Tonkin+Taylor

19 September 2022
Job No: 1089496.0000

Selwyn District Council
PO Box 90
Rolleston 7643

Attention: Emma Robertson and Justine Ashley

Dear Emma and Justine

461 Drain Road Doyleston: Comment on flood assessment

1 Introduction

Selwyn District Council (SDC) has engaged Tonkin and Taylor Ltd (T+T) to review certain aspects of information on surface water flooding prepared by Eliot Sinclair (ES) and provided in support of a Plan Change Submission (PCS) to the Selwyn District Plan. The PCS is to rezone 8.85 ha of land at 461 Drain Road Doyleston to enable residential subdivision. The legal description of the PCS site is RS5979.

The T+T scope of work comprises preparation of this letter setting out our expert opinion, based on information provided to us, as to the following:

i Comment on the assessment outlined in the ES report as relates to the potential for surface water flooding pre and post development.

ii Based on the ES report comment on the appropriateness of the land to be re-zoned with respect to surface water flooding.

We have not visited the site.

We have not discussed any matters raised in the ES report with ES.

Our letter sets out to what extent we agree or disagree with the ES reporting.

2 Source information

Our letter has been informed by the following documents provided to us by SDC:

- The report prepared by ES titled "*Flood Impact Assessment, 461 Drain Road, Doyleston, Submission for Residential Rezoning, Prepared for Millar's Machinery Ltd, 427853*", dated 24 September 2021.
- The report prepared by ES titled "*Submission to Selwyn District Plan Review*", dated 9 December 2020.

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3 Comments

We make the following comments:

i ES have indicated that earthworks will be required to establish suitable floor levels for residential lots at the northwest end of the site and an area near the southwest will be required for a stormwater basin. In principle this general approach appears correct.

ii It is necessary to understand flood flows to determine the relative extent of the areas for residential lots and the proposed stormwater basin. ES have not estimated flood flows from first principles e.g., by way of a rain on grid model. To estimate flows, ES have taken estimated water depths from a district wide model prepared by others and iterated flows in a hydraulic model created by ES to match the flood depth estimates developed by others. ES have then used their model to draw conclusions about how surface water flooding may impact on the PCS site pre and post development for a 0.5 % Annual Exceedance Probability (AEP) event (1 in 200 year Average Recurrence Interval) event.

iii The ES report does not mention the relative magnitude of inflows at the model boundary and/or flow generated from rain on the site. The ES report does not mention if flow generated on the site is significant and/or how flow from rain on the site has been addressed. We suggest that this matter is clarified.

iv Data from the Canterbury Maps website (Selwyn's flooding and coastal hazards, retrieved September 16 2022 from https://apps.canterburymaps.govt.nz/SelwynNaturalHazards, appear consistent with the 0.5 % AEP flood depth estimates relied on by ES as the basis to estimate 0.5 % AEP flows at the site. Based on an explanatory report available from the Canterbury maps website we understand that the Canterbury Maps flood depth estimates date from 2019.

v The Canterbury Maps flood depth estimates are district wide. There may be uncertainties applying the data to a specific site e.g., matters related to storm duration and/or precision of topographical information and/or local features such as culverts and the like. In this instance the model provisions for the Leeston Road crossing downstream of the PCS site is of interest and uncertain. That is, does the model accurately represent what ES have assumed when they created their model? We suggest that this matter is clarified.

vi For example, based on information from SDC and ES we understand that about late 2020 there was a significant upgrade to the culvert under Leeston Road near the site to address surface water flooding issues. SDC have indicated that the culvert was upgraded from 1.2 m diameter to a 2.5 m x 1.5 m box culvert. SDC have indicated that the upgraded culvert was "*sufficient to convey the 2 % AEP peak runoff from the upstream contributing Leeston Road catchment with limited surcharge at the inlet*"[1]. While this culvert is included in the ES model, it is not clear if it is taking flow from the site and/or if it is included in the model that ES used to derive flows for their model. Similar issues may apply to other infrastructure.

vii Given the preceding, we have not sighted a reliance statement confirming that the model results that ES have relied on to estimate flows are suitable for that purpose. We suggest that this matter is clarified.

viii The ES report does not state how flows from the PCS site will cross Leeston Road following development. For example, if existing infrastructure is sufficient or if upgrades will be required. We suggest that this matter is clarified.

ix The channel downstream of the site to the southeast of Leeston Road is flat. ES report some additional flooding in this area because of the proposed development. ES advise that this area

[1] Pers. Comm. D Meehan/T Morris, 9 September 2022.

is presently farmland and that channel upgrades may be implemented to address this area if required.

x The ES model indicates that the development will cause additional flooding to the domain upstream of the site. However, ES state that this flooding may be mitigated by providing additional capacity via the PCS site.

xi The ES report states that Mannings coefficient of n = 0.035 has been adopted for pre and post development scenarios. Subject to the magnitude of flows from different contributing areas (see iii. above) this assumption may or may not be correct.

xii The ES report does not mention what provision has been made for the impact on flood flows from potential climate change scenarios.

4 Conclusion

We consider that some areas within the site at 461 Drain Road are likely suitable for urban development given the surface water issues we have considered. We also consider that aspects of the land encompassed within the PCS site at 461 Drain Road are not suitable for urban development in its present form having regard to the potential for inundation.

Clarification from ES of the information gaps and/or uncertainties identified with the ES report is necessary for more specific comment to be made on the appropriateness of the land to be re-zoned regarding surface water flooding.

A likely outcome is that some of the site may be able to be developed for residential lots albeit that the relative portion of residential lots to stormwater basin is not clear and will depend on factors such as:

- What flooding can be accommodated in the domain.
- Leeston Road stormwater crossing.
- Downstream flooding.

If design work is to be progressed further, it is important that an appropriate stormwater model taking proper account of the critical event, proposed finished ground levels and existing/upgraded/new culverts is developed to confirm areas of the site to be developed. We suggest that this work informs an application for subdivision consent if it is not required by SDC to inform the PCS.

5 Applicability

The sole purpose of this report and the associated services performed by Tonkin & Taylor Limited (T+T) is to undertake a limited review of, and comment on, the reports listed at Section 2 of this letter report (the Reports) prepared by ES in accordance with the scope of services set out in the Contract between SDC and T+T. That scope of services, as described in this letter, was developed with SDC. No calculations have been checked by T+T as this is outside the scope of the agreed service.

T+T's review was a form of peer review, undertaken on a level-of-effort basis, to provide comment to assist SDC in its decision making in relation to the PCS. The responsibility for the Reports remains fully with ES and T+T's review does not constitute a means by which that responsibility can be passed on to T+T.

This letter has been prepared on behalf of, and for the exclusive use of SDC, and is subject to, and issued in accordance with, the provisions of the contract between T+T and SDC. T+T accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

Tonkin & Taylor Ltd

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