

In the matter of the Metro Tunnel Project

Planning Panels Victoria

Proponent: Melbourne Metro Rail Authority

**Expert Witness Statement of
John F McCrann**

Expert of Melbourne Metro Rail Authority

1 Name and address

This report has been prepared by John Frederick McCrann of 452 Flinders Street, Melbourne, Victoria.

2 Qualifications and experience

Annexure A contains a statement detailing my qualifications and expertise and addressing the matters set out within Planning Panels Victoria's Guide to Expert Evidence.

Annexure B contains a copy of my Curriculum Vitae.

3 Scope

3.1 Role in preparation of EES

My firm AJM was responsible for the preparation of the technical report titled "Surface Water Impact Assessment" which was included as Technical Appendix N to the EES.

My role in the preparation of the Surface Water Impact Assessment was to provide technical assistance to the report author, Mr David Sheehan. This specifically related to those parts of the assessment concerning:

- compensatory flood storage in and around the Arden and Western Portal precincts; and
- tunnel portal flood immunity.

3.2 Instructions

My instructions to prepare this witness statement are set out in Annexure C.

3.3 Process and Methodology

I have undertaken the following tasks in preparing this expert witness statement:

- I have reviewed the Surface Water Impact Assessment and Chapter 17 of the EES;
- I have undertaken additional analysis in respect of possible locations for compensatory flood storage at Arden and the Western Portal precincts and in respect of flood defence options at the tunnel portals;
- I have reviewed and responded to submissions that have been provided to me that raise issues in respect of surface water;
- I have reviewed a peer review report prepared by David Fuller that was exhibited as Appendix C to the Surface Water Impact Assessment and I have responded to a particular issue raised in section 3.1.3 of the peer review report;
- I have reviewed MMRA Technical Notes 1-18; and

- I have reviewed the EPRs relevant to surface water and made recommendations concerning modifications that I consider appropriate.

4 Findings

4.1 Summary of Opinions

I have reviewed the Surface Water Impact Assessment in preparing this expert witness statement.

Other than as indicated below, I adopt the Surface Water Impact Assessment as the basis of my evidence before the Inquiry and Advisory Committee:

- Section 14.5 of the Surface Water Impact Assessment details the impact assessment undertaken in respect of Precinct 8 – Eastern Portal. A recommendation of that assessment is that:

“At a very minimum, it is recommended that a flood warning system be implemented, such that rail services could be suspended and the tunnel and stations evacuated, in advance of an extreme flood. This system should link to existing systems in place in the Yarra Catchment. If the risk associated with more extreme floods is not deemed to be acceptable, emergency management measures, such as sandbagging or flood gates and emergency evacuation procedures, would need to be in place to protect the tunnel from flooding in these more extreme events. It is currently proposed that the 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. It is proposed that stop logs be stored adjacent to the portal.”

In my opinion it will be necessary, as part of the assessment of potential flood protection measures at this location, to consider the installation of automatic flood gates as a response to extreme flood events. These gates would extend to the full height and width of the portal, and thus provide protection against even the most extreme flood event. Automation would require a gauge to measure flood levels and trigger the closure mechanism of the gates once flood levels have reached a predefined level. Further details concerning how this type of gate would be designed and operate are provided in Annexure F to this statement.

I am satisfied that EPR SW1 establishes an appropriate framework to ensure that appropriate flood protection measures will be incorporated within the final design of the Project.

4.2 Additional Work Undertaken Since Exhibition of the EES

(a) Compensatory Flood Storage

EPR SW2 requires that for all precincts, existing flood storage capacity impacted by the Project must be maintained to the satisfaction of the responsible authority.

The Surface Water Impact Assessment identifies the need for compensatory flood storage at two precincts – Arden and Western Portal.

Consultation is ongoing with Melbourne Water Corporation regarding an acceptable location for the provision of the required Day 1 compensatory storage within these precincts.

I have prepared two reports which are Annexures D and E to this witness statement, which identify indicative locations for compensatory flood storage for both precincts.

The reports identify feasible compensatory storage strategies that could be implemented as a means of responding to EPR SW2 and would mitigate the influence of floodplain storage loss resulting from construction of the Metro Tunnel.

Annexure D also specifically addresses the IAC's question number 57 (as contained within the IAC's "Preliminary Matters and Further Information Request" of 25 July 2016) concerning a potential location for compensatory flood storage required as a result of the Western Portal works.

(b) Flood Immunity Risk Assessment

EPR SW1 requires that emergency flood management measures be incorporated within the design of the Project to protect against floodwaters and overland stormwater flows. The measures to be incorporated are required to be informed by a flood immunity risk assessment.

Potential measures are identified in the Surface Water Impact Assessment in respect of different precincts. I was asked to elaborate further on possible flood mitigation measures that could be provided. I have prepared a report attached as Annexure F which discusses a range of potential flood mitigation measures that could be utilised at the tunnel portals.

My report attached at Annexure F also specifically addresses the IAC's questions numbered 58 and 59 (as contained within the IAC's "Preliminary Matters and Further Information Request" of 25 July 2016) concerning specific flood mitigation measures.

(c) Interface between the Surface Water Impact Assessment and the Aquatic Ecology and River Health Impact Assessment

I note that the surface water peer reviewer commented at paragraph 3.1.3 of his report that it will be important to ensure that there is consistency between the runoff volumes and peak flow rates used in the Surface Water Impact Assessment and other impact assessments contained within the EES.

While I agree with this comment in principle, it is important to appreciate that the magnitude of the flows assessed as part of the Surface Water Impact Assessment are much greater than the flow rates related to the applicable SEPP requirements (which have informed the preparation of other assessment reports contained within the EES).

For instance, a separate Aquatic Ecology and River Health Report has been prepared as part of the EES. This includes consideration of water quality issues, and in particular potential reductions in water quality caused by runoff from project construction sites to waterways (either directly or via stormwater drainage). The focus of the Aquatic Ecology and River Health Assessment was on relatively frequent runoff events (say more frequent than 50% AEP), as these have the greatest potential to impact on the quality of receiving waters. In a rare or extreme flood event, the impacts of runoff from project construction sites on receiving water quality would be negligible in comparison to the impacts resulting from runoff from other areas of the catchments in which the construction sites are located.

The focus of the Surface Water Impact Assessment was, by way of contrast, on rare and extreme runoff and flood events, equal to and greater than 1% AEP. This is because these rare and extreme events have the greatest potential to inundate stations and tunnels, and to cause an increase in flood risk to

infrastructure and property. It did not include estimation of peak flows or runoff volumes resulting from more frequent flood events as this was not pertinent to the assessment.

4.3 Response to Submissions

I have reviewed the following submissions which raise issues concerning surface water:

Table 4.1 Issues identified during Exhibition

Submission	Issue
MM012, MM070, MM076, MM180, MM237, MM240, MM283, MM289, MM308, MM315, MM318, MM365, MM377	Increase in flood levels / flood impacts as a result of temporary or permanent works.
MM226, MM267, MM315	Significant runoff during construction.
MM267, MM315, MM367	Concern that the EES does not properly address water management.
MM091, MM133	Treatment of runoff prior to it entering the stormwater system.
MM133	Managing site runoff for above ground construction.
MM260	Impacts to Albert Park Lake.
MM365	Disruption to fish passage from plant / machinery located in waterways.
MM227	Ensure appropriate Water Sensitive Urban Design techniques are applied.

My detailed response to these matters is set out in Annexure G.

4.4 Review of MMRA Technical Notes

I have reviewed Technical Notes 1-18 prepared in response to requests for information made by IAC. Of these Technical Notes, I consider that only Technical Note 6 is relevant to surface water issues.

Technical Note 6 provides further information in relation to the connection between the Metro Tunnel and the existing Melbourne Underground Rail Loop (**MURL**). I have also considered the connection between the Metro Tunnel and the MURL in preparing my report on flood defence options, which is attached as Annexure F.

4.5 Environment Performance Requirements

I have reviewed the EPRs relevant to surface water and stormwater treatment and, subject to my recommendation below, I consider them to be appropriate to govern the construction and operation of the Project (including in the event that it ultimately differs from the Concept Design, provided that it is still situated primarily within the identified project boundary).

While I agree with the intent of AE7, I believe that it should operate in all precincts, not just for the portals. Accordingly, I recommend that AE7 be modified as follows:

EPR Number	Revised EPR	Precinct												
AE7	<p>Fully integrate the stormwater treatment system into the design of the western and eastern portal <u>Metro Tunnel [all precincts]</u> to ensure that stormwater entering a receiving water body complies with SEPP (Waters of Victoria). The best practice performance objectives for achieving compliance with SEPP (Waters of Victoria) during the operations phase are described below:</p> <table border="1" data-bbox="443 696 1032 1361"> <thead> <tr> <th data-bbox="443 696 579 801">Pollutant type</th> <th data-bbox="584 696 715 801">Receiving water objective</th> <th data-bbox="719 696 1032 801">Current best practice performance objective¹</th> </tr> </thead> <tbody> <tr> <td data-bbox="443 808 579 1144">Suspended solids</td> <td data-bbox="584 808 715 1144">Comply with SEPP</td> <td data-bbox="719 808 1032 1144"> <p>Effective treatment of 90% of daily run-off events (e.g. <4 months ARI). Effective treatment equates to a 50 percentile suspended solids concentration of 50 mg/L.</p> <p>This can be achieved by installing a sediment pond(s) to remove 95% of sediment down to 125 µm for a 1 year ARI.</p> </td> </tr> <tr> <td data-bbox="443 1151 579 1227">Litter</td> <td data-bbox="584 1151 715 1227">Comply with SEPP</td> <td data-bbox="719 1151 1032 1227">Prevent litter from entering the stormwater system.</td> </tr> <tr> <td data-bbox="443 1234 579 1361">Other pollutants</td> <td data-bbox="584 1234 715 1361">Comply with SEPP</td> <td data-bbox="719 1234 1032 1361">Limit the application, generation and migration of toxic substances to the maximum extent practicable.</td> </tr> </tbody> </table> <p>Notes:</p> <p>1. Best practice performance objectives are based on the Best Practice Environmental Management Guidelines for Urban Stormwater – CSIRO</p>	Pollutant type	Receiving water objective	Current best practice performance objective ¹	Suspended solids	Comply with SEPP	<p>Effective treatment of 90% of daily run-off events (e.g. <4 months ARI). Effective treatment equates to a 50 percentile suspended solids concentration of 50 mg/L.</p> <p>This can be achieved by installing a sediment pond(s) to remove 95% of sediment down to 125 µm for a 1 year ARI.</p>	Litter	Comply with SEPP	Prevent litter from entering the stormwater system.	Other pollutants	Comply with SEPP	Limit the application, generation and migration of toxic substances to the maximum extent practicable.	<u>All</u>
Pollutant type	Receiving water objective	Current best practice performance objective ¹												
Suspended solids	Comply with SEPP	<p>Effective treatment of 90% of daily run-off events (e.g. <4 months ARI). Effective treatment equates to a 50 percentile suspended solids concentration of 50 mg/L.</p> <p>This can be achieved by installing a sediment pond(s) to remove 95% of sediment down to 125 µm for a 1 year ARI.</p>												
Litter	Comply with SEPP	Prevent litter from entering the stormwater system.												
Other pollutants	Comply with SEPP	Limit the application, generation and migration of toxic substances to the maximum extent practicable.												

5 Declaration

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.

Signed 

Dated **11 August 2016**

Annexure A – Response to PPV Guide to Expert Evidence

John Frederick McCrann

Expert's Qualifications

Bachelor of Engineering (Civil) – La Trobe University, 2000

Master of Engineering (Civil) – University of Queensland, 2014

Professional Associations

Member of the Institution of Engineers Australia (MIEAust)

Member of the American Society of Civil Engineers (A.M.AMCE)

Employment History and Achievements

June 2015 – Present Jacobs Engineering Group Pty Ltd, Senior Flood Modeller

February 2006 – May 2015 Aurecon Group, Senior Water Engineer

August 2002 – October 2005 Hyder Consulting (UK), Engineer

Annexure B contains a copy of my Curriculum Vitae

Expertise to Make Report

June 2015 – Present Jacobs Engineering

Other Significant Contributors to the Report

I have prepared this expert witness statement based upon reports that have had significant input from David Sheehan (AJM), Norman Walker (AJM) and Clayton Johnston (AJM).

Instructions to Prepare Report

Annexure C contains copies of instructions for me to prepare reports.

Identity of Persons who have Carried out Tests or Experiments upon which Reliance has been Placed (if any)

Not applicable

Reports Relied Upon to Prepare Expert Witness Statement

EES – Chapter 17 Surface Water (MMR-AJM-PWAA-RP-NN000796), 20 April 2016 (MMRA)

EES – Chapter 23 Environmental Management Framework (MMRA)

EES Technical Appendix N, Surface Water Impact Assessment (MMR-AJM-PWAA-RP-NN000825), 210 April 2016 (MMRA)

Annexure B – Curriculum Vitae

Annexure C – Instructions from HSF

Annexure D – Western Portal Compensatory Flood Storage

Annexure E – Arden Precinct Compensatory Flood Storage

Annexure F – Flood Defence Options at Tunnel Portals

Annexure G – Response to Submissions
