

Inquiry and Advisory Committee

Melbourne Metro Rail Project

Preliminary Matters and Further Information

25 July 2016

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A handwritten signature in blue ink, appearing to read 'Kathy Mitchell', is displayed within a light blue rectangular box.

Kathy Mitchell, Chair

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1 Introduction

The Minister for Planning has appointed an Inquiry under the *Environment Effects Act 1978*, and an Advisory Committee (the IAC) under the *Planning and Environment Act 1987* to report upon the Melbourne Metro Rail Project (MMRP) in accordance with Terms of Reference (23 May 2016).

The IAC has undertaken a preliminary review of the Environment Effects Statement, supporting documents and the submissions. This report provides notice to the Melbourne Metro Rail Authority (MMRA) that there are a number of matters that the IAC is seeking clarification or further information upon as part of the public hearing process.

This report was provided to the MMRA on 25 July 2016 to enable it to review the information sought and to provide a preliminary response, and is now formally tabled at the Directions Hearing on 26 July 2016.

Declaration:

This information is sought for clarification and without prejudice to the final recommendations of the IAC. The MMRA and other parties should not assume that the issues raised in this request for information are the only issues of interest to the IAC or that the IAC has particular concerns about these issues. The IAC reserves the right to seek further information as necessary throughout the course of the Public Hearing process. The issues raised in this report do not represent any, or the only opinions, of the IAC.

2 Transport

2.1 Modelling animations

(i) Reference

The Transport Impact Assessment (TIA) at p16 states that various modelling tools have been used, some of which can provide animated outputs.

(ii) Request

The IAC requests:

1. short animation clips, where available, to demonstrate typical peak hour traffic conditions during construction phase and operations, with and without MMR, around the Parkville and Domain Precincts
2. short animation clips, where available, of pedestrian movements on public footpaths and crossings in the immediate vicinity of the station entries at Parkville, CBD North, CBD South and Domain.

2.2 Domain station

(i) Reference

The TIA at p139-140 - Figures 8-20 and 8-21 Domain station precinct travel times – 2021 construction case do not indicate the closure of Domain Road.

(ii) Request

The IAC requests:

3. confirmation that the outputs reflect conditions with the closure of Domain Road to general traffic.

(iii) Reference

Appendix B – Existing Transport Conditions at p88-89, Figure 7-3 and Table 7-5 headings indicate the inclusion of existing traffic volumes for Domain Road, but they are not shown.

(iv) Request

The IAC requests:

4. the existing Domain Road traffic volumes.

(v) Reference

Appendix D – Transport Modelling Report Section 4.8 p83 states almost 4000 pedestrians will walk between the Domain Station and the tram superstop at St Kilda Road in peak periods.

(vi) Request

The IAC requests:

5. analysis on how the design of the transit interchange at ground level will accommodate the movements between the Domain Station and the tram superstop, as well as movements between the tram superstop and St Kilda Road.

(vii) Reference

Appendix E - 2031 Road Functional Layouts: Map MMR-AJM-PWPM-SK-RR-69837 p2 shows a potential tram superstop on Domain Road.

(viii) Request

The IAC requests:

6. any current plans for this proposed tram superstop, and advice as to whether the superstop will be accessible from the proposed underpass below St Kilda Road.

(ix) Reference

Appendix F - Construction footpath closures and diversions and Map 4 of 5, Pedestrian routes impacted by construction phase shows significant construction hoarding closing St Kilda Road.

(x) Request

The IAC requests clarification on:

7. the extent of hoarding proposed.

2.3 Western portal - replacement parking

(i) Reference

The TIA at p78 states that:

Options are being investigated to provide replacement parking in the vicinity of the station to minimise impacts on rail patrons driving to the station and users of JJ Holland Park, but details are not available at the time of writing ...

(ii) Request

The IAC requests:

8. an update on this investigation and the results of that investigation.

2.4 Bicycle parking

(i) Reference

The TIA, at p178, p193, p203, p213 and p228, states that 20 bicycle parking spaces will be provided at CBD stations and 50 spaces at other stations.

(ii) Request

The IAC requests advice on:

9. how the quantum of bicycle parking was determined.

3 Land use and planning

3.1 Impact of the Project Area maps in GC45

(i) Reference

The Project Land maps 1 – 16 in the Incorporated Document for Amendment GC45 appear to extend beyond Precinct boundaries.

(ii) Request

The IAC requests advice on:

10. whether all affected landowners have been informed their properties are within the identified Project Land boundaries. If so, by what form of notice and when?

3.2 Impact of the Design and Development Overlay

(i) Reference

The Explanatory Report for Amendment GC45 states the Design and Development Overlay (DDO) is to be applied to land above, below, or in close proximity to the Project's tunnels, stations and associated infrastructure to protect them from inappropriate development. Maps in Amendment GC45 identify the areas covered by the DDO.

(ii) Request

The IAC requests advice on:

11. whether the landowners of all properties affected by the DDO have been informed that their properties are identified within the boundaries. If so, by what form of notice and when.

3.3 Property acquisition

(i) Reference

The EES documentation refers to numbers of properties to be acquired across the Precincts, except for Precinct 9, without listing those properties. Some maps disclose properties to be acquired with some landowners making submissions about the proposal. However, there appears to be no consolidated list of properties.

(ii) Request

The IAC requests advice on:

12. whether the landowners of all properties identified for acquisition been informed their properties are identified for acquisition. If so, by what form of notice and when.

13. whether there is a programme for acquisition in each precinct.

14. whether properties are to be compulsorily acquired.

4 Social and community

4.1 Concept design

(i) Reference

Throughout the EES documentation, options are presented as alternative design options or approaches. In instances, there are references to further consultations with agencies to determine outcomes and further consideration of alternatives. For example, for the Western Portal there is an option to reposition the tunnel entry. Similarly, there are alternatives and options presented for the vertical alignment of the tunnels, works and the placement of structures at places such as Linlithgow Avenue, Tom's Block, the Domain Precinct, Fawkner Park and the Eastern Portal and surrounds.

(ii) Request

The IAC requests advice as to:

15. whether all options remain for consideration by the IAC. If so, what are the preferred option(s).

4.2 Peer review

(i) Reference

The Social and Community Impact Assessment Technical Appendix F references a peer review by Mr Offer at 4.2.6 (included as Appendix B to that report). The IAC notes the brevity of the peer review.

(ii) Request

The IAC requests:

16. clarification as to whether this was the only peer review of this aspect of the EES and whether the attachment is either the full peer review, or a summary of the peer review. If it is a summary, the IAC requests the full peer review report be provided.

4.3 Schedule of works

(i) Reference

The Social and Community Impact Assessment Technical Appendix F provides information on various aspects of work in various locations over the time of the Project. These works do not appear to be consolidated in any form so that a reader can see and understand the extent of works in all locations at various times throughout the eight to ten year construction cycle.

(ii) Request

The IAC requests:

17. a 'gant' type chart(s) or similar of the key areas of work in all precincts over the whole of the construction period so that it has a full understanding of what work is being undertaken in what areas, at what times, over the full construction period.

4.4 Fawkner Park

(i) Reference

The IAC understands that the proponent now believes that the Fawkner Park Tennis courts will not be required for use as a construction worksite for the Project.

(ii) Request

The IAC requests:

18. advice on the basis for this belief
19. clarification how this belief has been conveyed and to whom, and what the alternative location will be and again, how this information has been conveyed
20. advice on what works are now proposed for Fawkner Park.

5 Business

5.1 Business Impacts

(i) Reference

The EES documentation assesses the effect of the Project on businesses and offers measures through the Environment Performance Requirements to address and ameliorate anticipated impacts. The *Land Acquisition and Compensation Act 1986* will be the legislative base for dealing with acquired properties.

(ii) Request

The IAC requests advice on:

21. what mechanisms, if any, exist to enable businesses that are adversely affected, but not acquired, to receive compensation.

6 Air quality

6.1 Potential for asbestos fibre in air emissions

(i) Reference

MMRP Chapter 12 Air Quality Section 12.1, Overview p12.1 notes:

Temporary, localised adverse impacts to air quality are expected during the construction of Melbourne Metro from dust and combustion emissions.

This Section does not mention any planned studies for initial air monitoring baseline testing in association with the Project's construction sites. Whilst dust (particulate) fall-out is mentioned and modelled, there is no detail as to whether or how initial baseline data is to be collected across the construction sites.

(ii) Request

The IAC requests advice on:

22. whether there is any baseline information as to asbestos fibres within the general air space from the current EPA Richmond and Footscray air monitoring stations (within dust particulates) available for review
23. the potential for adverse effects on air quality due to asbestos fibre in air (associated in dust particulates) as a consequence of the project.

6.2 Plans for air quality baseline monitoring – spoil disposal areas

(i) Reference

Technical Appendix H Section 12.4, Methodology, Section 12.4.1: Assessment Approach, Study Area and p12-14, notes:

With the exception of the TBM tunnelling works (where emissions to air would be contained within the tunnels), impacts to air quality are expected in all locations where construction activities would be conducted. Accordingly, the study area for the impact assessment spans all construction precincts, with the areas of greatest risk identified as those with the highest intensity of construction works and handling of excavated spoil.

The assessment focuses on the major construction work sites at Arden, Domain and Fawkner Park. These sites would be the extraction points for removal of TBM tunnelling spoil and a high number of truck movements would be required at these sites, in addition to other construction activities.

(ii) Request

The IAC requests advice on:

24. whether there are monitoring plans, and if so, detail those plans, to conduct baseline and ongoing air quality studies for the Project, at nominated tunnel spoil disposal locations, once these off-site locations are known.

6.3 Risks associated with tunnel thermal emissions

(i) Reference

Technical Appendix H Section 12.7 Impact Assessment and Section 12.7.2 Operation notes: *“Thermal emissions associated with venting heat from the tunnels and stations (a low risk for electrified rail tunnels)”*.

(ii) Request

The IAC requests:

25. further information that supports the contention that thermal emissions associated with the venting of heat from such tunnels and stations represents a low risk.
26. examples of monitoring and management measures for thermal emissions that have been implemented for similar existing projects.

7 Noise and vibration

7.1 Consequence rating criteria

(i) Reference

Technical Appendix I, Noise and Vibration Table 4.3 provides consequence rating criteria and refers noise criteria being exceeded 'occasionally' or for 'extended' periods.

(ii) Request

The IAC requests clarification on:

27. what length of time is meant by the terms 'occasionally' and 'extended'.

7.2 Vibration criteria – human comfort

(i) Reference

Technical Appendix I, Section 3.2.3.4 provides guideline targets for Vibration Dose Values (VDV) for construction vibration with respect to human comfort.

In regards to assessing human response to vibration, British Standard BS5228-2:2009 states that "*for construction, it is considered more appropriate to provide guidance in terms of PPV*" (peak particle velocity). This is particularly relevant to continuous vibration from sources such as the TBM.

The Environmental Performance Requirements (EPR) for the construction noise and vibration are silent on whether the proposed further noise and vibration investigations (referenced below) will include an assessment of guideline values in relation to human comfort

(ii) Request

The IAC requests clarification on:

28. whether proposed further noise and vibration investigations (as referenced below in 7.3) will include an assessment of PPV values in relation to human comfort

29. why the proponent has chosen to use VDV over PPV with respect to human comfort.

7.3 Further noise and vibration investigations - construction

(i) Reference

Technical Appendix I, Noise and Vibration in Sections 7.7, 8.7, 9.7, 10.7, 11.7, 12.7, 13.7, 14.7 and 15.6 provides the following Environmental Performance Requirements for construction noise and vibration impact:

Appoint an acoustic and vibration consultant to predict construction noise and vibration (through modelling) and update the modelling to reflect current construction methodology, site conditions and specific noise and vibration levels (this would require noise and vibration measurements). The model would be used to determine appropriate mitigation to achieve the Environmental Performance requirements.

The acoustic and vibration consultant would also be required to undertake noise and vibration monitoring to assess levels with respect to Guideline Targets specified in the Environmental Performance Requirements. Where monitoring indicates exceedences of Guidelines targets, apply appropriate management measures as soon as possible.

(ii) Request

The IAC seeks clarification on:

30. whether a detailed scope with indicative time line has been developed for the additional measurements, predictions, modelling and monitoring programme described above.

7.4 Operational vibration and ground borne noise

(i) Reference

Technical Appendix I, Noise and Vibration in Section 4.8.2 at p55 states that the modelling methodology provided in FTA 2006 (Federal Transit Administration) has been used to predict vibration and ground borne noise levels from the operation of trains. This method is based on “*site-specific tests of vibration propagation*”.

In addition, Technical Appendix I, Noise and Vibration in Sections 7.7, 8.7, 9.7, 10.7, 11.7, 12.7, 13.7, 14.7 and 15.6 provides the following Environmental Performance requirements for operational noise and vibration impact:

Appoint an acoustic and vibration consultant to predict noise and vibration and determine appropriate mitigation to achieve the Environmental Performance Requirements. The acoustic and vibration consultant would also be required to undertake commissioning noise and vibration measurements to assess levels with respect to the Environmental Performance Requirements.

(ii) Request

The IAC requests clarification on:

31. whether a program and methodology for on-site testing can be developed in a timely fashion

32. what contingency measures are available if performance requirements are not met.

7.5 Vibration sensitive equipment, bio resources and highly sensitive areas

(i) Reference

In Appendix B of Technical Appendix I, Noise and Vibration, the following tables provide predicted vibration and ground-borne noise levels:

33. Table B14: Vibration predictions for vibration-sensitive equipment due to construction activities (pages 105-107)

34. Table B15: Vibration and ground-borne noise predictions for biological resources due to construction activities (page 108)

35. Table B16: Vibration and ground-borne noise predictions for highly sensitive areas due to construction activities (page 109)

36. Table B18: Vibration predictions for vibration sensitive equipment due to construction activities.

The tables indicate where the target levels are exceeded and Technical Appendix I gives an approximate overall duration of the exceedences.

(ii) Request

The IAC requests:

37. the approximate duration of each listed exceedence.

7.6 Façade treatment

(i) Reference

Technical Appendix I, Noise and Vibration on pages xii, 63, 68, 132 and 133 mentions that improving glazing at a number of affected receivers could be used as a possible mitigation measure for both construction and operation noise.

(ii) Request

The IAC requests clarification on:

38. whether any detailed investigations have taken place to determine if such treatment is feasible in the buildings identified for this treatment option.

8 Historical cultural heritage

8.1 Recommendations for specific mitigation measures

(i) Reference

Technical Appendix J Historic Heritage Impact Assessment (HHIA) at page XXVII states that, in addition to Environmental Performance Requirements:

More specific mitigation measures which could be employed at particular locations or heritage places as part of compliance with the performance requirements have also been identified in the report.

Examples of more specific mitigation measures provided in the HHIA include in relation to 65 Swanston Street (D-graded in HO505) at p278:

It is, however, a building of sufficient value and distinction as to warrant consideration for retention, even if this was a partial retention (façade) with new build behind.

In relation to the Flinders Street Railway Station Complex (VHR H1083) at p265:

Visibility/awareness of the escalators (carrying patrons) rising within the building should be limited as far as is possible in views to the building, including at night ... In terms of a design response, the replacement shopfronts should be positioned on the alignment of the original. It is recommended that new glazing be divided into multiple panels reflecting the typical arrangement of the original shopfront glazing and plinth to maintain a consistent presentation of the building at the pedestrian interface.

(ii) Request

The IAC requests:

39. a summary of the specific mitigation measures (including design) in the HHIA and advise whether these will be implemented and if so, how these would be incorporated into project approvals if they are not specified in Environmental Performance Requirements
40. clarification on whether the risk ratings provided for risks HHO1 to HHO35 assume the implementation of these mitigation measures.

8.2 Information about physical works used in the HHIA

(i) Reference

The HHIA includes a risk and impact assessment that considered potential consequences of the project on heritage values, including physical impacts arising from works.

The IAC understands that this risk assessment is based on specific works occurring. The EES does not, however, comprehensively identify the specific works relied upon.

Two examples of where the risk assessment appears to rely upon works not specified in the EES are:

at p265 in relation to the Flinders Street Railway Station Complex (VHR H1083):

Proposed works included in the Concept Design include the construction of an underground connection to Flinders Street Station accessing the public

concourse at level 1. Within the station building, it is anticipated works would include the demolition of two shopfronts, internal wall structure and interiors of retail premises to Flinders Street (currently occupied by Scissors and Cignall, Figure 129); demolition of floors and ceilings to these spaces and floors and internal walls to level one above to enable escalator access to the concourse.

New infrastructure in place at the completion of the project would include two reconstructed shopfronts at ground level to Flinders Street, new escalators and pedestrian links within the station building.

It is understood that no works are proposed to the external structure and fabric of the building; specifically the stone plinth and piers and masonry structure with render dressings to the external facade ...

at p297-8 Table 63 'Comments on new above ground elements within the Flinders Gate Precinct (HO505)' states in the *Assessment Project* column "notional building envelopes have been reviewed as part of the assessment" and "future oversite development is indicated to the west and set back to the north".

(ii) Request

The IAC requests advice on:

41. whether the risk assessment is based on specific works occurring, if so, a complete list of any specific works relied upon in forming the assessment
42. whether that list has been provided to other specialists
43. what mechanisms exist for ensuring that the works relied upon in forming the assessment, as opposed to any other works, are carried out.

8.3 Cumulative impacts within a precinct

(i) Reference

The impact assessment within the HHIA is structured to consider each place within a precinct individually. The cumulative impacts within a precinct have not been addressed as a whole. For example, the HHIA states at p273:

Demolition and/or other works to graded buildings

A number of graded buildings in the precinct are proposed to be demolished. Each is considered in turn below.

(ii) Request

The IAC requests:

44. an assessment of the cumulative historic heritage impacts within precincts.

9 Aboriginal heritage

9.1 EES Evaluation Objective

(i) Reference

The draft EES evaluation objective for Cultural Heritage is *“To avoid or minimise adverse effects on Aboriginal and historical cultural heritage values”*, and further states *“The project is consistent with the draft EES evaluation objective as a CHMP is being undertaken for Melbourne Metro”* (p31 of Technical Appendix K).

Technical Appendix K Aboriginal Cultural Heritage states that generally (p24):

For the construction of stations, portals and other structures near the ground surface, as well as disturbance within construction work areas, the potential to destroy, reduce or intrude upon Aboriginal heritage is largely unknown.

In relation to specific precincts, the EES states *“works would have the potential to adversely impact on the unknown Aboriginal cultural heritage values”* (at p32, 47, 50 and 53 in relation to Domain Station to the Eastern Portal, and precincts 5, 6 and 7).

Further at p56, in relation to Precinct 8 the EES states:

The following works would have the potential to adversely impact on one previously unknown Aboriginal Place within this precinct during the construction phase of Melbourne Metro:

Construction work site at South Yarra Siding Reserve.

(ii) Request

The IAC requests clarification on:

45. why it is said that the EES objective is met if the impacts are largely unknown, particularly as precinct specific sections state that the Project may have adverse impacts.

9.2 Potential impacts

(i) Reference

The Scoping requirements require the following action:

Assess potential effects of the project on identified sites or places of ACH with due regard for relative levels of significance and possible impact pathways, including vibration.

The EES describes risk pathways for AH001 to AH007 as *“partial disturbance or complete removal”, “disturbance/removal”, “complete removal”*.

(ii) Request

The IAC requests clarification on:

46. whether the potential for impact pathways, other than direct disturbance or removal, such as through vibration, have been included in the identified risk pathways AH001 to AH007.

9.3 Design, mitigation and management options

(i) Reference

The EES Scoping Requirements require:

Design or other available measures that could substantially reduce and/or mitigate the risk of significant effects and measures that are proposed to manage those environmental effects still expected to occur

Specifically in relation to cultural heritage the EES Scoping Requirements state:

Describe and evaluate proposed design, management or site protection measures which could avoid or mitigate potential adverse effects on Aboriginal cultural heritage' and 'describe the principles for developing measures to mitigate and manage residual effects on Aboriginal cultural heritage within the framework of a draft CHMP.

The EES states at p31:

The project is consistent with draft EES evaluation objective as a CHMP is being undertaken for Melbourne Metro. The CHMP would identify any Aboriginal cultural heritage values within the activity area so that recommendations for the minimisation of impacts to these can be provided ... The CHMP would also provide contingency plans for the discovery of Aboriginal cultural heritage material during investigation and construction works.

(ii) Request

The IAC requests clarification on:

47. the proposed or available measures to reduce or mitigate risk of significant effects and the principles for developing measures to mitigate and manage residual effects within the framework of a draft CHMP
48. how the CHMP will reduce the consequence of impacts for risks AH001, AH004 and AH006
49. the progress of the CHMP and when it will be available.

10 Landscape and visual

10.1 Impact of proposed infrastructure

(i) Reference

Technical Appendix M, section 1.2 states that one of the purposes of the Urban Design Study is to *“Set out design guidelines that, along with further detailed content, will inform the technical specifications for the project’s procurement phase”*.

(ii) Request

The IAC requests clarification on:

50. any dimensions of stations or other infrastructure that will represent key design influences on the stations and any concept or preliminary designs that have been prepared.

10.2 Western Portal/South Kensington Station

(i) Reference

Technical Appendix L, section 6.1 states *“The existing South Kensington station building façade and entry forecourt are proposed to be refurbished as part of the portal works. A new pedestrian crossing from JJ Holland Park would connect to the station.”*

The near proximity of a decline or a tunnel at this point (depending on option) suggests that this crossing may be provided in the form of a bridge. If so, this will require attendant ramps or lifts necessary for station access.

(ii) Request

The IAC requests:

51. further consideration of how this design might inform the Environmental Performance Requirements outlined in Table 6.3 of Appendix L.

10.3 Arden Station

(i) Reference

Maps 2 of 15, and 3 of 15 in the map book identify two alternative design options for the Electrical Substation Construction Site. The legend states there are three alternative design options.

(ii) Request

The IAC requests clarification:

52. on the correct number of the alternative design options for Electricity Substations at Arden Station and advice about which is the preferred option and why.

(iii) Reference

Technical Appendix L Sect 7.1 p55 suggests the interim station entrance at Arden Station entry would be raised two metres above surrounding ground level.

(iv) Request

The IAC requests clarification:

53. on how this entrance will be addressed regarding visual and physical access to the station, and its relationship with the surrounding public realm.

10.4 Eastern Portal

(i) Reference

Technical Appendix L Section 12 no landscape impact plan is provided for the Eastern Portal in a format as provided for other stations.

(ii) Request

The IAC requests:

54. a Landscape Impact Plan for the Eastern Portal.

10.5 Visual impact

(i) Reference

EES volume 2 Section 16.8 states *“visual impact of construction work on Southbank boulevard, Domain, St Kilda Road would be diminished because people see the area impacted only briefly as they move past them”*.

(ii) Request

The IAC requests clarification on:

55. the basis for this conclusion.

11 Surface water

11.1 Treating collected groundwater inflows recovered from tunnels

(i) Reference

Section 17.8.2 on the EES Main Report on p17.19, states:

During operation of Melbourne Metro, a very small volume of groundwater may infiltrate the tunnels and station boxes and may require collection and disposal. It is probable that most of this water would evaporate within the tunnels, but if disposal to waterways is required, collected water would be treated via an interceptor and hydrocarbon separator to remove contaminants prior to discharge to the stormwater system in accordance with an EPA and Melbourne water approved management and disposal plan.

(ii) Request

The IAC requests further information on:

56. how dissolved inorganics (and organics) could be treated in this collected water, and how the high water quality standards normally required to dispose of such fluids to surface waters will be achieved. This particularly applies to already identified zones where shallow tunnelling is likely to encounter contaminated sub-surface conditions.

11.2 Compensatory flood storage – Western Portal

(i) Reference

Section 17.9.1 of the EES Main Report at p17.20 notes:

Construction of the portal and permanent works would result in some loss of floodplain storage. This would be mitigated by providing permanent compensatory flood storage of approximately 9,000 m³ (cubic metres). Further consultation with Melbourne Water during the detailed design phase would be required to finalise the location of this storage in accordance with the recommended Environmental Performance Requirements.

(ii) Request

The IAC requests further information on:

57. where compensatory flood storage might be located in the general surrounding area.

11.3 Automated flood gates – Maribyrnong River

(i) Reference

Section 17.9.2 of the EES Main Report at p17.20, notes:

Accordingly, the portal and tunnels would be designed to provide protection against flooding from the Maribyrnong River — for example, through a retaining wall to provide protection against the one per cent AEP flood event and the installation of automatic flood gates that extend to the full height and width of the portal, providing protection against extreme flood events.

(ii) Request

The IAC requests:

58. information on how the retaining wall and matched automated flood gates would reliably and robustly operate in conjunction with the tunnel portal in times of flood.

11.4 Precinct 8: Eastern Portal - use of 'stop-logs'

(i) Reference

Section 17.14.1 of the EES Main Report at p17.29 notes:

At a minimum, a flood warning system would be implemented to link with existing flood warning systems in the Yarra catchment, such that rail services could be suspended and the tunnel and stations evacuated in advance of an extreme flood. Subject to further flood immunity risk assessment, additional measures such as sandbagging or flood gates could also be put in place to protect the tunnel from flooding in more extreme events during both construction and operation. Currently, it is proposed that the eastern portal incorporate works to allow flood gates in the form of stop logs to be installed across the portal in advance of a flood event. These stop logs would be stored adjacent to the portal.

(ii) Request

The IAC requests:

59. further information on how such 'stop logs' used possibly in combination with sand-bags could be deployed and operate, including reference to any relevant examples from other similar projects.

12 Groundwater

12.1 Arden Station – diaphragm wall and groundwater inflows/grouting

(i) Reference

Section 18.10.1 of the EES Main Report at p18-26 notes:

Construction of Arden station would be expected to include the use of a diaphragm wall retaining structure with toe grouting beneath the wall. This method would prevent groundwater inflows through the excavation walls during construction, but may still allow some inflow through the base of the excavation.

(ii) Request

The IAC requests advice on:

60. when toe grouting would be initiated with the construction process and the extent to which targeted soils would be grouted.

12.2 Aquifer impact mitigation bore locations

(i) Reference

Section 18.12: Precinct 5: CBD North Station, Section 18.12.1: Construction, p18-29 notes:

Mitigation measures such as grouting of the cavern during construction would be implemented to limit inflows and drawdown in the surrounding aquifer. In addition to this, temporary injection or discharge bores may be used to control the hydraulic gradient and prevent the off-site migration of contaminants.

Section 18.12: Precinct 5: CBD North Station, Section 18.12.1: Construction, p18-29 notes:

The former industrial site at 539-553 Swanston Street (CARMS 64057) presents the highest risk of contaminant migration to neighbouring properties because drawdown at this Groundwater Quality Restricted Use Zone is predicted to be several metres. Over a construction period of two and half years, this level of drawdown would draw the containment plume towards the south. The presence of volatile components in this contaminant plume also raises the risk of vapour intrusion into existing underground structures in the area. Appropriate mitigation measures such as extraction of contaminated groundwater or the use of recharge bores to reverse hydraulic gradients away from the station are being assessed in order to minimise impacts from contaminant migration in this area.

Section 18.13: Precinct 6: CBD South Station, Section 18.13.1: Construction, p18-32, notes:

Two of the five existing recharge wells between the CBD South and Domain station precincts would be within the predicted unmitigated drawdown radius associated with construction activities at CBD South station. These wells inject water into the Moray Street Gravels to maintain groundwater pressures in the overlying Coode Island Silt and prevent ground settlement.

(ii) Request

The IAC requests advice on:

61. the proposed location of temporary injection, extraction or discharge water bores for groundwater control
62. what the dewatering control infrastructure would look like at surface or street-level
63. a map showing where these bores are located and their proposed founding detail
64. details of bore water flow rates and pressure heads at which the incumbent CityLink Authority injection wells typically operate
65. with respect to the provision of temporary aquifer recharge, whether discussion has occurred with the CityLink Authority to explore using the existing aquifer recharge bores and if so, the outcome of those discussions.

12.3 TBMs handling variance at paleo-valleys

(i) Reference

Section 18.6: Risk Assessment, p18-14. The IAC is not clear how Tunnel Boring Machines (TBMs) could cater for any potential significant variance in geology around the locations of the Jolimont Valley sediments (i.e. from CBD South Station and heading into the Yarra River Crossing and onto the other side of the Yarra).

The IAC requests:

66. clarification on how any potentially significant variance in geology would be managed by the TBM.

12.4 Additional site investigations reference

(i) Reference

Section 18.6: Risk Assessment, p18-14 and Section 19.6: Risk Assessment, p19-16 notes that rock structure, particularly vertical to sub-vertical rock features (i.e., joints or other defects) is expected to have a large effect on the potential for 'over-break' and groundwater inflow with the construction of the CBD Station caverns and inter-connecting space between the CBD Stations (where tunnelling by TBM is currently not proposed).

(ii) Request

The IAC requests advice on any additional site investigations, either conducted or proposed, since the issue of the EES and any supporting documents, with respect to:

67. updated estimates of hydraulic parameters for aquifers
68. targeting those alignment areas either with significant investigation gaps, or where investigation anomalies have shown up (i.e., current lack of investigation data directly at the locations of Domain and Parkville Stations, groundwater wells showing lower total dissolved solids results compared to surrounding data points, etc)
69. better definition and checks for steeply dipping fracture zones or defects that may result in anisotropic aquifer depressurisation patterns (to date it seems the data-bank is derived from mostly vertical investigation core holes, which will have a higher chance of missing such defects)
70. follow-up to the peer review comments provided by Mr Middelmis – Hydrogeologic (21 April 2016) with respect to:
 - aquifer confinement vs. unconfined behaviour

- refinement of aquifer specific storage parameters
- transient model calibration for aquifer behaviour
- evaluation of amelioration mechanisms, like in-situ grouting and temporary recharge wells
- if any, further investigations (i.e., inclined investigation core holes, early mapping of early works/excavations, etc) are proposed in order to determine the impact of rock structure and fabric on excavation conditions.

13 Ground movement and land stability

13.1 'Real time' monitoring programs

(i) Reference

Section 19.1: Overview, p19.4 notes:

In addition, real time monitoring programs would be implemented from the onset of construction to confirm the impact assessment and manage and document the implementation of any mitigation measures.

(ii) Request

The IAC requests:

71. more detail on what is proposed with 'real-time' monitoring across the Precincts for designated areas warranting such action
72. confirmation that the MMRA is proposing to set-up a reliable measure of a 'baseline' condition with this monitoring.

13.2 Soft sediments – creep compression and monitoring

(i) Reference

Section 19.4: Background, Section 19.4.2: Ground Movement Mechanisms, p19-7 on 'Secondary compression', notes:

This type of settlement occurs both as a natural process as a result of to (sic) the consolidation which occurs due to the self-weight of the soil, as well as due to historical activities such as fill placement. This settlement is not expected to be exacerbated by Melbourne Metro activities or other environmental effects of Melbourne Metro.

(ii) Request

The IAC requests advice on:

73. whether there will be any creep (secondary compression) effects in soft soils/sediments associated with dewatering effects that may need to be considered
74. with proposed baseline monitoring, whether it would be appropriate or necessary for long lead-in monitoring to be commenced, so that any existing/incumbent creep consolidation effects along the alignment could be differentiated/separated from any induced creep effects from the Project.

13.3 Design load statement for tunnels

(i) Reference

Section 19.6: Risk Assessment, p19-16.

(ii) Request

The IAC requests advice on:

75. whether design load statements (i.e. from the surface, near-surface or laterally from substantial basements or footings placed nearby) have been prepared for cut and cover tunnel segments, cavern construction and TBM drilled tunnels, and if so whether they have been relied upon in the preparation of the EES.

13.4 Minimum pillar width setting for tunnels

(i) Reference

Section 19.6: Risk Assessment, p19-16.

(ii) Request

The IAC requests advice on:

76. whether a minimum pillar width will be set for the tunnels, with respect to both TBM tunnels and the connecting caverns.

13.5 Mitigation measures to limit ground movement

(i) Reference

Section 19.8: Impact Assessment, Section 19.8.2: Measures to Limit Ground Movement p19-21 notes:

Ground improvement measures (pre-injection, jet grouting, etc.) may be adopted at some locations to improve ground mass strength and resist local deformation. Additional mitigations for potential ground movement risks may also need to be incorporated in the final design and adopted construction method.

(ii) Request

The IAC requests advice on:

77. the 'additional mitigation' measures likely to be deployed

78. how pressure grouting measures will deal with sensitive surrounding receptors to grout inflows and loss of grout control (i.e., basement tie-back holes, sewers, old existing monitoring wells, other preferred flow pathways).

13.6 Plans for baseline monitoring

(i) Reference

Section 19.8: Impact Assessment, Section 19.8.2: Measures to Limit Ground Movement, p19-21 notes:

The assessment assumes that ground movements and associated potential impacts would be minimised by adopting sound engineering practices which would include engaging contractors with the appropriate levels of skill and experience, using the proposed or equivalent construction methodologies to those in the Concept Design and managing the excavation sequencing and appropriate controls on TBM operation. In addition, comprehensive ground movement and groundwater monitoring programs would be implemented from the onset of construction.

(ii) Request

The IAC requests advice on:

79. whether there are further plans to conduct comprehensive baseline monitoring (movement and groundwater) leading into construction, and if so, for how long will such baseline monitoring be undertaken.

13.7 Diaphragm wall structures or similar – soft sediments surrounding

(i) References

Section 19.8.2 Measures to Limit Ground Movement, pp19-21, notes:

Potential for impacts to existing structures and infrastructure cannot be eliminated and would be managed through the adoption of measures to limit ground movement. Measures would be taken to limit ground movement around an excavation or its propagation to ground surface level. Ground improvement measures (pre-injection, jet grouting, etc) may be adopted at some locations to improve ground mass strength and resist local deformation. Additional mitigations for potential ground movement risks may also need to be incorporated in the final design and adopted construction method”.

(ii) Request

The IAC requests further detail on:

80. the wall support/staging/propping systems to be deployed for those tunnel alignment areas where diaphragm external walls or similar are proposed to be placed through softer sediments for Station Box construction: (i.e., Arden Street, Parkville, Domain) and where normally applied anchor tie-back systems cannot be relied upon for lateral support of these walls (due to the significant presence of the surrounding softer sediments).

14 Contaminated land and spoil management

14.1 Re-use of excavated spoil (clean fill)

(i) Reference

Section 20.7.2: Re-use of Excavated Spoil (Clean Fill), p20-12 notes:

An estimated 2,033,500 m³ of spoil would be generated by the construction of Melbourne Metro (approximately 613,000 m³ from the tunnels, 104,200 m³ from the portals and 1,316,300 m³ from the stations). Of this, it is anticipated that 1,349,300 m³ would be clean fill.

During construction of Melbourne Metro, for all precincts, there would be limited opportunities to re-use excavated clean fill on-site. This spoil would have to be removed off-site as a waste or be directed for re-use at another site – a positive outcome from the project. Potential re-use would be subject to further testing to determine the final waste classification and geotechnical suitability of this spoil, in accordance with EPA regulations and guidelines.

(ii) Request

The IAC requests advice on:

81. how will the spoil be disposed of and where.

14.2 Soil management – acid sulfate rock

(i) Reference

Section 20.10.1: Bulk Earthworks and Spoil Management, Page 20-24, Table 20-4 (Arden).

(ii) Request

The IAC requests clarification on:

82. the apparent inconsistency between Table 20-4 (which does not suggest that fresh Melbourne Formation will be encountered that could be classified as Acid Sulfate Rock) and the lead-in text at the top of Page 20-24 which states :

- *The base of the station box may extend into fresh Melbourne Formation rock, which is likely to be classified as potentially acid forming when exposed to air. The extraction and disposal of this material would be managed in accordance with EPA guidelines and the Acid Sulfate Soil and Rock Management Sub-Plan required by the recommended Environmental Performance Requirements (see Section 20.7.3).*

14.3 Ingress of gases/soil vapour – TBM disturbance

(i) Reference

Section 20.7.7: Gases and Vapour/Construction, p20-16, first two paragraphs notes:

Gas and vapour risks would also be managed in accordance with EPA guidelines and SEPP (AQM). Specific mitigation measures incorporated into

the contractor's CEMP — such as the method of drilling selected and the provision of air ventilation — would mitigate the risks to workers.

Risks to buildings would be mitigated by following the British Standards Institute's 2015 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (BSI Code of Practice). Using the terminology from this code of practice, the risk to infrastructure would be characterised as low or very low and mitigation would largely be achieved by the use of structural concrete. Further mitigation measures could be required around the shafts, cross passages and other underground infrastructure and could include incorporating pressure relief blankets or low permeable strips around any structural concrete.

(ii) Request

The IAC requests clarification on:

83. how gases or vapours from tunnel boring operations (and tunnel face pressurisation) may be proactively managed.

14.4 Ingress of gases/soil vapour – specific gas sources

(i) Reference

Section 20.7.7: Gases and Vapours, p20-15:

As noted in Section 20.5.4, site investigations indicate the presence of natural methane in Coode Island Silt at the western portal and Arden station sites, with some methane also likely to be present beneath the Yarra River (CBD South station to Domain station).

Site investigations have confirmed the presence of volatile organic compounds (VOCs) in soil and groundwater at Arden, Parkville and CBD North stations. There is potential for VOCs to be present at all station precincts based on historic land uses.

(ii) Request

The IAC requests advice on:

84. the measures proposed for the constructors and operators to follow, to manage potential risks from natural methane (CH₄) or volatile organic compounds (VOCs)
85. as well as considering the soft organic sediments within the Paleo-valleys as potential generators of natural methane (CH₄) carbon dioxide (CO₂) and hydrogen sulphide gas (H₂S), whether there has been any consideration to the potential for ground-gas ingress or egress/displacement to surrounding sensitive receptors where there are either:
- old/large Sewer Mains in close proximity (CH₄ and H₂S producing) – North and South Yarra Sewer mains, or others
 - in-filled sites.

14.5 Ingress of contaminated groundwater – tunnel liner segment seals

(i) Reference

Section 20.7.8: Durability of structures and buildings, p20-17 notes:

As discussed in Section 20.7.7, vapours and gases may degrade some building materials. Therefore, the choice of materials and construction design and engineering measures would need to take these risks into account.

(ii) Request

The IAC requests advice on:

86. what tunnel lining joint seals are planned to be used for contaminated site areas.

15 Arboriculture

15.1 Useful life expectancy (ULE) divergence

(i) Reference

EES Technical Folder 13 of 14 includes Appendix R Arboriculture: City of Melbourne, Port Phillip and Maribyrnong states that:

It is noted that there was divergence (in some cases significant) between the existing City of Melbourne ULE assessments for many plane trees within the proposed project boundary, against the field assessment undertaken as part of this study. In many cases, the field assessment revealed much longer ULEs than those recorded by City of Melbourne, possibly a response to more favourable growing conditions in recent years, exhibiting improved health characteristics.

As the trees were dormant at the time of assessment, limited sampling of these particular trees is recommended once the trees are in leaf, to confirm the updated ULE. The ULE of each tree contributes to its monetary value as calculated by City of Melbourne (p18).

(ii) Request

The IAC requests further information on:

87. the significance of this divergence with regard to the potential impacts of the Project.

15.2 Timeframe for mitigation

(i) Reference

EES Technical Folder 13 of 14 includes Appendix R Arboriculture: City of Melbourne, Port Phillip and Maribyrnong states that:

To ensure loss of trees would be temporary, mitigation should seek to re-establish canopy cover in accordance with the City of Melbourne's Urban Forest Strategy as part of project delivery ... (p78)

As they mature, replanted trees would progressively mitigate impacts and contribute to the landscape and, at an estimate, it is considered that within 20-30 years following planting, a high quality semi-mature canopy can be established ... (p79)

(ii) Request

The IAC requests further information on:

88. the basis for the conclusion that this mitigation measure is 'acceptable', having regard to the time required for plantings to mature.

15.3 Visual impacts from removal of trees

(i) Reference

EES Technical Folder 13 of 14 includes Appendix R Arboriculture: City of Melbourne, Port Phillip and Maribyrnong at p78 and p79 states that:

To ensure loss of trees would be temporary, mitigation should seek to re-establish canopy cover in accordance with the City of Melbourne's Urban Forest Strategy as part of project delivery. As they mature, replanted trees would progressively mitigate impacts and contribute to the landscape and, at an estimate, it is considered that within 20-30 years following planting, a high quality semi-mature canopy can be established.

Chapter 16 of the EES, Section 16.7.1 states: *"The recommended Environmental Performance Requirements specify the outcomes to be achieved and the proposed mitigation measures that would apply across all precincts and would help to mitigate the impacts of tree removal. While a number of these trees are nearing the end of their useful life expectancy and would require replacement in the future, there would still be a high residual impact during construction in the Parkville and Domain station precincts, and a medium residual impact in all other precincts."*

Technical Appendix R, Appendix B Tree assessment descriptors states that a tree in the Juvenile phase *"is actively growing and is still in its establishment phase. Tree currently makes little contribution to the landscape"*. Technical Appendices R, S, J, and L assess impacts on trees to be removed from those perspectives/disciplines. Appendix R outlines the number of trees that would need to be removed to construct the Project, these total approximately 900 trees.

Technical Appendix R states at p34: *"it is considered that within 20-30 years following planting, a high quality semi-mature canopy can be established."* Technical Appendix L states at pV that *"residual impacts gradually reducing over a period of 7 to 10 years following construction (as trees and vegetation take time to grow)"*.

(ii) Request

The IAC requests:

89. an explanation about the measures or strategies that will be employed to ensure that replacement trees will not all approach the end of their useful life at the same time
90. advice on which, if any, of the trees proposed to be removed would be likely to need replacing under the normal course of events within the time span of the construction and maturation phase
91. clarification of the total number of juvenile and mature trees to be removed.

15.4 Urban heat effect

(i) Reference

EES Volume 3, Chapter 22 details Greenhouse Gas as well as Technical Folder 14 of 14 Appendix V.

(ii) Request

The IAC requests further details on:

92. the impact of the removal of 900 trees on urban heat effect.

16 Environment Management Framework

16.1 Environmental management framework

(i) Reference

The EES documentation explains the proposed level of planning control to apply to the Project. For example in EES Volume 3, Chapter 23 which details the Environmental Management Framework for the Project - section 23.6 (page 23-9) and table 23-2 (page 23-11); in Appendix A (Technical Folder 1 of 14) which includes a Draft Incorporated Document at Appendix B and the Explanatory report for Amendment GC45; in the Environmental Risk Assessment Report (Risk register) at Appendix B (Technical Folder 1 of 14).

The IAC is interested in the ability of these controls to construct and deliver the Project with the stated outcomes.

(ii) Request

The IAC requests advice on:

93. whether it is proposed that the recommended mitigation and management measures contained in the Risk Register for both the construction phase and the final form of the Project will be incorporated into the Environment Performance Requirements in the Environmental Management Framework (EMF) in the Incorporated Document.

94. If so, how it is proposed that this will occur, and if not, why not.

16.2 Planning scheme amendment and associated documentation

(i) Reference

The Planning Scheme Amendment and associated documentation includes reference to the EMF at clause 5.2 of the Draft Incorporated Document. At section 23.4 (EES Main Report Vol 3, p23-6) and at table 23-2 (p23-11), there is detail about the role and responsibilities of various independent audits/review of the Project against the Environmental Performance Requirements.

(ii) Request

The IAC requests advice on:

95. whether these reporting, independent audits and review mechanisms are, or should be, included in the Draft Incorporated Document.

16.3 Approval of strategies, guidelines and plans

(i) Reference

The EES documentation refers to the need for the preparation of strategies such as the Urban Design Strategy, guidelines such as for tree lopping, removal and replacement and, at Clause 5.2 of the Draft Incorporated Document, the requirement for a Construction Environmental Management Plan, a Site Environmental Management Plan and Traffic Management Plan.

(ii) Request

The IAC requests clarification on:

96. the governance and approval process proposed for those strategies, guidelines and plans. In particular, who is to approve these plans, and why that person or body is appropriate for the task
97. the description of these plans etc being 'endorsed' by the Minister for Planning rather than approved.

Document ends