AJM Joint Venture

MELBOURNE AIRPORT RAIL

MAR STATE LAND CONTAMINATED LAND IMPACT ASSESSMENT

MAR-AJM-PWD-PWD-REP-XEV-NAP-0001715

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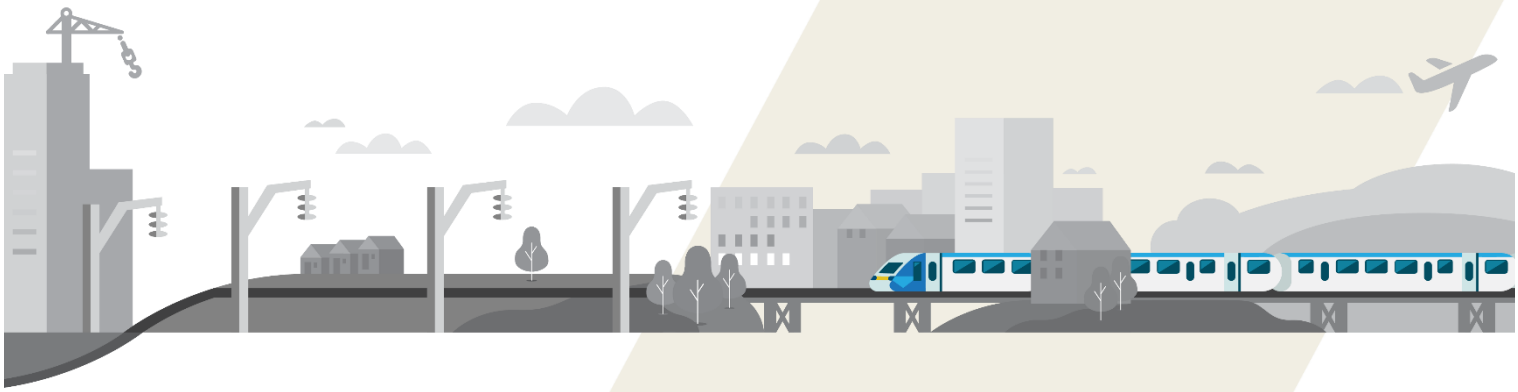
Prepared for Rail Projects Victoria



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Executive Summary

The MAR Project has undertaken several intrusive investigations to understand contamination across the Melbourne Airport Rail (MAR) State land alignment. The contaminated land impact assessment found that excavation and construction activities have the potential to disturb contaminated soil and, to a limited extent, groundwater.

Soil and rock are the primary focus of this impact assessment given the mostly shallow nature of excavation activities planned. Groundwater impacts potentially may occur in areas of deeper excavation (e.g. piling activities) where the works interact with groundwater.

The main aspects of contamination and spoil management requiring consideration for the MAR project are:

- Non-natural contaminated spoil (fill), where there has been a long history of potential presence of non-natural contaminated soil, either due to former land uses or historical importation of contaminated fill, where there has been a history of potentially contaminating land use activities.
- Handling and reuse and/ or disposal of large volumes of contaminated and clean spoil.
- Naturally occurring, potentially acid sulfate soil / rock associated with the presence of specific geological formations.
- Potential migration of contaminated groundwater plumes due to project activities interacting with groundwater (dewatering) with potential exposure risks to the environment.
- Interception of contaminated groundwater and/or vapour in the immediate vicinity of the project boundary during construction, with potential exposure risks to workers and the environment.

Key Environmental and Planning Implications

Key environmental and planning approval implications are summarised below.

- In respect to the EES referral process and contamination related referral triggers, contaminated land issues on the project are well known and are not considered to cause potential adverse environmental effects that could be significant in a regional or State context. In summary, none of the EES referral triggers are likely to be realised due to the nature of the proposed works, with limited deep excavation and interaction with groundwater / soil vapour that can be managed during delivery.

- Where appropriate recommendations have been made to minimise the impacts on human health amenity and the environment from contaminated land through mitigation and management measures. These measures will be formalised through an Environmental Management Framework (EMF), prepared and approved in accordance with the relevant planning approval. The EMF will provide a transparent and integrated governance framework to manage the environmental aspects of the Project and will detail Environmental Management Requirements (EMR) that must be implemented by the delivery partner.

- A Waste Designation application is to be submitted by RPV to EPA Victoria in relation to spoil to be generated on MAR, so as to provide certainty in the detailed design and delivery phase in relation to spoil management.

Proposed Mitigation Measures

The mitigation measures in relation to the potential contaminated land and groundwater impacts associated with the MAR are well-established, including standard construction techniques and management processes. These measures would minimise, as far as reasonably practicable, the disturbance of sources of contamination and the excavation of contaminated spoil. Where sources of contamination are encountered and disturbed, processes would be implemented to minimise the impacts of this disturbance and to handle and dispose of contaminated waste safely.

Where groundwater may potentially be encountered, the works shall be designed to minimise changes to groundwater levels during construction and operation, including excavation and piling. A piling method

should be selected that maintains groundwater levels; with design contingency measures and/or controls to set out the measures required to maintain the groundwater surface and groundwater quality, and prevent groundwater draw-down such as may cause groundwater contamination plume migration.

The Project's Environmental Management Framework will outline management measures to be implemented by the Contractor, including the development and implementation of a Construction Environmental Management Plan (CEMP). The measures provided in the contractor's CEMP to meet the EMRs must comply with relevant Commonwealth and Victorian laws and policies, and with EPA and WorkSafe Victoria requirements. The recommended EMRs set out in this document, provide proposed measures that would mitigate these impacts to acceptable levels, resulting in a low to very low risk to human health and the environment from MAR.

Therefore, the impact assessment has determined that with consideration of standard management and mitigation measures, residual potential contaminated land and groundwater impacts would not pose a significant risk to the environment and / or human health, provided those management methods are adhered to.

1. Introduction

Aurecon Jacobs Mott Macdonald Joint Venture (AJM-JV) has been engaged by Rail Projects Victoria (RPV) to prepare the Melbourne Airport Rail (MAR) State Land Contaminated Land Impact Assessment (the Impact Assessment).

1.1 Purpose

This impact assessment report is a summary of intrusive land investigations and assessments undertaken for that can be based to support the State land planning approvals process for the Melbourne Airport Rail (MAR) project. The key intent of the document is to:

- Inform an assessment of the project against the Ministerial Guidelines for Assessment of Environmental Effects under the Environment Effects Act 1978 (the Ministerial Guidelines), referred to as an *Environment Effects Act 1978* (EE Act) self-assessment.
- Inform the strategic justification needed to support planning approval under the *Planning and Environment Act 1987.*

A preliminary environmental risk assessment informed the environmental aspects requiring further assessment. The impact assessment will inform mitigation measures as part of the updated project-wide Environmental Risk Assessment (ERA), which will describe and quantify the key residual risks and outline the recommended mitigation measures that can be incorporated into the Environmental Management Framework (EMF). The EMF will outline the required mitigation measures to mitigate likely impacts that will be required in the design, construction and operational phases of the Project.

It provides a high-level overview of assessments undertaken to date along the proposed State land MAR alignments and the Design and Delivery Implications and Opportunities associated with contaminated land and groundwater that has been identified within the Project footprint. This report is not intended to present advice in respect to 'constructability' of the project. Rather it is intended to summarise the existing conditions, outline the current understanding of the risks due to contamination related potential impacts from the construction and operation of the Project, and provide recommendations on potential environmental risk management measures applicable during the planning, design and delivery phase of works.

1.2 Scope

This impact assessment report applies to all MAR Project activities that are occurring within State land, which includes both the Corridor and Sunshine Sections. The investigation and assessment undertaken by AJM JV to prepare this report has included consideration of existing information and data to report on the following:

- An overview and summary of investigation works completed on the project to date, incorporating intrusive investigations, environmental sampling and spatial survey.
- A summary of areas where significant ground disturbance / excavation is proposed during the construction phase.
- Indicative estimates of spoil volumes to be generated during the construction phase, based on proposed construction methods and assumptions.
- Indicative spoil classification for waste management purposes under Victorian Environmental Legislation.
- Recommendations for environmental risk management that would apply to the design/ delivery phases of the project.
- Overview of implications of these findings, including:
    - > Spoil classification and waste management practices for each indicative classification.
    - > Potential reuse of spoil material within the project.

> Data gaps that may be existing within the project.

- Recommendations for further investigation, fulfillment of environmental obligations, and spoil management practices.

1.3 Methodology

The preparation of the Impact Assessment included the following:

- Review of the scope of works and mapping presented in the 'MAR Project Description for Environmental Specialists' (MAR-AJM-PWD-PWD-MEM-XLP-NAP-0001505, Revision C) (the Project Description).
- Desktop review of all relevant documentation, including intrusive land investigations and reports.
- Based on the desktop information review, the potential risk for contaminated land to impact the project was characterised qualitatively, considering:
  - > The nature and extent of contaminated land: Potential for soil and / or groundwater concentrations of contaminants to be present in exceedance of quality objectives applicable for the current land uses adjacent to the Project and the future use of land corresponding to the proposed rail development, and/or EPA IWRGs for waste soil classification;
  - > The associated management responses required as a result of that contamination: 'complex' contaminant classes include those that present remediation and/or disposal challenges and require active or additional management measures;
  - > The extent of ground disturbance during construction, e.g. shallow versus deep excavation and / or piling, and likelihood of encountering groundwater.
- Potential impacts to the project are primarily determined by the nature and extent of contamination, particularly 'complex' contaminant classes having specific management implications; and the extent of interaction of the project construction and operation with that contamination. Those interactions are primarily associated with excavation, piling, and interactions with groundwater.
- The potential impacts to the project is assessed considering potential for risks to human health, amenity and the environment to arise as a result of the project, and impacts accordingly to project budget and program associated with implementation of recommended risk mitigation actions in design and construction, and potentially regulatory requirements/ implications, associated with contaminated land.

1.4 Assumptions and Limitations

The following assumptions and limitations apply to the Impact Assessment:

- The Impact Assessment relates only to public and privately owned State land and does not consider Commonwealth-owned land or the 'Airport' Section, as Commonwealth land is not subject to Victoria's legislative framework. Impact Assessments associated with Commonwealth land, specifically land at Melbourne Airport, will form part of a separate suite of impact assessments.
- The Impact Assessment is based on the scope of works detailed in the Project Description and State Project Land is based on 'MAR Project Description for Environmental Specialists' (MAR-AJM-PWD-PWD-MEM-XLP-NAP-0001505, Revision C)
- The Impact Assessment should only be used for the purpose outlined in Section 2.1. This Impact Assessment is not intended to be a comprehensive report outlining all contaminated land issues, but rather a summary of the key potential impacts to inform the relevant planning approvals.
- The impact assessment does not contain sufficient information to enable it to be used for any use other than the project specific requirements for which the report was carried out. AJM JV accepts no liability to the Client for any loss and / or damage incurred as a result of changes to the usage, size, design, layout, location or any other material change to the intended purpose.

- The interpretations in this report are reliant on the regulatory guidance as available at the time of reporting and are subject to changes outside of AJM JV's control.
- Any reliance on this report by a third party shall be entirely at such party's own risk. AJM JV provides no warranty or guarantee to any third party, express or implied, as to the information and/or professional advice indicated in the report and accepts no liability for or in respect of any use or reliance upon the report by a third party.

2. Project Description

2.1 Strategic Context

The MAR Project (the Project) is a once-in-a-generation transformation of Victoria's transport network, connecting Melbourne Airport's Integrated Terminal Precinct with a rail service for the first time.

Melbourne Airport handled more than 37 million passenger movements in 2018-19[1] and by 2038, this figure is projected to almost double to more than 67 million[2], which is an average growth of 3.2% per annum. Transport connectivity from Melbourne Airport to Melbourne's Central Business District (CBD) is currently limited to the Tullamarine Freeway, and therefore, the Victorian Government is committed to delivering an efficient, competitive alternative to cater for the ongoing increase in passenger numbers at Melbourne Airport.

In 2002, the Victorian Government considered possible corridor and alignment options for a Melbourne Airport Rail Link, ultimately selecting the Sunshine route as the preferred option. At this time, land was reserved between the Albion-Jacana rail corridor and extending through to Sharps Road, Tullamarine for the construction of a rail link.

In 2018, the Victorian Government released the Melbourne Airport Rail Link Sunshine Route Strategic Appraisal, which confirmed that the Sunshine route remains the best solution for an airport rail link. The Sunshine route would provide superior connections to regional Victoria, Melbourne's growth areas in the north and west and Melbourne's south eastern suburbs and could be delivered sooner and at a significantly lower cost than other route options.

2.2 State Project Land

The State Project Land defines the land within which the Project components and construction activities are planned to be contained. It sets out the full extent of land identified as potentially required for the delivery of the Project.

The Project Land encompasses all State land areas that would be used for permanent structures and temporary construction areas. It provides the basis for and informs the Impact Assessment

Project Land relevant to State-based approvals generally includes:

- Land between Sharps Road and the Albion-Jacana rail corridor, including land crossing the M80 Freeway
- The existing Albion-Jacana rail corridor generally between Jacana and Albion Stations
- Land around Sunshine and Albion Stations, including the existing rail corridor
- Land required for the Project from Jacana Station in the north-east to Newport Station in the south-west and Middle Footscray Station in the east. This largely includes the Albion-Jacana rail corridor via Sunshine and Albion stations and land required for a new rail corridor between Sharps Road and the Albion-Jacana rail corridor.

The extent of the State Project Land is shown in Figure 2.1**Error! Reference source not found.**.

2.3 Main Works Scope

The main works for the Project consists of the construction of a heavy rail link between a new railway station at Melbourne Airport and Melbourne CBD, via the Albion-Jacana rail corridor, Sunshine Station and connecting to the new tunnels provided via the MTP.

[1] https://www.bitre.gov.au/publications/ongoing/airport_traffic_data
[2] https://www.melbourneairport.com.au/Corporate/Planning-projects/Master-plan

2.3.1 Project Sections

The main works for the Project comprise of three geographically distinct sections. The sections are summarised in Table 2.1 and the location of the sections are shown in Figure 2.1.

Table 2.1 Summary of Project sections

Section	Summary
Airport section Not considered in State land approvals.	The Airport section generally includes all land relevant to the Project between Sharps Road, Tullamarine and Melbourne Airport and is located on Commonwealth owned land and is subject to a separate approvals process under the *Commonwealth Airports Act 1996*
Corridor section	The COR section generally includes the Albion-Jacana rail corridor between Jacana Station and south of Barwon Avenue, Sunshine North, as well as land between Sharps Road, Tullamarine and the Albion-Jacana rail corridor.
Sunshine section	The SUN section generally includes the existing rail corridor between Barwon Avenue, Sunshine North and Middle Footscray Station. The SUN Section also includes the Sunbury rail corridor to Ginifer Station and the Brooklyn freight corridor to Newport Station.

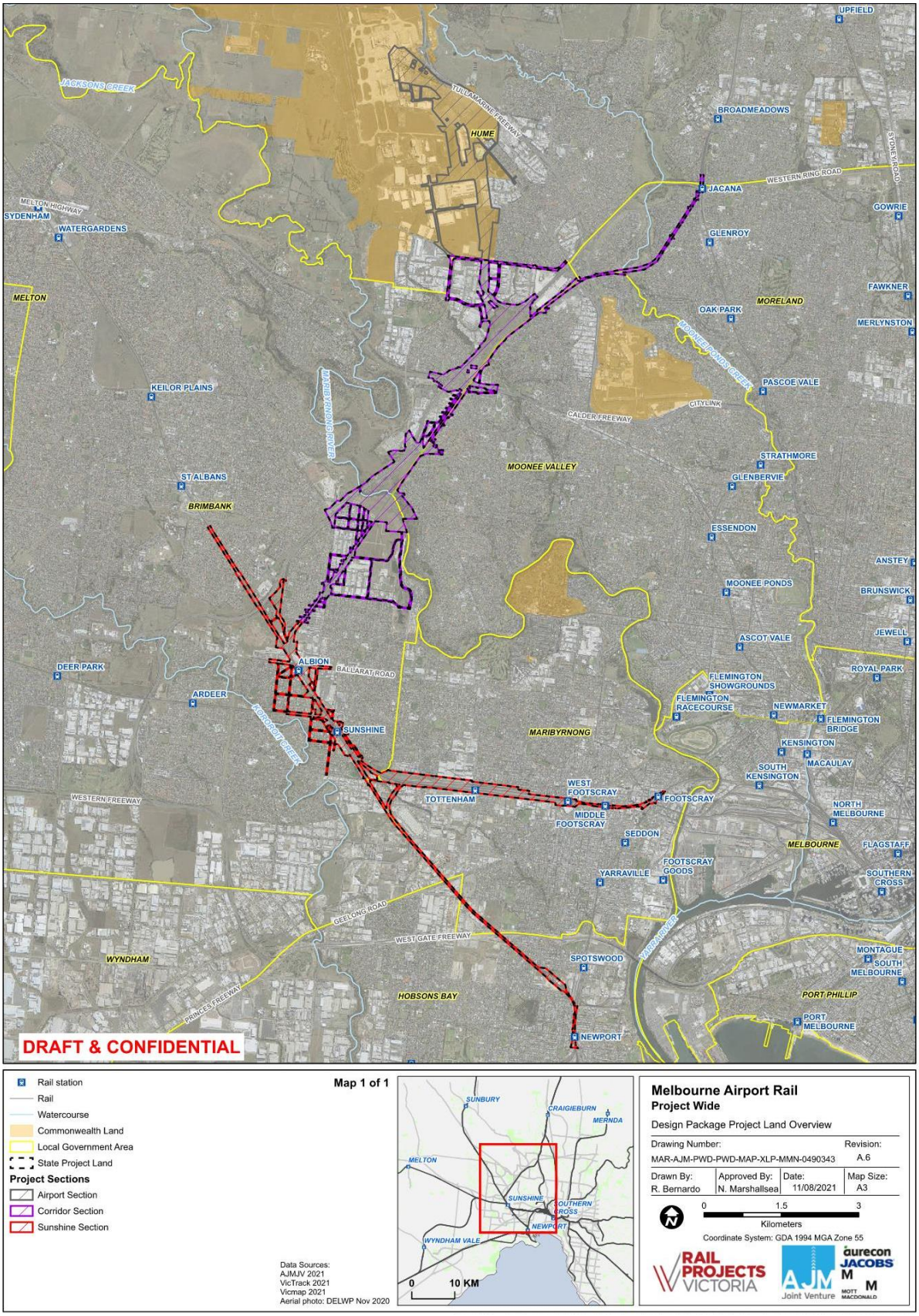


Figure 2.1 Sections of the Project Overview

2.4 Corridor Section Summary

The COR section of the Project includes the following main works:

- Construction of the new MAR tracks, comprising an approximately 8 km dual track railway and associated overhead line equipment (OHLE), combined services route (CSR) and track drainage works, including:
  - > A 2.3 km long elevated twin track viaduct structure between Sharps Road, Tullamarine and the Albion-Jacana rail corridor, crossing Steele Creek and the Western Ring Road including emergency and maintenance access points.
  - > New at-grade MAR tracks within the existing Albion-Jacana rail corridor, located on the Western side of the existing Australian Rail Track Corporation (ARTC) tracks.
  - > An elevated twin track viaduct structure across the Maribyrnong River valley, adjacent to the Western side of the existing state significant heritage bridge.
  - > Slewing of ARTC tracks between Keilor Park Drive and the Calder Freeway.
- Signalling works along the Albion-Jacana rail corridor between Jacana Station and Barwon Avenue, Sunshine North and within the new MAR corridor North of the Western Ring Road.
- Construction of an intake supply substation at Terror Street or the Northeast area of Brimbank Park and two traction substations at Fullarton Road and within the McIntyre Sidings, Sunshine North.
- Construction of two new Digital Train Radio System (DTRS) facilities one North or South of Keilor Park Drive, Keilor East and a second at Airport Drive, Tullamarine.
- Diversion, relocation and replacement works associated with utilities and underground services, including the existing ARTC CSR, high voltage (HV) transmission lines and numerous miscellaneous assets
- Protection works associated with the Exxon Mobil jet fuel pipeline along the Albion-Jacana rail corridor.
- Modifications to existing structures, including structural modifications and strengthening works at Calder Freeway inbound and outbound bridges, Fullarton Road bridge, Western Ring Road on-ramp and off-ramp bridges, Keilor Park Drive and McIntyre Road bridges.
- Replacement of shared use path (SUP) connections at Calder Freeway / Fullarton Road, provision of a new SUP overpass at Cranbourne Avenue, and provision of a Strategic Cycling Corridor link between Western Ring Road and Airport Drive via Steele Creek.
- The provision of retention basins at several locations along the Albion-Jacana rail corridor
- Establishment of temporary construction laydown areas, site offices, worksites, storage, parking areas and access roads

2.5 Sunshine Section Summary

The SUN section of the Project includes the following main works:

- Construction of a new 1.8 km long MAR twin track viaduct structure, including associated OHLE and CSR between Sunshine Station and the Albion-Jacana corridor, crossing Anderson Road, Ballarat Road, the Sunbury rail corridor, St Albans Road and Stony Creek.
- Signalling works, including the installation of trackside equipment along the Sunbury line towards Ginifer Station, along the Brooklyn freight corridor towards Newport Station, and along the Western rail corridor to West Footscray Station.
- Modifications to the tracks, formation, drainage, CSR, OHLE and signalling equipment for the MAR, Sunbury and Bendigo tracks from Albion to the beginning of the Jacana freight corridor
- Modifications to the Western and Eastern Albion Station forecourts and car parks.

- Modifications to Sunshine Station, including modifications to platforms, the Sunshine Station western car park and the construction of a new concourse.
- Modifications to the existing Sunshine and Sunshine West substations
- Diversion, relocation and protection of existing utilities and underground services.
- Establishment of temporary construction laydown areas, site offices, worksites, storage, parking areas and access roads

3. Planning and Environment

3.1 Environment Effects Statement

The *Environment Effects Act 1978* (EE Act) provides for assessment of proposed projects (works) that are capable of having a significant effect on the environment. Under section 8(4) of the EE Act, a referral is required to be submitted to the Minister for Planning to determine whether an EES is required. Referral criteria relevant to contaminated land are as follows:

- *Potential extensive or major effects on land stability, acid sulfate soils or highly erodible soils over the short or long term.*
- *Potential extensive or major effects on beneficial uses of waterbodies over the long term due to changes in water quality, stream flows or regional groundwater levels.*
- *Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport.*

3.2 Planning and Environment Act 1987

The project is located within the municipalities of Hobsons Bay, Maribyrnong, Brimbank, Moonee Valley, Moreland and Hume and is subject to their local planning schemes. The respective planning schemes set out the relevant planning controls which determine whether planning approval is required for the use and/or development of land. These controls include zones, overlays, and particular and general provisions.

The *Planning and Environment Act 1987* is relevant to the project as land use planning studies have shown that a variety of approvals are triggered by the proposed works. There are a variety of pathways via which planning approval may be obtained for rail projects. The planning approval pathway for the project will be confirmed through further consultation with DELWP.

3.3 Environment Protection Act 2017

In 2017, the Victorian Parliament passed the *Environment Protection Act 2017* (2017 Act). The *Environment Protection Amendment Act 2018* (Amendment Act 2018) substantively amends the 2017 Act so that the 2017 Act will become the principal environmental legislation in Victoria, and the 1970 Act has been repealed. Consultation with the Victorian EPA should be undertaken during the design phase to ensure further requirements can be incorporated into the project and design in a timely manner.

The State Environment Protection Policy (land) which previously outlined beneficial uses to be protected has now been replaced by the Environmental Reference Standard (ERS). The ERS defines outcomes for human health and the environment by identifying environmental values in locations across Victoria. The environmental values of the land environment defined in the ERS are:

- Land dependent ecosystems and species;
- Human health;
- Buildings and structures;

- Aesthetics; and
- Production of food, flora and fibre.

Key changes and implications with respect to waste management and spoil disposal/ reuse apply to the design and delivery phases of MAR now the new EP Act and subordinate legislation has taken effect from 1 July 2021; notable of those include:

- Section 25(1) imposes a general environmental duty (GED) requiring that "*A person who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable*".
- Section 39 also imposes a duty to manage contaminated land upon "*a person in management or control of contaminated land*…" (S39(1)), including duties in relation to identification, investigation, provision and maintenance of reasonably practicable measures to minimise risks, and provision of adequate information in regards to contaminated land.
- Section 31 imposes a duty to take action to respond to harm caused by pollution incident; "*If a pollution incident has occurred as a result of an activity (whether by act or omission) and the pollution incident causes or is likely to cause harm to human health or the environment, a person who is engaging in that activity must, so far as reasonably practicable, restore the affected area to the state it was in before the pollution incident occurred*". Section 32 imposes a "*Duty to notify Authority of notifiable incident*" and Section 40 a duty to notify of contaminated land stating (S40(1)) "*A person in management or control of land must notify the Authority if the land has been contaminated by notifiable contamination as soon as practicable after the person becomes aware of, or reasonably should have become aware of, the notifiable contamination*".
- Section 156 enables that "*The Governor in Council may by Order published in the Government Gazette, for the purposes of minimising risks of harm to human health or the environment from pollution or waste, require a council, public sector body or infrastructure manager*…" to take actions, consider information, and comply with given requirements "*when managing land, managing or operating infrastructure or planning the management of land or infrastructure*".

In accordance with the GED, contractors will be expected to reduce risk of harm from activities to avoid environmental damage, including appropriate handling of industrial waste and preventing run-off, or any other uncontrolled movement of contaminated soil or water, from a construction site.

Environment and planning implications related to secondary consents from EPA Victoria, particularly around the reuse of spoil materials, include:

- A Declaration of Use (DoU) may be required for reuse of Fill Material, which would describe the waste, assesses its risks and identify legitimate use. There is potential that an EPA designation sought to manage Category D material would also be applicable to Fill Material.
- Soils classified as Category D material will require an A17 Permit under the Victorian EPA waste guidelines to be adopted from July 2021.
- For soils classified Category C and above, a Permit L02 (Contaminated sites – on-site soil containment) will be required for onsite retention of contaminated soil in a facility designed for the purpose of holding at least 1000 m3 of contaminated soil.

4. Existing Conditions

4.1 Overview

Multiple drilling and sampling programs completed by Golder Associates on behalf of AJM JV for the MAR Project, with intrusive investigations being completed over multiple phases during the concept and reference design. Sampling is ongoing and further work will be undertaken so spoil can be appropriately managed in the delivery phase. The investigations to date have informed several reports that have been prepared for the MAR project which outline the nature and extent of contamination to date.

Investigation works undertaken to date have included the collection and analysis outlined in Table 4-1.

Table 4-1: Summary of MAR investigation locations and analytical dataset that informed the impact assessment

Section	Project Segment	Boreholes	Auger Holes	Test Pits	No. Soil Samples	No. Groundwater Samples	Soil Vapour Bores	No. Soil Vapour Samples
COR	M80 to Airport	31	2	1	129	8	-	-
	North of Maribyrnong River to M80	33	24	8	212	9	-	-
	Sunshine to South of Maribyrnong River	20	12	-	125	7	6	2
SUN	Sunshine	27	1	-	93	8	2	6
TOTAL		**111**	**39**	**9**	**559**	**32**	**8**	**8**

4.2 Ground Conditions

This section summarises the geotechnical and hydrogeological conditions along the alignment based on completed investigations.

4.2.1 Geological Conditions

Most of the proposed MAR alignment is at grade over the relatively level basalt plains except for an elevated viaduct commencing to the south of Steele Creek, then descending to an excavated dive structure and station commencing approximately 1km to the south of the Airport. The alignment will bridge two deeply dissected drainage courses containing the Maribyrnong River and Steele Creek. Existing bridges will need to be widened, or new standalone bridges be constructed to accommodate the new tracks.

The ground conditions of the basalt plains comprise Quaternary aged volcanic basaltic rocks beneath a relatively thin, but variable, band of residual highly reactive clay. The thickness of the basaltic rock ranges from greater than 30m towards the Sunshine end of the alignment and around 16m towards the Airport. Despite there being no discernible relation between rock strength with depth, there is a marked difference between the strength of the basalt rock north and south of Steele Creek. One possible reason for the difference in rock strength is the different sources and ages of the basalt flows. The older basalt, north of Steele Creek is likely to have become more weathered over time resulting in lower strength.

Where the alignment crosses the Steele Creek valley, sediments of the Brighton Group and variable weathered Older Volcanics can be expected. Interbedded siltstones and sandstones of the Melbourne Formation can be expected within the base of the Maribyrnong River valley. Although most of the Melbourne Formation is moderately weathered, or better, a borehole encountered a significant thickness of intense fracturing, crushing and shearing.

4.2.2 Hydrogeological Conditions

The hydrogeology along the alignment can be summarised by the following hydrogeological features:

- Shallow perched groundwater.
- Quaternary Alluvial materials groundwater.
- Newer Volcanics aquifer.
- Tertiary Sediments of the Brighton Group aquifer.
- Tertiary Older Volcanics aquifer.

Groundwater recharge occurs from diffuse rainfall recharge, and locally during high flows in creeks and rivers. Anthropogenic sources such as leaky water infrastructure or deep drainage from irrigation of parks and gardens may contribute to recharge. The main discharge points are the Maribyrnong River and Steele Creek, with evapotranspiration and discharge into leaky sewers and or drainage services, especially in the Steele Creek valley area.

Shallow perched groundwater can be expected to form following rainfall events where run off exceeds the capacity of the relatively low permeability materials either on top of, or within the Newer Volcanics, to permeate into the underlying Newer Volcanic aquifer. The extent and duration of the perched groundwater will be dependent upon the rainfall event. Perched groundwater will usually occur during the wetter periods of the year and but can occur at any time.

The regional groundwater flow is expected to follow the topography, except for localised flow to watercourses and leaky services. The depth to groundwater along the alignment typically ranges from between 20m and 30m within the Airport precinct and 10m to 15m along the existing ARTC tracks between Albion Station and the Calder Highway crossing. At the base of the Maribyrnong River and Steele Creek valleys, groundwater is expected to be the baseflow of the water courses.

The Newer Volcanics are a regionally extensive high permeability aquifer which provide water both to many private groundwater users and to the environment.

5. Impact Assessment

5.1 Introduction

The assessment of existing conditions at MAR in respect to land contamination issues is based on appraisal of information relating to current and historical land uses, and environmental investigation data reported in the public domain as well as data collected specifically for the MAR project.

Contaminated land is described in the *Environment Protection Act 2017* as that at which "waste, a chemical substance or a prescribed substance" is present on, or under the surface of the land: in a concentration above the background level; and which creates a risk to human health or the environment. This impact assessment considers '*environmental conditions*' pertaining to contaminated land as indicated from available information that may potentially cause *'any significant effects…on the use or development'.*

Project impacts in relation to contaminated land can be considered from broadly two perspectives:

- The potential impacts / effects of the project on the environment and community is considered based on the residual impacts after mitigation measures to reduce impacts have been implemented within the project. For the purposes of informing a referral under the EE Act, these impacts are considered after the application of mitigation measures and relate to the likely residual impacts.
- That context does not require recognition of the complexity, scale, or cost etc. of implementation of the mitigation measures required; those are impacts to the project due to the need to implement management/mitigation measures relating to the project's interaction with contaminated land.

This impact assessment focusses primarily on the latter, and seeks to present the qualitative characterisation of the potential risk for contaminated land to impact the project, considering the potential interactions of the project with contaminated land as identified from assessment of existing land contamination conditions.

Major infrastructure projects within urban environments have the potential to encounter contaminated soil, rock and groundwater being the legacy of many years of commercial and industrial development combined with poor environmental management and waste disposal practices in the past. MAR is no exception, with many known and potentially contaminated sites along or near the proposed project boundary.

The main impacts from disturbing sources of contamination would be associated with the MAR construction phase and with shallow excavation works within the rail easements; including handling, transporting and reuse/ disposal of large volumes of clean fill/ potentially contaminated material/ prescribed industrial waste/ and/ or, asbestos-containing materials.

5.2 Excavation

5.2.1 Excavation (Soil and Rock)

The majority of excavation for the Project will be shallow bulk earthworks and trenching. Excavation of contaminated soils may create an exposure pathway to sensitive receptors (this is further discussed in Section 5.4). This may have a material impact on human health or the environment, or that will generate waste spoil in volumes that will require active management or disposal.

'Significant' excavation is defined in the context of this assessment as excavations or other ground disturbance typically with average excavation depths greater than one metre. Deeper excavations (primarily piling works) are expected to intercept groundwater and require active management during construction to mitigate impacts.

Table 5-1: Bulk earthworks on MAR

Item	Section	Description
Elevated Structure Piling through to Airport Drive	COR	Piling required for elevated viaduct through to Mercer Drive roundabout. Includes minor access roadworks. Potential for minor earthworks associated with relocation of drainage pipes to accommodate piling.

Item	Section	Description
		Groundwater may be encountered during piling.
CSR Keilor Park Drive to Calder Freeway	COR	Trenching works.
CSR to Jacana Station (TBC)	COR	Trenching works.
Detention Basin	SUN	Bulk earthworks. Approximately 4,000 m^3, located off St Albans Road.
Maribyrnong River Bridge Piling & Associated works	COR	Piling and major earthworks expected to allow access for piling rigs. Groundwater may be encountered during piling.
Cutting Works	COR	Bulk earthworks.
Substation	COR	Bulk earthworks to establish new substation site.
Calder Freeway Underpass Cut & retaining wall	COR	Bulk earthworks.
Provisional Station at Fullerton Drive	COR	Bulk earthworks.
MAR Viaduct Piling	SUN	Piling required for elevated viaduct through Sunshine. Includes minor access roadworks. Minor stripping and filling throughout this section.
CSR to West Footscray (TBC)	SUN	Trenching works.
CSR to Newport (TBC)	SUN	Trenching works.

5.2.2 Interaction with Groundwater

Groundwater is not likely to be encountered for bulk earthworks, or any significant project infrastructure. Based on groundwater levels across the site, groundwater is expected to be encountered only for piling activities.

Piling activities may require drilling down through multiple aquifers; controls are therefore required during piling to limit groundwater flow into excavations (including bored piles) to control potential mixing though different groundwater regimes; and to control potential for groundwater drawdown to prevent movement of any existing contaminated groundwater (if any), and ensuring maintenance of base flow of the Maribyrnong River.

The key project areas where piling is likely to intersect groundwater are detailed below.

M80 Flyover and Viaduct (State Land)

The proposed elevated viaduct will be an elevated structure over Steele Creek and the M80 heading into the Airport. The proposed piles that support each pier are which vary in pile lengths but will typically between 10-50m in length. The groundwater level at this area is noted to be relatively shallow, and based on the information provided, the piles will intersect groundwater.

Piling activities will also encounter groundwater and may require drilling down through multiple aquifers. The presence of groundwater may allow softening of the base of the foundation material once exposed and would need to be carefully managed during construction.

Maribyrnong River Bridge

The proposed bridge will support the broad gauge, twin tracks carrying the new electrified MAR trains over the Maribyrnong River valley to the west of the existing rail bridge. It is expected that piles will be required to support vertical, and some lateral, loads for the proposed elevated structures and works associated with widening existing bridges.

Pile lengths will be typically between 30-50m in length, and are anticipated to be bored and will intersect groundwater. These are likely to be a wet piling (using bentonite or polymer) methodology to prevent collapse; however will be subject to further detailed design and construction planning.

Sunshine Viaduct

The Sunshine Albion viaduct is an elevated flyover structure of Ballarat and Andersons Roads in the Sunshine-Albion Section. Based on information available to date, dry bored piles may be implemented within the Newer Volcanics (however this will be confirmed in detailed design), and the piles are likely to intersect groundwater.

5.3 Conceptual Site Model

AJM JV has developed conceptual Site Models (CSMs) for three typical excavation scenarios which form the basis for assessment of the implications and opportunities for contaminated land. CSMs are provided for the following project excavation scenarios. The procedure to develop the preliminary CSM followed was generally in accordance with the Amended National Environmental Protection (Assessment of Site Contamination) Measure (NEPM) (NEPC, 2013).

- Shallow Rail Easement with no Adjacent Industry
- Shallow Rail Easement with Adjacent Industry
- General Urban Soils and Deeper Structures

They illustrate the domain (e.g. shallow / deep soils or groundwater), sources of impact (e.g. fill), exposure medium (e.g. exposed soils) as well as exposure pathways and receptors. These general CSMs were used as the basis for identifying potential contamination within each of the zones along the MAR alignment.

The contaminant profile within the project area around Sunshine Hub and Albion station and along the Jacana rail reserve was characterised by the presence of ballast and fill (which may include a wide variety of contaminants of potential concern including asbestos) superimposed with herbicides (arsenic, 2,4-D+), wear and tear of railway rolling stock and railway infrastructure (heavy metals – copper, zinc, lead), use and storage of fuels, oils and/or lubricants, naturally elevated elements (nickel, in soils derived from Newer Volcanic basalt). Additional contamination may be transported onto the project areas from off-site sources relating to industrial and waste disposal practices; potential for presence of contamination associated with off-site sources. Transport pathways may be via windblown dust (such as with asbestos fines) and or via overland flow or drain of water borne contaminants.

A variety of pathways and physical, chemical, and biological transport mechanisms will influence the distribution of chemicals from their sources to locations throughout and beyond the site. Chemicals generally are transported via solution (i.e. dissolved in groundwater or surface water), particulate matter (i.e., chemicals sorbed to soils, sediments, or other particulate matter), as a vapour or gas or in biological matrices (i.e. bioaccumulated through food chain). The chemical forms (species) and phases in which they occur influence their transport, fate, and bioavailability. Each chemical's form and phase depends on its properties as well as local environmental conditions.

An indication of potential receptors that might be impacted by any contaminants at the site has been determined by first reviewing the potential beneficial uses at the site. "Beneficial use" as defined by EPA Victoria means a use of the environment or any element or segment of the environment which is:

- Conducive to public benefit, welfare, safety, health or aesthetic enjoyment, and which requires protection from the effects of waste discharges, emissions or deposits, or of the emission of noise; or
- Declared in the Environmental Reference Standard as an Environmental Value (previously under the State Environment Protection Policy to be a beneficial use).

5.4 Summary of contaminated land impacts

5.4.1 Ongoing use of soil

A discussion of contaminants which exceeded the adopted assessment criteria and their potential impact to the identified beneficial uses of the soil and groundwater are summarised below:

Aesthetics

Overall, no aesthetic issues were identified that would have a significant impact on the project.

Buildings & Structures

Selected soil and rock samples (excluding QA/QC samples) were assessed for sulfate (as SO_4), chloride, electrical resistivity and laboratory pH to assess aggressivity of the soils to concrete and steel piles.

Review of the results indicates that for pH, sulfate and chloride, none of the samples fell outside of the lowest exposure classification for either concrete or steel piles in soil; indicating that soil conditions are non-aggressive and unlikely to corrode building materials.

Acid Sulfate Soil/ Rock

Bridge piling and associated minor excavation for piling rig working pads at existing rail bridge locations and elevated structures (notably Maribyrnong River Bridge) are proposed within the Project. A total of 73 samples were analysed for Acid Sulfate Soils (ASS) and 72 samples analysed for Acid Sulfate Rock across the project. The assessment was based on the comparison to EPA Publication 655.1 (EPA Victoria, 2009b).

Overall, acidic soil conditions were not readily identified in near surface soils, consistent with AJM JV's understanding of the geological setting as based on published maps of soil acidity and AJM JV's desktop reporting. Actual ASS or Potentially Acid Forming conditions were generally encountered in deeper samples (between 11 – 52 mbgl). These samples were variously described as clay, silt, lignite, siltstone or sandstone in the borelogs, indicating that the deeper geologic formations underlying the Newer Volcanics Basalt were encountered.

These boreholes were located within identified areas of deeper excavation, and therefore may be encountered during piling works. Due to the nature of piling excavation, low volumes of excavated spoil with these conditions can be expected. Material can be reasonably managed with standard construction techniques and management processes

Naturally Elevated Compounds

In some cases, elevated concentrations of certain compounds within in-situ soil may be considered naturally occurring and therefore not contamination for the purposes of spoil classification.

The available dataset for the project corroborates this, as nickel was reported at concentrations exceeding IWRG1828.2 Fill Material criteria in approximately 36%[3] of soil samples collected. It is therefore likely that reported concentrations of nickel above IWRG1828.2 Fill Material criteria in natural or reworked natural soil is not indicative of contamination where no other contaminants are reported. However, this may limit off-site re-use opportunities in geological areas where nickel is not naturally elevated or other sensitive offsite uses.

Human Health

With respect to other material issues, potential for risks to human health (construction contractors) with respect to inhalation of contaminated dusts and fines, and direct contact with contaminated materials were identified. Soil samples from a total of 159 locations on State land have been assessed for the presence of contamination with total of 559 soil samples analysed.

- Exceedances of adopted screening criteria protective of construction workers were reported in a total of three samples collected from two borehole locations and one test pit location.
- No exceedances of adopted screening criteria protective of commercial/industrial land uses were reported.

Ecological Health

Soil samples from a total of 159 locations on State land have been assessed for the presence of contamination with total of 559 soil samples analysed. Samples collected from State land were compared against NEPM guidelines protective of ecological receptors in a public open space or industrial setting.

- Exceedances of adopted screening criteria protective of ecological receptors in a public open space setting were reported for certain contaminants in a total of 23 samples collected from 18 borehole locations.

[3] 144 of 458 samples based on currently available dataset.

- Similarly, exceedances of screening criteria protective of ecological receptors in a commercial / industrial setting were reported for certain contaminants in a total of 11 samples collected from 8 borehole locations.

The risks to ecological receptors will likely require a more site-specific consideration of potential source-pathway-receptor linkages than can be determined by the existing dataset.

5.4.2 Offsite disposal/ reuse

The presence of significant volumes of contaminated spoil has the potential to impact upon the delivery of the project in multiple ways. Limitations in local landfill capacity due to the cumulative demand of multiple large infrastructure projects may reduce offsite disposal options. Regulatory changes can also impact upon waste classification and management requirements. Finally, community stakeholders' interests can also impact upon the way material is managed on major infrastructure projects. By understanding the likely spoil volumes and characteristics and with an emphasis on spoil reuse where feasible, RPV aims to minimise disposal to landfill and to address management and community stakeholder concerns.

The current estimates of spoil generation associated with the State land portion of the project is **297,500** cubic metres (m^3), with approximately 80% of this spoil being excavated from the top 1m. Investigations to date have shown that the estimated volumes of spoil against the EPA Vic Publication IWRG1828.2: Waste Disposal Categories include volume estimates of Fill Material (~15%), Category D Material (~75%), and limited Category B and C hotspot areas (<1%).

The current identified risk to the project with respect to spoil re-use or waste management is Moderate, primarily based on the presence of concentrations of contaminants that are not listed in 1828.2 and require an EPA Vic waste designation. AJM JV note that disposal requirements for these soils in Victoria will ultimately be determined in consultation with EPA Victoria on a case by case basis, via the process of specific application to EPA for a classification determination.

5.4.3 Groundwater

Based on the geological and hydrogeological investigations undertaken to date, the potential for groundwater interaction during construction is anticipated to be limited to areas of deep excavations or pilings; accordingly, the potential for project interaction with groundwater contamination (if any) is also limited to those areas.

The risks associated with groundwater movement due to piling is low, provided adequate controls are identified and implemented during the delivery phase, based on the detailed design and construction planning. The process of piling may impact on the movement of existing groundwater contamination plumes as a result of project dewatering activities, and which may induce human health risks at third-party property buildings due to vapour intrusion risk if a 'volatile contaminant' plume is mobilised to beneath that building; potential regulatory issues should EPA determine mobilisation of a plume to be itself an act of pollution, may also apply.

However, it is important to note that the current bore network does not adequately target these areas where piling is to occur; as groundwater wells are located along a linear feature and may not provide information on the presence of contamination on nearby properties nor delineate existing groundwater plumes.

The key project areas where piling is likely to intersect groundwater are as follows:

- M80 Flyover and Viaduct (State Land): Piling is anticipated to be a combination of bored and driven piles, however the proposed methodology (i.e. wet/dry piling) is currently unknown. Based on the information provided, the piles will intersect groundwater.
- Maribyrnong River Bridge: Piles are anticipated to be bored and will intersect groundwater. These are likely to be a wet piling (using bentonite or polymer) methodology to prevent collapse.
- Sunshine Viaduct: Piles are anticipated to be bored and will intersect groundwater. AJM JV understands, that dry bored piles are anticipated within the Newer Volcanics.

An assessment of the potential impacts of piling activities was undertaken, which outlines the overall risk to receptors as a result of piling activities is considered to be low. Based on the current understanding of the project and available data, the assessment considered the groundwater impacts would not result in any EES referral criteria being triggered.

5.4.4 Soil vapour/ landfill gas

The desktop review has identified several former quarries, and waste disposal sites both within and abutting the State project land that have the potential to be filled with putrescible and industrial wastes. If any above or below ground enclosed structures are along the pathway for landfill gas migration, risks from landfill gas may arise. These gases, if present, have the potential to impact upon the construction and operation phases of the project, particularly with respect to asphyxiation and explosive risks.

Based on the available data and understanding of the project (including the location of any enclosed structures), the current identified risk of vapour contamination and / or landfill gas substantially affecting the project is low.

If there is the potential for any enclosed structures to be constructed in the vicinity of the former Sunshine Harvester Factory in Sunshine or the former Halon Bank site in Braybrook, then further investigation into the risk posed by soil vapour impacts as may be associated with identified chlorinated hydrocarbons detected in groundwater is recommended. There are currently no plans for enclosed structures in the vicinity of these sites.

5.5 Environmental Risk Management

Contaminated land is currently regulated[4] in Victoria through the Environmental Protection Regulations, Environmental Reference Standard (ERS), Part 4 – Land and other subordinate legislation tools under the new EP Act.

The following sections address the recommended management measures that are either:

- Currently ongoing as part of the Reference Design (Planning and Design Phase) contaminated land investigation program.
- Will become project obligations during the Detailed Design and Delivery Phase through contractual requirements (PS&TRs) or through the EMF and EMRs. The below summarises these recommended environmental management measures to be undertaken.

[4] Regulation of contaminated land constantly changes as a result of improved research and studies.

5.5.1 Planning and Design

5.5.1.1 Soil and Rock

Areas of Additional Assessment

The Project has already taken significant measures to identify the nature and extent of contamination. However, a number of areas within the MAR project land have been identified as known or potentially contaminated, which have not yet been investigated by AJM JV. Additional sampling of soil in the vicinity of identified hotspots is recommended to attempt to delineate the extent of elevated contamination.

Spoil Reuse

Spoil reuse will be prioritised in accordance with EPA Victoria's Waste Hierarchy. MAR has undertaken initial work to identify potential reuse options based on the suitability of spoil for reuse, including the waste classification and associated volumes. A detailed assessment of the preferred options will be undertaken to assess the viability of the preferred options and assess feasibility for each option in the delivery phase.

Reuse options will be further informed by risk workshop, including community and stakeholder management and budget aspects. Options aim to be cost effective, practical and viable, where utilisation of reuse options in the delivery phase will have economic, environmental and social benefits.

5.5.1.2 Groundwater

All civil structures will be designed for the most adverse high and low groundwater levels, including variance between sides of the structure both during construction and throughout the Design Life, including accounting for effects of climate change. The works shall be designed to avoid changes to groundwater levels during construction and operation, minimising impacts on groundwater dependent values, ground movement and contamination plume migration.

A piling method should be selected that maintains groundwater levels. Design contingency measures and/or controls shall be established to maintain the surface and groundwater quality by:

- Limiting groundwater flow into any subsurface excavations or between different groundwater regimes;
- Controlling the movement of any contaminated groundwater and minimising impact to existing plume geometry (if any);
- Ensuring maintenance of base flow of the Maribyrnong River;
- Piles to be concreted (where possible) within 24 hours of completion of excavation.

The contractor will be responsible for implementing an appropriate monitoring program during piling to monitor groundwater levels to check that they are maintained and no adverse impacts can occur.

5.5.2 Delivery Phase

The EMF and EMRs will outline the obligations for management and mitigation of contaminated land impacts. These EMRs will be required to be fulfilled by all Contractors during the detailed designed and delivery phases. The EMRs will require each Contractor to develop and implement a Construction Environmental Management Plan (CEMP), and other management plans that outline the relevant mitigation measures. The measures provided in the contractor's CEMP to meet the EMRs must comply with relevant Commonwealth and Victorian laws and policies, and with EPA and WorkSafe Victoria requirements. During delivery the Contractor's compliance with these plans will be audited by an Independent Environmental Auditor.

Well-established construction techniques and management processes to mitigate and avoid these potential impacts would be set out in the CEMP for MAR with remedial works incorporated into designs as required. These measures would minimise, as far as reasonably practicable, the disturbance of sources of contamination and the excavation of contaminated spoil. Where sources of contamination are encountered and disturbed, processes would be implemented to minimise the impacts of this disturbance and to handle and dispose of contaminated waste safely.

Draft EMRs that are for Contaminated Land Management and Groundwater Management recommended to be implemented by the Contractor are outlined below.

5.5.2.1 Soil and Rock

Contaminated soil and spoil management

Prepare and implement a Soil Management Plan (SMP) in accordance with relevant regulations, standards and best practice guidelines. The SMP must be developed in consultation with the EPA Victoria and include processes and measures to manage spoil.

RPV have completed a comprehensive contaminated land investigation program, and some requirements listed below will already have been achieved by RPV, however is still required to be collated into a SMP to address site specific issues.

The SMP must define roles and responsibilities and include requirements and methods for:

- Complying with applicable regulatory requirements
- Completing a detailed site investigation (in accordance with Australian Standard AS 4482.1:2005 Guide to the investigation and sampling of sites with potentially contaminated soil prior to any excavation of potentially contaminated areas to identify location, types and extent of impacts and to characterise spoil (waste determination/ designation) to inform spoil and waste management.
- Identifying locations and extent of any prescribed industrial waste (PIW), other waste, and the method for characterising PIW and other waste prior to excavation.
- Identifying the nature and extent of spoil (clean fill and contaminated spoil)
- Storage, handling, transport and disposal of spoil in a manner that protects human health and the environment, including:
    - > Design and management of temporary stockpile areas.
    - > Requirements and methods for the appropriate treatment/remediation of any contaminated excavated spoil and contaminated residual material left on site.
    - > Transporting spoil material, the appropriate with obligations, transport permits, waste transport certificates and accredited agents.
    - > Disposal or reuse of spoil to a lawful place
- Spoil must be managed in accordance with EPA Victoria's waste hierarchy, spoil reuse must be prioritised over landfill disposal, including:
    - > Identifying and managing potential sites for re-use, management or disposal of any spoil in accordance with the Environment Protection Act 2017 and Regulations 2021 on waste management hierarchy
    - > Identifying suitable sites for disposal of any waste. This includes identifying contingency arrangements for management of waste, where required, to address any identified capacity issues associated with the licensed landfills' ability to receive PIW and other waste.
- Minimising impacts and risks from disturbance of asbestos in soils, acid sulfate soils, odour management and vapour and ground gas intrusion
- Identifying where any contaminated or hazardous material is exposed during construction; and management of hazardous substances, including health, safety and environment procedures that address risks associated with exposure to hazardous substances for visitors and general public; contain measures to control exposure in accordance with relevant regulations, standards and best practice guidance and to the requirements of WorkSafe and EPA Victoria; and include method statements detailing monitoring and reporting requirements
    - > Identify the areas of contamination risk and risk management procedures

- > Include a contamination unexpected finds protocol in case localised contamination is encountered (I.e. hotspot management)
- > Safety procedures to protect human health, environmental health, contamination control
- > Identify and implement environmental monitoring of potential exposure risks

- The SMP should refer to relevant WorkSafe and EPA publications related to spoil management. These guidance documents provide best practice measures for applying the General Environmental Duty and maintaining environmental values of land listed in the Environmental Reference Standard. Documents include (but are not limited to):
  - > EPA Publication 1834: Civil construction, building and demolition guide.
  - > EPA Publication 1820: Construction – Guide to preventing harm to people and the environment.
  - > EPA Publication 1895: Managing Stockpiles.
  - > WorkSafe Industry Standard: Contaminated construction sites.

  This must include reducing impacts to human health and the environment from contaminated land, including site planning, stockpile management, dust suppression, and erosion and sedimentation. The SMP must detail methods for:
  - > Construction of appropriate cover (soil, concrete, geofabric etc) such that no contamination is left exposed at the surface or where it may be readily accessed by the public and such that it cannot generate runoff or leachate during rain events
  - > Maintenance of the cover
  - > Identification of the nature and depth of the contaminants
  - > Mitigating impacts during sub-surface works in those areas, E.g. drilling and excavation
- Records management, monitoring and reporting

Asbestos in Soils

Prior to commencement of relevant works, prepare and implement a health, safety and environmental plan for the management of hazardous substances. The plan must include but not be limited to:

- Consideration of the risks associated with exposure to hazardous substances for employees, visitors and general public.
- The identification of methods to control such exposure in accordance with relevant regulations, standards and best practice guidance and to the satisfaction of WorkSafe and in consultation with EPA.
- Method statements detailing monitoring and reporting

Laydown Areas

Prior to works commencing, the Delivery Partner must complete pre- and post-construction soil assessments in areas to be used for project office compounds, depots or laydown areas (where pre-construction investigations have not already been completed). This assessment will enable the comparison between the contamination status of each site prior to works and upon completion of the works and, if necessary, inform site remediation requirements. All sites are to be left in an equivalent condition at the completion of works as recorded in the pre-construction assessment.

5.5.2.2 Groundwater

Groundwater Management Plan

Where groundwater is expected to be encountered a groundwater management plan must be developed. The plan must include measures the demonstrate groundwater values (including groundwater dependent ecosystems) outlined in the ERS will be maintained and achieved. The plan may include groundwater modelling and/ or groundwater monitoring to validate values will be maintained.

The plan should consider the following:

a) Approach to maintaining groundwater levels during piling activities, including cumulative impacts of multiple piles.

b) Approach to collection, treatment and disposal of groundwater collected (if any) during construction.

c) Groundwater monitoring to check that the groundwater levels are being maintained and confirming no impacts to groundwater values or potential plume migration.

d) Contingency measures if piling activities cannot be completed within 24 hours of excavation being completed.

e) Contingency measures should unexpected groundwater conditions be encountered.

Piling Encountering Groundwater

A piling methodology must be selected that maintains groundwater values, including maintaining local groundwater levels and using non-hazardous drilling fluids used during piling (E.g. polymer and bentonite fluids).

Appropriate evidence must be provided in the Groundwater Management Plan that supports the construction methodology will not materially change groundwater levels

Unexpected groundwater conditions

A plan or process must be developed that includes contingency measures where groundwater is unexpectedly encountered. Contingency measures if impacts occur at existing active groundwater bores and surface water bodies.

6. Conclusion

6.1 Environment Effects Statement Implications

The *Environment Effects Act 1978* (EE Act) provides for assessment of proposed projects (works) that are capable of having a significant effect on the environment. Under section 8(4) of the EE Act, a referral is required to be submitted to the Minister for Planning to determine whether an EES is required.

The Ministerial Guidelines provide the criteria used to determine whether a referral should be made to the Minister for Planning. Combination criteria require a combination of two or more potential types of effects on the environment that might be of regional or State significance to warrant referral of a project. Based on environmental assessment undertaken to date and the current scope of the project (with no tunnelling), it is considered unlikely that the project will trigger either of the relevant referral criteria below to warrant referral to the Minister for Planning.

6.1.1 Contamination

- *Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport.*
- *Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport.*

Based on the preliminary sampling undertaken to date, the risks to human health (to general public) and the community are considered low. No exceedances of adopted screening criteria for human health protective of commercial/industrial land uses were reported, and therefore no significant impacts associated with contaminated land are anticipated with respect to the operational phase of the project. Surplus spoil will be generated by the project, with potential reuse options identified. Any proposed reuse of low-level contaminated spoil will be in accordance with the legislative requirements and require approval from EPA Victoria; other more hazardous material generated in small volumes will likely be sent to a licensed landfill (or treated and reused where appropriate).

Potential risks to human health (construction contractors) with respect to inhalation of contaminated dusts and fines, and direct contact with contaminated materials were identified. Based on the assessment undertaken to date, human health risk associated with identified contaminants is anticipated to be managed sufficiently by standard management / mitigation measures implemented via the Construction Environment Management Plan (CEMP), or management sub-pans to minimise impacts to the health, wellbeing and safety of human communities.

The delivery contractor will be required to develop an asbestos management procedure or plan that outlines control measures for the management of asbestos to reduce potential exposure. This plan will address standard control measures, and (where required) site specific controls for higher risk areas, these may include additional PPE and monitoring. The plan will outline an “unexpected finds” procedure.

6.1.2 Acid Sulfate Soils

- *Potential extensive or major effects on land stability, acid sulfate soils or highly erodible soils over the short or long term.*

The majority of works require construction of rail infrastructure within an operating rail corridor. As such, the extent of excavation, and therefore the risk of extensive or major effects on land stability, ASS or highly erodible soils is minimal.

Mitigation and management of ASS is a common and generally well-understood requirement of large infrastructure projects. Bridge piling and associated minor excavation for piling rig working pads at existing rail bridge locations and elevated structures (notably Maribyrnong River Bridge) are proposed within the Project. A total of 73 samples were analysed for ASS and 72 samples analysed for ASR across the project. Overall, acidic soil conditions were not readily identified in near surface soils, consistent with the

understanding of the geological setting as based on published maps of soil acidity. AASS or PAF conditions were generally encountered in deeper samples (between 11 – 52 mbgl).

These boreholes were located within identified areas of deeper excavation, and therefore may be encountered during piling works. Due to the nature of piling excavation, low volumes of excavated material with these conditions can be expected. Material can be reasonably managed with standard construction techniques and management processes. Provided that the nature and extent of ASS within the project areas is assessed in accordance with EPA Publication 655.1, and appropriate mitigation and management measures are put in place through the design and delivery phases of the project, potential extensive or major effects on ASS are unlikely to be realised.

6.1.3 Groundwater

- *Potential extensive or major effects on beneficial uses of waterbodies over the long term due to changes in water quality, stream flows or regional groundwater levels.*
- *Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport.*

There is potential for the project to encounter groundwater during construction in some discrete areas of the Project, mainly associated with piling activities associated with pier construction for the elevated structures (M80 Flyover and Viaduct, Maribyrnong River Bridge and Sunshine Viaduct). The identified risk of groundwater contamination related project impacts is low, based on the current understanding of the project and available data.

Risk associated with impacts to groundwater during piling are assessed as low with implementation of appropriate measures to mitigate potential impacts. An appropriate piling methodology will be selected that will maintain groundwater levels and mitigate the potential for causing migration of existing groundwater contamination and/ or impacts to ground or surface water values. Low volumes of potentially contaminated groundwater may require management during dewatering associated with piling, with potential exposure to construction workers. Engineering controls to segregate drilling slurry and standard management / mitigation measures implemented via the Construction Environment Management Plan (CEMP), or management sub-pans will be sufficient to minimise impact to the health, wellbeing or safety of a human community. Piling works can be managed in a way that maintains groundwater levels and will not impact on regional groundwater levels, water quality or groundwater flows.

6.2 Planning and Environment Act 1987

It is considered there will requirement to develop an EMF that will outline the relevant measures to avoid or minimise adverse environmental impacts from contaminated land. This will be developed in Consultation with each relevant municipal council on environmental management for the use or development. Public consultation, including consultation with relevant public authorities (including EPA Victoria) and the municipal council for the municipal district within which the proposed use or development will be carried out, must be carried out to the satisfaction of the Minister for Planning.

The recommended EMRs to be included in the EMF are outlined in Section 6.5.2.

6.3 EPA Victoria (secondary consents)

Contaminant concentrations were compared to soil waste guidelines listed within EPA Publication 1828.2 *Waste disposal categories – characteristics and thresholds* (EPA Victoria, 2020). Consideration of leachable concentrations was also undertaken as part of an assessment of contaminant mobility. A large portion of soil is preliminarily classified as either Fill or Category D in accordance with IWRG1828.2, in effect 1 July 2021 for the purpose of off-site disposal/ reuse.

Where waste cannot be given a waste category under the characteristics and thresholds listed in EPA Publication 1828.2; further engagement is required with EPA Victoria. This may include a specific waste designation from EPA Victoria based on the MAR spoil composition. MAR will take all necessary steps to undertake classification of wastes to determine the relevant waste disposal category in accordance with Schedule 6 of the Environment Protection Regulations 2021.

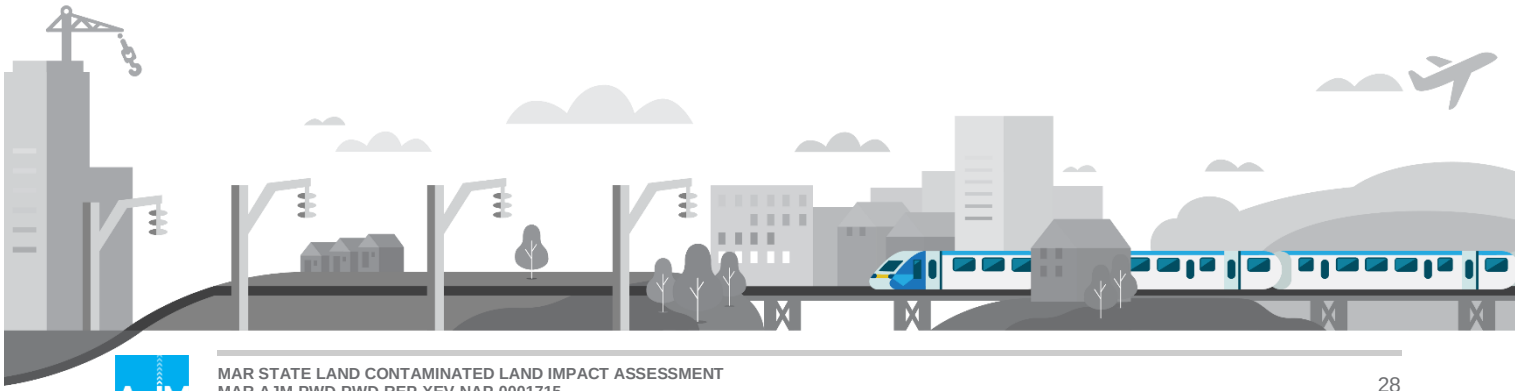
Where Category D Soil is reused, an EPA A17 permit will need to be obtained. The application will involve a risk assessment of the spoil and proposed reuse site to ensure suitability. More stringent EPA Victoria approvals would be required under the permissions framework for more hazardous (I.e. Category C Soil and above) spoil reuse.

The Project EMF will outline sufficient environmental mitigation measures related to the characterisation of soils and necessary spoil management processes, including handling during excavation, storage, transport and reuse/ disposal in relation to mitigate potential contaminated land impacts.

6.4 Summary

In summary, the Project is not likely to have a potential significant effect on the environment based on potential contaminated land impacts when assessed against the relevant referral criteria outlined in the Ministerial Guidelines. Where identified impacts cannot be mitigated through the detailed design and delivery phases, no significant effects related to contaminated land have been identified. This includes impacts that will have an impact of the future use or development of the land.

Mitigation measures (EMRs) will be developed and incorporated into the Project Environmental Management Framework (EMF) in relation to contaminated land. These will outline well-established construction techniques and management processes, that can be implemented to mitigate and avoid these potential impacts. The Contractor's construction environmental management plan (CEMP) for MAR will be required to include these measures to be implemented in the detailed design and delivery with remedial works incorporated into designs as required.



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