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City of Hume Planning Scheme Amendment C207

Statement of Expert Evidence Provided to Planning Panels Victoria

Stormwater Management Evidence for 35 Buckland Way

Prepared for Kolceg Family

Prepared by Nina Barich

1 Witness Details

1.1 Name and Address

Nina Barich

Principal Engineer

Incitus Pty Ltd

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1.2 Qualifications and Experience

I have almost 20 years' experience working in engineering related projects, focusing specifically on stormwater quantity and quality management. I have extensive experience in the development industry in relation to surface water management having worked for both the private and public sectors.

My related experience:

- I have 15 years' experience in strategic planning and design of stormwater management systems for greenfield and brownfield developments.
- In 2006 I achieved Chartered Professional Engineer status with Engineers Australia recognising skills and experience with respect to stormwater management.
- I formerly worked at Melbourne Water as Development Program Leader for the south-east region, which provided insight to the creation and implementation of Development Services Schemes for growth areas.
- I have undertaken stormwater strategies to inform Precinct Structure Plans and undertaken peer reviews of stormwater strategies undertaken for Precinct Structure Plans.
- I have participated in the creation of Development Services Schemes and Engineering Reviews of existing Development Services Schemes whilst employed by a consultant engaged by Melbourne Water.
- I have provided input to numerous industry guidelines and standards relating to drainage, including for Melbourne Water and the Victorian Planning Authority (formerly Growth Areas Authority)
- I have a sound understanding of the guidelines applicable to stormwater management for development and the role of government agencies in stormwater planning and management.
- I have attended and presented at various industry conferences and seminars.
- I lecture Civil and Environmental Engineering students at Royal Melbourne Institute of Technology in the subject of Stormwater Management and have done so for the past 8 years.

Therefore, my experience and expertise in stormwater management associated with civil engineering and development projects qualifies me to make this report.

2 Instructions

This statement has been prepared on the instruction of Echelon Planning on behalf of the Kolceg Family. I was instructed to:

- Be prepared to act as an expert witness on behalf of the Kolceg family at the Panel Hearing on 20th September 2017, including preparation of a report to the Panel in accordance with the Planning Panels Victoria expert evidence guidelines.
- Your report should address the following issue:
  - Whether the waterway could be piped to provide more developable land within the walking catchment of the Harper Creek town centre.

3 Information and Documentation

In preparing this statement, Nina Barich has had regard to:

- Sunbury South Precinct Structure Plan – November 2016 Exhibition – Victorian Planning Authority
- Melbourne Water's Fox Hollow Drive Development Services Scheme
- Stormwater Management Strategy Sunbury South and Lancefield Road – Alluvium (November 2014)
- Australian Rainfall & Runoff (1997) – Engineers Australia
- Urban Stormwater Best Practice Environmental Management Guidelines (1999)
- Melbourne Water, 2014, Constructed Waterways in New Urban Developments Design Manual, Draft

4 The Site

The site at 35 Buckland Way Sunbury is illustrated in **Figure 1**. The rectangular-shaped site is bounded by Buckland Way to the east, the existing railway to the west, and other properties to the north and south.

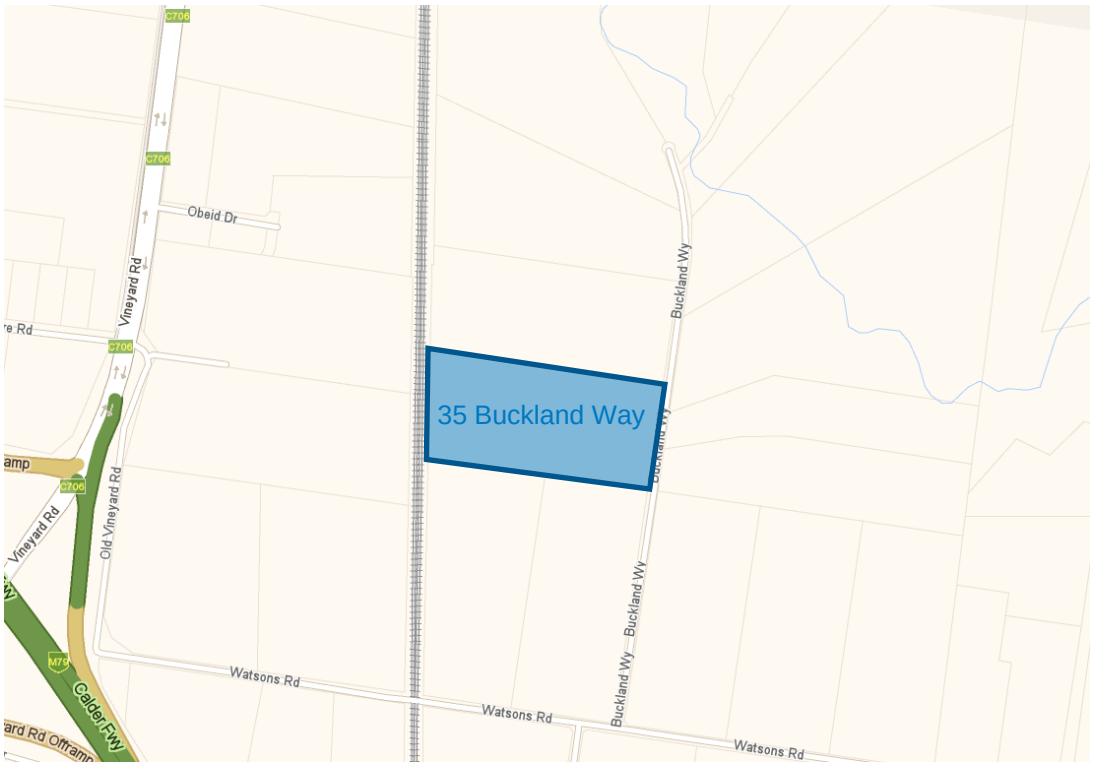

Figure 1 – 35 Buckland Way Sunbury

The site is approximately 9 ha in area. The site generally grades from west to east, with slopes around 5%. The site has 2 existing drainage lines; a minor drainage line entering from the south-west corner at an existing railway culvert crossing and traversing the site to the north-east where it connects to a slightly more defined drainage line traversing the north-east corner of the site. The minor drainage line from the south-west to the north-east of the site has a farm dam built on the watercourse. The drainage line which traverses the north-east of the site has a farm dam build on the watercourse just north of the site. The site is currently used for agricultural purposes and has had significant modification to the pre-European catchment form.

The site is located within the proposed Sunbury South Precinct Structure Plan and Melbourne Water's proposed Fox Hollow Drive Development Services Scheme. A Development Service Scheme plans stormwater infrastructure required for a growth area to ensure new development meets appropriate standards for flood protection, water quality, waterway health and amenity.

The current draft Fox Hollow Drive Development Services Scheme (DSS) proposed numerous stormwater assets in the property at 35 Buckland Way Sunbury, including:

- A natural waterway traversing the north—east of the site, located along the alignment of the existing drainage line
- A constructed waterway connecting the south-west corner of the site with the natural waterway in the north-east, located along the alignment of the existing drainage line
- 2 x pipelines to service the allotments to the south
- Pipelines running adjacent to the natural waterway on both sides of the waterway for the length of the natural waterway within 35 Buckland Way Sunbury

Figure 2 illustrates an extract of Melbourne Water's Fox Hollow Drive Development Services Scheme illustrating the proposed assets within 35 Buckland Way.

Figure 2 – Extract from Melbourne Water's Draft Fox Hollow Drive Development Services Scheme

Information provided by Victorian Planning Authority regarding the DSS waterways within 35 Buckland Way indicate that the constructed waterway diagonally traversing the site from the south-east to the north-west has a 40 m wide corridor. The waterway traversing the north-east corner of the site has a 50 m wide corridor downstream of the confluence with the constructed waterway. The draft Fox Hollow Drive DSS proposes approximately 24.5% of the site will be allocated as non-compensable drainage reserve.

5 Proposed Amendment to the Draft Fox Hollows Development Services Scheme

A balance is required between the protection of the natural environment and ecosystem with the viability of the development of the land and the stormwater management selected for the catchment to achieve the required level of service.

The Fox Hollow Drive Development Services Scheme (DSS) proposes two waterways through the property at 35 Buckland Way Sunbury; a 50 m natural waterway traversing the north-east corner of the site and a 40 m wide constructed waterway from the south-west corner to connect to the natural waterway in the north-east of the site.

It is proposed to replace the 40 m wide constructed waterway with a conventional pipe conveyance for minor flows and overland flow conveyance along road reserves within the development.

5.1 Stormwater Quantity

The Fox Hollow Drive DSS has proposed a 40 m wide constructed waterway to convey flows from the existing railway culvert crossing located in the south-west of the site to the natural waterway in the north-east of the site. No upgrade of the crossing is proposed in the draft Fox Hollow Drive DSS, therefore it is presumed that the retarding basin located west of the railway line is proposed to retard the stormwater runoff flows generated from the urbanisation of the catchment to magnitudes which can be conveyed through the existing culvert. Figure 3 is a photograph of the existing railway brick barrel culvert taken on 17 July 2017.

Figure 3 – Existing Railway Culvert

It is presumed that the culvert has the capacity to convey flows up to and including the 1% Annual Exceedance Probability (AEP) storm event generated from the pre-developed catchment.

Based on the intent depicted on the DSS map, the catchment to be conveyed through the existing culvert is approximately 19.3 ha. The peak pre-developed 1% AEP design flow for this catchment is 2.07 m^3/s.

The same presumptions have been applied for the crossing of the railway line to the north, which contributes to the natural waterway traversing the north-east corner of the site. The contributing catchment upstream of the railway line based on the intent depicted on the DSS map is estimated to be 57.4 ha. The peak pre-developed 1% AEP design flow for this catchment is 4.82 m^3/s.

5.2 Design

5.2.1 Constructed Waterway

A constructed waterway is typically adopted for stormwater conveyance when the overland flow cannot be safely conveyed along a road reserve, or when the grades are very flat.

A 1% AEP design flow of 2.07 m^3/s proposed for the constructed waterway can be safely conveyed via a subsurface pipe network and overland flow along road reserves.

The longitudinal slope of the existing surface along the alignment of the proposed constructed waterway is approximately 1 in 30. This is much steeper than Melbourne Water's recommended acceptable 'stable' grade of less than 1 in 100 to 1 in 200. A constructed waterway with an average longitudinal grade of 1 in 30 will require the bed to be stabilised with a series of rock chutes.

The upstream waterway diversion through the proposed retarding basin, the crossing at the railway line and the significant number of rock chutes required in the proposed constructed waterway impede the continuity of the natural waterway reducing the benefits of connecting the upstream system with the tributary crossing the north-east corner of the site with a constructed waterway.

The constructed waterway also proposes to cross the gas main located east of and adjacent to the railway line. The constructed waterway will need to be excavated, reducing the existing cover over the gas main. Depending on the depth of the constructed waterway, this may result in the requirement to lower the gas main. A drainage pipe can meet the APA's requirements to cross this gas main without prohibiting development or restricting the crossing of this gas main with other services.

5.2.2 Natural Waterway

The natural waterway is proposed to convey a 1% AEP design flow from the catchment upstream of the railway line of approximately 4.82 m^3/s. A flow of this magnitude can be safely conveyed via a pipe and road network system.

This waterway has an average longitudinal grade of 1 in 35 from the railway line to the constructed waterway, and 1 in 50 from the constructed waterway to the crossing at Buckland Way.

This waterway will also cross the existing gas main, with proposed pilot channel works, effectively reducing the cover of the main.

This waterway could also be replaced with a pipe and road network system until the catchment is substantial enough to warrant a waterway, which is downstream of Buckland Way.

5.3 Costs

The preliminary drainage contribution rates for the Fox Hollow Drive DSS effective as at 28 September 2017 is $ 356,829 per hectare of standard density residential development. This is the second highest drainage contributions rate of any DSS, and significantly higher than the drainage contribution rates for most greenfield DSS. The DSS that has higher drainage contribution rate has a very small land area, so limited hectares of developable land to contribute, and limitations of existing downstream infrastructure.

The Fox Hollow Drive DSS drainage contribution rates are based on the DSS achieving cost neutrality over the life of the scheme. They are based on estimated costs for the delivery of the stormwater assets indicated in the DSS, proportioned over the scheme area for the developable land only. The scheme can reduce the contribution rates through the reduction in the cost of the stormwater assets and an increase in developable land. Removing the constructed waterway in 35 Buckland Way and replacing it with a pipe will achieve that.

The cost of the constructed waterway is difficult to estimate without undertaking a detailed design. However, works will include excavation, vegetation and construction of rock chutes. The vegetation works for the constructed waterway is estimated to be approximately $180,000, based on Melbourne Water's standard reimbursement rates for the region. Excavation rates will be approximately $20 / m^3 and rockwork approximately 200 / m^3, which will result in a cost to the scheme exceeding $200,000.

If the constructed waterway was to be replaced with a pipe and road network, the scheme would provide a 600 mm diameter RRJ pipe to convey the 18% AEP design flow (or 1 in 5 year Average Recurrence Interval design flow). Based on Melbourne Water's standard reimbursement rates for the region, the pipeline would cost the scheme approximately $130,000.

Not only is the cost of the infrastructure significantly less, the area of the proposed constructed waterway would also be factored into the overall developable land, resulting in an overall lower drainage contribution rate.

6 Recommendation and Summary of Opinion

The scheme should replace the constructed waterway that traverses diagonally across 35 Buckland Way from south-west to north-east with a conventional pipe and road network conveyance.

The conventional conveyance results in a lower overall cost to the community.

The environmental benefits that may be obtained from the connection of the waterway are reduced by the requirement of rock chutes and bed stabilisation due to the steep longitudinal grades.

The development potential for the site is increased through the removal of the constructed waterway.

The loss of the amenity associated with the waterway is negligible as the walkable catchment will contain other waterways.

Consideration should also be given to the removal of the waterway that traverses the north-east corner of the site and replacing this system with the conventional pipe and road network until the system has a substantial catchment to warrant a waterway. This would also result in a lower overall cost to the community.

7 Declaration

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

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