Expert Opinion
North East Link Project (NELP) EES

Address of Property:	An expansive project corridor spanning multiple Municipalities
Report Prepared For:	Banyule, Boroondara, Manningham & Whitehorse City Councils
Instructed By:	Maddocks & Harwood Andrews Lawyers
Date of Report:	15 July 2019

1 REPORT AUTHOR

Warwick Bishop

Senior Principal Engineer, Director

Water Technology Pty Ltd

15 Business Park Drive

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Qualifications:

- B.E. (Hons), University of Melbourne, 1993
- MEngSci, Monash University, 2000

Affiliations:

- Charter Member, Institution of Engineers, Australia
- Chair, Engineers Australia, Victorian Water Engineering Branch Committee
- Member, International Association for Hydraulic Research
- Member, Australian Water Association
- Member, River Basin Management Society
- Member, Stormwater Victoria

Area of Expertise

Key areas of expertise relevant to this report are summarised below.

- Assessment of flooding related issues associated with residential, industrial and wetland development proposals;
- Hydraulic modelling of flood flows for major flood studies, including assessment of existing problems and evaluation of alternative floodplain management options; and
- Expert witness for flooding related issues at planning appeals and civil actions.

2 STATEMENT OF EXPERTISE

With my qualifications and experience, I believe that I am well qualified to provide an expert opinion on the floodplain matters for the North East Link Project Environmental Effects Statement.

3 REPORT CONTRIBUTORS

Niels Unger

Senior Engineer

Water Technology Pty Ltd

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Qualifications:

- B.E. (Civil), Monash University 2007
- G.D. Planning & Design (Architecture), Melbourne University 2012

Affiliations:

- Member, Engineers Australia

Area of Expertise:

Key areas of expertise relevant to this report are summarised below.

- Assessment of urban flooding including hydrologic and hydraulic modelling
- Urban waterway design and management
- Application of GIS

Scope of contribution:

Niels Unger undertook review and analysis of background information to the EES and figure preparation under my supervision. Niels also attended a meeting at NELP on my behalf to meet with the consultant undertaking the surface water analysis for the EES.

4 SCOPE OF REPORT

I have been requested to provide an expert opinion on the potential impacts on surface water of the proposed North East Link Project as documented within the Environmental Effects Statement (EES) report written by and on behalf of the North East Link Project (NELP).

The scope of work undertaken for this assessment included the following:

1. Review all reports, maps and appendices provided and provide opinions and recommendations based on the outcomes detailed; and
2. Produce an Expert Witness Report in accordance with the instructions from Maddocks and Harwood Andrews Lawyers, in line with the Expert Witness Code of Conduct.

A copy of the instructions is provided in Appendix A and answers to specific questions in Appendix B.

5 BASIS OF THIS REPORT

This report is based on the following sources of information:

- Environmental Effects Statement Report: North East Link Project Report
- Environmental Effects Statement Report: North East Link Project Map Book
- EES Appendix P: Surface Water Technical Report - Parts 1 & 2 and Appendices: Surface Water
- EES Attachment III: Risk Report
- EES Attachment V: Draft Planning Scheme Amendment
- Manningham City Council's public submission on the EES (5 June 2019)
- Banyule City Council, Boroondara City Council and Whitehorse City Council's joint public submission on the EES (7 June 2019)
- IAC tabled document No. 5 titled "Preliminary Matters and Further Information Request" (20 June 2019)
- IAC tabled document No. 14 being the Maddocks further information request on behalf of Banyule, Boroondara and Whitehorse City Councils
- Harwood Andrews further information request on behalf of Manningham City Council
- Clayton Utz (acting on behalf of NELP) initial response to the Maddocks further information request

This report has been prepared in accordance with the Expert Witness Code of Conduct. I have read the code and am aware of my overriding duty to assist the Inquiry and Advisory Committee on matters relevant to my expertise.

6 INTRODUCTION

The project is described in the proposed Planning Scheme Amendment (EES Attachment V Draft Planning Scheme Amendment, Section 2 Project background, page V-3) as follows: *"North East Link is a proposed new freeway standard road connection that would complete the missing link in Melbourne's metropolitan ring road, giving the city a fully completed orbital connection for the first time. North East Link would connect the M80 Ring Road (otherwise known as the Metropolitan Ring Road) to the Eastern Freeway and include upgrades to the Eastern Freeway."*

The project's extent is shown in Figure 6-1 below where it is split into three distinct precincts:

1. The M80 Ring Road to Northern Portal - interfacing with the M80 at Plenty Road and the Greensborough Bypass, this section of the project is to extend to the northern portal utilising at surface, above and below ground road sections.
2. The Northern Portal to Southern Portal - at this point the road alignment transitions into three lane tunnels as its alignment traverses existing urban regions of Viewbank, Banyule Flats and Bulleen, in addition to the Yarra River, ultimately daylighting to interface with the Eastern Freeway.
3. Eastern Freeway - Widening of the existing freeway between Hoddle Street and Springvale Road to accommodate future traffic volumes in addition to a dedicated bus lane.

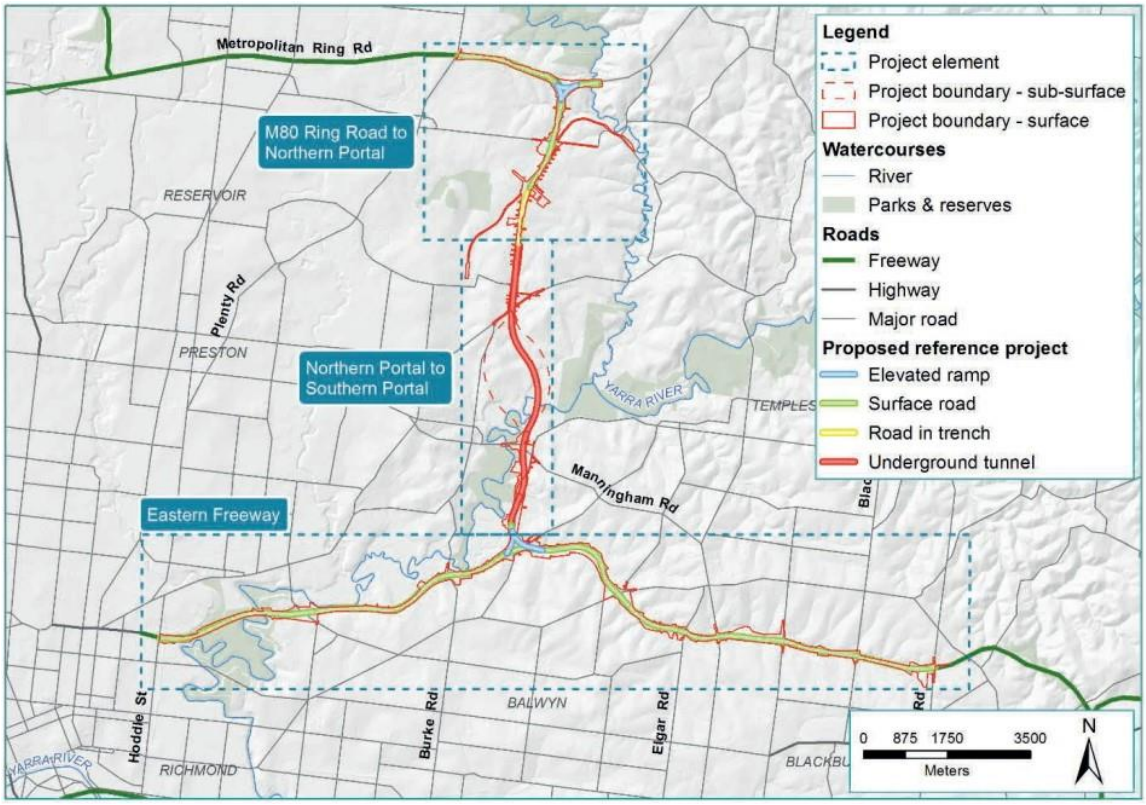

Figure 6-1 Study Area with the Proposed Project Corridor Superimposed, source: EES Attachment III – Risk Report

This report draws conclusions and recommendations based on the contents of the publicly exhibited EES including its Attachments and Appendices.

A detailed technical review of the hydrologic, hydraulic and water quality models was outside the scope of this assessment due to:

a) Time constraints such that a thorough technical review was not possible;
b) Not having access to the models or detailed results.

7 SITE DESCRIPTION

The proposed project alignment traverses six catchments of varying size and shape; Yando Street Main Drain, Kempston Street Main Drain and Watsonia Station Drain catchments to the north, Banyule Creek and Yarra River through the middle and Koonung Creek to the south. Figure 7-1 shows the locations of each associated waterway in relation to the project corridor in red.

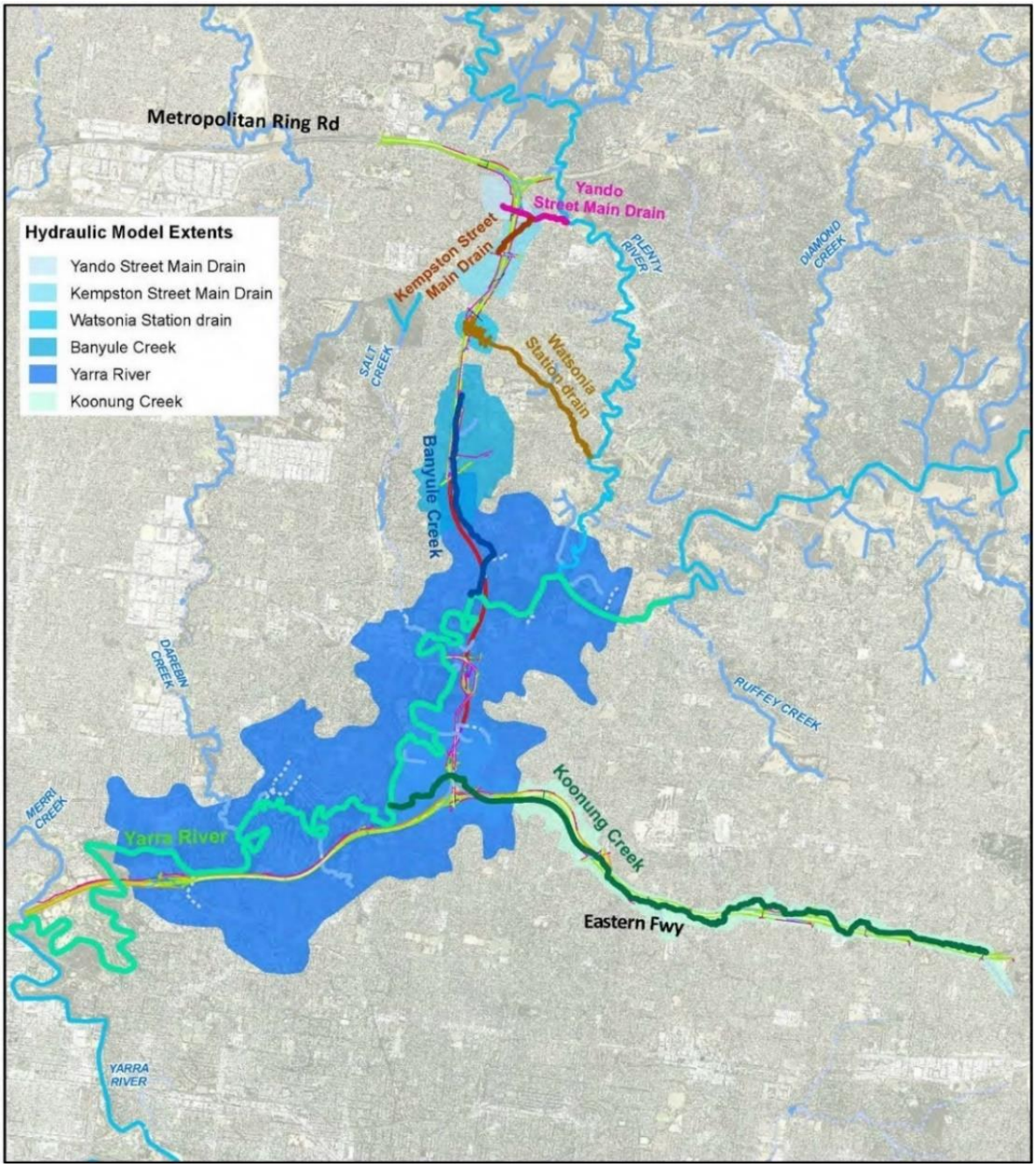

Figure 7-1 Waterways Affected, source: EES – Appendix P, Technical Report: Surface Water

8 ANALYSIS – REVIEW OF EES TECHNICAL CONTENTS

8.1 Water Quality

The following items were reviewed regarding the water quality impact assessment (EES Chapter 24, section 24.3.2 and 24.4.2) of the project.

- Surface water chapter (Chapter 24)
- Technical report P Surface water Part 1
- Technical report P Surface water Part 2
- Technical report P Surface water Appendices
- Map book - Horizontal Alignment Part 1
- Map book - Horizontal Alignment Part 2
- Map book - Vertical Alignment Plans and Indicative Cross Sections

The water quality impact assessment consisted of an investigation of the existing conditions of waterways affected by the project, and potential impacts and mitigation/management options during the construction and operation phases.

8.1.1 Existing Conditions of Receiving Waterways

Existing water quality data was obtained for key water quality parameters within Banyule Creek, Yarra River and Koonung Creek from Melbourne Water, EPA Victoria and Waterwatch monitoring sites. These data were compared against the State Environment Protection Policy (Waters) (SEPP (Waters)) objectives to evaluate existing water quality. Additionally, the water quality index of the Yarra River and Koonung Creek are also presented.
The assessment of existing conditions of these waterways, based on the available data, is considered to be of an appropriate level of detail.

8.1.2 Construction Impact Assessment

A qualitative assessment was conducted to investigate the potential water quality impacts during the construction of the project. A water quality monitoring program, together with the implementation of a surface water management plan during construction, is proposed.

The water quality program is to be conducted in consultation with Melbourne Water and EPA Victoria before construction to establish a baseline. The water quality monitoring program is to be continued during the construction phase to confirm the effectiveness of the environmental controls provided as per the surface water management plan. The surface water management plan is to be designed in accordance with EPA Victoria guidelines for best practice sediment and erosion control and monitoring.

The construction phase water quality impact assessment undertaken is considered to be of an appropriate level of detail.

8.1.3 Operation Impact Assessment

A semi-quantitative assessment of water quality impacts during the project operation was conducted. The operational phase water quality impact assessment is structured around surface roads, tunnels and diversions.

8.1.4 Surface Roads

Water quality impacts of surface roads / impervious surfaces were considered under two categories;

- contaminated runoff from additional impervious area flowing into waterways; and
- spills or accidents occurring on North East Link flowing into waterways.

8.1.4.1 Contaminated runoff from the additional impervious area

Water sensitive urban design (WSUD) features such as wetlands, bioretention ponds and subsurface storages are proposed to mitigate adverse impacts on water quality by the contaminated runoff from additional impervious area flowing into waterways. It is noted that:

- MUSIC modelling (industry standard tool for water quality analysis) was used to test the effectiveness of the WSUD assets.
- A total of 30 WSUD assets are proposed (11 bioretention systems, 9 wetlands and 10 subsurface storages as shown in Figure 9-1 to 9-31 of Technical report P) to reduce pollutant loads to meet the Best Practice Environmental Management Guidelines (BPEMG). However, the proposed WSUD features cannot be clearly identified in the map book.
- Compliance with the BPEMG in operation is considered in meeting long-term pollutant concentrations in receiving waters specified in the SEPP (Waters).
- Modelling has shown that the pollutant reduction requirements of BPEMG can be achieved using a subset of the potentially available sites.
- Location of WSUD assets are not finalised. However, the initial locations of the WSUD features were selected with consideration of topography (located within natural depressions) and existing land uses with a preference for locations within the road reserve.
- As the project details are subject to change, the detailed arrangements for ownership, maintenance and operation of WSUD assets are proposed to be resolved during the detailed design stage.

Use of MUSIC modelling to test the effectiveness of WSUD asset is common practice. However, in the absence of the MUSIC model and additional asset information, it is not possible to provide detailed comments on the suitability of the proposed solution.

Particularly:

- It is not evident whether the BPEMG is achieved for each asset, collectively for individual receiving waterways (Banyule Creek, Yarra River and Koonung Creek), or collectively for the whole project area.
- The criteria/reason for adopting particular WSUD asset types (i.e. bioretention, wetland and subsurface storage) at each location is not clearly evident.
- Asset footprint areas and contributing catchment information is not available. It is noted that the surface area estimates from MUSIC results typically do not include additional footprint required for embankments and maintenance access etc.
- No information on asset ownership and maintenance is provided.

It is considered that additional details on the proposed WSUD features are needed before an informed decision on the adequacy of the EES can be made.

- Summary table of WUSD assets including, asset ID, footprint area, pollutant reduction performance, the rationale for selecting asset type and asset ownership based on the proposed location for each proposed WSUD asset.
- Overall pollution reduction performance at the outfall of Banyule Creek, the Yarra River and Koonung Creek.
- Overall pollution reduction performance at the project boundary (overall project performance).

I note that any reliance on bio-retention systems to maintain current pollutant loads (and therefore mitigate impacts associated with the proposed NE Link) introduces numerous points of failure into the system as they:

1. Are highly sensitive assets which present a challenge to construct correctly and require experienced/specialised Contractors to undertake the works.
2. Require a higher degree of on-going maintenance during the life of the asset (when compared to vegetated swales); and
3. Have a short lifespan before treatment effectiveness is impaired relative to the lifespan of the road network they support. As a result, they often require a full-reset every 7-10 years.

However, considering the constraints of the proposed corridor (relative to available area) and the highly efficient nature of bio-retention systems with respect to pollutant removal, it is not unreasonable to propose these assets within the project.

It is also noted that the reporting in Section 9.2 of Technical Report P, Surface Water, is not specific about how the BPEMG requirements for water quality will be achieved. That is, does each catchment achieve the required BPEMG target or does the overall project meet BPEMG . Due to the sensitive nature of individual receiving waterways, it is important that each section of the project meets BPEMG targets internally as well as the project overall.

8.1.4.2 Spills

A qualitative assessment on potential risks concluded that "To manage the potential of spilled liquids ending up in waterways, the project would include the provision of spill containment for all freeway pavements (including ramps) to meet Austroads requirements. Procedures would be developed for existing and proposed roads and ramps, to be implemented in response to hazardous spills." No additional details on the type of spill containment are provided.

Furthermore, Austroads Guidelines state "*High volume road projects upstream of very sensitive waterways, such as Ramsar wetlands (Ramsar 2012), may require specific spill management elements to be designed into the drainage system. While it could be said that this should occur for all parts of a drainage system, this is neither practical, nor cost effective from a construction or ongoing maintenance perspective. Specific capture techniques can be installed to respond to high pollution locations, even retrospectively.*"

It is considered a spill management system designed in accordance with Austroads requirement is sufficient. However, conducting a spill risk assessment for each outfall during the ESS stage would be beneficial in identifying appropriate locations/ management options, and potential opportunities and constraints in incorporating spill management system with the proposed WSUD features.

8.1.4.3 Tunnels

A qualitative assessment was conducted on the water quality impacts of the tunnel drainage system. A water treatment plant is proposed to manage and treat the water collected in the tunnels before discharge into receiving waterways. Discharge to sewer / stormwater or re-use is subjected to tunnel drainage water quality.

No recommendations relating to this section.

8.1.4.4 Diversion of waterways

It is identified (EES Technical Report P Surface Water, Section 9.2.3) that "*The project assets may directly impact the performance of an existing water quality asset such as the wetlands south of the Eastern Freeway adjacent to Koonung Creek.*" It is proposed that *"Retaining or replacing existing water quality assets would be required to address any direct impacts.*"

No recommendations relating to this section.

8.2 Flood Risk

8.2.1 Existing Conditions Modelling

It is understood the modelling of existing conditions in relation to flooding utilises existing TUFLOW models originally sourced from Melbourne Water. This avoids the potentially lengthy process of development and validation of "new" base models. However, on a project of this scale, which traverses a number of catchments and utilises numerous TUFLOW models, the approach has the potential to cause issues of consistency.

The reports lack detail regarding the technical parameters of the hydraulic models such as grid size, boundary conditions, topography, timestep and roughness maps. There are also no details of the hydrology models such as catchment layout or flow validation. This is the type of information I would expect for models that are being relied on for the prediction of potential impacts of a substantial infrastructure project.

An example of this is the representation of both the Melbourne Water and Council stormwater systems within the modelling, some models contain quite refined networks whilst others only include a few key features to ensure flows are conveyed. Whilst a coarser approach to representing the stormwater network is most likely fit-for-purpose with respect to identifying impacts of the project within waterway corridors and on the Melbourne Water network, without a refined approach there is a possibility of not identifying smaller overland flowpaths and as such, identifying possible impacts. This potentially could result in impacts on the Council stormwater system being missed or under-represented.

Figure 8-1 to Figure 8-6 provide a visual comparison between the waterway and piped networks included within the modelling versus the Melbourne Water and Council stormwater systems at the same locations. These highlight the variation in drainage network definition between the different catchments.

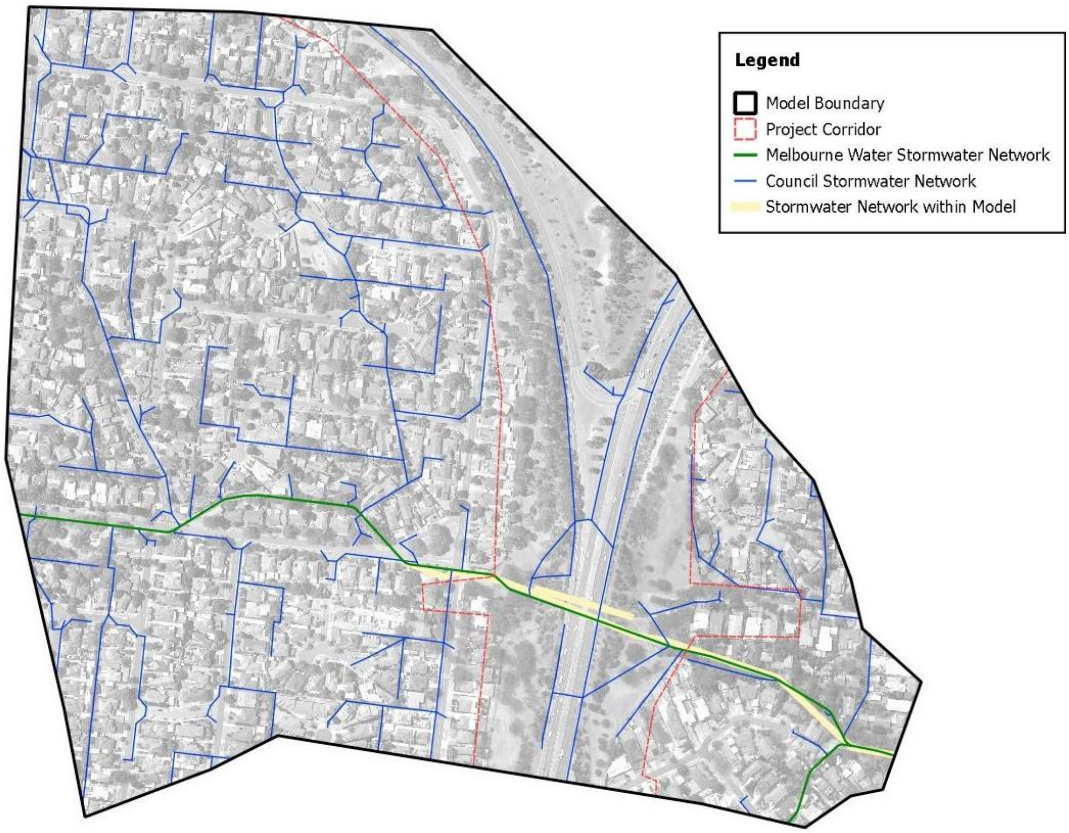

Figure 8-1 Yando Street Main Drain Model – Stormwater Network

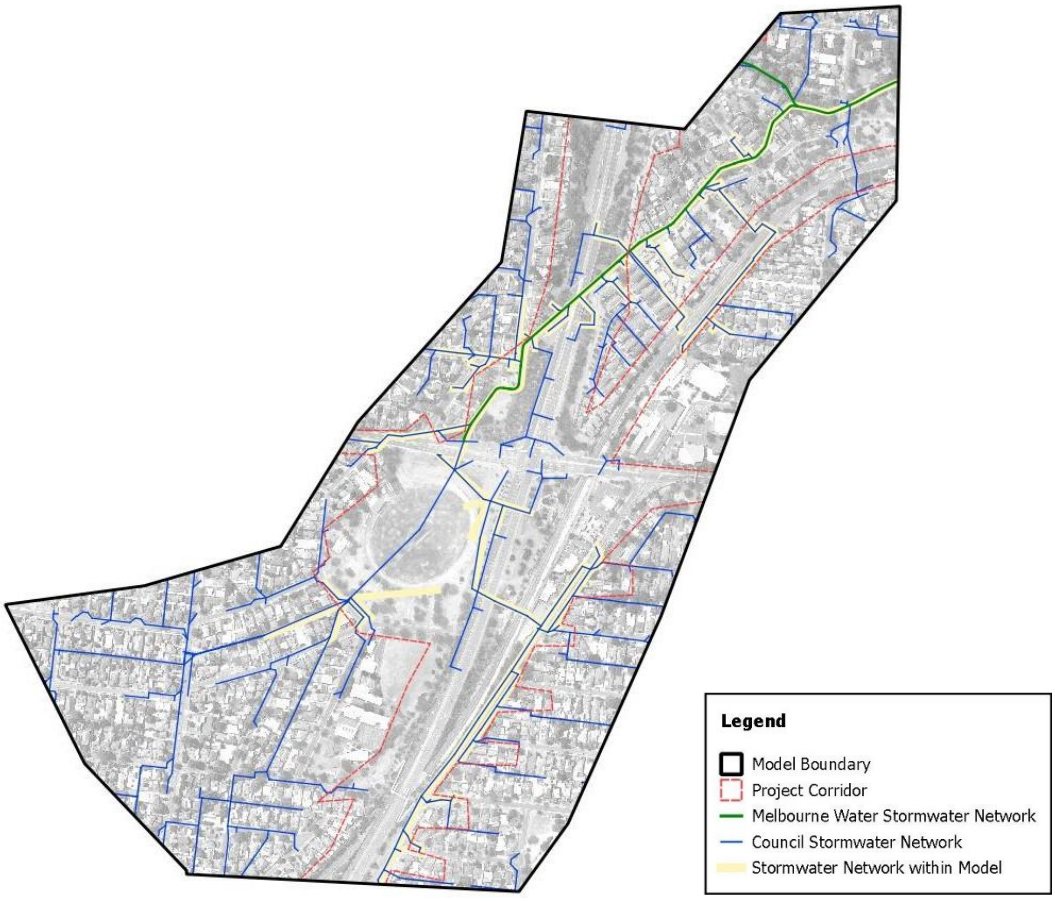

Figure 8-2 Kempston Street Main Drain Model – Stormwater Network

Figure 8-3 Watsonia Station Drain Model – Stormwater Network

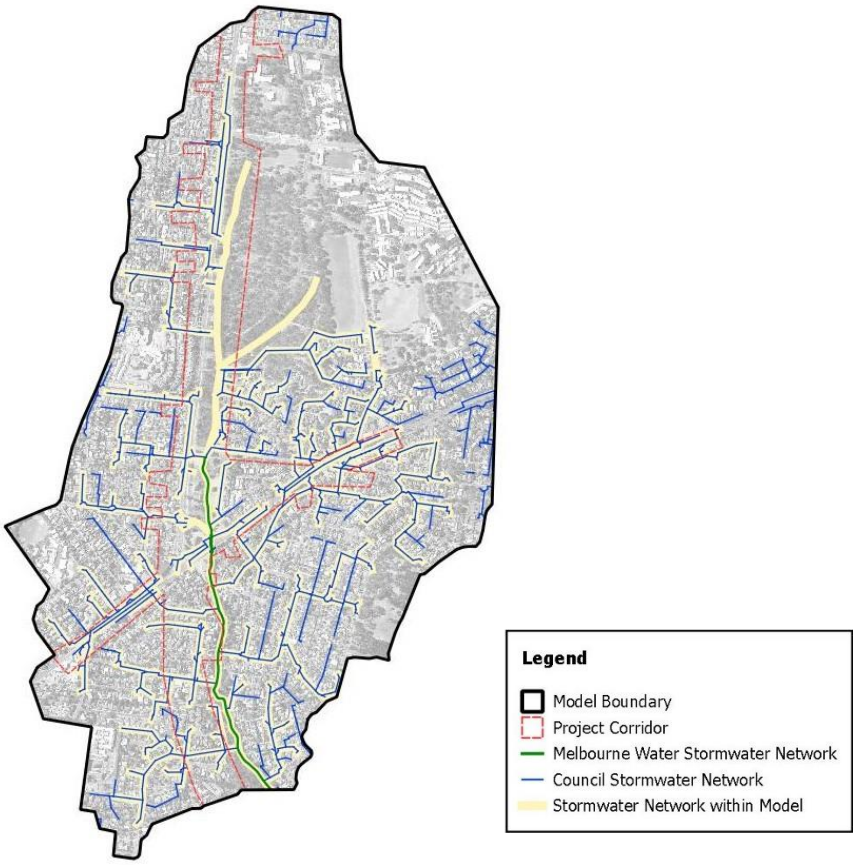

Figure 8-4 Banyule Creek Model – Stormwater Network

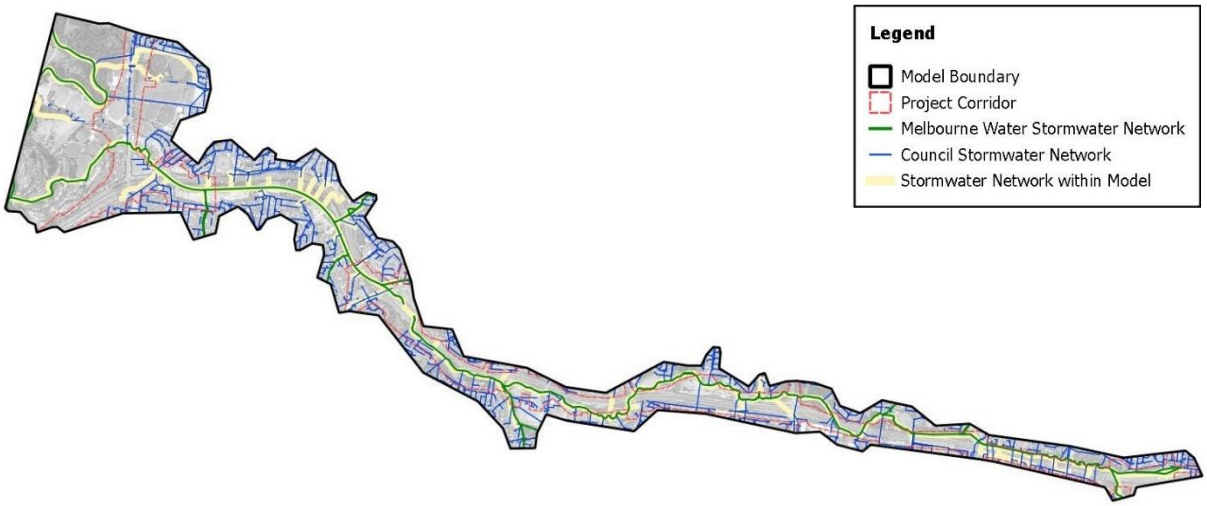

Figure 8-5 Koonung Creek Model – Stormwater Network

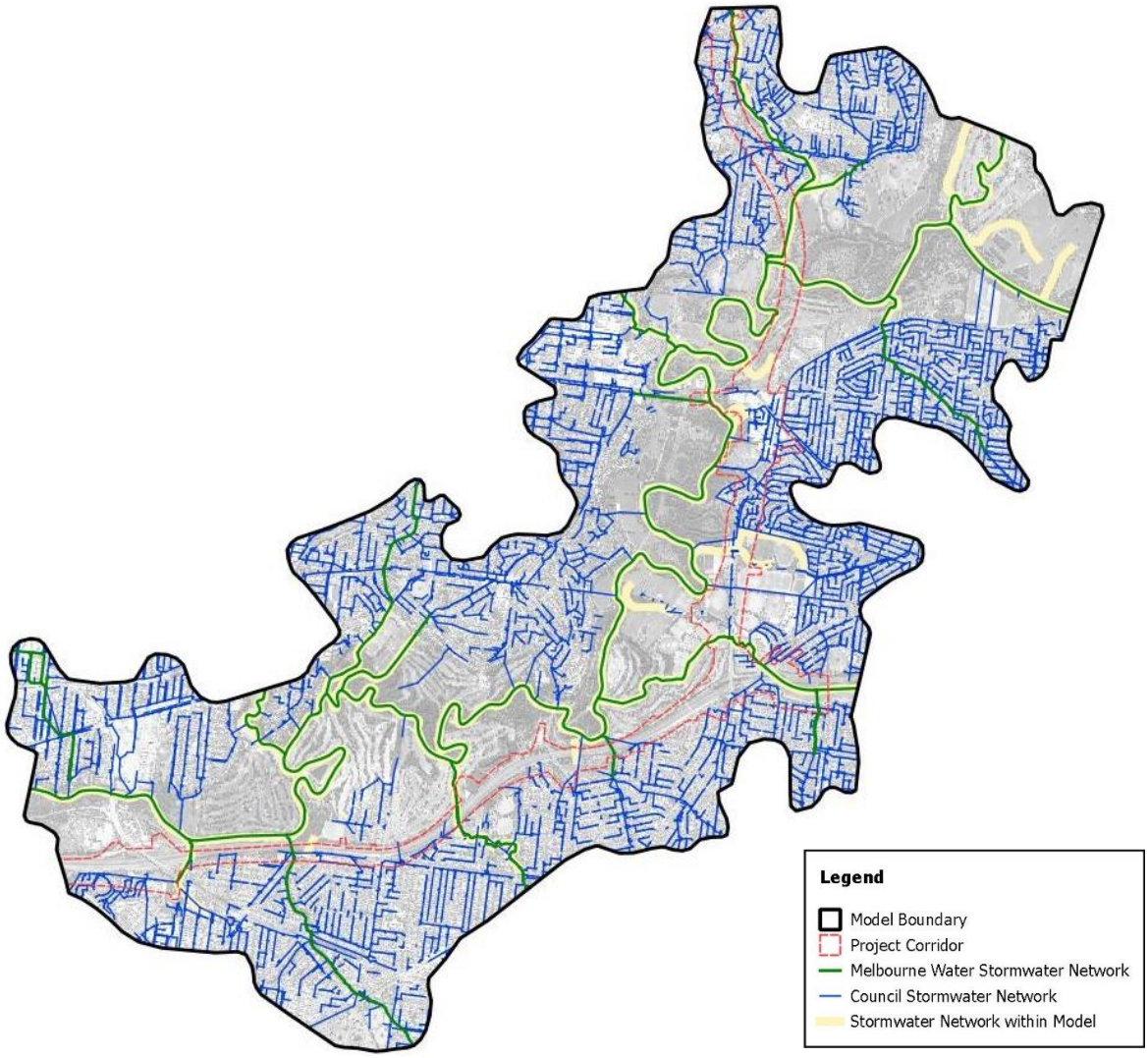

Figure 8-6 Yarra River Model – Stormwater Network

Both the Banyule and Koonung Creek models appear to include a high level of detail with respect to the inclusion of the MW and Council stormwater networks, whilst Kempston and Yando Street Main Drain models do not exhibit the same level of detail. The Watsonia Station Drain model appears to contain reasonably detailed stormwater network and, whilst the Yarra River model does not include much of the minor network, due to the magnitude of flows being conveyed within the river, it is reasonable to assume this would have negligible impact on results.

8.2.2 Construction Impact Assessment

Activities and potential risks to surface water during the construction phase are generally well-identified within Section 8 of the EES Technical Report P Surface Water, however the lack of detail regarding possible solutions/measures to mitigate the risks make it difficult to form a firm opinion as to their feasibility.

An example of this is the identification of potential impacts on the conveyance of flood flows within Banyule Creek as a result of construction activities at the alternate Tunnel Boring Machine (TBM) launching site north at Lower Plenty Road. Whilst the risk is identified, the only reference to a possible resolution comes from the statement (EES Technical Report P Surface Water, Section 10.2, 3rd Para.) *"Consideration of the modelling results and a range of design concepts indicates there is a feasible surface water solution..."*. Without the provision of detail relating to the design concepts investigated nor (at least preliminary) results to reinforce the statement, this does not provide any confidence that a feasible solution can been developed.

As with other sections, the investigation and provision of a functional outcome is deferred through requirement to meet the appropriate EPRs.

Additionally, whilst the technical report notes (EES Technical Report P Surface Water, Section 5.5.1, 3rd Para.) *"In exceptional cases where the qualitative assessment indicated that construction activities may have impacts which may be difficult to avoid or mitigate, modelling was undertaken to further inform the assessment."* there appears to be no results of the construction phase modelling scenarios included within the documentation provided.

8.2.3 Operational Impact Assessment

The result plots outlining changes in flood level (afflux) are depicted in such a way which makes identifying possible locations of interest difficult, this is mainly due to:

1. The scale at which the results are presented is so large it is difficult to ascertain smaller details.
2. The lack of cadastre information, specifically property boundaries within the maps makes it difficult to distinguish between what is private property and what is a floodway, floodplain or waterway.
3. The lack of stormwater infrastructure overlays within the maps makes it difficult to distinguish between the Melbourne Water and Council stormwater systems which in turn makes it challenging to identify where/if the Council system is impacted.
4. The colour coding of the thematic afflux mapping utilises multiple shades of the same colour making it difficult to ascertain the exact level of afflux being reported – particularly the different shades of yellow.
5. The lack of any transparency to the afflux results makes it difficult to distinguish where the flood extent is interacting with existing buildings and private properties.

Regarding the results presented within the chapter; there appears to be no results which identify and quantify flood hazard/safety issues – this is true for both existing and developed conditions. Although

the management of flood hazard is mentioned within multiple sections, without results it is not possible to form an opinion on the validity of the conclusions.

In relation to flood hazard specifically; regions which experience moderate to high levels of flood hazard within existing conditions should be identified as being highly sensitive to any increase in flood level and as such, warrant greater scrutiny of results at these locations for the post-construction case. Additionally, in regions where flood hazard is moderate to high within the road reserve and afflux is predicted as a result of the project, an assessment of the impacts on safe ingress/egress to surrounding properties should be undertaken.

It is my experience that, in the review of development proposals for planning approval over many years, detailed results of the impacts of the proposed works and any mitigation solutions are required at the planning stage. This is to ensure that mitigation is feasible and does not have any unintended consequences, which at a later stage may not be able to be accommodated within the constraints of the approved project plan.

8.2.3.1 Yando Street Main Drain

The main impacts on flood levels within the Yando Street Main Drain catchment are summarised within the EES report (EES Chapter 24 Surface Water, P29) as follows:

- *No significant change to existing flooding of private properties*
- *Localised afflux within the floodplain upstream of Greensborough Bypass of up to 100 millimetres*
- *Localised afflux within the floodplain downstream of Greensborough Bypass of up to 80 millimetres*

The response to the identified increase in flood risk is as follows (EES Chapter 24 Surface Water, P31, para. 1):

"The potential for an increase in flood risk would be mitigated by ensuring the risk from changes to flood levels, flow and velocities are minimised (EPR SW6). This would be achieved through further design refinement during the detailed design and may potentially involve land modifications to increase the floodplain storage upstream and downstream of Greensborough Bypass."

Considering the afflux is contained within the floodplain and there is no reported increase in flood risk to private properties, this would generally be a reasonable assumption. However, without a feasibility assessment through mitigation modelling, there is no evidence within the document to support the statements that the afflux can be mitigated at the location.

8.2.3.2 Kempston Street Main Drain

The main impacts on flood levels within the Kempston Street Main Drain catchment are summarised within the EES report (EES Chapter 24 Surface Water, P31) as follows:

- *Flood levels in the AK Lines Regarding Basin and the depth of flow overtopping Grimshaw Street is increased by up to 40 millimetres in the 1% AEP event*
- *Flood depth at the corner of Trist Street and Sellars Street, immediately upstream of the top of Kempston Street and within the existing floodplain, is increased by around 220 millimetres.*

The provided response to the identified increase in flood risk (EES Chapter 24 Surface Water, P31, last para.) is as follows:

"The potential for an increase in flood risk would be mitigated by ensuring the risk from changes to flood levels, flow and velocities are minimised (EPR SW6). This would be achieved through further refinement during detailed design to integrate the retarding basin and shared user path, and may potentially include steepening of grass batters at the retarding basin adjacent to the shared user path or moving the shared user path slightly further east."

This mitigation strategy sounds reasonable and could have the potential to abate the impacts on flood levels however, without further investigation through model refinement (which in my opinion should occur at this stage in the process), there is currently no evidence to support this assumption. In addition, in order to quantify the risk associated with the identified 40 mm increase in flood levels over Grimshaw Street, an assessment of the flood hazard which the road is subject to during existing conditions should be undertaken.

8.2.3.3 Watsonia Station Drain

The main impacts on flood levels within the Watsonia Station Drain catchment are summarised within the EES report (EES Chapter 24 Surface Water, P33) as follows:

- *Flood depths upstream (west) of the North East Link on Watsonia Road increased by up to 100 millimetres for larger events*
- *Flood depths in the new upstream service road of up to 600 millimetres in the larger events although fairly dry for events up to and including the 10% AEP*
- *Flood depths in the downstream service road increase in the smaller events by less than 200 millimetres and are generally reduced for the modelled 1% AEP and larger events*
- *Flooding through the rear of properties fronting Rasheda Street is increased by around 100 millimetres in more frequent events although experiences some modest reductions of less than 100 millimetres in the larger events modelled*

The provided response to the identified increase in flood risk (EES Chapter 24 Surface Water, P33, last para.) is as follows:

"Further modelling of the final design to confirm that adopted mitigation measures adequately offset the impacts on flood levels would need to be undertaken to meet the City of Banyule and Melbourne Water requirements (EPR SW6). Mitigation may potentially involve land modifications to increase the floodplain storage both upstream and downstream of Greensborough Bypass. Consultation with the City of Banyule and other stakeholders would occur through the detailed design process."

As with the previous two catchments, further (mitigation) modelling is required to ensure a solution to offset the increase in flood risk as a result of the project is viable at the location. This is particularly critical within this catchment due to the increase in flood risk reported within private properties.

8.2.3.4 Banyule Creek

Rather than providing a summary of findings for the Banyule Creek catchment, the document makes note of the potential to mitigate any increase in flood risk through compliance with the EPRs and further modelling, as per the following statement (EES Chapter 24 Surface Water, P35):

"Modelling of the reference project was undertaken to quantify the potential impacts on flood risk. Modelling indicates that with appropriate design in compliance with the EPRs, that the project poses no significant increase in flood depths for any of the events or locations assessed, and no private property would have an increased flood risk."

Figure 8-7 provides a snapshot of the afflux as a result of the project within the catchment, widespread albeit shallow increases in flood depth can be observed. There may be multiple viable solutions to this increase in flood risk however, no details are provided as to the potential mitigation measures nor are there any mitigation design results to reinforce the above statement.

Consequently, it is difficult to form an opinion as to the feasibility to mitigate the impacts on flood levels as a result of the project.

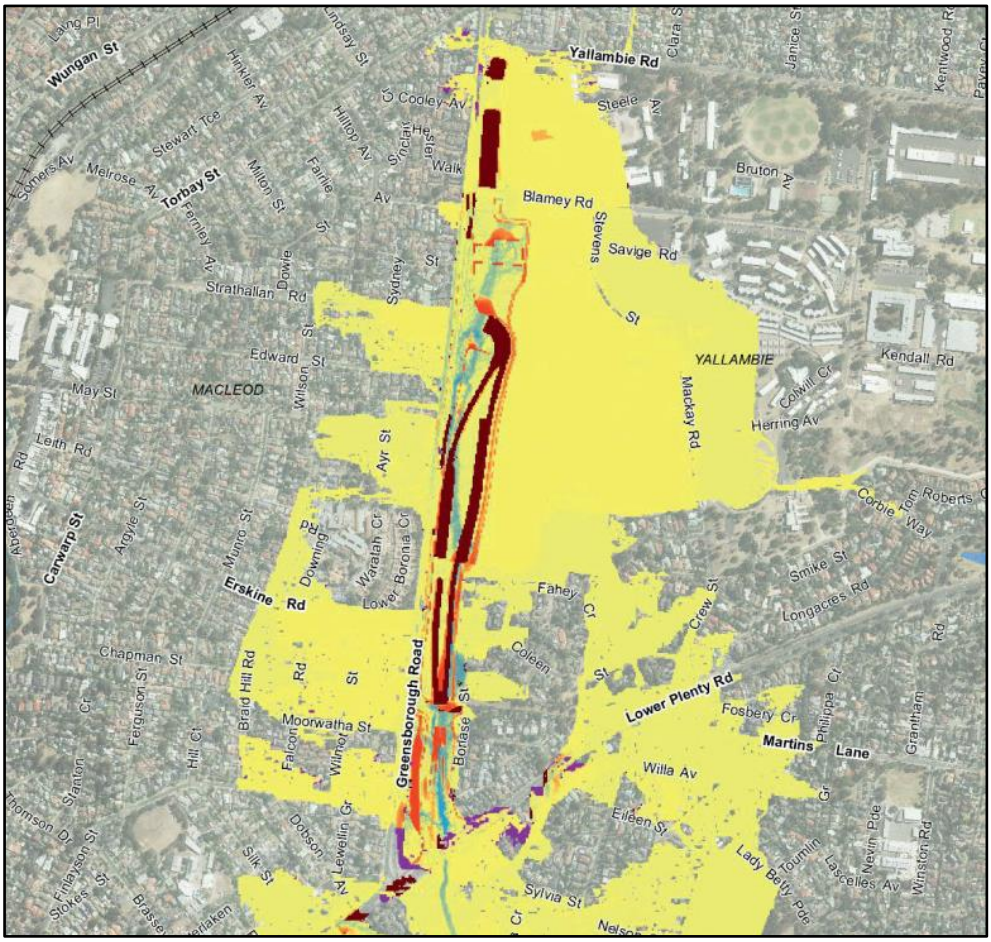

Figure 8-7 Banyule Creek – Extract of Afflux Plot, source: EES Chapter 24 – Surface Water

8.2.3.5 Yarra River

The main impacts on flood levels within the Yarra River catchment are summarised within Chapter 24 Surface Water (p37-38) of the EES report as follows:

- *Due to the road level at Manningham Road, the reference project may cause some localised increases in flood levels (less than 25 millimetres) upstream of Manningham Road. While this is a small increase it continues a substantial distance upstream before fully dissipating.*
- *Smaller increases are predicted along the Eastern Freeway near Burke Road due to a slight lowering of the Eastern Freeway and to the east of Bulleen Road from Koonung Creek. Although these small increases may be further mitigated, a preliminary assessment of the number of properties potentially affected was undertake and is summarised in Table 24-12. Buildings within the flood extent would not necessarily experience above floor flooding.*

The provided response to the identified increase in flood risk (EES Chapter 24 Surface Water, P38, last para.) is as follows:

"The potential for an increase in flood risk would be mitigated by ensuring the risk from changes to flood levels, flow and velocities are minimised (EPR SW6). This would be achieved through further design refinement during detailed design, and may potentially include modifying the level of Manningham Road."

Considering the shallow nature of the afflux identified it is likely a viable mitigation solution exists however, without evidence obtained through mitigation modelling confirming this, it is difficult to form an opinion.

Location	Maximum afflux(m)	Additional properties affected by flooding	Flooded properties exposed to an increase in flood level	Main buildings within flood extent exposed to an increase in flood level
Eastern Freeway (near Burke Road)	0.015	0	1	1
Koonung Creek (east of Bulleen Road)	0.016	0	2	0
Yarra River (north of Manningham Road)	0.022	0	123	46
Yarra River (north of Banyule Road)	0.01	0	122	33
Total	**N/A**	**0**	**248**	**80**

Figure 8-8 Yarra River – Properties Affected, source: EES Chapter 24 – Surface Water

The increase in flood levels as a result of the project potentially exposes 80 private properties with main buildings within the flood extent to an increase in flood risk. Considering the scale of the impacts it is recommended further assessment be undertaken specifically to investigate the level of flood risk experienced by the properties during existing conditions such that the increase in flood depth can be quantified.

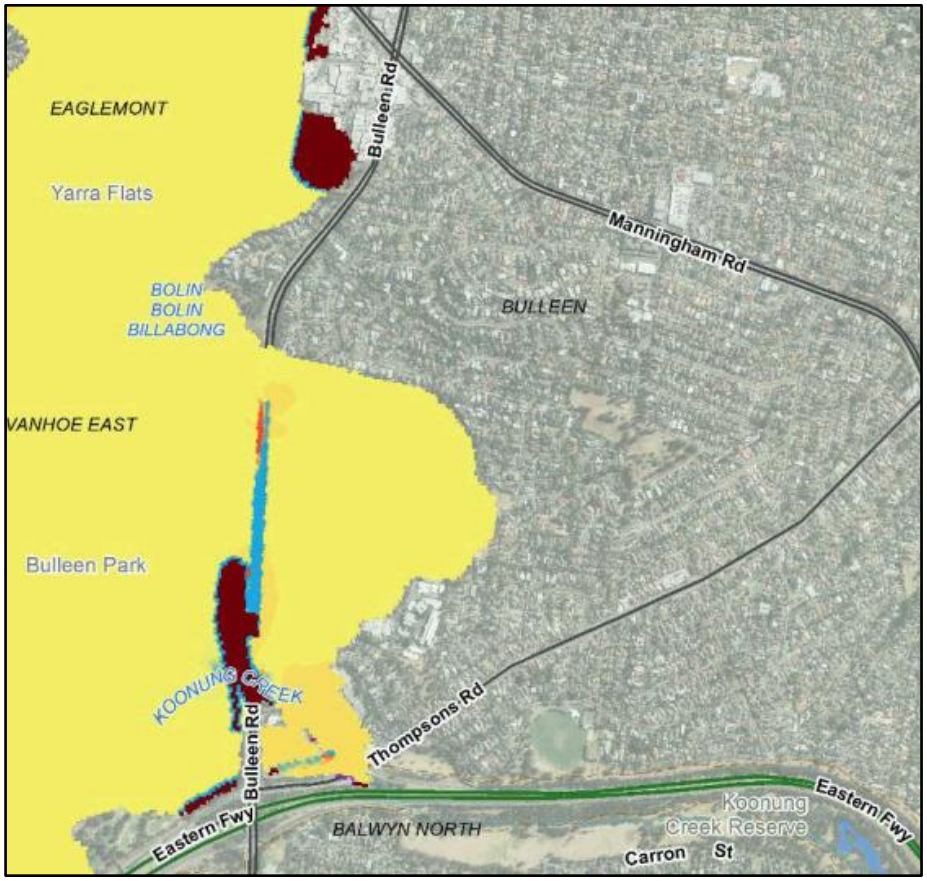

Figure 8-9 Yarra River – Extract of Afflux Plot, source: EES Chapter 24 – Surface Water

As shown in Figure 8-9, the lack of cadastre information (specifically property boundaries) and a solid afflux plot with no transparency overlaid onto aerial imagery makes it difficult to ascertain which private properties are affected.

I note that, whilst the levels of afflux are generally not high, they are extensive in area and the Yarra Floodplain is a particularly sensitive environment in terms of flooding and the existing private and public infrastructure within it.

8.2.3.6 Koonung Creek

The main impacts on flood levels within the Koonung Creek catchment are summarised within Chapter 24 Surface Water (p40-41) of the EES report to as follows:

- *There is a widespread reduction in flood levels to the north of the freeway between Tram Road and Middleborough Road which reduces flood levels on some private properties for example reductions of 150 millimetres in properties fronting Grange Park Avenue.*
- *Between Doncaster and Elgar Roads, there is a mix of small reduction in flood levels (~12mm) and no significant change to existing flooding of residential properties along Valda Avenue. Some localised increases in flooding in this area are limited to parklands with no impact to private properties. Flood extents are generally reduced.*

Location	Potential flood impact	Potential mitigation
Downstream of Thompson Road	Reduced flood levels on the upstream (east) side of Bulleen Road with a slight increase in the downstream (west) side of Bulleen Road of less than 100 mm	Small reduction in the low flow capacity of the new cross culverts is expected to improve this outcome
Inbound Bulleen Road onramp	The shared use underpass doesn't have a flood barrier in place and subsequently shows increased flooding in the freeway, especially in the more frequent events.	Protect the shared use underpass with a flood barrier such that the local catchment doesn't drain through the underpass onto the Eastern Freeway
Southern edge of the Eastern Freeway from Wilburton Parade to Mountain View Road	Removal of existing surface flooding also removes a location which would currently inundate the Eastern Freeway in significant events near Mountain View Road. Flooding on the freeway is reduced, although ponding in the reserve increases with afflux in larger events extending across Carron Street into private property. 1% AEP levels in Carron Street are expected to increase by approximately 400 mm.	This may potentially be reduced by providing a high level outlet from this area or additional storage in the parkland.
Northern side of the Freeway between Bulleen Road and Doncaster Road	There are local increases in flood levels at a number of discrete locations. This is due to a fast flow rate of Koonung Creek which results in a build-up of water trying to get into the inlets during a flood event, and a reduction in local flood storage as a result of the freeway widening.	These issues would individually benefit from local terrain modifications and refinement of upstream storages to slow Koonung Creek.
Between Tram Road and Middleborough Road.	On the south side of the Eastern Freeway, the properties along Eram Road (near Heathfield Rise) experience a flood level increase of up to 90 mm in short duration (smaller volume high intensity) events due to a loss of existing local flood storage. The reductions in flood levels on the north of the freeway increase the outlet capacity from this area sufficiently that in longer duration (lower intensity) events flood levels reduce by up to 250 mm.	Balance water transfer from north to south side of freeway

Figure 8-10 Koonung Creek – Impacts & Mitigation, source: EES Chapter 24 – Surface Water

The provided response to the identified increase in flood risk (EES Chapter 24 Surface Water, P41, last para.) is as follows:

"The potential for an increase in flood risk would be mitigated by ensuring the risk from changes to flood levels, flow and velocities are minimised (EPR SW6). This would be achieved through further design refinement during detailed design, which may involve the mitigation measures summarised in Table 24-13."

The detailed table (Figure 8-10) of possible mitigation measures provides some confidence that a mitigation solution exists however, without mitigation modelling for each of the solutions proposed are tested, it is difficult to provide an informed opinion on the viability of these measures.

It is noted that the levels of unmitigated afflux predicted by the hydraulic model are significant, up to 500 mm. This is something that I would expect to be addressed within the EES material and I believe the reporting is deficient in that no demonstration of feasible mitigation options has been provided.

8.3 Environmental Performance Requirements

The Environmental Performance Requirements as described in Chapter 27 of the EES provide a number of measures intended to ensure any potential impacts are managed appropriately. The vast majority appear to be clear and concise whilst providing enough detail to ensure a suitable outcome is achieved. Where I believe improvements could be made, I have provided selective comments below.

EPR SW8: Minimise impact from waterway modifications

The EPR states the following:

Where waterway or flow regime modification is necessary, modifications will be designed and undertaken in a way that mitigates to the extent practicable the effects of changes to flow and minimises, to the extent practicable, the potential for erosion, sediment plumes, impacts on bed or bank stability and exposure or mobilisation of contaminated material during construction and operation to the requirements of Melbourne Water or the relevant drainage authority.

Waterway modifications are to be design and undertaken in a way that maximises the visual and aesthetic amenity and environmental conditions (including habitat, connectivity, refuge and hydraulic conditions) to support aquatic ecosystems of the waterways having regard to relevant strategies, policies and plans for that waterway and in consultation with Melbourne Water or the relevant drainage authority.

Considering the scale of the proposed changes to several waterways as part of the reference design, the importance of this particular EPR becomes significant. I recommend the use of stronger wording in relation to the design outcomes (such as amenity and provision of habitat, etc) of the waterway modifications to include "to the satisfaction of Melbourne Water and other relevant stakeholders" (such as Council). I also recommend the removal of "to the extent practicable" as what is considered practicable has the potential to be subjective.

EPR SW12: Minimise impacts on irrigation of sporting fields

The EPR states the following:

Maintain existing storage and available water supply for the irrigation of sporting fields impacted by the project as necessary in consultation with the impacted stakeholders.

I recommend further refinement of this EPR to note the quality of the water supply is to be of an equivalent standard to that available to the relevant stakeholders pre-development. Additionally, that

there are no costs implications for the stakeholder to access the alternative water source, i.e. through maintaining additional pumps.

EPW SW14: Meet existing water quality treatment performance

The EPR states the following:

Retain or replace existing water quality treatment assets to meet or exceed existing water quality treatment performance. Consider climate change effects where practicable.

I recommend a stronger commitment to taking into consideration the impacts of climate change beyond "where practicable" to be in line with EPR SW13 which handles the assessment of the impacts of climate change on flood risk.

8.4 General Comments and Recommendations

8.4.1 Evidence to Support the Viability of Mitigation Solutions

The most challenging aspect of providing an informed opinion on the reference design with respect to surface water is the lack of evidence to support claims that impacts identified, be it an increase in flood level, decrease in water quality or reduction in access to water supply, will be mitigated within the detailed design phase of the project.

Within each section of the EES, possible impacts are identified, however the mitigation of the impacts is deferred to the detailed design phase. It is generally good practise to undertake a feasibility assessment via coarse mitigation modelling at the concept (or reference) design phase to establish that a solution is indeed possible at the location. This provides all stakeholders with a level of confidence and comfort through proof of concept. Once the project moves to detailed design, any changes to the reference design and mitigation measures would need to be demonstrated to provide an equivalent or improved outcome (compared to the reference design).

It is my understanding that EPRs exist as a mechanism to reinforce and scope the commitment to resolve any impacts on the environment as a result of the project. The apparent tendency to lean on the EPRs as a method to defer the need to resolve identified impacts provides the affected stakeholders no insight into potential solutions nor the opportunity to provide comment on the suitability of the proposed solution(s).

8.4.2 Undergrounding of Existing Waterways

The EES notes approximately 1,400 metres of Banyule Creek and approximately 1,500 metres of Koonung Creek which currently convey flow within above ground waterways are to be 'undergrounded' to a piped system (culverts) with an overland flow path component above as part of the project.

This proposal appears to be contrary to Melbourne Water's general principles in relation to waterway design and working within existing waterways, in addition to a numerous planning policies (such as the Yarra River Bulleen Land Use Framework Plan, May 2019) which deal with the social and amenity value of such assets.

I agree with the statements within the chapter that the physical impacts such as changes in flow regime and geomorphology within the affected waterways as a result of 'undergrounding' can be mitigated through considered design in line with Melbourne Water requirements and best practice methods. However, I believe the potential loss of habitat, habitat corridors (including fish passage)

and existing vegetation should be assessed as part of the concept (reference) design phase to provide a clear indication to all stakeholders as to the ramifications of these activities.

In summary, in order to consider the 'undergrounding' of sections of existing waterways a viable option, a thorough feasibility assessment must be undertaken and documented within which all other possible mitigation options are explored and, based on analysis and evidence, exhausted.

8.4.3 Asset Ownership and Connection Rights

Through previous experience in the land development sector, Water Technology has been party to several instances where disputes between road authorities and Local Government have occurred, stemming from Approved Point of Discharge (APD) requests from adjacent private land owners.

These issues arise where either:

- The outfall of the Council stormwater system has gone from a Melbourne Water owned asset to that attributed to the major infrastructure project, or
- Access to the Council stormwater system has been severed by the major infrastructure project alignment.

Both cases can result in restricted access of a private land owner to connect their drainage assets to a road authority drainage outfall or allowing the private connection on the condition the local Council take on all maintenance requirements for the asset from the connection point downstream.

Recommend these issues be tabled and a formal agreement between the relevant authorities be made prior to the construction of the project.

9 RESPONSE TO REQUEST FOR INFORMATION (RFI)

Maddocks Lawyers on behalf of Boroondara, Banyule and Whitehorse City Councils submitted a formal RFI to NELA on 19th June 2019. Clayton Utz Lawyers provided a response on behalf of NELA on 26th June 2019 to the requests and queries posed by Maddocks. An opinion on each pertinent item has been provided within the section below.

Maddocks Request – 10:

Request access to a Shapefile of the areas where stormwater treatment wetlands or other WSUD works or Integrated Water Management projects may occur.

NELA's Initial Response:

"Consideration is being given to this request and a response will be provided shortly."

It is my understanding that, at this time, the requested data has not been issued.

Maddocks Request – 23:

Request access to flood hazard mapping / modelling outputs

NELA's Initial Response:

"The EES contains mapping of both changes in depth and changes in velocity which are considered to provide a good indication of potential changes to flood hazard."

Whilst afflux and changes in velocity plots are published within the EES, flood hazard specifically does not appear to have been assessed – utilising the provided maps to infer flood hazard does not provide the ability to accurately ascertain the change in flood hazard. As previously noted, without baseline hazard assessments for existing conditions it is not possible to quantify the impacts of any increase in flood level or velocity (or both).

Maddocks Request – 25:

Request access to the hydrologic and hydraulic models and results

NELA's Initial Response:

"Council's expert is invited to inspect the model prior to or as part of the expert witness meeting."

Representatives of both Water Technology (Niels Unger) and Engeny (Scott Dunn) attended a meeting with GHD at NELP's offices on 12th July 2019. The general approach to the meeting was a question and answer forum rather than a hands-on look at the modelling. Whilst both GHD and NELP were accommodating and responded to all queries, many technical queries relating to the modelling remained unanswered.

Maddocks Request – 26:

Clarification as to why differences in modelling approach exists across catchment areas.

NELA's Initial Response:

"Council's expert is invited to inspect the model prior to or as part of the expert witness meeting."

Representatives of both Water Technology (Niels Unger) and Engeny (Scott Dunn) attended a meeting with GHD at NELP's offices on 12th July 2019. The query was posed as part of this meeting, specifically noting the lack of consistency in the completeness of the stormwater network in some models when compared to others and why the Yando St MD and Kempston St MD models were split. The response was to improve efficiency in runtimes (which may be reasonable) without any comment on possible issues with not picking up local (minor) overland flowpaths as a result.

Maddocks Request – 27:

Details of the proposed augmentation of the existing retarding basin in AK Lines Reserve.

NELA's Initial Response:

"The reference design is a concept that has been developed to understand the issues and constraints. The EES includes some discussion of AK Lines reserve in section 9.1.1 of Technical Report P – Surface Water. There have also been discussions with Council. The final design is a matter for the detailed design and construction phase. The EPRs require this to be done in association with the Council."

This appears to be deferring mitigation to the detailed design phase under the assumption the reference design's purpose is to merely identify issues and constraints rather than demonstrate the effectiveness of mitigation measures.

Maddocks Request – 27:

Details of the proposed augmentation of the existing retarding basin in AK Lines Reserve.

NELA's Initial Response:

"The reference design is a concept that has been developed to understand the issues and constraints. The EES includes some discussion of AK Lines reserve in section 9.1.1 of Technical Report P – Surface Water. There have also been discussions with Council. The final design is a matter for the detailed design and construction phase. The EPRs require this to be done in association with the Council."

This appears to be deferring mitigation to the detailed design phase under the assumption the reference design's purpose is to merely identify issues and constraints rather than provide an indication (even if conceptual in nature) of what is being proposed.

Maddocks Request – 28:

Full details of the blockage considerations.

NELA's Initial Response:

"Blockage has been specifically referred to within EPR SW6 in recognition that it may be more relevant for alterative design outcomes."

The need for blockage scenarios being run is indeed within EPR SW6 without any indication as to what level of blockage is to be utilised; it is assumed this would be dictated by the relevant floodplain authority (Melbourne Water). It is my understanding that blockage scenario modelling was not undertaken as part of the reference design assessment and that through the EPR it will be undertaken as part of the detailed design process. I recommend this be done as part of the reference design assessment process.

Maddocks Request – 29:

An indication of the location of all proposed drainage assets including locations where proposed drainage will be discharged to and proposed ownership of drainage assets.

NELA's Initial Response:

"Details and ownership of potential assets has been discussed at length with Councils and other drainage authorities. The reference design is appropriate to establish the acceptability of drainage impacts."

If these details have in-fact been discussed with all affected Councils at length I have not been privy to the details discussed. Through the meeting at NELP's offices on 12th July 2019 it was clear there was some hesitation to provide any detail on proposed stormwater asset alignments and points of outfall due to procurement concerns of providing someone an unfair advantage as part of the future tender process.

10 CONCLUSION

The purpose of this report was to evaluate and provide opinion on the surface water outcomes detailed within the EES report, its appendices and attachments. Overall, it appears the modelling and results that define existing conditions and the potential impacts of the project are of a reasonable standard and comply with all relevant guidelines and requirements. However, without details of the proposed mitigation solutions and evidence to support the effectiveness of these, it is not possible to provide a firm opinion on the feasibility of mitigating any surface water impacts that may arise from the project.

I make the following concluding points:

- Hydraulic mitigation modelling should have been undertaken to provide clarity as to whether (or not) mitigation solutions to the predicted flood and water quality impacts of the project can be achieved at each location in question for the reference design.
- Further, rigorous assessment into the feasibility of the WSUD assets proposed including earmarked locations and asset configurations to provide all stakeholders with a clear understanding of what may potentially form part of the detailed design is missing from the EES documentation.
- An assessment into whether BPEMG water quality treatment targets can be met at a catchment scale rather than at a holistic project scale to ensure the even distribution of stormwater treatment between all receiving waterways is needed.
- An Asset Management Plan should be established to cover all proposed on-going maintenance and “full reset” activities including lifecycle costing. Considering these assets are also proposed to play a part in spill containment, the management plan must contain specific actions related to when oil/petrol spills occur (this appears to be covered by EPR SW2).
- I recommend further reporting be undertaken to ensure no catastrophic flooding occurs as a result of the project in the 0.5% and 0.2% AEP design floods.
- Blockage scenarios have not been modelled as part of the reference design assessment. Given the importance of the project infrastructure and potential consequences, this should be undertaken to provide an understanding of the potential likelihood and impacts of blockage.
- I recommend minor changes and additions to several of the draft EPRs as described in Section 8.3 of this report.

11 DECLARATION

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

Warwick Bishop

B.E. (Hons), MEngSci

15 July 2019

APPENDIX A – Instructions

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Partner: Terry Montebello

28 June 2019

Warwick Bishop
Water Technology
Email: warwick.bishop@watertech.com.au

Subject to legal professional privilege

Dear Warwick

North East Link Environment Effects Statement process

Harwood Andrews act for Manningham City Council and Maddocks act for Banyule City Council, Boroondara City Council and Whitehorse City Council (collectively, the **Councils**) in relation to the North East Link Environment Effects Statement (**EES**) process, the draft planning scheme amendment and the works approval application prepared to facilitate the North East Link Project (**Project**).

We are instructed to engage you to provide expert evidence in the area of surface water.

An Inquiry and Advisory Committee (**IAC**) has been appointed by the Minister for Planning under section 9(1) of the *Environmental Effects Act* to hold an enquiry into the environmental effects of the Project. The role of the IAC in this regard is set out in paragraph 1 of the Terms of Reference (**TOR**).

The IAC has also been appointed as an advisory committee under section 151 of the *Planning and Environment Act 1987* to review the draft planning scheme amendment prepared to facilitate the Project. The role of the IAC in this regard is set out in paragraph 2 of the TOR.

The IAC is a multi-disciplinary committee. The biography of each committee member is available here.

The IAC will hold a public hearing from **25 July 2019** to approximately 6 September 2019.

A summary of key dates is set out below.

Instructions

We request that you provide a fee proposal to:

1. Review the exhibited documents relevant to your area of expertise and each of the Councils' municipal areas, in particular:
    a) The EES:
        - Volume 1 (Chapters 1 to 8);
        - Volume 4 (Chapters 21 'Ground movement', 22 'Groundwater', 23 'Contamination and soil', 24 'Surface water', 25 'Ecology', 27 'Environmental management framework');
    b) Technical Report P Parts 1 & 2 and Appendices: Surface Water;
    c) EES Map Book;
    d) Attachment III: Risk Report;
    e) Attachment V: Draft Planning Scheme Amendment.

2. Review:

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a) The Ministerial Guidelines for assessment of environmental effects under the *Environmental Effects Act 1978* (2006);
b) Manningham City Council's public submission on the EES dated 5 June 2019;
c) Banyule City Council, Boroondara City Council and Whitehorse City Council's joint public submission on the EES dated 7 June 2019;
d) IAC tabled document no. 5 titled *Preliminary Matters and Further Information Request*, dated 20 June 2019;
e) IAC tabled document no. 14 being the Maddocks further information request on behalf of Banyule, Boroondara and Whitehorse City Councils;
f) Clayton Utz (acting on behalf of NELP) initial response to the Maddocks further information request (**attached**);
g) Harwood Andrews further information request on behalf of Manningham City Council (**attached**);
h) the *draft Yarra River Bulleen Precinct Land Use Framework Plan 2019* and Manningham City Council's public submission on this dated 6 June 2019; and
i) any other submission or document we subsequently refer to you.

3. Prepare a single expert witness report on behalf of the Councils for circulation that contains your opinion on the following matters, as relevant to your area of expertise:

   a) Does the EES adequately document and assess the nature and extent of the environmental effects of the Project? In addressing this question please explain where you are satisfied with the content of the EES and why, and if not, what if any deficiencies exist in the documentation and/or assessment of the nature and extent of environmental impacts contained in the EES;

   b) Can the Project as described in the EES achieve a level of environmental performance which is consistent with relevant legislation, documented and endorsed policy or acknowledged best practice;

   c) If the Project, as described in the EES cannot achieve a level of environmental performance which is consistent with relevant legislation, documented and endorsed policy or acknowledged best practice, are there any recommendations that you would make as to specific measures which you consider necessary and/or appropriate to prevent, mitigate and/or offset adverse environmental effects? If so, please explain your reasoning in detail. To the extent that it is within your expertise to comment upon the feasibility of any of your recommendations, please state whether or not any recommendations are feasible, explaining your reasoning;

   d) How does the Project as described in the EES respond to the principles and objectives of "ecologically sustainable development" as defined in the IAC's Terms of Reference;

   e) Are there any recommendations that you would make as to specific measures which you consider necessary and/or appropriate to improve the response of the Project to the principles and objectives of "ecologically sustainable development"? If so, please explain your reasoning in detail. To the extent that it is within your expertise to comment upon the feasibility of any of your recommendations, please state whether or not any recommendations are feasible, explaining your reasoning; and

   f) To the extent that the content of the draft planning scheme amendment, works approval and environmental protection requirements lies within your expertise, do you have any recommendations for changes that should be made to the draft planning scheme amendment, works approval or planning approval and/or draft environmental performance requirements in order to improve the environmental outcome of the Project?

4. In due course, review and comment on other parties' expert evidence (surface water);

5. Attend any conclave of surface water experts requested by the IAC;

6. Present your expert evidence at the hearing. You should anticipate preparing a short (no more than 30 minutes) presentation to facilitate this. The presentation is to be drawn from your expert witness report and may respond to other expert reports (as relevant).

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Please ensure you carefully read and comply with both Planning Panels Guide to expert evidence (DOCX, 81.8 KB), April 2019 and the IAC directions set out in tabled document 15 here.

Key Dates

Please note the following key dates:

- NELP has offered for its experts to meet with other experts (outside the formal expert conclave process) prior to **5pm Friday 12 July 2019** to discuss issues, view models etc. The IAC has encouraged parties to take up offer in the IAC Directions (orders 4-7). If you would like to take up this offer and meet with a NELP expert before you finalise your expert evidence, please let us know as soon as possible and we will arrange for this to occur.
- Your expert witness statement will need to be circulated by **9.00 am on Monday 15 July**. We kindly ask that you provide us with a copy of the report by **10.00 am on 11 July**.
- A conclave of surface water experts is likely occur (as per order 14 of the IAC Directions). A time and date for this meeting has not yet been scheduled but we expect it to occur during the week of 15 July. We will confirm this as soon as possible;
- Presentation of the proponent's case is scheduled to commence on Thursday 25 July; and
- Presentation of the Councils' case is likely to be scheduled to commence in mid-August. We are waiting on a timetable for hearings to be circulated so will confirm this as soon as possible.

Documents

The exhibited EES documents may be accessed at: https://northeastlink.vic.gov.au/environment/environment-effects-statement-ees/environment-effects-statement-documentation.

Confidentiality

Please keep our engagement of you and the preparation of your expert witness statement confidential until we have notified you that we have circulated your evidence externally or made it publicly available.

If you have any queries, please contact Tessa D'Abbs on 9611 0117 or at tdabbs@ha.legal (acting for Manningham) or Sophie Jacobs on 9258 3546 or at sophie.jacobs@maddocks.com.au (acting for Banyule, Boroondara and Whitehorse).

Yours sincerely,

HARWOOD ANDREWS **MADDOCKS**

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APPENDIX B – Response to Specific Questions

APPENDIX B – Response to Specific Questions

Whilst I believe all queries posed by the Client as part of the instructions to provide evidence (Harwood Andrews & Maddocks 28/06/2019) are addressed within the main body of this report, please see summary responses to each specific query below.

a. **Does the EES adequately document and assess the nature and extent of the environmental effects of the Project?**
   It is my opinion that the EES documentation package provided, documents and assesses the nature and extent of the environmental effects of the reference design to an acceptable degree. However, the EES does not provide sufficient evidence to support the statements within it that the effects of the reference design can be sufficiently mitigated to the satisfaction of the relevant authorities.

b. **Can the Project as described in the EES achieve a level of environmental performance which is consistent with relevant legislation, documented and endorsed policy or acknowledged best practice?**
   As a result of the lack of access to scrutinise the modelling or results presented in the EES Surface Water reports, in addition to the lack of evidence to support proposed mitigation measures, it is not possible to form a firm opinion regarding whether the Project, as presented, can achieve a level of environmental performance which is consistent with relevant legislation, documented and endorsed policy or acknowledged best practice.

c. **Are there any recommendations that you would make as to specific measures which you consider necessary and/or appropriate to prevent, mitigate and/or offset adverse environmental effects?**
   As discussed within the main body of this report, further mitigation modelling including feasibility assessments into the proposed solutions at each location where an impact is identified is required to provide stakeholders with sufficient evidence to support the statements made within the EES that the impacts can be appropriately mitigated.

d. **How does the Project as described in the EES respond to the principles and objectives of "ecologically sustainable development" as defined in the IAC's Terms of Reference?**
   Based on the lack of supporting evidence within the EES, it is difficult to form a firm opinion as whether the Project adequately responds to the principles and objectives of ecologically sustainable development defined in the IAC's Terms of Reference. I believe, based on assessing the EES documentation provided, it is unclear as to whether or not the Project has the ability to enhance or conserve the environ within which it is to reside.

e. **Are there any recommendations that you would make as to specific measures which you consider necessary and/or appropriate to improve the response of the Project to the principles and objectives of "ecologically sustainable development"?**
   As above, further details of the proposed mitigation designs and modelling is required to ensure the mitigation of any/all impacts identified within the EES Report is achievable at each location to the satisfaction of the relevant authorities.

f. **Do you have any recommendations for changes that should be made to the draft planning scheme amendment, works approval or planning approval and/or draft environmental performance requirements in order to improve the environmental outcome of the Project?**
   I have outlined some recommended changes to the EPR's within the report.