEES MM supported, as aligned with the SEES IAC acceptance of changes.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	will inform how actions will be taken to: – *manage emissions of noise and vibration and minimise their impacts, so far as reasonably practicable, and* – *prevent the emission of unreasonable noise (as defined In the Environment Protection Act 2017) by:* • maintaining dredging noise levels within the Project Noise Criteriadetermined in MM-NV05, to ensure the noise limits set in Part 5.3, Division 3 of the Environment Protection Regulations 2021 are not exceeded; and • having regard to the factors in part (a) of the definition of unreasonablenoise; and • managing low frequency noise, in accordance with EPA Publication 1996(Noise guidelines: assessing low frequency noise) (as amended or replaced from time to time).	implemented that will inform how actions will betaken to: – *manage emissions of noise and vibration and minimise their impacts, so far as reasonably practicable, and* – *prevent the emission of unreasonable noise (as defined In the Environment Protection Act 2017) by:* • maintaining dredging noise levels ~~within the Project Noise Criteria determined in MM-NV-05 to ensure~~ to no higher than the noise limits set in Part 5.3, Division 3 ofthe Environment Protection Regulations 2021~~ are not exceeded~~; and • having regard to the risk of cumulative noise with other commercial, industrial and trade premises • having regard to the factors in part (a) of the definition of unreasonable noise; and • managing low frequency noise, in accordance with EPA Publication 1996 (Noise guidelines: assessing low		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		frequency noise) (as amended or replaced from time to time). The DNMP must include: – *a schedule for dredging noise measurements that ensure that they are conducted either continuously throughout the dredging period, or at justified key milestones where the dredging activities represent the worst case of exposure to dredging noise within noise sensitive areas* – *the selection and justification of alternative assessment locations that may be required to measure dredging noisethat is not influenced by noise from the refinery or from other commercial, industrial or trade premises the calculation and justification of alternative assessment criteria set so that compliance with these noise levels at alternative assessment locations will ensure that dredgingnoise does not contribute to a cumulative exceedance of the noise limits within noise sensitive areas*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		– *the procedures and the equipment requirements that must be followed to conduct the measurements and assessments in accordance with the Noise Protocol and theEPA Publication 1997 (Technical guide: Measuring and analysing industry noise and music noise) (as amended or replaced from time to time).*		
MM-NV02	**Out-of-hours construction** – *The CNVMP ~~should~~ will include a framework for justification and approval of out- of-hours works that are planned to be undertaken, established in consultation with the relevant stakeholders including occupants of noise sensitive areas potentially affected by out of hours construction activities.* – *This framework should include a clear rationale for both unavoidable works and managed impact works, and response strategies with mitigation measures to reduce noise and vibration and their impacts, so far as reasonably*	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	practicable, consistent with EPA publications 1834 (Civil construction, building and demolition guide) and 1820.1 (Construction – Guide to preventing harm to people and the environment) (as amended or replaced from time to time). – *Assessment and approval of out-of-hours works must be conducted by an Independent Environmental Auditor, or by someone who has no prior involvement inplanning or delivery of the Project and Is able to make decisions free from influenceor pressure related to the delivery of the project.* *In respect of unavoidable works* – the necessity for such works to be carried out outside of normal working hours must be assessed and documented by an independent person with skills and expertise in risk/safety assessments; – the mitigation measures to reduce noise and vibration			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	must be assessedand documented by ~~a~~ an independent person with skills and expertise innoise and vibration control. *In respect of managed impact works* – the net benefit in terms of the project's environmental impacts, of conducting managed impact works out-of-hours must be assessed and documented by an Independent Environmental Auditor; – a person with skills and expertise in noise and vibration control must assess that managed-impact works are consistent with the definition from EPA – publication 1834 (as amended or replaced from time to time), includingthat a) the noise does not have intrusive characteristics such as impulsiveness, tonality,			

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	intermittency or high energy in the low frequency range; and b) the risk of impacts is addressed adequately by limiting the emergence of construction noise levels LAeq above the background noise level LA90 at the time of noise impact. – *Unavoidable works ~~should~~ will be assessed for approval by a person with skills and expertise in risk/safety assessment such as a Health Safety and Environment (HSE) specialist, who has no prior involvement in either planning or delivery of the Project and who can make decisions free from influence or pressure related to the delivery of the Project. This Includes:* – Appointing a suitably qualified HSE representative to manage and approve unavoidable night work (10:00 pm to 7:00			

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	am) applications by the Independent Environmental Auditor ~~IEA.~~ – Appointing a suitably qualified Independent Environmental Auditor to review and approve the implementation of noise and vibration mitigation and management during unavoidable night work (10:00 pm to 7:00 am) applications. *Justification of managed impact works is to include* – an assessment that conducting these works out-of-hours will have a net benefit in terms on environmental impacts of the project, and – appointing a suitably qualified Independent Environmental Auditor to review and approve the implementation of and vibration mitigation and management during managed-impact works. – *Noise requirements for managed-impact works must be consistent with the definition of managed-impact*			

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	works from of EPA publication 1834 (as amended or replaced from time to time), and including that – the noise does not have intrusive characteristics such as impulsiveness, tonality, intermittency or high energy in the low frequency range; and – address adequately the risk of impacts by limiting the emergence of construction noise levels LAeq above the background noise level LA90 at the time of noise impact. *Common construction noise mitigation measures for out-of-hours works* Where the construction works are justified and approved to occur outside of EPA normalworking hours, mitigation measures will be implemented to minimise the impact on receivers, so far as reasonably practicable, including (but not limited to) the measures in MM-NV06 and the following onsite mitigation measures:			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	– *Limiting works in proximity to receivers to the arrival of staff on site and toolbox meetings between 6 am and 7 am. The use of plant equipment, generation of unnecessary noise and the movement of vehicles on the construction footprint will be avoided.* – *Providing respite periods by restricting the hours that very noisy activities can occur.* – *On Sundays, works at Lascelles Wharf will be limited to low noise impact works, as defined in EPA Publication 1834 (as amended or replaced from time to time).* – *Adopting engineering noise controls at the source (e.g., silencer, mufflers, enclosures) by the best practical means using current technology – r~~R~~eduction istypically in the range of 10 to 15 dB.* – Installing onsite barriers such as hoardings or temporary enclosures to provide anoise barrier between any particularly noisy construction			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	works and ~~the~~ residences - ~~R~~reduction is typically in the range of 5 to 10 dB.			
MM-NV03	Minor editorial update	**Vibration safe working distances** Additional management measures will be undertaken where occupancies, structures and assets are within the safe working distances derived using the values in the following standards: – *British Standard BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting – Table 1 Vibration dose value ranges which might result in various probabilities of adverse comment within residential buildings* – *German Standard DIN4150-3:2016-12: Table 1 – Guideline values for vibration velocity for evaluating the effects of short-term vibration on structures* – *German Standard DIN4150-3:2016-12: Table 3 – Guideline values for vibration velocity for evaluating the effects of short-*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		term vibration on buried pipework – *An asset owner's utility standards.*		
MM-NV04	**Construction noise and vibration monitoring** Noise and vibration monitoring will be undertaken during construction at: – *The nearest noise sensitive residential property or properties impacted by out-of-hours works to confirm the effective implementation of noise mitigation measures, per their design, and verify that levels set as criteria In the CNVMP are not exceeded.* – *The nearest building or assets that are within derived set back distances for human response or in response to a complaint* – *Where an asset owner's utility standards are at risk of being exceeded.*	*EES IAC's MM adopted in full, with some additional updates in response to the SEES hearing outcomes:* **Construction noise and vibration monitoring** Noise and vibration monitoring will be undertaken during construction at: – *The nearest noise sensitive residential property or properties impacted by out-of-hours works to confirm the effective implementation of noise mitigation measures, per their design, and verify that levels set as criteria in the CNVMP are not exceeded.* – *The nearest building or assets that are within derived set back distances for human response or in response to a complaint* – *Where an asset owner's utility standards are at risk of being exceeded.*		Viva Energy's SEES MM supported, as aligned with the SEES IAC acceptance of changes.

Frequency and duration:

- *Attended measurements will be undertaken at the earliest stage (within the first*
- *24 hours) for each construction activity identified to impact sensitive receiver locations during out of hours works.*
- *The measurement duration will be adequate to represent a typical 15-minute period for the applicable evening or night period.*
- *Continuous monitoring will be undertaken for any works scheduled outside of normal working hours (including unavoidable works) ~~modelled or~~ previously measured to be within 3dB or exceeding the low-impact and managed-impact noise levels.*
- *For onshore pipeline construction, where the noise sources will be transient, measurements will be required for works at representative sensitive receivers where noise has been identified as a risk. Where noise levels modelled or measured at Geelong*

Frequency and duration:

- *Attended measurements will be undertaken at the earliest stage (within the first 24 hours) for each construction activity identified to impact sensitive receiver locations during out of hours works.*
- *The measurement duration will be adequate to represent a typical 15-minute period for the applicable evening or night period.*
- *Continuous monitoring will be undertaken for any works scheduled outside of normal working hours (including unavoidable works) ~~modelled or~~ previously measured to be within 3dB or exceeding the low-impact and managed- impact noise levels.*
- *For onshore pipeline construction, where the noise sources will be transient, measurements will be required for works at representative sensitive receivers where noise has been identified as a risk. Where noise levels modelled or measured at Geelong Grammar School or at other sensitive*

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	Grammar School~~GS~~ or at other sensitive receivers, exceed the levels set in the CNVMP (as required in MM-NV01 and MM-NV02) these works will not be carried out other than during normal working hours, unless mitigation measures are applied to meet the requirements of MM-NV01 and MM-NV02. – *Measurements shall be undertaken at the commencement of dredging and during meteorological conditions suitable to favourable noise propagation at Geelong Grammar School ~~or~~ and other sensitive receivers. Where assessments conducted in accordance with EPA Publication 1826.4 (Noise Protocol) (as amended or replaced from time to time) indicate cumulative noise impacts (including the contributions from dredging, from the Viva Refinery and from other commercial, Industrial or trade premises) will exceed the night period*	*receivers, exceed the levels set in the CNVMP (as required in MM-NV01 and MM-NV02) these works will not be carried out other than during normal working hours, unless mitigation measures are applied to meet the requirements of MM-NV01 and MM-NV02.* – *Measurements shall be undertaken in accordance with the DNMP prepared under MM-NV01 and at the commencement of dredging and during meteorological conditions suitable to favourable noise propagation at Geelong Grammar School ~~or~~ and other sensitive receivers. Where assessments conducted in accordance with EPA Publication 1826.4 (Noise Protocol) (as amended or replaced from time to time) indicate cumulative noise impacts (including the contributions from dredging, and from other commercial, industrial or trade premises) will exceed the day, evening or night period noise limits determined in accordance with the Noise Protocol, dredging operations*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	noise limits determined in accordance with the Noise Protocol, dredging operations shall cease between the hours of 10pm and 7am until the night period limits are met. – *Measurements will be undertaken in response to any community complaints, where noise emissions need to be verified to resolve the issue i.e., where the activity cannot simply be stopped or mitigated to avoid the risk due to noise.* A response plan will be developed to manage potential impacts if construction noise ~~requirements~~ criteria are not met, including: – *Actions taken to rectify exceedance of nominated criteria e.g., stop works until noise monitoring confirms the exceedance is resolved or implement mitigation measures to manage impacts.* – *Actions to minimise risk of reoccurrence e.g., provide*	*shall ~~cease between the hours of 10pm and 7am until compliance is achieved. the night~~ during those periods until the relevant period limits are met.* – *Measurements will be undertaken in response to any community complaints, where noise emissions need to be verified to resolve the issue i.e., where the activity cannot simply be stopped or mitigated to avoid the risk due to noise.* A response plan will be developed to manage potential impacts if construction noise ~~requirements~~ criteria are not met, including: – *Actions taken to rectify exceedance of nominated criteria e.g., stop works until noise monitoring confirms the exceedance is resolved or implement mitigation measures to manage impacts.* – *Actions to minimise risk of reoccurrence e.g., provide mitigation measures or alternative methods.*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	mitigation measures or alternative methods. – *Name of person(s) responsible for undertaking the required actions.*	– *Name of person(s) responsible for undertaking the required actions.*		
MM-NV05	**Establishing and implementing operational noise controls** An operational noise management framework will be prepared that will inform, through allstages of the project, including design, equipment selection, construction, and installation,and operation, how actions will be taken to: – *manage emissions of noise and vibration and minimise their impacts, so far as reasonably practicable, and* – *prevent the cumulative emission of unreasonable noise (as defined In the Environment Protection Act 2017), by* – *not exceeding the noise limits set In Part 5.3, Division 3 of the Environment Protection Regulations*	*EES IAC's MM adopted in full, with some additional updates in response to the SEES IAC hearing outcomes.* **Establishing and implementing operational noise controls** An operational noise management framework will be prepared that will inform, through all stages of the project, including design, equipment selection, construction, and installation, and operation, how actions will be taken to: – *manage emissions of noise and vibration and minimise their impacts, so far as reasonably practicable, and* – *prevent the contribution of the project to cause cumulative emission of unreasonable noise (as defined In the Environment Protection Act 2017), by*		Viva Energy's SEES MM supported, subject to amending the MM to refer to the project noise criteria presented in Figure 11 of the SEES IAC report.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	2021 taking into consideration cumulative noise impacts from existing and approved industrial, commercial and trade premises; and – *having regard to the factors in part (a) of the definition of unreasonable noise; and* – *managing low frequency noise, in accordance with the Noise guidelines: assessing low frequency noise (EPA Publication 1996) (as amended or replaced from time to time).* Regulatory noise limits, pre-existing industry noise and Project Noise Criteria To inform the design, construction and operation of the project: – *Background noise levels shall be measured and verified*	– ~~*not exceeding the noise limits set In*~~*maintaining the contribution of the project ~~to the cumulative effective noise levels within~~ at noise sensitive areas within Project Noise Criteria set such that the Project does not contribute to a cumulative exceedance ~~noise achieves compliance with~~ of the noise limits of Part 5.3, Division 3 of the Environment Protection Regulations 2021~~; and~~* – *having regard to the factors in part (a) of the definition of unreasonable noise; and* – *managing low frequency noise including cumulative low frequency noise, in accordance with the Noise guidelines: assessing low frequency noise (EPA Publication 1996) (as amended or*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	without the inclusion of noise from Viva Refinery and from other commercial, Industrial and trade premises, with noise limits of Part 5.3, Division 3 of the Environment Protection Regulations 2021 established accordingly. – *Further assessment of the pre-existing noise from commercial, industrial and trade premises (from the Viva Refinery and from other commercial, industrial and trade premises) shall be carried out based on measurements taken over a period of at least 1-week to determine existing LAeq,30-min noise impacts and the likely cumulative noise impacts at Geelong Grammar School and at other noise sensitive areas. If background noise cannot be measured without impacts from the Viva Refinery, it will be measured during a period of plant shut down.* – *Establish and justify, supported by documented*	*replaced from time to time).* ~~Regulatory noise limits, pre-existing industry noise and ProjectNoise Criteria~~ ~~To inform the design, construction and operation of the project:~~ – *Background noise levels shall be measured and verified without the inclusion of noise from Viva Refinery and from other commercial, Industrial and trade premises, with noise limits of Part 5.3, Division 3 of the Environment Protection Regulations 2021 established accordingly.* – *Further assessment of the pre-existing noise from commercial, industrial and trade premises (from the Viva Refinery and from other commercial, industrial and trade premises) shall be carried out based on measurements taken over a period of at least 1-week to determine existing LAeq,30-min noise impacts and the likely cumulative noise impacts at Geelong Grammar School and at other noise sensitive areas. If background*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	evidence, Project Noise Criteria to ensure that the noise from the Project, when combined with the pre-existing and approved noise from commercial, industrial and trade premises will not lead to an exceedance of the regulatory noise limits. Plant design and selection – *Ensure, via iterative reviews, that all reasonably practicable opportunities to reduce the emission of operational noise have been considered across the design, construction and operation of the project.* – *Engage a suitably qualified acoustic consultant to review detailed plant designs and noise emission data for plant and vessels, and provide noise mitigation advice.* – *Operational plant selection process must ensure that manufacturers' data or noise measurement data to be verified for all operational*	*noise cannot be measured without impacts from the Viva Refinery, it will be measured during a period of plant shut down.* – *Establish and justify, supported by documented evidence, Project Noise Criteria to ensure that the noise from the Project, when combined with the pre-existing and approved noise from commercial, industrial and trade premises will not lead to an exceedance of the regulatory noise limits.* *Plant design and selection*, mitigation and contingency measures – *Ensure, via iterative reviews, that all reasonably practicable opportunities to reduce the emission of operational noise have been considered across the design, construction and operation of the project.* – *Engage a suitably qualified acoustic consultant to review detailed plant designs and noise emission data for plant and*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	equipment to ensure that tonality is not present. – *Low frequency noise emissions from operational plants, including (but not limited to) the following items, which must be assessed and managed in accordance with EPA Publication 1996 (as amended or replaced from time to time):* a) LNG carriers b) FSRU vessels c) Tugboat exhausts d) Regasification boilers. Operational management plan – *Noise from the Project will be managed in accordance with the Environment Protection Regulations 2021, EPA Publication 1826 (as amended or replaced from time to time) and the General Environmental Duty, including cumulative noise impacts from any other industrial, commercial or trade premises.*	*vessels, and provide noise mitigation advice.* – *Operational plant selection process must ensure that manufacturers' data or noise measurement data to be verified for all operational equipment to ensure that tonality is not present.* – *Low frequency noise emissions from operational plants, including (but not limited to) from the following items, which must be assessed and managed in accordance with EPA Publication1996 (as amended or replaced from time to time):* a) LNG carriers b) FSRU vessels c) Tugboat exhausts d) Regasification boilers *Operational management plan* – *Noise from the Project will be managed in accordance withthe Environment Protection Regulations 2021, EPA Publication 1826 (as amended or replaced from time to time) and the*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	– *Prepare an operational management plan, supported by documented evidence that details the approach that will be taken to meet the Project Noise Criteria. Thisplan ~~should Include~~will include:* • how the noise from LNG carriers will be taken Iinto account andmanaged: • details of equipment selections and mitigation measures adopted; and • scheduling to ensure all activities minimise noise emissions. For example, during the night period, limit the number of activities operating concurrently. – *Review and update the operational management plan wherever necessary and relevant, including on the basis of any noise monitoring carried out to assess noiseemissions from the Project, cumulative noise impacts or adverse noise character identified.*	*General Environmental Duty, including cumulative noise impacts from any other industry.* – *Prepare an operational management plan, supported by documented evidence that details the approach that will be taken to meet the Project Noise Criteria. This plan ~~should~~ will include:* • how the noise from LNG carriers will be taken into account and managed: • details of equipment selection~~s~~ and mitigation measuresadopted; ~~and~~ • scheduling to ensure all activities minimise noise emissions. For example, during the night period, limit the number of activities operating concurrently; ~~and~~ • how weather forecasts and weather conditions will be monitored and trigger the implementation of contingency measures; and • what protocols will be implemented to cease particular works or shutdown		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	– *Additional cumulative impact management strategies will be developed inconsultation with the relevant stakeholders.* Operational noise monitoring Operational noise monitoring will be undertaken to confirm operational noise levels andverify cumulative noise impacts. – *Within the first 3 months of operation, conduct long-term noise monitoring (overa minimum of 1 month) in accordance with the Noise Protocol and the provisionsof EPA Publication 1997 (as amended or replaced from time to time), to verify that the Project Noise Criteria and/or regulatory noise limits are not exceeded at Geelong Grammar School and other noise sensitive areas. The measurements shall be undertaken for all operating scenarios* – *Where operational compliance relies on the ongoing scheduling or managedhours of sources, permanent real-*	plant when excessive noise is reported or forecast. – *As part of the operational management plan, prepare an operational noise monitoring plan that is developed in consultation with relevant stakeholders including Geelong Grammar School and EPA. The operational noise monitoring plan will include:* • the process for noise monitoring and reporting during the first three months of operation to assess compliancewith the Project Noise Criteria; • the locations to be used for permanent real-time noise monitoring; • the process for establishing and validating alternative assessment criteria at the real-time noise monitoring locations with reference to EPA Victoria Publication 1997, including how an automatic alert and forecasting system will function; • the equipment to be used for noise monitoring and any		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	time noise monitoring shall be installed andcarried out at any impacted receptors identified during the monitoring undertaken within the first 3 months of operation. Real-time monitoring data shall be made available to those relevant stakeholders. – *Measurements will also be undertaken as part of the Environmental Management Plan in response to any community complaints.* – *Operational noise monitoring will inform ongoing updates to the operationalmanagement plan including potential scheduling of activities and mitigationmeasures if required.* – *Wherever the noise emissions from the Project are measured to exceed the Project Noise Criteria, or the cumulative Industry noise is measured to exceed theregulatory noise limits, additional attenuation and/or management controls shallbe implemented and*	additional sensors to be used such as weather stations, or directional microphone technology to isolate Project noise; • the noise data, metrics and intervals to be collected and reported; and • the process for making data available to key stakeholders on a website maintained by Viva Energy. • Review and update the operational management plan wherever necessary and relevant, including on the basis of any noise monitoring carried out to assess noise emissions from the Project, cumulative noise impacts or adverse noise character identified. • Additional cumulative impact management strategies will be developed in consultation with the relevant stakeholders. *Operational noise monitoring* Operational noise monitoring will be undertaken in accordance with the operational noise management plan to confirm operational noise levels		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	measurements repeated until compliance is demonstrated. – *Further noise monitoring should be conducted at least every 6 months to verifythe effectiveness of the attenuation and/or management controls to prevent exceedances of the Project Noise Criteria and the regulatory noise limits.* – *Where management and scheduling for the operational activities is changed, the risk of exceedance of the Project Noise Criteria and the regulatory limits must be assessed, and wherever relevant further noise monitoring must also be conducted to verify compliance.*	and verify cumulative noise impacts. At a minimum, noise monitoring will include: – *Within the first 3 months of operation, conduct long-term noise monitoring (over a minimum of 1 month) in accordance with the Noise Protocol and the provisions of EPA Publication 1997 (as amended or replaced from time to time), to verify that the Project Noise Criteria and/or regulatory noise limits are not exceeded at Geelong Grammar School and other noise sensitive areas. This process shall also validate alternative assessment criteria for any permanent real-time monitoring locations. The measurements shall be undertaken for all operating scenarios ~~anticipated to occur for more than 40 hours per year to verify the noise emissions~~ that can practically be assessed within the first 3 months of operation. For scenarios that are justified to not being able to be assessedwithin the first 3 months of operation, specific*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		commissioning measurements must be planned and conducted as soon as practicable. – ~~*Where operational compliance relies on the ongoing scheduling or managed hours of sources,*~~ ~~*p*~~*Permanent real-time noise monitoring shall be installed and carried out at locations representative of any impacted receptors, identified during the monitoring undertaken within the first 3months of operation and/or during specific commissioning measurements, that require ongoing scheduling of noise sources in order for noise to be below the Project Noise Criteria. Real-time monitoring data and audio on event shall be made available to those relevant stakeholders, with aminimum history of 30-days of records maintained and available.* – *Measurements ~~will also be~~ undertaken as part of the Environmental Management Plan in response to ~~any~~ any community complaints ~~relating to noise where no current and relevant noise monitoring data~~*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		~~*exists*~~ *unless it is justified that the cause of the complaint can be addressed without measurement, for example if current relevant noisemonitoring data exists.* – *Operational noise monitoring will inform ongoing updates tothe operational management plan including potential scheduling of activities and mitigation measures if required.* – *Wherever the noise emissions from the Project are measured to exceed the Project Noise Criteria, or the cumulative Industry noise is measured to exceed the regulatory noise limits as a result of the Project, additional attenuation and/or management controls shall be implemented and measurements repeated until complianceis demonstrated.* – ~~*Further noise m*~~*Monitoring* ~~*should be*~~ *conducted to verifythe effectiveness of the attenuation and/or managementcontrols to prevent exceedances of the Project Noise Criteria and the regulatory noise limits.*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		– *Where management and scheduling for the operational activities is changed, the risk of exceedance of the Project Noise Criteria and the regulatory limits must be assessed, and wherever relevant further noise monitoring should alsobe conducted to verify compliance.*		
MM-NV06	**Construction noise mitigation measures – normal working hours** During normal working hours, mitigation measures must include, as a minimum: – *A noise barrier will be installed ~~to~~ along the site boundary of the horizontal directional drilling~~HDD~~ site compounds at a minimum height of 2.4 m provided that modelling has confirmed this height to be sufficient to reduce constructionnoise impacts by at least 10dB~~.~~. The noise barrier may include~~For example, the use of~~ shipping containers or alternative solid acoustic screen to reduce*	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	noise emissions at the closest noise sensitive receivers. – *Installation of enclosures or localised noise barriers around the construction equipment to provide a noise barrier between any particularly noisy constructionworks and the closest noise sensitive receivers.* – *Stationary equipment such as generators and pumps will be stored withinshipping containers or suitable acoustic enclosures.* – *Where the construction works would occur for a numberof consecutive days, consult with the affected residences and offer alternative accommodation or onsite noise mitigation measures for people that may require to work or studyfrom home.* *Construction noise mitigation measures - outside of normal working hours* Where the construction works are justified and approved to occur			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	outside of EPA normalworking hours, all reasonably practicable mitigation measures will be implemented to minimise the impact on receivers as per MM-NV01 and MM-NV02, including the followingadditional onsite mitigation measures where~~ver~~ relevant: – *When works are linear, schedule works to avoid the closest noise sensitive receiver locations during out of normal hours or avoid works during this period(e.g., avoid works on Saturday afternoons 1pm to 6pm at Geelong Grammar School and Macgregor Court, Lara).* – *Schedule noisy unavoidable work when it is less likely to affect residents' amenity(e.g., avoid weekends) and for shorter periods, wherever possible.* – *Where the construction works ~~would~~ will occur for a number of consecutive days,consult with the affected resident~~ce~~s and offer alternative*			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	accommodation or onsite noise mitigation measures for people who are ~~that may require to~~ working or studying from home.			
MM-NV07	**Unavoidable works, Horizontal Directional Drilling – noise control** Horizontal Directional Drilling (HDD) may be conducted outside of hours if approved as unavoidable works, in accordance with MM-NV02. Onsite mitigation to reduce the noise from HDD, and mitigate its impacts, so far as reasonably practicable will require the implementation of work practices, equipment selection and noise and vibration mitigation measures consistent with the process set out in MM-NV01. Actions to reduce noise from the HDD entry and exit sites are to include, as a minimum, the following: – *A noise barrier will be installed to provide an envelope between the compound and the site boundary at a*	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	minimum height of 2.4 m provided that modelling has confirmed this height to be sufficient to reduce construction noise impacts by at least 10dB. – *Any access gates will be solid and generally kept closed, especially at night.* – *Installation of enclosures or localised noise barriers around the HDD construction equipment to provide a noise barrier between any particularly noisy construction works and the residences.* – *Provide respite periods by restricting the hours that the very noisy activities can occur.* – *Stationary equipment such as bentonite treatment, generators and pumps will be stored within shipping containers or suitable acoustic enclosures.* – *Where the construction works will occur for a number of consecutive days, and particularly during the night*			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	period, consult with the affected residentsees and offer alternative accommodation or onsite noise mitigation measures for people who are that may require to working or studying from home. The impacts and the design of site-specific mitigation will be determined prior to construction, and confirmed during construction via onsite monitoring.			
MM-NV08	*EES IAC recommended a minor editorial change.*	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.
Safety, hazard and risk				
MM-SHR01		**FSRU safety standards** The Floating Storage and Regasification Unit (FSRU) will be designed, constructed and operated to meet relevant safety standards. The FSRU will be designed, operated and maintainedunder the purview of DNV GL (or equivalent classification agency). It will comply with the Rules for Classification as required to retain its Class Notation. This will		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		include requirements for inspection, maintenance and functionality of all on-board safety systems.		
MM-SHR02		**Pipeline design and standards** The pipeline will be designed, constructed and operated in accordance with AS2885 and consistent with a T1 (Residential) environment. This will include completion of a Safety Management Study with the identification of threats and appropriate mitigation measures including increased depth of burial, heavier duty piping and protective slabs.		Viva Energy's SEES MM supported.
MM-SHR03		**Facility standards** The Refinery Pier No. 5 extension, the equipment installed on Refinery Pier No. 5, and the Treatment Facility will be designed,operated and maintained in accordance with relevant Australianand international standards.		Viva Energy's SEES MM supported.
MM-SHR04		**Automated systems – safety and process control** The operation of the FSRU, pipeline and Treatment Facility willbe monitored using appropriately SIL		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		rated process automationand shutdown systems. Abnormal conditions will alarm locally and remotely to fully attended control rooms. Operation out of the design / operation envelope has the potential to result in imminent loss of containment, which will result in an automatic shutdown of gas operations via closing of emergency shutdown valves with depressuring of inventory through vent stacks if and when required will to be initiated remotely by an operator in the control room to ensure safe release. The control, monitoring and shutdown systems will be fail-safe and be designed to best industry practices with redundancy.		
MM-SHR05		**Dangerous goods – storage and handling** Dangerous goods, as defined by the Australian Dangerous Goods Code, and flammable and combustible liquids will be stored and handled in accordance regulatory requirements (refer Table 31), EPA Victoria Publication 1698 – Liquid Storage and Handling Guidelines and all		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		relevant Australian Standards – including but not limited to the requirements of: a) *AS1940 – The storage and handling of flammable and combustible liquids* b) *AS1210 – Pressure vessels* c) *AS4343 – Pressure equipment – hazard levels* d) *AS3846 – The handling and transport of dangerous cargoes in port areas* e) *AS2941 – Fixed fire protection installations – pumpset systems* f) *AS/NZS60079 – Explosive atmospheres.*		
MM-SHR06		**Monitoring of chemical and fuel storage facilities** Routine visual monitoring and recording of chemicals and fuel storage facilities will occur as part of routine operational practices.		Viva Energy's SEES MM supported.
MM-SHR07		**Emergency response plans** Emergency response plans, such as for spills, will be developed and implemented for both the		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		construction and operations phases of the project.		
MM-SHR08		**Fire and gas protection** The FSRU or LNG carrier will be provided with their own onboard fire protection and suppression systems. This is a requirement of the DNVB GL (or other equivalent classification society) class notation. Active fire protection and suppression will be provided for liquid fires and gas fires on Refinery Pier in compliance with Australian Standards. The design fire case for fire systems is a jet fire in the MLA area. The required firewater cooling rate is for the ship/shore manifold area, which is defined as the MLAs and associated piping and valves as well as for FSRU hull cooling. The diesel fuel supply will be designed for six hours of firewater per pump. The existing refinery current design will be upgraded to provide 2×100% or 3×50% capacity fire water pumps to provide 50% of the required firewater with the remaining firewater to be provided		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		by firefighting tugs located with the Port of Geelong. Fire and gas detection will be provided in key locations piping on Refinery Pier and within the Treatment Facility. The storage vessel and pipework for the odorant at the Treatment Facility must have a fire rating coating of FRL240/240/240. It must be double contained with monitoring equipment in the intermediate space to monitor for leaks in the primary containment.		
MM-SHR09		**Separation distance** The location of the FSRU provides sufficient separation distance from sensitive receptors (North Shore, Geelong Grammar School) to be outside impact zones for significant breach events. The refinery process area is located over 600m from the FSRU to minimise the potential for escalation of an incident from one facility to the other.		Viva Energy's SEES MM supported.
MM-SHR10		**Site safety advisor** A suitably competent person will be appointed as Site Safety Advisor		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		during construction and will have on-site a set of the relevant safety data sheets (SDS) for hazardous and dangerous materials.		
MM-SHR11	**Consideration of expert advice** Issues raised and recommendations made in the written expert evidence of Mr Martin Mannion and Dr Anand Pillay in the IAC hearings (Documents 70 and 69) must be explicitly considered and responded to in the further detailed design stages of the Project.	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported, subject to being updated to state the 'MHF safety case' for the FSRU and not the 'Gas safety case.'
Social and business				
MM-SB01		**Consultative mechanism for information and enquiries** A consultative mechanism will be developed: a) *to make information on changes to the waterside exclusion zone available to the community and stakeholders (in particular recreational fishing and boating clubs and Geelong Grammar School)*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		b) *to make details of construction schedule (in particular disruptions to the road network) available to the community and stakeholders including Geelong Grammar School* c) *to make the results of environmental monitoring available to the community and Geelong Grammar School* d) *to make information relating to potential risks to human health and safety available to the community and stakeholders including Geelong Grammar School as required* e) *for residents to make enquires, lodge complaints etc. during construction and operation.*		
MM-SB02		**Consultation and arrangements with Quantem** 'Business as Usual' arrangement between Viva Energy and Quantem will continue to minimise potential scheduling conflicts between the LNG carrier and ships at Berth 1 through clear communication,		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		advanced notification and scheduling.		
MM-SB03		**Employment plan** An employment plan will be prepared and implemented with a commitment to prioritise employing locals from northern Geelong suburbs, Indigenous groups and individuals from disadvantaged or low socio-economic backgrounds to enhance the employment benefits to the local community, as appropriate.		Viva Energy's SEES MM supported.
MM-SB04		**Social procurement plan** A social procurement plan will be prepared and implemented to focus on utilising local businesses as much as possible. Viva Energy will partner with local not-for-profit community groups to assist with social procurement and employment of locals (i.e., Northern Futures, Give Where you Live).		Viva Energy's SEES MM supported.
MM-SB05	**Community program** ~~To~~ C~~c~~ontinue to work with the local community (e.g., Norlane Community Initiatives, Northern Futures, Give Where You ~~Live~~Live) and provide ongoing support that	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	is aligned with their needs and delivers positive impact and social benefit consistent with Viva Energy's existing Community Program.			
MM-SB06	**Community Reference Group** Establish and resource a dedicated Community Reference Group that includes representation from the Proponent and local community leaders and representative organisations with an agreed Terms of Reference to define the scope and methodology for, and oversee the implementation of, tasks associated with mitigations measures MM-SB01, MM-SB03, MM-SB04 and MM-SB05.	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.
Surface water				
MM-SW01		**Surface water** Depending on rainfall, soil condition and the groundwater table, dewatering may be required particularly during pipeline trenching activities. The following mitigation measures are		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		recommended for management of water from trenching activities: a) *Water collected from excavated areas will be recycled and reused for construction activities such as dust suppression.* b) *Where discharge to waterbodies is unavoidable, water will be collected and treated if turbidity exceeds turbidity objectives prior to discharging.* c) *Discharge to land will not occur within 50 metres of watercourses or be discharged directly into stormwater drains.* d) *Construction activities to be in accordance with EPA Publication 1834 (as amended or replaced from time to time), and the requirements of the Environment Protection Act 2017* e) *Site management mitigation measures will include appropriate placement of material stockpiles and chemical storages, covered loads, street sweeping and water quality monitoring, where required.*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		f) Discharge of water to land will avoid soil erosion or sedimentation of land or water. Sediment control devices such as silt fence to remove suspended solids and dissipate flow will be used where required. *g) Water will not be discharged to waterways, wetlands or into stormwater drains without approval from relevant authorities.* *h) Water will be tested for pH and salinity prior to discharge to land. pH and salinity should not exceed acceptable limits in EPA guidelines.* *i) Water that cannot be treated to meet the relevant discharge criteria will be disposed to an EPA Victoria licensed facility.* *j) Relevant landholder(s) and water authorities will be consulted, and permission obtained prior to discharge to land.* *k) Discharge will be to low gradient, stable, grassed areas and be undertaken in accordance with*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		landholder requirements and through "irrigation type" systems to prevent scour or erosion. Visual monitoring during land discharge will be undertaken to ensure water does not enter existing waterways and/or wetlands. ***l)*** *Groundwater encountered during construction of the pipeline will be managed in accordance with the groundwater mitigation measures.*		
MM-SW02		**Managing runoff** *a) Obstructions to flow will be removed.* *b) Flow diversion banks will be placed upstream of spoil material if required.* *c) An overflow spillway will be constructed to allow runoff from external catchments to pass over the spoil material at a controlled location without causing erosion.* *d) During the works, sediment control devices such as bunding*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		or silt fences will be set around stockpiled material, earthworks and disturbed areas to minimise loss of sediment to the receiving environment. e) *Temporary diversions will be provided to allow flow around the excavation area.*		
MM-SW03	**Watercourse trenching** Where trenching is undertaken over a watercourse the following mitigation measures willbe undertaken: a) *Undertake works in accordance with APGA guidelines.* b) ~~*Where practicable, t*~~*The trenched watercourse crossing will be constructed duringno flow conditions and reinstated as soon as possible.* c) *Weather forecasts will be monitored to avoid having open trenches at thewaterway when high rainfall events are expected.* d) *Where the watercourse is trenched, all obstructions to*	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	flow will be removed assoon as practicable after the pipe is laid and backfilled. *e) Trenching on both sides of the waterway will be fully excavated and preparedprior to undertaking the final section of trenching over the waterway.* *f) Waterway reinstatement will be carried out in consultation with the CCMA.* *g) The exposed trench within the watercourse will be reinstated immediately following the installation of the pipeline, including providing suitable compactionand revegetation.* *h) Waterway reinstatement will be designed to avoid future erosion. This mayinclude the use of riprap made of stones and fabric mesh to stabilise the waterway.* *i) If necessary, a geofabric will be provided to prevent erosion and scour until thevegetation has established.*			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	j) Visual monitoring will be undertaken downstream of the trench during flowevents if the trench has not been reinstated. *k) Sediment control devices such as silt fences will be used to remove suspendedsolids and dissipate flow where required.*			
MM-SW04		**Capture and treat runoff from treatment facility** Runoff from the treatment facility after a rain event will be captured and managed by the controlled discharge facilities (CDF) in place at the refinery.		Viva Energy's SEES MM supported.
Terrestrial ecology				
MM-TE01		**Complete works within construction right of way** Construction works will be completed within the 15-20 m construction right of way and additional designated works areas to restrict impacts on retained native vegetation and habitat.		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
MM-TE02	*EES IAC recommended a minor editorial update.*	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.
MM-TE03		**Minimise soil erosion** All earthworks will be undertaken in a manner that minimises soil erosion and adhere to the Construction Techniques for Sediment Pollution Control (EPA, 1991).		Viva Energy's SEES MM supported.
MM-TE074		**Minimise impacts to trees** Large-scale excavation at the margins of construction works will be minimised where trees occur within 15 m to avoid impacts on the root zones (e.g., Between School and Torresdale Roads)		Viva Energy's SEES MM supported.
MM-TE085	**Conduct an arborist assessment** An arborist assessment will be conducted prior to construction to identify those trees that will not be adversely impacted by the works, those that may not be impacted if protection measures are implemented, and those where loss is unavoidable. Protection measures recommended by the arborist will	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	be implemented as required to minimise impacts.			
MM-TE096	**Minimise disturbance, injury or death of wildlife** – *Any open pits or trenches will be managed to reduce potential for fauna entrapment. The following measures will be implemented, with regular inspections and maintenance to ensure ongoing effectiveness of the measures:* • Minimise the period trenches and other excavations are open • Design excavations with slopes less than 45o to provide exit ramps for fauna • Create 'ladders' to enable fauna to exit the excavations (e.g. branches, ropes, planks) • Ensure fauna are discouraged from work areas by erecting barriers where practicable. • A protocol included in the site induction around the	*EES IAC's MM adopted in full, with some editorial updates:* **Minimise disturbance, injury or death of wildlife** – *Any open pits or trenches will be managed to reduce potential for fauna entrapment. The following measures will be implemented, with regular inspections and maintenance to ensure ongoing effectiveness of the measures:* • Minimise the period trenches and other excavations are open • Design excavations with slopes less than 45o to provide exit ramps for fauna • Create 'ladders' to enable fauna to exit the excavations (e.g. branches, ropes, planks) • Ensure fauna are discouraged from work areas by erecting barriers where practicable. • A protocol included in the site induction around the procedure for finding trapped fauna.		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	procedure for finding trapped fauna. – *Fencing required to define construction boundaries or to protect NGZs will be designed in accordance with relevant DELWP guidelines to limit fauna strike.* – *The number, type and layout of lights for lighting (if required) for night works or for security purposes will be selected and designed to minimise light spill and to only light up the construction area with reference to the National Light Pollution Guidelines for Wildlife including marine turtles, seabirds and migratory shorebirds (DoEE, 2020). The design will:* • keep lights close to the ground • direct and shield lights to avoid light spill beyond the workspace • use lowest intensity lighting appropriate for the specific purpose	– *Fencing required to define construction boundaries or to protect NGZs will be designed in accordance with relevant DELWP/DEECA guidelines to limit fauna strike.* – *The number, type and layout of lights for lighting (if required) for night works or for security purposes will be selected and designed to minimise light spill and to only light up the construction area with reference to the National Light Pollution Guidelines for Wildlife May 2023 Version 2.0. The design will:* • keep lights close to the ground direct and shield lights to avoid light spill beyond the workspace • use lowest intensity lighting appropriate for the specific purpose • use lights with reduced or filtered blue, violet and ultra-violet wavelengths • avoid the use of LEDs if possible. – *Night-time works will be minimised to reduce impacts of*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	• use lights with reduced or filtered blue, violet and ultra-violet wavelengths • avoid the use of LEDs if possible. – *Night-time works will be minimised to reduce impacts of noise and light on nocturnal animals.* – *Pre-clearing survey will be conducted at all sites where trees and shrubs being removed to assess presence of fauna.* – *A suitably qualified wildlife handler ('wildlife spotter'), holding a relevant and current authorisation under the Wildlife Act 1975, will be engaged to salvage any wildlife encountered during the construction program.* – *If construction is undertaken during the little eagle breeding season, undertake a search for nests in trees within 200 metres of the proposed works. If a nest is found, works must*	*noise and light on nocturnal animals.* – *Pre-clearing survey will be conducted at all sites where trees and shrubs being removed to assess presence of fauna.* – *A suitably qualified wildlife handler ('wildlife spotter'), holding a relevant and current authorisation under the Wildlife Act 1975, will be engaged to salvage any wildlife encountered during the construction program.* – *If construction is undertaken during the Little Eagle breeding season, undertake a search for nests in trees within 200 metres of the proposed works. If a nest is found, works must be avoided within 200 metres of the nest.*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	be avoided within 200 metres of the nest.			
MM-TE-~~1~~07	*Control spread and/or introduction of weeds and/or pathogens* – *Hygiene measures will be implemented to ensure opportunities for the introduction and spread of weeds (importation of seeds and other vegetative material to the site) and pathogens are limited. This will include vehicle inspections and establishment of wash down facilities.* – *Fill that is clean and certified weed and contaminant free will be used, where possible.* – *High risk weeds from construction areas will be treated prior to works commencing.* – *Regular monitoring for ~~Outbreaks of~~ noxious and/or Weeds or National Environmental Significance (WoNS) within construction areas will be undertaken. Outbreaks that ~~that~~ occur~~s~~*	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	due to construction activity will be managed. Spread into adjacent land will be prevented. – *Weed management will be undertaken in accordance with the requirements ofthe Catchment and Land Protection Act 1994.* – *All contract staff inductions will include details about the requirement for vehiclesand equipment to be free of mud and plant material prior to entering work sites.*			
MM-TE~~11~~08		**Reduce erosion, sedimentation and contamination risk to retained vegetation and habitat** Measures to manage erosion and sedimentation, address the management, handling, and storage of hazardous chemicals, and manage dust will be implemented to minimise impacts on retained vegetation and habitat and aquatic environments.		Viva Energy's SEES MM supported.
MM-TE~~12~~09		**Contractor/personnel awareness of ecological values**		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		All contract staff will be inducted on the presence and location of ecological values and informed of all relevant protective measures and obligations while undertaking construction activities.		
Transport				
MM-TP01	**Ongoing** stakeholder consultation A community, business and relevant authority stakeholder and communications plan will be developed for transport with ongoing stakeholder consultation to be undertaken duringthe lifecycle of the project. This will consider findings from the Technical Report K: *Transport Impact Assessment* and from the Traffic Management Plan developed for the project. Stakeholder consultation, including, but not limited to DoT, City of Greater Geelong, Geelong Grammar School, TT Line (operator of the Tasmanian ferry service) and GeelongPort will be undertaken.	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	Key notifications and agreements may include: – *Pre-construction stage:* • TMP agreement • Dilapidation surveys – *Construction, operation and decommission or re-power stages:* • TMP measures and controls • Construction traffic monitoring • Road network monitoring, remediation protocols and maintenancerequirements. – *Prior to operation:* • Construction close-out meeting, infrastructure hand-back criteria.			
MM-TP02		**Traffic Management Plan** Prior to the commencement of construction (excluding preparatory works), TMP(s) will be developed and implemented to minimise disruption (to the extent practicable) to affected local land uses, traffic, car parking, on-road public transport, pedestrian and bicycle movements		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		and existing public facilities during all stages of construction. The TMP will be developed in consultation with the relevant road management authorities and be informed and supported by the Stakeholder Consultation under MM-TP01, an appropriate level of transport analysis including measures outlined in the Transport Impact Assessment. The TMP will include: – *Any required regulatory approvals conditions resulting from the EES process and other secondary approvals.* – *A review of relevant policy, regulatory and protocol requirements which have informed the TMP.* – *Existing conditions review undertaken at the time of TMP development to verify conditions. Those provided as part of the Transport Impact Assessment can be used as a baseline.* – *Approved project scope as discussed in MM-TP01, including finalised details on construction extents, staging, vehicle types,*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		final material sources, and peak construction impacts based on the refined detailed design and construction schedule – *Consideration of cumulative impacts of other major projects operating concurrently in the local area, such as the traffic movements associated with the proposed relocation of the TTLine operations to Corio Quay and the construction of the Geelong Grammar School junior school.* – *Verification of final site access strategy, including access points and crossovers to the site.* – *Final nominated origins of any OD truck visitations for plant and equipment identified and final OD route assessments completed by the project transport contractor (see MM-TP08).* – *Mitigation measures outlined, including site access point requirements (e.g. vehicle size movements facilitated and Austroads intersection type requirements according to traffic*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		demand warrants) and any requirements for OD delivery along derived transport routes. – *This may need to consider road section upgrades.* – *Design drawings would need to be prepared for the above and sent for review and agreement with the relevant road authority at concept, functional and detailed design stages.* – *Following road condition and maintenance requirements considered:* a) Pre-condition (dilapidation survey) to provide an existing survey of public roads that may be used for access and designated for construction vehicle routes. b) Consultation with road asset owners to agree on the extent of pre-condition (dilapidation survey) survey extents and survey requirements (specialist vehicle condition or photographic), road maintenance criteria, treatments and response		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		timeframes, and post construction survey and asset hand-back agreements. – *Depending on stakeholder requirements, other requirements may include specific traffic monitoring (maximum daily truck volumes), and specific bond payments for remedial works.* – *TMP control measures outlined, covering the following aspects:* a) Roles and responsibilities, including project management, co-ordination, public consultation, advertising and complaint procedures. b) Road authority notification requirements. c) Training and site induction requirements. d) Contractor liaison protocol. e) Roadside native vegetation requirements, including identification protocols and approvals (if required).		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		f) Vehicle access measures. – *Access requirements by vehicle type, including any regulator or stakeholder permits.* – *Road closure requirements. Management of any temporary or partial closure of roads and traffic lanes to maintain existing connectivity for local access, pedestrians and cyclists, in accordance with relevant road design standards and in consultation with landholders and any other relevant third parties. Traffic counts may need to be conducted to investigate suitable times for road and lane closures. Road closures to occur in off-peak periods when demands are low where possible (notably for OD vehicle deliverables). Minimise the number of road closures* – *Development of suitable measures to ensure emergency service access is not inhibited due to project construction activities in consultation with emergency services, especially regarding any road closures on*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		the public road network (see MM-TP05). – *Construction staging and car parking requirements to ensure no car parking occurs outside of the project boundary and affects local land use or accessibility. If required car share or shuttle bus provisions will be considered to reduce the need for single vehicle worker occupancy.* – *Signage requirements with reference to Australian Standard AS 1742. Notably for this project this would include notification of:* a) Movement of trucks from site access points to/from major road connections. b) No-truck access signage to ensure vehicles do not access restricted areas and to aid with wayfinding, – *Speed limits set for construction stage. Notably review of existing speeds along Shell Parade and near nominated site access points to consider safe system principles.*		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		– *Verify operating and working hours during construction. These will need to be agreed with key stakeholders with a remit for the construction contractor to verify local bus routes/timings to ensure no conflicts occur.* – *Environmental measures considered such as (see also MM-TP07):* a) Management of dust / sedimentation b) Noise and vibration. – *Monitoring, inspection and auditing requirements detailed with regards to the TMP, including:* a) Addendum TMP triggers b) Monitoring, and inspection protocols outlined to ensure the integrity of the TMP given it will be viewed as a live document for the duration of the projects construction period. Reviews are typically undertaken on monthly basis with relevant stakeholders		

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		informed of any significant changes. c) Auditing can include compliance and road safety audits. – *The TMP would be an overarching document to inform subsequent specific work site TMPs developed by works contractors. In addition, there may be a need for other specific TMPs, such as for the delivery of components via OD vehicles.*		
MM-TP03		**Road safety audits** Road safety audits (RSA), at various stages of project development, indicatively suggested at: *a) Existing condition and site access audits* *b) Detailed design stage* RSA's will be completed by a pre-qualified VicRoads RSA auditor and be independent to the project and notable the design team.		Viva Energy's SEES MM supported.
MM-TP04		**Emergency access and evacuation plan**		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		A contractor emergency evacuation plan will be developed outside the TMP report but reference to its production and Viva emergency evacuation protocols to be made. It will be produced in tandem between the developer, works contractor, local business and CFA.		
MM-TP05		**Sub TMPs** Sub TMPs will be completed by the relevant contractors, including for specific work activities (Worksite Traffic Management Plans). These will all consider and reference back to the overarching project TMP outlined previously. The sub TMPs will also outline more specific protocols and works contacts, for example: a) *Roles and responsibilities* b) *Training* c) *Incident and emergency procedures* d) *Documentation and communication procedure.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
MM-TP06		**OD transport route assessments** Formal OD transport route assessments will be completed by the project transport contractor from the nominated origin(s) along with all necessary mitigation measures and stakeholder approvals. Following this assessment, final routes options will be verified, and any impacts identified along with relevant stakeholders who may need to be contacted to facilitate the safe delivery of materials to the project sites. Potential impacts include clearance to potential obstructions, such as wires, structures (bridges and culverts), trees, and rail crossing infrastructure for OD vehicles.		Viva Energy's SEES MM supported.
MM-TP07		**Operational transport plan** An operational transport plan will be developed considering appropriate stakeholder consultation in accordance with the MM- TP01. This plan will include identifying the suitable route(s) to accommodate the projected heavy vehicle movements, management measures at key intersections and permit		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
		requirements for access to roads that are not approved B-Double routes along the anticipated routes from each facility to the Refinery. Consideration to the safety and amenity impacts of proposed heavy vehicle routes during operation will be given where possible. Relevant road authorities will be consulted during the development of the Operational Transport Plan. As required, the Operational Transport Plan may be used to assess impacts to road assets and assist in any potential compensation to relevant road authorities should impacts occur.		
Underwater noise				
MM-UN01	**Minimise underwater noise impacts** Underwater noise must be minimised as far as reasonably practicable during construction and operation. Choose the quietest operational technique possible and reduce the number or duration of sound exposure periods to the absolute	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	minimum necessary to achieve the construction targets: *a) Reduce the rate of penetration and the number of piles installed per day (hammer strikes).* *b) Use noise dampening technologies at the source to reduce the initial sound production (primary noise mitigation) or placed in the path of propagating sound to reduce intensity (secondary noise mitigation).*			
MM-UN02	**Deter** marine ~~animals~~ mammals and fish from construction area Implement procedures to deter marine ~~animals~~mammals and fish from the constructionvicinity, including methods such as: *a) Using Acoustic Harassment Devices (AHDs) during (noise-) critical activities such asthe onset of impact pile driving* *b) Implementing a safety zone around loud sound sources by visual monitoring of the surrounding area prior to*	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	commencing loud activities and implement activitydelays of 20 minutes based on time of last sighting c) *Using soft-start or ramp-up procedures.* Develop implementation protocols for deterring marine mammals and fish from the construction vicinity, including guidance on the extent of the monitoring zone and how thevisual monitoring should be carried out. The protocols must be developed by a suitably qualified marine biologist.			
MM-UN03	MM also applicable to fish: Impacts on marine mammals and fish during FSRU operation	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.
MM-UN04	Performance monitoring and contingency mitigations~~, if required~~ After operation commences, commissioning underwater noise testing will be carried out to determine: a) *whether the noise emission levels are generally ~~in accordance with, or~~ lower*	*EES IAC's MM adopted in full.*		Viva Energy's SEES MM supported.

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	than, ~~those~~ the inherent noise levels predicted in the EES technical work (Technical Report A Appendix A-2); and *b) to detect whether any excessive noise is being emitted (atypical levels) for the equipment and shipping activity in question.* If noise emissions levels ~~meaningfully exceed~~are not generally lower than those presented inthe EES, or atypical sound levels are detected, then all reasonably practicable mitigation measures must be applied to reduce noise such as, without limitation, isolating noise producingequipment from the ship structure through resilient mountings / vibration isolation. The commissioning monitoring: *a) will be conducted for a period of two months, or four LNG carrier offload events,after the commissioning of the project; and* *b) include testing/commissioning of the diffuser system, and*			

MM ID #	EES IAC's MM recommendation	Viva Energy's SEES MM	SEES IAC's MM recommendation	Minister's response
	during the first operationaluse of the diffuser system. Monitoring should be every 5 years, or such other period as approved by regulatory authorities, to ensure underwater noise emissions continue to be minimised for the life of theproject.			

Appendix B. Matters of national environmental significance

Context

The EES, SEES and my assessment examine the likely impacts on matters of national environmental significance (MNES), relevant to the controlling provisions identified in the Commonwealth EPBC Act controlled action decision (2020/8838) for the project. The relevant controlling provisions were: Ramsar wetlands (sections 16 & 17B), listed threatened species and communities (sections 18 & 18A) and listed migratory species (sections 20 & 20A).

This appendix consolidates the likely effects of the project on MNES protected under the EPBC Act, drawing on the assessment of specific matters discussed in other sections of my assessment. This includes assessment findings on the marine environment (Section 5.1), terrestrial ecology (Section 5.2) and Groundwater and surface water (Section 5.7).

Potential impacts on relevant MNES were discussed in the following EES and SEES documentation:

- EES Technical Report A (marine environment);
- SEES Technical Report A (marine environment);
- SEES Technical Report B (threatened and migratory birds);
- EES Technical Report D (terrestrial ecology);
- EES Technical Report E (surface water);
- EES Attachment IV (MNES); and
- SEES Attachment II (MNES).

This technical information was summarised in EES Chapter 8 (marine environment), EES Chapter 10 (land environment, including terrestrial ecology and surface water), SEES Chapter 3 (marine environment) and SEES Chapter 4 (threatened and migratory birds). EPBC Act listed threatened and ecological communities within the project area were specifically discussed in:

- EES Technical Report A – Marine ecology and water quality impact assessment – Table 5-21;
- EES Technical Report D – Terrestrial ecology impact assessment;
- EES Technical Report D – Appendix A: Likelihood of occurrence assessment (threatened flora);
- EES Technical Report D – Appendix B: Likelihood of occurrence assessment (threatened fauna);
- EES Technical Report D – Appendix C: EPBC Act Protected Matters Report (15/10/2020); and
- SEES Technical Report B – Appendix A: Likelihood of occurrence (threatened and migratory birds).

Viva Energy commissioned a peer review for the EES terrestrial ecology assessment, which was undertaken by Nature Advisory (the Nature Advisory peer review).[30]

As described in Section 4 of this assessment, I determined that a Supplementary EES (SEES) was required to examine some key matters, consistent with the recommendations of the EES IAC. Amongst other related technical areas, the SEES included further work for MNES of concern: the marine environment, including Ramsar wetlands, and threatened and migratory birds. The SEES considered revised marine modelling and its implications for Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site (the Ramsar site) and threatened and migratory birds, including marine birds and shorebirds.

[30] EES IAC Tabled Document 177: Viva Energy – Technical Report D: Addendum – Peer Review.

My assessment of terrestrial threatened species and communities is predominantly based on the EES documentation, with the construction of the onshore, underground gas transmission pipeline and new treatment facility the primary potential actions of the project in the terrestrial environment. My assessment of marine MNES is based on the updated SEES documentation and has also drawn on the EES in relation to the potential effects of lighting, surface water, underwater noise and additional shipping movements.

The key finding of Viva Energy's EES and SEES was that the project is not expected to have significant residual impacts on any MNES. It found that significant residual impacts were not anticipated for MNES based on the implementation of the EMF. As such, offsets in accordance with the EPBC Act were not included.

Chapter 11 of the SEES IAC report and Chapter 19 of the EES IAC report summarised the likely impacts of the project on MNES. Table 34 of the EES IAC report provided a list of species that were considered predominantly as part of the EES only. The overall finding of the EES IAC was that residual impacts from the project were not likely to be significant and could be acceptably managed with the application of the EES IAC's recommended MMs, updated as detailed in sections 5.1 and 5.2 of my assessment. This included the conclusion that a significant residual impact to the Ramsar site is not expected. The SEES IAC similarly found the project was not expected to have significant residual impacts on threatened and migratory bird species, including the EPBC Act listed Sharp-tailed Sandpiper *Calidris acuminata* (Vulnerable, marine and migratory), and Orange-bellied Parrot *Neophema chrysogaster* (Critically endangered, marine).The SEES IAC also found that impacts could be acceptably managed with the implementation of the marine environment MMs (MM-ME01 to MM-ME21), terrestrial ecology MMs (MM-TE01 to MM-TE12), surface water MMS (MM-SW01 to MM-SW04), lights spill MMs (MM-LS01 and MM-LS03) and underwater noise MMs (MM-UN01 to MM-UN04), following adoption of the IAC's recommended amendments. A summary of the SEES IAC's findings for threatened and migratory birds is provided below in Table B1.

Table B1: SEES IAC updated assessment of impacts to EPBC Act listed threatened species and migratory bird species[31].

Bird group	SEES IAC assessment
Threatened shorebirds and seabirds	Significant impacts not expected. Reasoning based on: • Ramsar site is not proposed to be modified; • Dredging or operational discharges are not expected to significant impacts the environment or Ramsar site; • Seabird foraging habitat in Corio Bay is not expected to be substantially modified given the localised extent of the project; and • Seabirds are unlikely to be reliant on Corio Bay as their sole foraging resource.
Migratory shorebirds and seabirds	Significant impacts not expected, including Sharp-tailed Sandpiper. Reasoning as per the above.
Threatened terrestrial birds	Significant impacts not expected. Reasoning based on: • These groups being mobile; • Any effects of dredging on marine habitat and food resources will be temporary; and

[31] Source: SEES IAC Report – Chapter 11, Table 10.

Bird group	SEES IAC assessment
	• Operational effects on the marine environment will be similar to the effects of existing Refinery operations.
Migratory terrestrial birds	Significant impacts not expected, including Orange-bellied Parrot. Reasonings as per the above dot points. Recent sightings of Orange-bellied Parrot were within known strongholds for the species (i.e., Western Treatment Plant/Point Wilson etc.). The project is not impacting suitable habitat.

The EES identified the potential for threatened terrestrial species to be present within the project area. Table 34 of the EES IAC report (Chapter 18.4) provided a list of additional species relevant to the assessment of MNES outside of the further works required as part of the SEES.

Two threatened ecological communities were identified during the EES assessment: Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP; Critically endangered) and Subtropical and Temperate Coastal Saltmarsh (STCS; Vulnerable). NTGVVP was not found within the study area (up to 50 metres from the proposed pipeline) but was found adjacent to it in Corio Native Grassland Reserve. The location of NTGVVP was confirmed by the Nature Advisory peer review. STCS was mapped within the study area, occurring along the shoreline near Refinery Pier. This threatened ecological community was mapped within the study area 50-metre buffer, although not within the pipeline alignment. As such, no direct impact to either threatened ecological community is proposed by the project. As the gas transmission pipeline is proposed to be underground, I expect potential residual effects, like shadowing of threatened ecological communities, to be minimal once construction is completed. The EES also found that residual surface water and groundwater impacts were expected to be minor and surface water impacts could be acceptably managed via the EMF, particularly through MM-SW03. Additionally, expert evidence[32] indicated that the STCS patch was in fact below the size threshold required to qualify as the threatened ecological community. Consequently, the EES IAC determined that the project is not expected to have any significant residual impact to these threatened ecological communities. I acknowledge the findings of the EES and EES IAC and I consider that the project is unlikely to result in any significant residual impact to these threatened ecological communities.

The EES explained that construction of the underground gas transmission pipeline would impact marginal or potential habitat for three EPBC Act-listed species (i.e., Swift Parrot *Lathamus discolor* – Critically endangered and marine, Grey-headed Flying-fox *Pteropus poliocephalus* - Vulnerable and Golden Sun Moth *Synemon plana* - Vulnerable). Planted Eucalypts (0.354 hectares) throughout the pipeline study area was classified as potential occasional and marginal foraging habitat for Swift Parrot and Grey-headed Flying-fox. The habitat was defined as limited in extent, canopy spread and maturity, with Swift Parrot likely to occasionally utilise these Eucalypts as they migrate north and Grey-headed Flying-fox potentially utilising these trees whilst on nightly foraging expedition. The EES determined a significant impact on these two species was unlikely. The EES IAC accepted this finding on the basis of the EES assessment and EES submission D246.

EES submission D246[33] was an updated assessment of MNES impacts undertaken by Nature Advisory for the proponent, provided to the EES IAC during the hearing. The assessment advised on threatened species only,

[32] EES IAC Tabled Document 140: Viva Energy – Presentation of Evidence – Terrestrial Ecology.

[33] EES IAC Tabled Document 246: Viva Energy – Nature Advisory – MNES Reassessment.

determining 15 threatened species to potentially or likely to occur in the project area and undertook Significant Impact Assessments for these species. The assessment, including Swift Parrot and Grey-headed Flying-fox, determined the project was unlikely to significantly impact these species. Considering this reassessment, I support the findings of the EES IAC that a significant impact for Swift Parrot and Grey-headed Flying-fox is unlikely.

The EES took a precautionary approach to the assessment of Golden Sun Moth, as targeted survey was not undertaken. The species was assumed to be present within suitable habitat, however considered unlikely to occur in the project area. Habitat conservatively classed as potentially suitable (i.e., patch cover was assessed as being too dense to support the species) was located along the onshore, underground gas transmission pipeline route, with 0.48 hectares of Chilean Needle-grass *Nassella neesiana* habitat and 0.001 hectares of suitable native grassland to be removed. Horizontal direction drilling (HDD) is proposed to avoid the majority of potential habitat for Golden Sun Moth. The Significant Impact Assessment[34] found that a significant impact was not expected. Nature Advisory[35] also determined Golden Sun Moth to be unlikely to occur within the project area and concluded that a significant impact is unlikely to occur. The EES IAC determined that a significant residual impact for Golden Sun Moth is not expected. I support the findings of the EES IAC.

Similarly, a grassland species, Striped Legless Lizard *Delma impar* (Vulnerable), was determined as unlikely to occur within the study area due to the absence of suitable habitat. It is my understanding that targeted survey, as per the Referral guidelines for the vulnerable striped legless lizard, *Delma impar,*[36] were not undertaken as the lack of suitability of habitat within the terrestrial ecology study area deemed survey unnecessary.

Two threatened flora species, Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* (Critically endangered) and Large-headed Fireweed *Senecio macrocarpus* (Vulnerable), were initially assessed as potentially occurring within the project area. Field assessments indicated that both species were unlikely to occur. The Nature Advisory peer review supported this determination of absence. On this basis, the EES IAC accepted that these species are not present and found that no significant impacts are expected for these species. I support the findings of the EES IAC.

MNES deemed likely to be present or confirmed as present within the project area, and potentially affected by the project, are the focus of the discussion presented below in Section B.1. The migratory, marine and threatened bird species assessed as likely to be present or confirmed as present are included on the basis of the SEES, as listed within Appendix A of SEES Technical Report B.

B.1. Ramsar wetlands

As mentioned, the relevant Ramsar site for this assessment was the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site, including associated conservation reserves such as Limeburners Lagoon (Hovells Creek) Flora and Fauna Reserve and Avalon Coastal Reserve. These reserves fall within the Ramsar site boundary or are currently proposed to be included[37]. The Ramsar site covers 22,650 hectares and is

[34] Department of the Environment (2013) *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance*

[35] EES IAC Tabled Document 246: Viva Energy – Nature Advisory – MNES Reassessment.

[36] Department of Sustainability, Environment, Water, Population and Communities (2011) *Environment Protection and Biodiversity Conservation Act 1999* referral guidelines for the vulnerable striped legless lizard, *Delma impar*

[37] Department of Environment, Land, Water and Planning (2023) *Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site Boundary Review*.

comprised of six discrete sections, with the boundary of the Point Wilson/Limeburners Bay area approximately 700 metres from the project's areas closest point. At this Ramsar location the ecological characteristics description focus is seagrass. Primary potential actions associated with the project relate to construction, specifically the 8-week dredging program, and the proposed future operation of the FSRU, particularly wastewater discharge and the potential effects of this on marine water quality.

Fundamental to the assessment of potential project effects on the Ramsar site were the regional hydrodynamic model (RHM) and scenario modelling of sediment transport and entrainment. As part of the SEES the RHM was revised and the sediment transport and entrainment models re-run utilising these updated RHM outputs. Entrainment modelling assessed potential uptake of marine organisms, including fish eggs and plankton, during operation. The sediment transport modelling assessed the effects of the dredging program, where a total of 490,000 cubic metres of dredged material will be moved to the existing Point Wilson dredged material ground (DMG). Overall, the SEES IAC determined all models to be 'fit for purpose,' stating the models provided an appropriate basis from which the assessment of effects on the Ramsar site (and migratory and marine birds or threatened shorebirds – refer to the below section) could occur.

The SEES revised modelling predicted the following outcomes:

- Turbidity from dredging on seagrass was likely to be temporary and localised to Corio Bay.
- Operational wastewater discharges of temperature and chlorine plumes were not expected to impact seagrass at the Ramsar site.
- Operational seawater intake and discharge volumes were expected to be the same as current volumes at the Refinery in Corio Bay.
- Operational seawater intake at the FSRU was expected to have negligible effects on native fish species populations, as assessed through analysis of entrainment of fish eggs and larvae.
- Operational wastewater discharge is not expected to result in temperature changes or chlorine levels exceeding guideline levels at the Ramsar site.

No construction is proposed within or adjacent to the Ramsar site - direct impacts have been avoided. The EES and SEES did not identify any potential for loss of saltmarsh, mangrove or seagrass communities within the Ramsar site. The SEES IAC supported this finding and all revised model findings. The SEES IAC also agreed with the SEES assessment that removal of 0.5 hectares of seagrass (outside of the Ramsar site) for construction of the offshore seawater transfer pipe was not expected to affect the Ramsar site. Considering these outcomes, the SEES IAC and SEES IAC reports assessed the potential project effects against the significant impact criteria[34] for declared Ramsar sites. Both IACs found a significant residual impact from operational effects on the Ramsar Site was unlikely. The SEES IAC also noted the residual impacts could be acceptably managed through the EMF, particularly via the baseline monitoring program (MM-ME05a) and operational (MM-ME17, MM-ME19, MM-ME21) and dredging (MM-ME05 – MM-ME07) wastewater monitoring programs.

Additionally, the EES IAC determined spoil deposits at the Point Wilson DMG location was appropriate. The EES noted Point Wilson DMG had received material from several past dredging programs in Corio Bay. On this basis, the EES IAC determined the use of this existing DMG was appropriate and was unlikely to present a significant impact at the Point Wilson DMG. The EES IAC also found that the residual surface water and groundwater impacts of the project were expected to be minor. It noted that the impacts on surface water, including the receiving waters of Hovells Creek, Corio Bay and the Ramsar site, would be manageable through implementation of the proposed MMs, particularly via MM-SW03 requiring trenching of waterways to occur during times of no flow. I support this determination based on the recommended update to MM-SW03.

Following the implementation of MMs, the SEES IAC found that a significant impact to the marine environment, including the Ramsar site, was unlikely. However, recommendations to strengthen the marine environment

monitoring program MMs were recommended to ensure appropriate management of residual impacts and implementation of adaptive management measures.

A range of MMs were proposed by Viva Energy to reduce the potential effects of residual impact to the marine environment. MMs were proposed for design and construction efforts, such as the updated application of silt curtains during dredging (MM-ME04) and refined detailed design of the FSRU seawater intake system to minimise entrapment (MM-ME08). Baseline monitoring programs were also included in the EMF, to continue gathering of existing condition data to inform the development of 'trigger' and 'exceedance' thresholds for the proposed operational monitoring programs. Operational monitoring programs were proposed to occur during construction and operation and would monitor a range of values associated with wastewater discharge, turbidity and seagrass health.

MM updates recommended by the EES IAC and SEES IAC in relation to the marine environment and the Ramsar site are discussed in Section 5.2 of this assessment. Two main recommendations made by the SEES IAC relate to the baseline monitoring. The SEES IAC recommended baseline monitoring occur for 12-months prior to construction for all 'monitoring' MMs and that the development of thresholds for monitoring turbidity (MM-ME05) should be developed in consultation with EPA.

I support the SEES IAC's findings and all MM-ME recommendations in relation to the mitigation of effects to the Ramsar site. I support, in principle, the SEES IAC recommendation for MM-ME05, to require EPA consultation in relation to threshold development of particular, relevant monitoring values for the dredging monitoring program. As recommended by the SEES IAC, light availability calculations should be consistent with the Victorian Dredging Guidelines.

In light of the additional MM recommendations within this assessment, it is my conclusion that construction and operation of the project is not expected to have any significant residual impact on the marine environment and Ramsar site.

B.2. Listed migratory and marine birds and threatened shorebirds

As part of the SEES, Viva Energy revised the threatened bird list, inclusive of EPBC Act listed migratory and marine birds and threatened shorebirds. The revision involved updated Victorian Biodiversity Atlas and Protected Matters Search Tool extractions (8 September 2023 – 5-kilometre radius.). An online search of the BirdLife Australia database was also undertaken in March 2024 and additional birds included in the assessment. The revised list was also peer review by Stantec, as noted within the SEES IAC report. Stantec determined the revised list appropriately considered the required species[38].

Based on the revised SEES threatened and migratory bird list (Technical Report B – Appendix A), from a total of 113 birds listed[39], 73 species of threatened and/or migratory birds had the potential to occur in association with project area or offsite environment. The offsite environment was defined by the SEES as areas outside of the projects area including Corio Bay, Limeburners Bay and Avalon Coastal Reserve (i.e., the Ramsar site). Of the 73 species, nineteen species are listed as threatened, 54 species are listed as migratory, and 45 species are listed as marine under the EPBC Act.

[38] Species newly listed under the EPBC Act following the referral decision notice were not required to be assessed.

[39] Quantified species numbers include both EPBC Act and FFG Act species.

The 73 species consisted of:

- Six terrestrial (non-aquatic) species, including Orange-bellied Parrot.
- Four raptor species utilising the project area and offsite area for foraging.
- Twenty-two migratory shorebirds associated with Avalon Saltworks and the Ramsar site. All species were considered unlikely to be present along the shoreline of the project area.
- Twelve waterbird species deemed to mostly be utilising the inshore ponds and wetlands of the Ramsar site rather than the shoreline of the project area or Corio Bay.
- Twenty seabird species assessed as occasionally utilising shallow marine waters of Corio Bay for foraging. Species of tern within this seabird group are known to regularly occur in the area and may roost on structures.

As detailed in Section 4, further shorebird assessment was also warranted via the SEES. This included further field assessment. Four species were observed during these assessments including, Sharp-tailed Sandpipe, Red-necked Stint *Calidris ruficollis* (marine and migratory), Curlew Sandpiper *Calidris ferruginea* (Critically endangered, marine and migratory), Common Sandpiper *Actitis hypoleucos* (marine and migratory). The further analysis found Avalon Coastal Park and the former Avalon Saltworks (survey site 3T) was also deemed important site for Sharp-tailed Sandpiper in Australia and for the East Asian-Australasian Flyway. No survey sites were determined to be individually or collectively internationally important for any of the four shorebird species.

The SEES concluded, overall, that there were no changes to the EES outcomes and stated that a significant residual impact from the project to the threatened and/or migratory birds with potential to occur in the Project Area or offsite environment was not expected. The SEES highlighted the lack of direct impacts to habitat, species mobility and noted the results of the revised marine environment modelling. No additional MMs were included for birds as a result of the SEES studies.

The SEES IAC was satisfied that the updated assessment of impacts on threatened and migratory birds was appropriate and met the requirements outlined in the EES IAC's recommendations for further work. The SEES IAC considered that the list of threatened and migratory bird species relevant to the project included in the SEES was comprehensive and accurate. The SEES IAC's assessment of significance of impacts for the bird groups examined is presented in Table B1.

A broad range of MMs are applicable to the avoidance, minimisation and management of project impacts to this MNES, including across the marine environment (MM-MEs), terrestrial ecology (MM-TEs) and light spill (MM-LS03), with MM-TE09 first seeking to minimise disturbance, injury or death of wildlife. In relation to the marine environment, implementation of the SEES marine environment MMs, reduces the likelihood of significant residual impacts from the project. However, for MM-ME02, I support the EES IAC's recommended MM, as the intent of the update is to also mitigate impacts to shorebirds, migratory birds and the Ramar site. The EES IAC recommended dredging not take place from September to March (inclusive) as these months are important for these bird species and intertidal feeding.

The SEES also found that Tern roosting locations on existing structures at Refinery Pier were not expected to be permanently altered and habitat and food source availability were unlikely to be adversely impacted by the project.

Considering these outcomes and the refined MMs to be implemented, it is my assessment that the project is not expected to result in a significant residual impact to any threatened, migratory or marine birds or threatened shorebird species assessed.

B.3. Listed threatened marine species

EES Technical Report A considered the likelihood of occurrence of number of marine species, including turtles, marine invertebrates, marine and marine migratory fish, sharks, whales and dolphins (refer to Table 5-21 for a full list). The majority of these species were assessed as unlikely to occur within the project area. Two EPBC Act-listed threatened marine fauna species (also listed as migratory) were considered to have a possible or higher likelihood of occurrence within Corio Bay: Leatherback Turtle *Dermochelys coriacea* (EPBC Act Endangered) and White Shark *Carcharodon carcharias* (EPBC Act Vulnerable). Both species have been recorded in Port Phillip Bay and were deemed likely to occasionally pass through Corio Bay.

The EES assessed two main potential effects of the project on marine species: additional shipping movements (and associated effects such as the risk of spills or collision with marine fauna) and underwater noise. The SEES reassessed potential impacts in relation to food availability for these species and found the project was not expected to result in any real change to food availability.

The EES IAC highlighted concern around the use of international guidelines for underwater noise parameters but acknowledged the absence of known local data for the marine species in question. It recommended a precautionary approach to managing potential underwater noise effects and recommended amendments to MM-UN01 and MM-UN02. The EES IAC accepted that the uncertainty of underwater noise effects could be managed through the application of MM-UN04 'Performance monitoring and contingency mitigations.' I support the recommended amendments to the underwater noise MMs made by the EES IAC. I consider that the potential effects of noise on the underwater marine environment can be acceptably managed with the implementation of the recommended MMs.

The EES IAC found that the risks to marine species associated with additional shipping movements were due in large part to the project location (i.e., being within an active port) and these risks were already predominantly managed via existing port operations and management frameworks. The EES IAC recommended amendments to MM-ME15 to ensure that collision risk measures are applicable to all marine mammals. It found that the increased, potential effects from the project was not significant and could be satisfactorily mitigated through the existing port procedures and the recommended MMs. I support the change recommended by the EES IAC, with the addition of turtles to be named at MM-ME15 as the EES found turtles were potentially present in Corio Bay on isolated occasions.

Taking into account the EES, SEES, and evidence from the EES IAC and SEES IAC, it is my assessment that the project is not expected to have any significant residual impact on listed threatened marine species.

B.4. Assessment

It is my assessment that the project is not expected to have a significant residual impact on any MNES, subject to the implementation of Viva Energy's SEES MMs, including the amendments recommended by the EES IAC, SEES IAC and as refined through this assessment (i.e. including the further update to MM-ME15 and MM-ME02).


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