AECOM Australia Pty Ltd
Level 9
8 Exhibition Street
Melbourne VIC 3000
Australia
www.aecom.com

+61 3 9653 1234 tel
+61 3 9654 7117 fax
ABN 20 093 846 925

Memorandum

To	Cameron Mattingley - VicRoads	Page	1
CC	George Smyth		
Subject	Palmers Road Corridor Environment Effects Statement (EES) (Western Freeway to Calder Freeway) –FINAL Surface Water Desktop Assessment		
From	Melanie Collett		
File/Ref No.	60267382 / 1.5.3	Date	13 September 2013

Dear Cameron,

AECOM Australia Pty Ltd ('AECOM') has been engaged by VicRoads to prepare the Palmers Road Corridor Environment Effects Statement (EES) (Western Freeway to Calder Freeway). This memorandum details the findings of the surface water desktop assessment undertaken for the EES.

1.0 Introduction

1.1.1 Project Background

The Palmers Road Corridor Project (Western Freeway/Deer Park Bypass to Calder Freeway) (the Project) comprises development of a major north-south arterial road in the west of Melbourne, between the Western Freeway (Deer Park Bypass) and Calder Freeway.

In the short term, the proposal involves reserving relatively small areas of land in the Melton and Brimbank planning schemes to complete a 16 kilometre long and 40 – 60 metre wide corridor for the future long term development of Robinsons Road, Westwood Drive and Calder Park Drive. The required corridor is mostly provided within the existing corridor of Robinsons Road, Westwood Drive and Calder Park Drive.

In the long term, the project involves the upgrade of the Palmers Road Corridor to a six lane divided road (i.e. three lanes in each direction), with off-road shared bicycle and pedestrian facilities on both sides of the road. Two existing railway crossings will be removed, one at the Melbourne-Bendigo rail line crossing with Calder Park Drive and another at the Melbourne-Ballarat rail line with Robinsons Road. An additional new three lane bridge will be constructed over Kororoit Creek, and a grade separated diamond interchange is proposed where the northern extent of the route intersects the Calder Freeway.

Complete development of the route is expected to be a longer term project, which would result in the arterial road being constructed potentially by 2046.

1.1.2 Scope and Methodology

The surface water desktop assessment included a review of publically available data regarding surface water for the study area. The assessment included the following:

- determination of the name, location and type of surface water crossings encountered
- review of relevant surface water policy and legislation
- review of surface water related planning scheme overlays and zones
- review of publically available data, databases and maps of hydrological features
- review and summary of reports obtained from other authorities who have undertaken recent work in the area, including Regional Rail Link, Work Package D
- preparation of one surface water figure
- preparation of this memorandum documenting the findings, potential impacts and mitigation measures.

2.0 Assessment Findings

The findings of the desktop assessment are presented in the following sections.

2.1.1 Surface Water Crossings

Surface water crossings that are encountered along the study area are shown in **Figure 1**. The waterways in the Corridor include the following five existing watercourses:

- Taylors Creek
- Sydenham Drain
- Kororoit Creek
- Billingham Road Drain
- Unnamed drain downstream of confluence with Whiteside Drain.

In addition to the crossings above, an unnamed minor water crossing is noted south of Ballarat Road in the vicinity of Wagani Avenue. Several of these waterways are within Melbourne Water Development Services Schemes (DSS), and as such are subject to Melbourne Water DSS requirements.

2.1.2 Legislation and Policy

The Palmers Road Corridor is located in western Melbourne and falls within Port Phillip and Westernport Catchment Management Authority's (PPWCMA) jurisdiction as the applicable drainage authority. PPWCMA have delegated authority to Melbourne Water.

A summary of current policy and legislation related to surface waters in Victoria is provided in Table 1. Please note that the relevant policies and legislation may change over time and additional requirements may be introduced in the future which could impact on this project.

Table 1 Victorian Surface Water Policy and Legislation Summary

Legislation	Summary
Environment Protection Act 1970	• Regulates and controls actions relating to the protection of Victoria's environment • Focus on air, land, noise, waste and water • Philosophy of preventing pollution and environmental damage by setting environmental quality objectives and establishing programs to meet them • Empowers the Environment Protection Authority (EPA) to manage legislative instruments including, but not limited to, Acts, regulations and State Environment Protection Policies (SEPPs)
Planning and Environment Act 1987 (P&E Act)	• Establishes a framework for planning the use, development and protection of land in Victoria in the present and long-term interests of all Victorians • Victorian Planning Provisions (VPPs) are set out in the P&E Act to assist in providing a consistent and coordinated framework for planning schemes (administered at a local government level) in Victoria. Refer to Section 2.1.3 for Surface Water planning zones and overlays
Water Act 1989	• Resourcing and use of water in Victoria • States that Melbourne Water has the power to make By-Laws including By-Law No. 2 *Waterways, Land and Works Protection and Management.* By-Law No. 2 objectives include: o The management, protection and use of lands, waterways and works under the management and control of Melbourne Water o Preventing or minimising interference with or obstruction of the flow of water o Preventing or minimising the silting up of a designated waterway or designated land or works or any injury to or pollution of it or them, including prohibiting the deposit of material in or near it or them o Prohibiting or regulating the removal of any material from land forming part of a designated waterway or designated land or works o The general management and control of any designated waterways or designated land or works

Legislation	Summary
State Environment Protection Policy (Waters of Victoria) – [SEPP WoV]	• Sets the framework for government agencies, businesses and the community to work together, to protect and rehabilitate Victoria's surface water environments under the *Environment Protection Act 1970* • Protects the uses and values of the water environments that the community and government want to protect (Beneficial Uses) • Sets objectives and indicators which describe the environmental quality required to protect beneficial uses • Provide guidance to CMAs, coastal boards, water authorities, communities, businesses and local and state government agencies
Schedule 6 – Waters of Port Phillip Bay	• Schedule 6 of the SEPP WoV includes all of the waters of Port Phillip Bay bounded by the high water mark • Part 5 of the Schedule (Attainment Program) promotes integrated management of activities in Port Phillip Bay and its catchment, recognising the cumulative effects of different activities on water quality and consequent need to co-ordinate planning of land, water and waterway management • Development and implementation of an Environment Management Plan for Port Phillip Bay. Topics of relevance to catchment surface water and the Palmers Road Corridor project include: o Stormwater management o Sediment Management • Water quality objectives shall be the criteria specified by the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC)
Urban Stormwater - Best Practice Environmental Management Guidelines (BPEMG)	• The SEPP WoV requires measures to be implemented to control the environmental impact of stormwater pollution. To meet this requirement the SEPP WoV makes reference to the Urban Stormwater - Best Practice Environmental Management Guidelines (BPEMG), written by the Victorian Stormwater Committee (VSC) and published by the CSIRO in 1999 • BPEMG establishes best practice performance objectives for urban stormwater management necessary to meet the SEPP WoV objectives • Sets specific pollutant reduction targets for future development activities, these targets are outlined in **Appendix A.** It is compulsory under the Sustainable Neighbourhoods Clause 56 of the VPP to design and manage urban stormwater management systems for all new residential subdivisions to meet current BPEMG objectives. • BPEMG also provides guidance that helps to improve the quality of urban stormwater entering receiving waters.
Port Phillip and Westernport Regional River Health Strategy 2004 (RRHS)	• Developed under the *Catchment and Land Protection Act 1994* and is guided by the Victorian River Health Strategy (VRHS) • Provides a five year plan for improving the health of rivers and creeks in the Port Phillip and Westernport region • Condition descriptions of key rivers in the region are based on water quality, aquatic life, habitat and stability, vegetation and flow • The RRHS Addendum, released in 2007 aligns the RRHS priorities and targets for the second five year water plan (Water Plan 2) period between 2008/09 to 2012/13
DRAFT Healthy Waterways Strategy 2013 (HWS)	• Developed by Melbourne Water in consultation with the Port Phillip and Westernport region's community • Anticipated release date July 2013 • Builds on work undertaken through the RRHS 2004 and Addendum 2007 • Strategy for period 2013/14 – 2017/18 • Focuses on seven key waterway values: amenity, birds, fish, frogs, macroinvertebrates, platypus and vegetation • Complemented by the *Stormwater Strategy (DRAFT)*

2.1.3 Planning Schemes

Planning Schemes set out policies and requirements for the use, development and protection of land and incorporate appropriate zones and overlays in the Victorian Planning Provisions (VPPs) from the P&E Act (1987).

Surface water planning schemes are implemented to protect waterways and water quality in accordance with local planning policy and the State Environmental Protection Policies (SEPPs). The planning schemes overlays and zones that relate to surface water that are applicable to the study area include:

- Land Subject to Inundation Overlay (LSIO)
- Special Building Overlay (SBO)
- Urban Floodway Zone (UFZ).

The LSIO identifies land that is susceptible to flooding caused by a 1 in 100 year flood (or any other area determined by the floodplain management authority) and ensures that development maintains the free passage and temporary storage of floodwaters while minimising flood damage.

The SBO identifies land in urban areas that is liable to inundation by overland flows from the urban drainage system and sets appropriate conditions and building floor levels to address the flood risk while ensuring that flood waters are not obstructed or diverted by development.

The UFZ applies to riverine flooding in urban areas where development has not occurred and the primary function of the land is to convey active flood flows. It identifies waterways, major flood paths, drainage depressions and high hazard areas within urban areas which have the greatest risk and frequency of being affected by flooding.

Figure 1 details the surface water planning zones and overlays for the study area.

Figure 1 shows UFZs and LSIOs are encountered where significant waterways cross or are adjacent to the alignment, namely Taylors Creek, Kororoit Creek and the unnamed drain downstream of confluence with Whiteside Drain. An SBO is observed in the vicinity of the Sydenham Drain indicating that this area acts as an overland flood path generally due to insufficient capacity within the drainage infrastructure in the area. A SBO is also observed at the minor waterway crossing south of Ballarat Road in the vicinity of Wagani Avenue. No overlays or zones are noted near the intersection of Billingham Road Drain and the corridor at the time of this assessment; however, it may not be appropriate to assume that this area is free from flood risk.

A permit is required to construct or carry out works within the above zone and overlays. Permits are generally issued by the local council and include a referral to Melbourne Water as the responsible Catchment Management Authority (CMA).

AECOM notes that the extent of areas currently identified as being affected by inundation in the study area, through surface water planning zones and overlays from the Department of Planning and Community Development (DPCD) are not exhaustive and information may not be available for all locations. As a result, if zones and/or overlays are observed to be absent in the study area, it may not be appropriate to assume that an area is not flood prone, and further information may be required.

2.1.4 Data, databases and maps of hydrological features

Taylors Creek

Taylors Creek is named part of the 'Lower Maribyrnong System in line with the *Healthy Waterway Strategy 2013 (draft)*[1]. Taylors Creek originates near Sydenham and flows through Taylors Lakes before entering the Maribyrnong River at Brimbank Park in Keilor. Taylors Creek is noted as being a modified reach receiving a Melbourne Water Index of River Condition (IRC) score of 23 corresponding to 'Poor' condition[2].

A search of the Victorian Water Resources Data Warehouse located two surface water monitoring locations relevant to Taylors Creek, approximately 3.5km east of the Palmers Road alignment. The monitoring locations were at Taylors Lake, named TAY1 and TAY2 respectively, however, no data was available.

[1] Melbourne Water, *DRAFT Healthy Waterway Strategy – Chapter 5.2, 2*013 <http://consultation.melbournewater.com.au/document/show/179> (accessed 14 May 2013)
[2] Melbourne Water, *Index Of River Condition – Taylors Creek,* 2004 < http://www.melbournewater.com.au/content/rivers_and_creeks/river_health/index_of_river_condition.asp> (accessed 14 May 2013)

Kororoit Creek

Kororoit Creek is named part of the 'Cherry, Kororoit, Laverton and Skeleton system' in line with the *Healthy Waterway Strategy 2013 (draft)*[3]. This system is within the Werribee Catchment. Kororoit Creek begins in the rural foothills of the Great Dividing Range around Gisborne and Sunbury before entering the western areas of Melbourne at Caroline Springs and Deer Park. Eventually, Kororoit Creek meets Port Phillip Bay at Altona.

The Lower Kororoit Creek, stretching from the western urban area of Melbourne to where it enters Port Phillip Bay at Altona, is of relevance to the Palmers Road corridor and is contained within the Shire of Melton local government area. The Lower Kororoit Creek is noted as being a modified reach receiving a Melbourne Water IRC score of 21 corresponding to 'Poor' condition[4].

The *Melton East Strategy Plan*[5] highlighted that although Kororoit Creek is considered to be in a degraded condition it contains certain natural and cultural features and qualities of importance. Areas of cultural heritage and habitat for significant flora and fauna were also acknowledged along the Kororoit Creek, floodplain and tributaries in the *Growth Corridor Plans*[6].

Sydenham, Billingham and Unnamed Drains

Sydenham Drain, Billingham Road Drain and the unnamed drain downstream of confluence with Whiteside Drain cross the Palmers Road corridor beneath Calder Park Drive, Westwood Drive and Robinsons Road respectively.

No information was available regarding catchment characteristics or water quality for these waterways.

2.1.5 Review and summary of reports obtained from other authorities who have undertaken recent work in the area

Regional Rail Link (RRL) – Work Package D Ultimate Configuration Design Report

A review of the RRL report by the Regional Rail Link Authority, KBR and ARUP identified that Kororoit Creek was one of two major drainage crossings within the Work Package D area. The Creek is to be crossed with a bridge.

No further information was available.

3.0 Impacts and Mitigation

3.1.1 Construction

During construction within the Palmers Road corridor, impacts to surface water would include activities that affect the function and quality of waterways and floodplains. Reduction of floodplain capacity through constriction of the waterway flow area has the potential to affect flood levels and result in potentially adverse impacts to neighbouring property. Waterway function could be impacted where the natural course or where characteristics such as flow, of the waterway are altered. Water quality could be impacted through increased stormwater volumes and pollutant loads discharging into waterways directly from construction sites.

Management measures for the construction of the crossing of Kororoit Creek should be developed in consultation with Melbourne Water to ensure that floodplain functions are maintained throughout the construction period.

Reduction of floodplain capacity to the floodplain of the waterways within the Project corridor could be minimised through the staging of project activities. Similarly, consideration during construction should be given to minimise changes to the natural flow regime of the waterways intersected, for example, bridge construction methodology should aim to not inhibit flow. The *Melton East Strategy Plan*[7] notes that filling (including filling on private land) which changes the natural creek (Kororoit Creek) profile should not be allowed.

Mitigation of the impacts identified above would ultimately be managed through construction best practice, adherence to VicRoads procedures and processes and development and implementation of a Construction Environmental Management Plan (CEMP). Measures that the CEMP may include, but not be limited to are:

- consideration of position/storage of temporary work offices and materials away from identified floodplains (unless unavoidable)

---

[3] Melbourne Water, *DRAFT Healthy Waterway Strategy – Chapter 5.1, 2*013 < http://consultation.melbournewater.com.au/document/show/178 > (accessed 14 May 2013)
[4] Melbourne Water, *Index Of River Condition – Lower Kororoit Creek,* 2004 < http://www.melbournewater.com.au/content/rivers_and_creeks/river_health/index_of_river_condition.asp > (accessed 14 May 2013)
[5] GHD, *Shire of Melton - Melton East Strategy Plan,* June 1997
[6] Growth Areas Authority *Growth Corridor Plans* June 2012
[7] GHD, *Shire of Melton - Melton East Strategy Plan,* June 1997

- restrictions or requirements on cutting and filling activities and volumes within floodplains
- erosion and sediment management and control
- refuelling of equipment and vehicles to be conducted in specified areas
- designated storage facilities and containers for fuels, lubricants and chemicals within an impervious bunded area to mitigate potential for spills and/or leaks
- spill kits and safety procedures to be in place should a spill or leak occur

Sediment management for the project should align with Clause 23, Schedule 6 of the SEPP WoV which aims to '*ensure developers, contractors and protection agencies manage and develop sites in accordance with best practice thus helping to protect the beneficial uses of Port Phillip Bay from adverse impacts of sediment.'*

An erosion and sediment control plan would be incorporated into the CEMP outlining measures to reduce erosion and sediment generation such as structural (i.e. silt fences) and vegetation measures and soil stabilisation techniques.

Prior to the commencement of construction, storage and handling procedures for chemicals and other hazardous materials should be developed and implemented, including procedures for preventing spills and safely and effectively responding to incidents and emergencies.

3.1.2 Operation

During operation within the upgraded Palmers Road Corridor, impacts to surface water could result from, but not be limited to, altered flood levels and stormwater, contaminants and litter entering the waterways.

Impacts to surface water during operation could be reduced through consideration of the potential impacts during project design. This is most critical for the crossing of Kororoit Creek. Assessment of flood levels should be incorporated into project design to ensure that existing flood levels are maintained and potentially adverse impacts to flood levels and risks to neighbouring private property are minimised. Where possible, piers within the waterways should be avoided.

Similarly, the potential impact of runoff from the road surface to the receiving waterway could be reduced by introducing effective Water Sensitive Road Design (WSRD) measures. These measures could include, swale drains, wetlands and retarding basins, designed to meet BPEMG. The quality of water flowing into the Ravenhall Nature Reserve which is a Growling Grass Frog habitat will need to be maintained and may require specific water quality treatment measures.

The *Growth Corridor Plans* [8] state that arterial roads will be grade-separated from other transport modes such as the Regional Rail Link and Outer Metropolitan Ring Road and will be designed to minimise their impact on the amenity and accessibility of residential districts. Grade separation will also be required at waterway crossings.

4.0 Conclusions and Recommendations

The desktop assessment detailed in this memorandum has identified that the Palmers Road study area crosses five waterways; Taylors Creek, Kororoit Creek, Sydenham Drain, Billingham Road Drain and an unnamed drain downstream of the confluence with Whiteside Drain.

A number of planning zones and overlays related to surface water were identified for the corridor and are presented on **Figure 1**. Limited water quality information is available, although the current information from Melbourne Water indicates that the Lower Kororoit Creek is in 'Poor' condition[9].

Potential impacts to surface water and catchment values, identified during construction and operation of the Palmers Road Corridor include activities that affect the function and quality of waterways and floodplains, such as increased flood levels at waterway crossings and reduced water quality due to contaminants entering the waterways. Impacts to surface water can be most effectively reduced by the consideration of impacts during the project design stage.

If required by the relevant water authority, a hydraulic assessment will be undertaken during detailed design to quantify the impact of the project on flood levels at each waterway. WSRD should be introduced at detailed design stage to ensure that the SEPP guidelines are met for each discharge point to an existing waterway.

---

[8] Growth Areas Authority *Growth Corridor Plans* June 2012
[9] Melbourne Water, *Index Of River Condition – Lower Kororoit Creek,* 2004 < http://www.melbournewater.com.au/content/rivers_and_creeks/river_health/index_of_river_condition.asp > (accessed 14 May 2013)

If you have any questions regarding the information contained in this memorandum please do not hesitate to contact me.

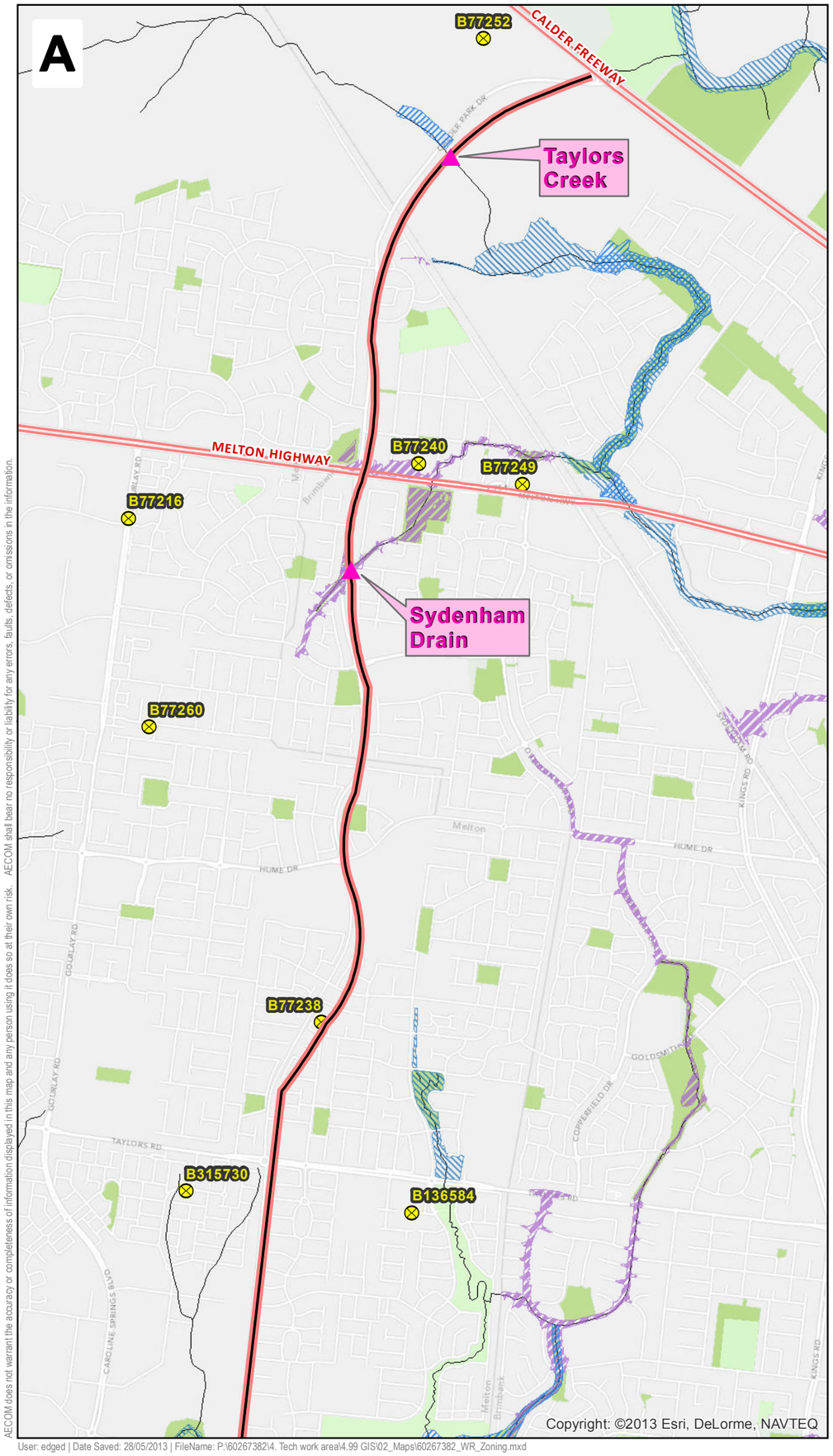
Melanie Collett
Associate Director – Water Resources
melanie.collett@aecom.com

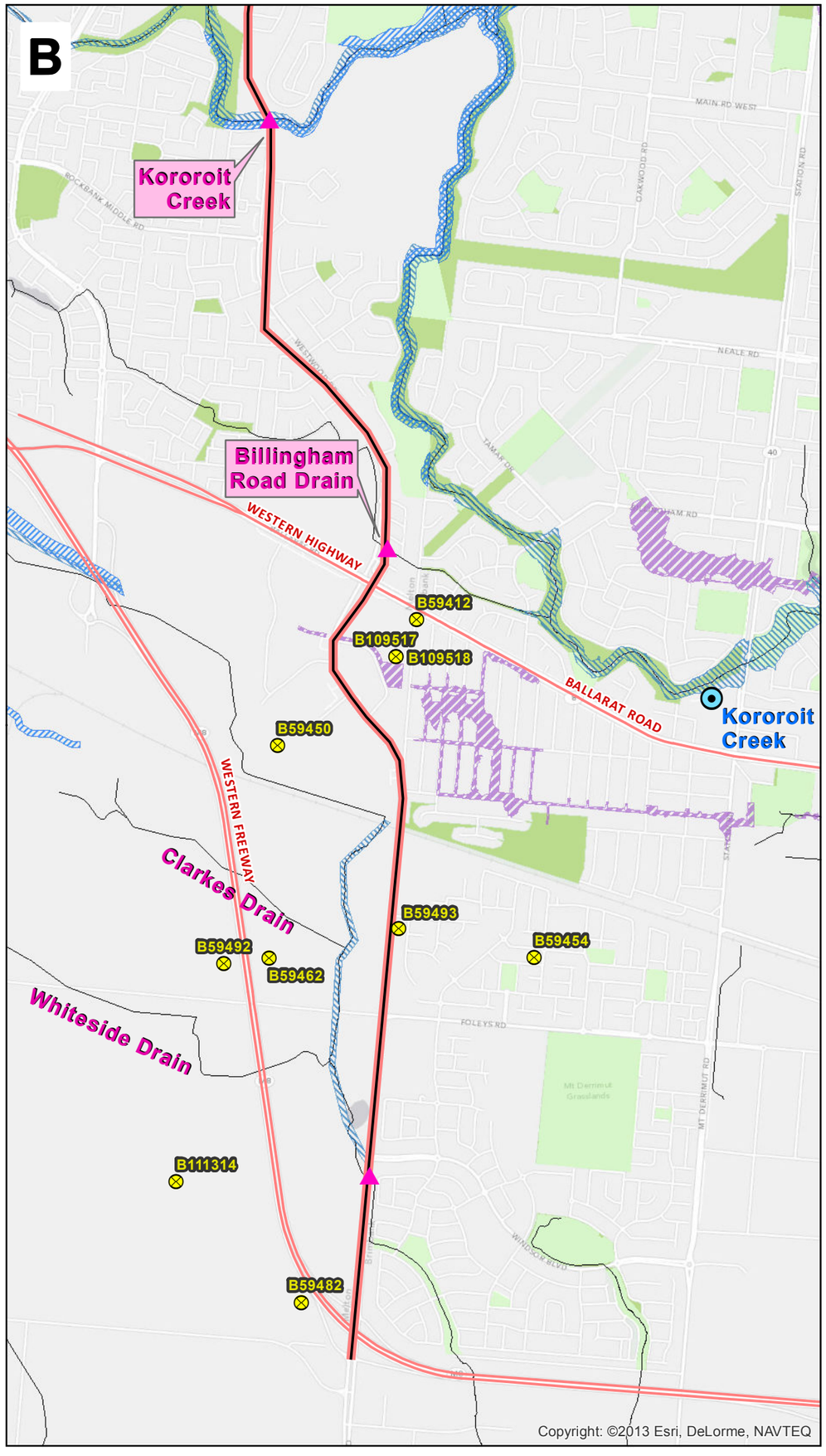
Mobile: +61 413 188 052
Direct Dial: +61 3 9653 8947
Direct Fax: +61 3 9654 7117

Figure 1

PALMERS ROAD CORRIDOR ENVIRONMENTAL EFFECTS STATEMENT (EES)

Surface Water Desktop Assessment Figure 1





LEGEND

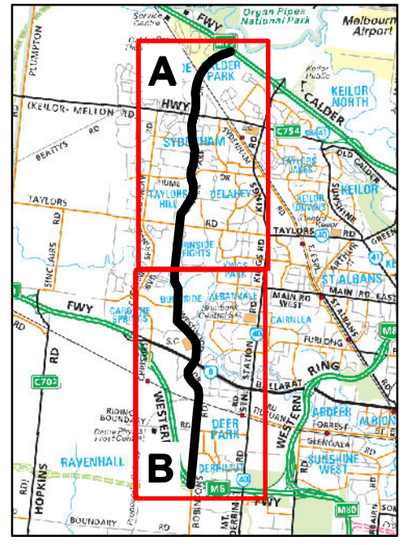
- Groundwater Bores
- Watercourses

SURFACE WATER MONITORING SITE

- Kororoit Ck beneath Bridge Station Road Deer Park (005509)

ZONING & PLANNING OVERLAYS

- Urban Floodway Zone (UFZ)
- LSIO - Land Subject to Inundation Overlay
- SBO - Special Building Overlay
- Public Parks, Recreation and Conservation
- Other Parks



0 250 500 1,000

Metres

1:25,000 (when printed at A3)

N

Client: VicRoads

Data sources:
Planning Overlays © 2012 (Vic DSE)

AECOM

www.aecom.com

User: edged | Date Saved: 28/05/2013 | FileName: P:\60267382\4. Tech work area\4.99 GIS\02_Maps\60267382_WR_Zoning.mxd

AECOM

Appendix A

Stormwater Environmental Management Objectives

Appendix A – Stormwater Environmental Management Objectives

Stormwater pollution within urban environments has been identified as having potentially detrimental impacts on receiving surface water bodies. The SEPP WoV requires measures to be implemented to control the environmental impact of stormwater pollution associated with urban development and supports the development and implementation of municipal stormwater management plans and the implementation of effective management practises. The development of stormwater management plans is currently supported by the EPA through its administration of the Victorian Stormwater Action Program (VSAP).

The SEPP WoV makes reference to the *Urban Stormwater - Best Practice Environmental Management Guidelines* (BPEMG) written by the Victorian Stormwater Committee (VSC) and published by the CSIRO in 1999. The BPEMG established best practice performance objectives for urban stormwater management to assist in determining the level of stormwater management necessary to meet the SEPP WoV requirements. The BPEMG sets specific pollutant reduction targets for future development activities.

The objectives for environmental management of stormwater determined by the CSIRO (1999) in Table 2.1 of the BPEMG are reproduced in Table 2 below.

Table 2 Objectives for Environmental Management of Stormwater (Source: CSIRO, 1999)

Pollutant	Receiving water objective	Current best practice performance objective
Post Construction Phase		
Suspended solids (SS)	Comply with SEPP (e.g not exceed the 90th percentile of 80 mg/L) [1]	80% retention of the typical urban annual load
Total phosphorus (TP)	Comply with SEPP (e.g base flow concentration not to exceed 0.08 mg/L) [2]	45% retention of the typical urban annual load
Total nitrogen (TN)	Comply with SEPP (e.g base flow concentration not to exceed 0.9 mg/L) [2]	45% retention of the typical urban annual load
Litter	Comply with SEPP (e.g No litter in waterways) [1]	70% retention of typical urban annual load [3]
Flows	Maintain flows at pre-urbanisation levels	Maintain discharges for the 1.5 Year ARI at pre-development levels
Construction Phase		
Suspended Solids	Comply with SEPP	Effective treatment of 90% of daily run-off events (e.g <4months ARI). Effective treatment equates to a 50th percentile SS concentration of 50 mg/L.
Litter	Comply with SEPP (e.g No litter in waterways) 1	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.

[1] An example using SEPP (WoV 1988), general surface waters segment.
[2] SEPP Schedule F7 – Yarra Catchment – urban waterways for the Yarra River main stream.
[3] Litter is defined as anthropogenic material larger than five millimetres.

Compliance with the BPEMG will assist in meeting the SEPP objectives over the long term for pollutant concentrations in receiving waters.