

MEMORANDUM

To Chris Mallalue, Foundry Projects Pty Ltd
From Niels Unger, Water Technology Pty Ltd
Date 17 May 2019
Subject Ultimate (Mitigated) Development Conditions: 52 Golf Road, Oakleigh South

Dear Chris,

This memo has been prepared by Water Technology Pty Ltd following our previous memo (dated 20/03/2019, ref. 6536-01_M01v01c) within which the results of 2D hydraulic (flood) modelling for both existing and developed conditions are detailed for the above address. This memo seeks to assess and report on the impacts of flooding for ultimate (mitigated) developed conditions on behalf of FMG Engineering.

Flood mitigation scenario modelling was undertaken utilising an iterative approach with the goal of achieving no increase in flood risk to surrounding properties (both up-and-downstream) during the 1% AEP rainfall event as a result of the development. The design outcome of which is referred to within this memo as “Ultimate Conditions” which is to ensure:

- Safe conveyance of overland flow through the site (for events up to and including the 1% AEP);
- Suitable road and Finished Surface Levels (FSL) are nominated such that continuous grade is achieved;
- The existing elevations surrounding trees nominated to be retained are not changed;
- The need to upgrade the existing infrastructure surrounding the subject site is minimised; and
- That not only is the status quo (regarding the flood risk) of adjacent properties maintained but reduced or removed as a result of the development.

Proposed FSLs for the development are depicted as 100 mm contours (in red) within Figure 1-1, in addition the proposed overland flowpaths through the site are indicated by white/blue arrows.

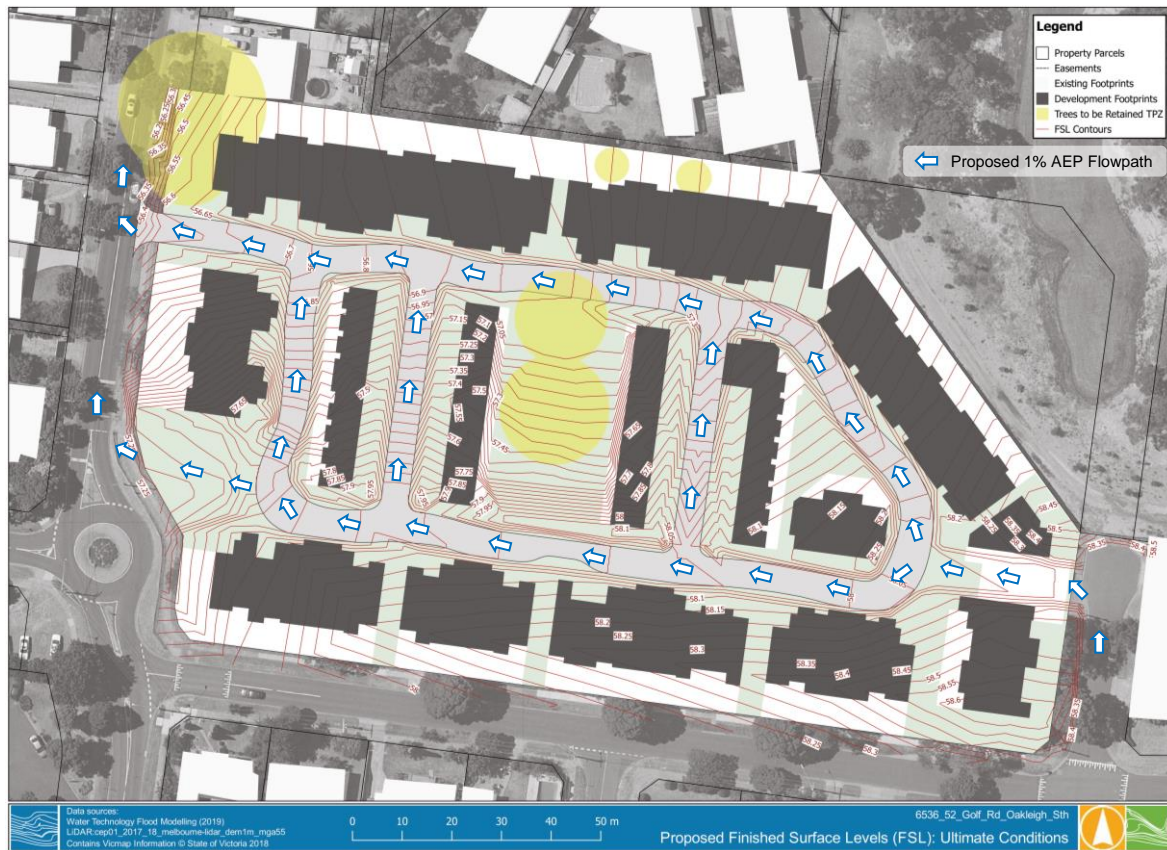


Figure 1-1 Proposed Finished Surface Levels (FSL): Ultimate Conditions

Figure 1-2 depicts the 1% AEP flood extents and contours for existing conditions (in blue) and ultimate conditions (in orange). It is evident the movement of overland flow through the site and directly downstream has been significantly altered – with ultimate conditions overland flows contained within the proposed development’s streetscape with continuous grade allowing for the conveyance of flow from east-to-west and ultimately out into Golf Road. This is in contrast to the movement of flow in existing conditions which has an approximate south-to-north orientation resulting in eight properties directly downstream being affected by flood to varying degrees.

This complete removal of existing flood risk to the properties north of the subject site is an excellent development outcome for not only the property owners but for Council as it removes the financial risk associated with flooding for all events up to and including the 1% AEP.

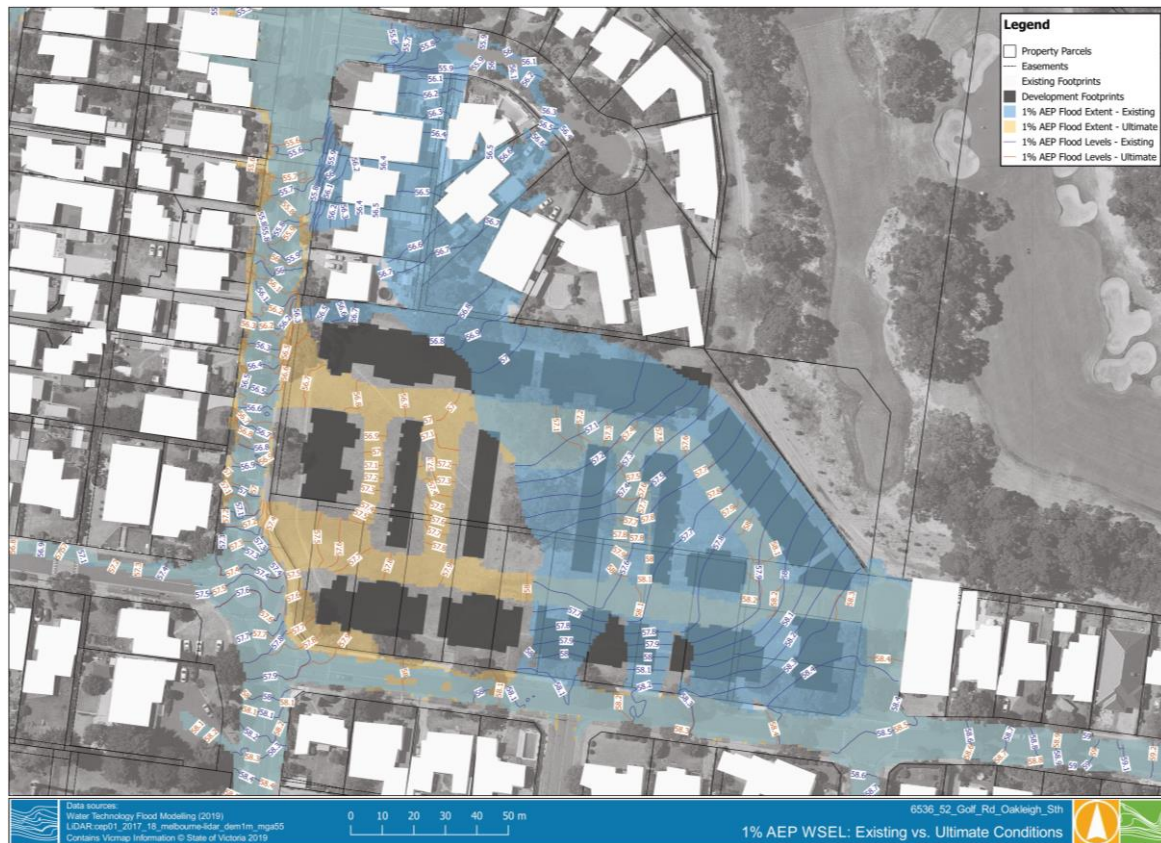


Figure 1-2 1% AEP WSEL – Existing & Ultimate Conditions

Figures 1-3 and 1-4 depict the difference in flood extent and depth between the existing and ultimate scenarios for the 1% AEP event. Note the removal of overland flow through the eight properties to the north of the subject site which, within existing conditions, are impacted by overland flows of up to approximately 330 mm in depth. By severing the flowpath to the north within ultimate conditions flows are being introduced to the road reserve earlier which results an increase in flow depth and a slight increase in extent directly adjacent to the subject site.

Figure 1-5 is an afflux plot which provides detail in the changes in flood level between the two scenarios in addition to nominating regions which either:

- Were wet in existing conditions and are dry in ultimate conditions (in purple), or
- Were dry in existing conditions and are wet in ultimate conditions (in pale blue).

As depicted, there are regions within both Golf Rd and Beryl Ave which are subject to an increase in localised flood level (and depth) as a result of the development.

Multi-point sampling yields an average increase in flood depth of 25 mm equating to an average flood depth of 120 mm within the road reserve of Golf Rd. There are isolated pockets of increased flood depths of up to 100 mm, these however are most likely due to the utilisation of LiDAR elevation data which can result in poor representation of the road profile.

Localised flood levels within Beryl Ave also increase as a result of the development by an average of 15 mm, equating to an average flood depth of 85 mm within the road reserve. Even with the poor representation of the road profile it appears the increase in flood level has not resulted in any increase in actual flood extent.



Figure 1-3 1% AEP Flood Depth – Existing Conditions



Figure 1-4 1% AEP Flood Depth – Ultimate Conditions



Figure 1-5 1% AEP WSEL Difference – Existing vs. Ultimate Conditions

In an attempt to further quantify the impacts of the increase in flood levels within Golf Rd and Beryl Ave, an assessment of changes in flood safety within the road reserve was undertaken. Figure 1-6 depicts the flood safety results for existing conditions during the 1% AEP event; the region is almost entirely classed as low risk with a peak velocity and depth product (or “v.d ratio”) of less than 0.2. The only exception being a small pocket nominated to be of low to moderate flood safety adjacent to Barholme Crt where the “v.d ratio” is approximately 0.25.

As a result of the development the existing pocket of low to moderate flood safety is enlarged, extending southwards to the proposed point of vehicular ingress/egress of the development. See Figure 1-7. Whilst the “v.d ratio” within this region is increased to approximately 0.30 the associated flood safety risk is still considered within Melbourne Water’s criteria of 0.35.



Figure 1-6 1% AEP Flood Safety (v.d ratio) – Existing Conditions



Figure 1-7 1% AEP Flood Safety (v.d ratio) – Ultimate Conditions



The proposed mitigation design is successful in the conveyance of overland flows through the development in a controlled manner with the major upshot of entirely removing the pre-existing flood risk to eight properties directly north of the subject site.

This is however at the cost of localised increases in flood depth within Golf Road to the south-west of the site. This increase results in an altered (enlarged) flood extent which is, for the most part, contained within the road reserve with the exception of minor infringements in the frontages of 99-109 Golf Rd.

The increase in flood risk with respect to safety has been assessed with the impact considered to be low and well within acceptable limits.

Yours sincerely,

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Senior Engineer

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