Water Solutions
Certainty in Water

Report to

SOUTHERN DARLING DOWNS COMMUNITY CONSULTATION COMMITTEE

on

ARTC INLAND RAIL

INTERIM REPORT ON FLOOD IMPACTS

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Southern Darling Downs Community Consultation Committee
ARTC Inland Rail
Interim Report on Flood Impacts

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1 Introduction

This report provides a summary of interim outcomes from a review of potential impacts on flooding by the proposed (Australian Rail Transport Corporation) ARTC Inland Rail crossing of the Condamine River at Pampas.

The review has been based on the outcomes of flood modelling investigations undertaken by engineers from the Future Freight Joint Venture (FFJV), a joint venture of companies engaged by ARTC to undertake design of the inland rail at the subject location.

The purpose of this review is to provide the Southern Darling Downs Community Consultation Committee (SDD CCC) with independent expert opinion of expected flood related impacts, in a format intended to assist the potentially affected layman (the stakeholder) in forming a rational view as to the nature and significance of the impact on their situation.

This interim report is work in progress, for discussion with the SDD CCC. It has been prepared by Dr John Macintosh, Managing Director and Principal Water Engineering, Water Solutions Pty Ltd (WS), for Mr Graham Clapham, Chair of the SDD CCC. He report has been sponsored by Mr Robert Smith, Senior Project Manager, ARTC.

The report contains:

- Section 2 – A summary of key information considered by WS
- Section 3 – An appraisal of the quality and substance of flood modelling work by FFJV
- Section 4 – Communication of flood related information at sample locations
- Section 5 – Conclusion
- Appendix – Sample graphics

2 Key Information

This review has been undertaken on the basis of a range of information provided by:

- Mr Graham Clapham
- Future Freight Joint Venture
- QG Department of Environment and Science

Mr Graham Clapham

Mr Clapham provided the original brief for the expert review investigations and is the primary point of contact.

He hosted an inspection of the Condamine River area on 7 November 2018, including site meetings with a number of local Stakeholders.

On 7 November 2018 he hosted WS's attendance at the SDD CCC meeting and provide for introduction to both committee members and observing people from the community.

Future Freight Joint Venture

The FFJV flood modelling team have been the primary source of the technical information required by WS for this review. The scope of this information included:

- Detailed technical briefing of the flood modelling undertaken for the Condamine River crossing, by those FFJV engineers doing the work, followed by technical question and answer discussion to the satisfaction of WS
- Provision of floodplain computer modelling data and result data files
- Provision of extract of the Hydrology section of the report "Inland Rail: Phase 2 – NSW / QLD Bordet to Gowrie, Draft Final Condamine River Floodplain Solutions Report, ARTC"

QG Department of Environment and Science

Historical daily rainfall data was extracted from the DES SILO database for the Condamine River catchment for the period 1889 to-date.

3 FFJV Flood Modelling

The computer flood modelling work undertaken by the FFJV followed well established contemporary techniques that involved:

- Use of suitably qualified and experienced engineers to undertake the work
- Engagement of an independent suitably qualified and experienced engineer to peer review the work
- Identification and acquisition of the necessary data to undertake the work
- Selection and use of the most appropriate computer software to process the data
- Setup and calibrate computer models for:
  a) the estimation of design floods – that is, the hydrology;
  b) the simulation of the progression and expansion of flood water over the Condamine River valley in response to the occurrence of design floods – that is, the flood hydraulics.
- Apply the calibrated flood model to various alternative inland rail line configurations, and in particular:
  a) the existing lie of the land (no inland rail) in the Condamine River valley, under typical land-use / cropping conditions – the "existing" scenario
  b) conditions as per "existing", but modified to include the presence of the proposed (preferred) inland rail line formation (embankment and bridge openings) – the "design" scenario (code named as D20f by FFJV)
- Produce detailed mapping of computer model generated outputs of key flooding characteristics under both "existing" and "design" scenario conditions – peak flood levels, depths, velocities etc.

FFJV has not provided any interpretation of flood modelling results or any opinion on the performance of the "design" scenario under the various design flood conditions considered.

WS has reviewed the information provided by FFJV in detail. We have considered their method and conduct of analysis, and the integrity of the products.

WS is satisfied that the FFJV flood modelling work, in our opinion, is a quality professional product that is fit for the purpose of representing the expected changes in key flooding characteristics of the Condamine River about the subject inland rail route Border to Gowrie.

4 Communication of Flood Related Impacts

A key outcome of the WS expert review will be the communication of the meaning of FFJV flood modelling work to stakeholders.

Done properly, it follows that each individual stakeholder should then be better placed to form their own view as to the likely flood related impact associated with the proposed inland rail. That is, proper communication should better enable stakeholders to state and quantify the basis of a potential flood related impact that they consider to be significant.

WS proposes the following method of communication with stakeholders as follows:

1. Describe the process to the stakeholders by way of public forum
2. Ask concerned stakeholders to each provide a list of those items that they worry could be affected by changes in flooding occurrence (level), marking the locations on a map.
3. Produce a bespoke report to the stakeholder dealing with each identified item:
    a. A time-line graph showing how many times per year the subject item would have been inundated under existing conditions – if the historical flooding sequence for the site since 1889 to date were to be repeated.
    b. This same information, but presented with respect to a percentage of time summation of all years
    c. Generic flood impact mapping showing the location of each stakeholder identified item, and the expected change in flood depth over the Condamine River floodplain for the range of design floods considered by FFJV (1 in 2 AEP up to 1 in 2,000 AEP)
    d. Overlays on graphics a. and b. the same information but under design scenario conditions.

The strategy embodied in the above is summarized as follows:

- Obtain stakeholder engagement (Items 1 and 2 above)
- Item 3a. provides stakeholders with a description of assessed flooding characteristics, using a measure that they should readily understand (occurrence of inundation), and on a basis that allows them to readily make comparison with their own experience (what year that inundation occurred in the past). The stakeholders can look at the pattern and frequency of occurrence and will be able to draw their own conclusion as to whether or not the information is consistent with their own personal experience.

  This is a critical step as it goes to establishing the credibility of the information being put forward, and hence, the credibility of the following information which presents expected inland rail flood impacts.
- Item 3b. presents the same information shown in 3a. but in (more abstract) summary. The value of this summary format is that is makes it much easier to identify (and quantify) changes to flood characteristics.
- Item 3c. provides a big picture overview of the spatial extent of expected changes in flood characteristics (depth), and places stakeholder items of concern in context with this. This information should immediately indicate if a stakeholder item lies within an affected region – or if it is remote and unaffected. Mapping will be provided for a range of design flood events (1 in 2 AEP up to 1 in 2,000 AEP). It will be seen that the extent of inland rail flood impact becomes larger with the magnitude of the flood event. However, an important message to be conveyed to stakeholders (at the Item 1 forum) is that a 1 in 2 AEP event happens relatively frequently, whereas the occurrence of 1 in 2,000 AEP event is extremely rare. That is, typically, events up to around 1 in 10 AEP are of potential significance to lifestyle and financial well-being, whereas

the larger and less frequent events (1 in 50 AEP up wards) tend to be of potential significance to issues affecting population safety and protection of primary infrastructure.

It is important to convey the issue of frequency of occurrence and consequence to stakeholders so that they gain better understanding of what is important and what is not.

- Item 3.d provides the informed stakeholder with comparative information upon which they should be able to form a rational opinion as to whether or not they are likely to be impacted. If they consider that they are impacted, then the reported information they have been provided with should provide a sound basis upon which to quantify and describe the basis of their concerns.

5 Conclusions

WS trusts that the information and opinions provided in this interim report will be viewed by the SDD CCC as meeting with their requirements for the purpose of communicating the expected flood related impact of the proposed ARTC inland rail on Condamine River to stakeholders.

We anticipate that the next step of the stakeholder communication process will be direct engagement as outlined in Section 4.

WS would be pleased if the committee considers our report and proposed communication strategy, and provides us with their feedback and guidance, as the committee feels necessary.

Appendix A - Sample Graphics

Figure A.1 – Sample Station Locality Map

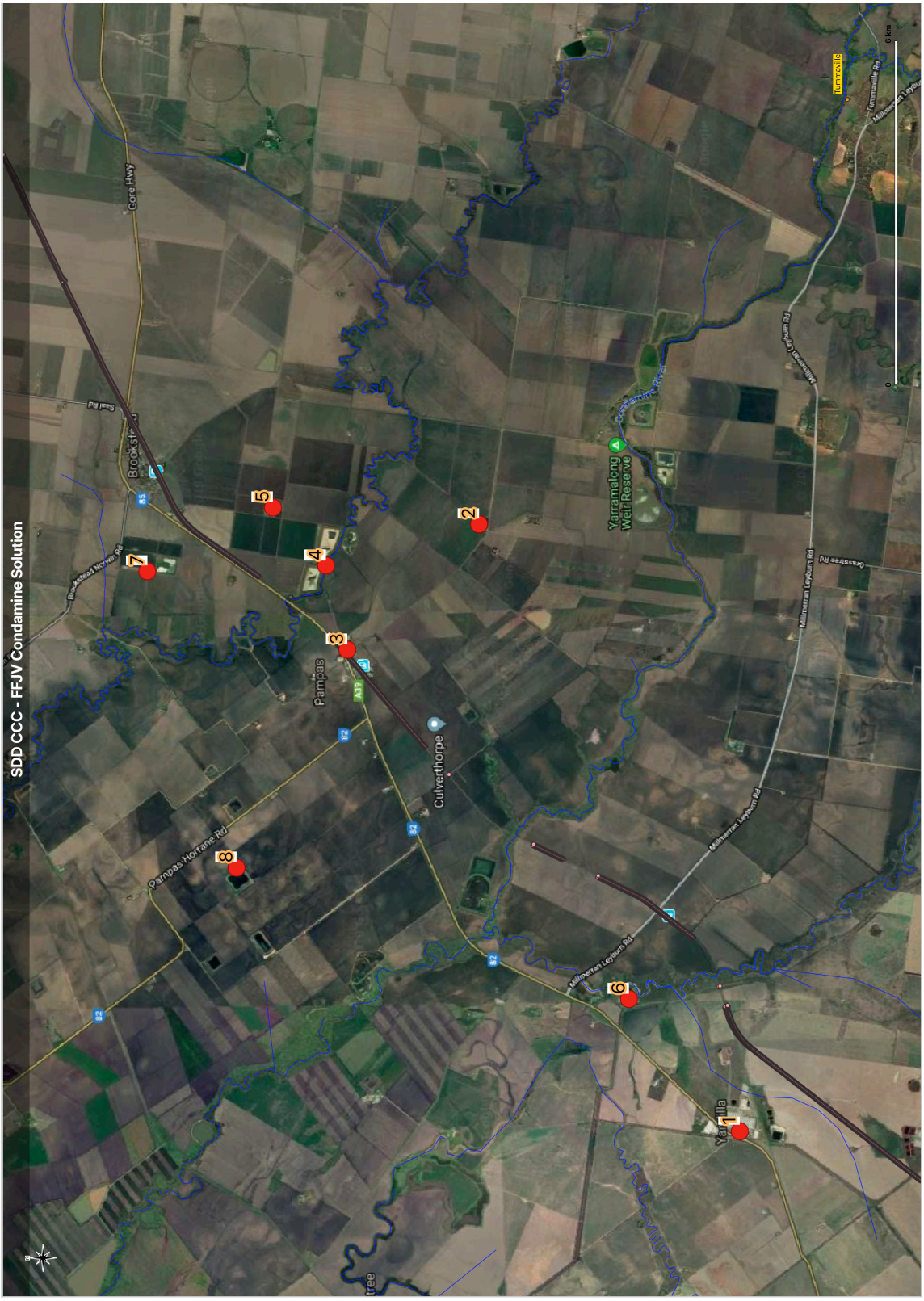

Figure A.2 – Flood Event Time-line @ Stn 3 - U/S Gore Hwy ay Fysh Rd

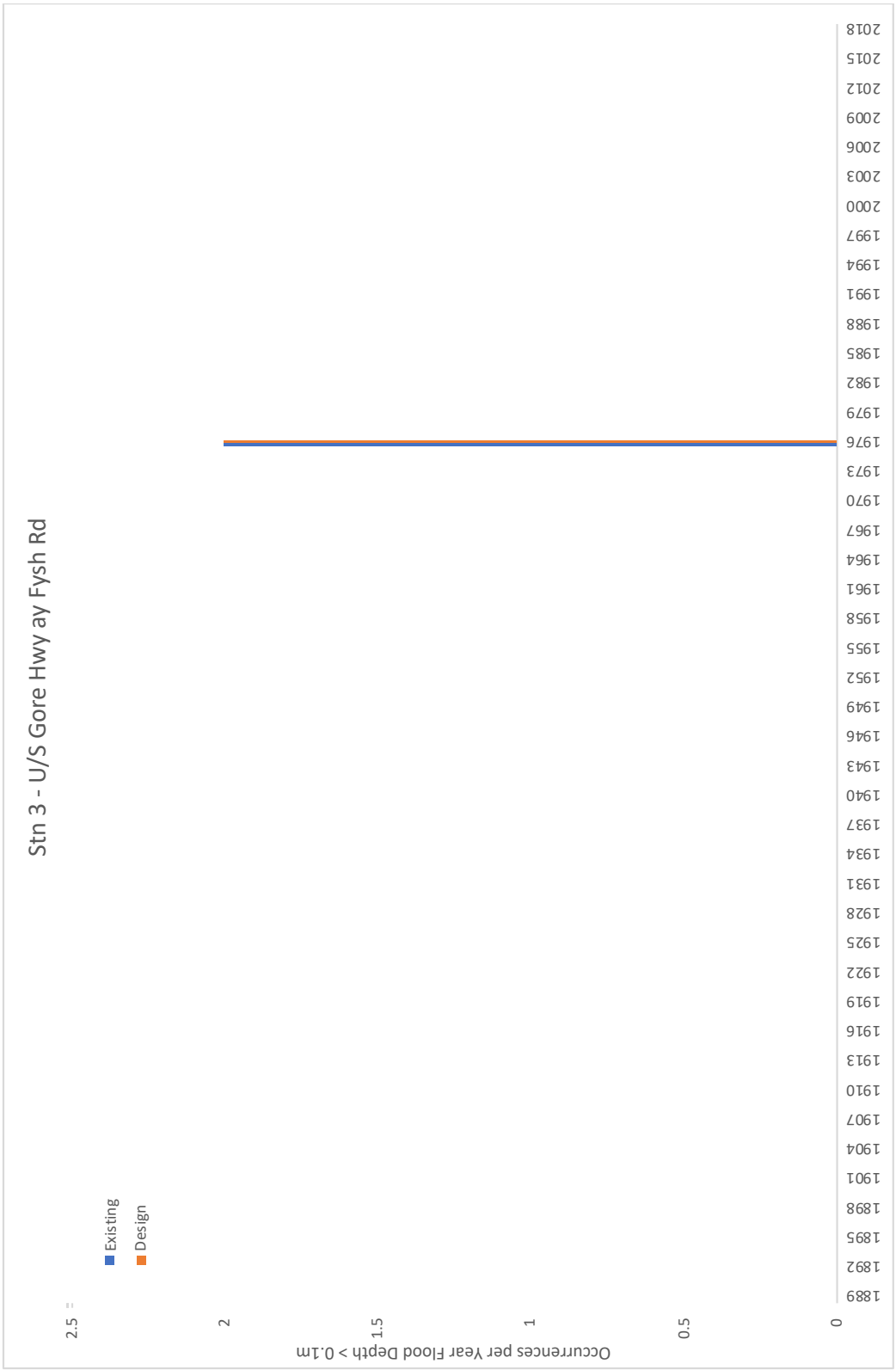

Figure A.3 – Flood Event Time-line @ Stn 5 - Farm at Gibbs Rd

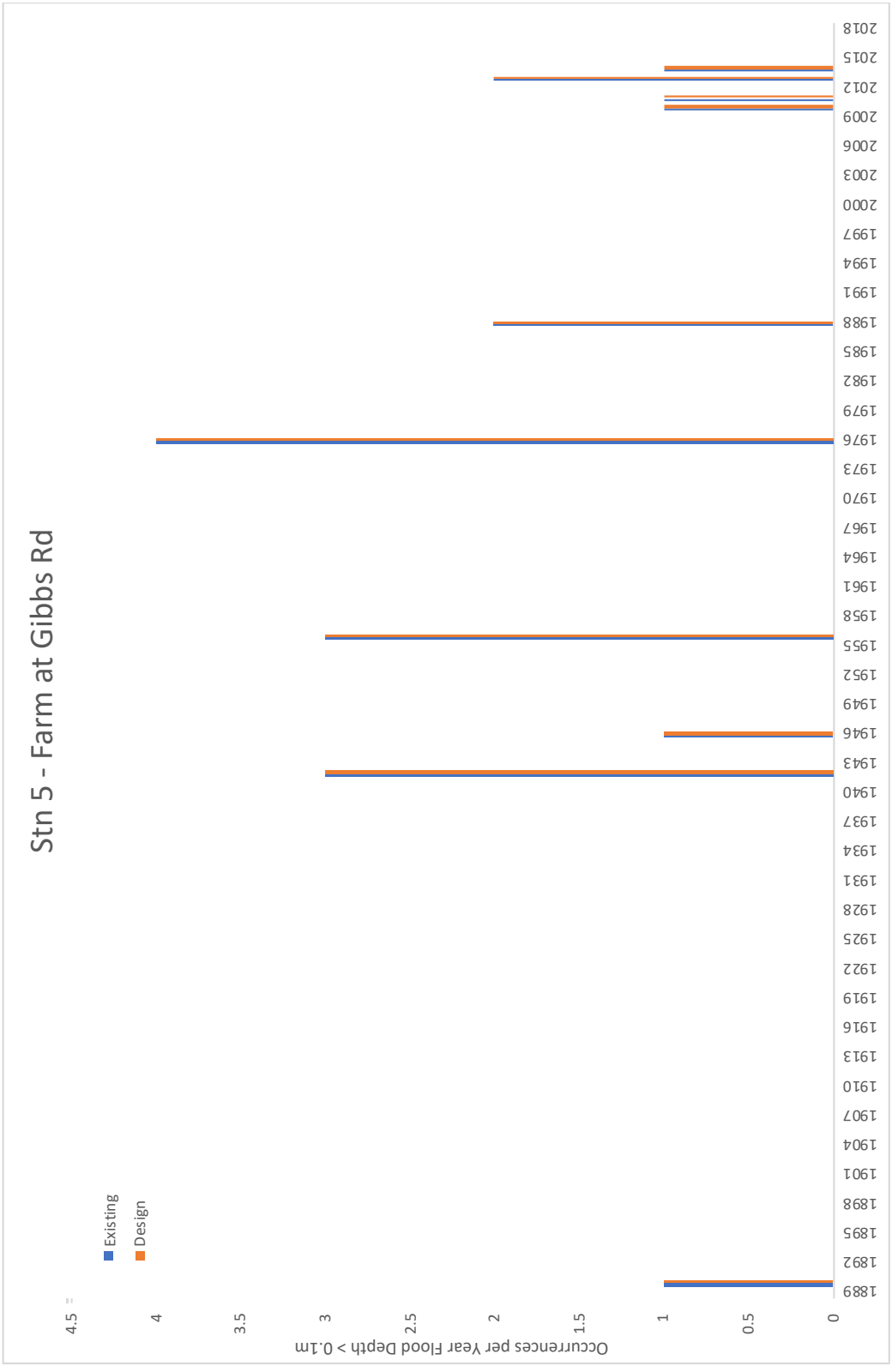

Figure A.4 – Flood Event Time-line @ Stn 8 - Ring Tank at Pampas Horrane Rd

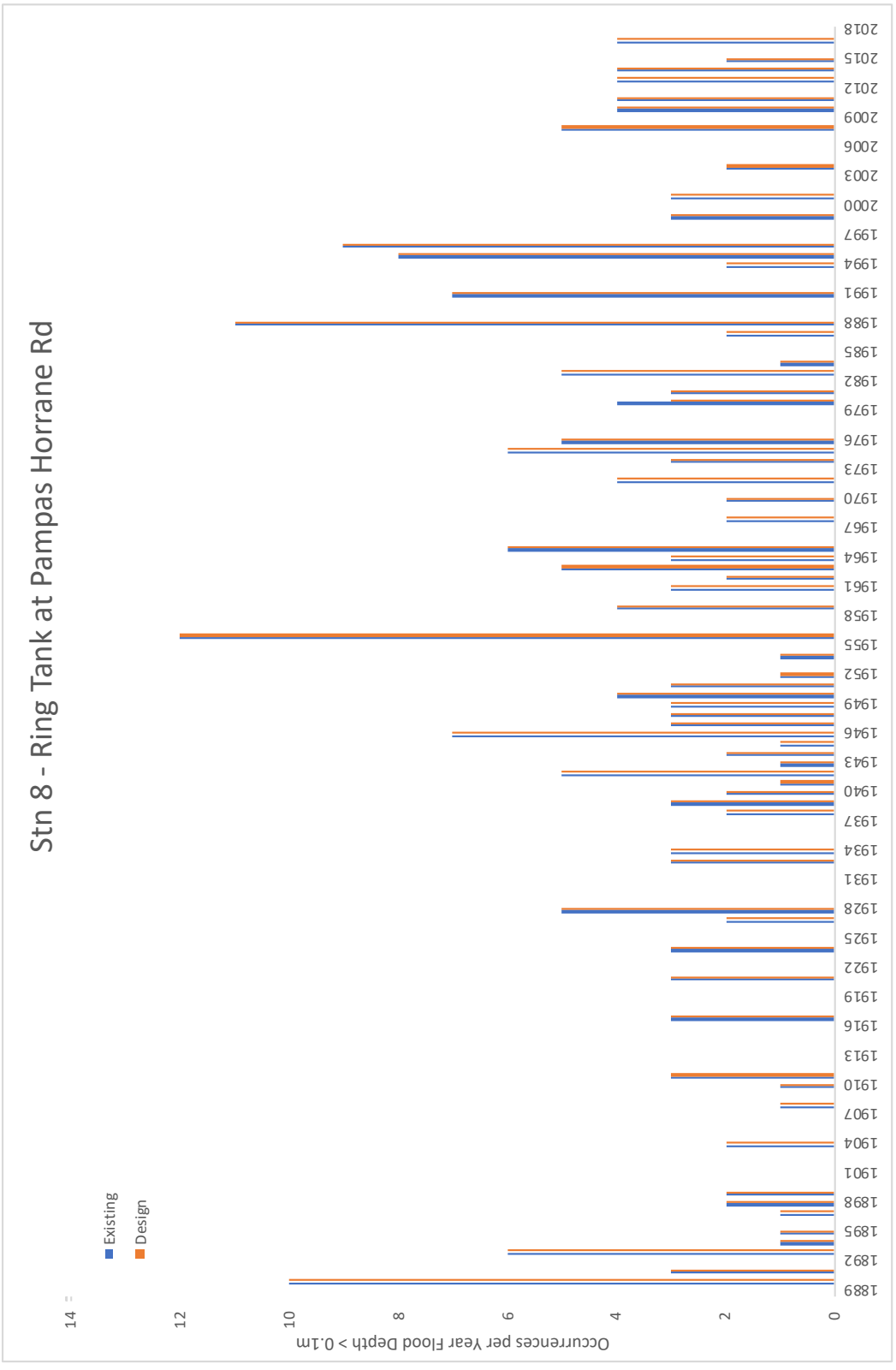

Figure A.5 – Flood Event % of Years Summary @ Stn 3 - U/S Gore Hwy ay Fysh Rd

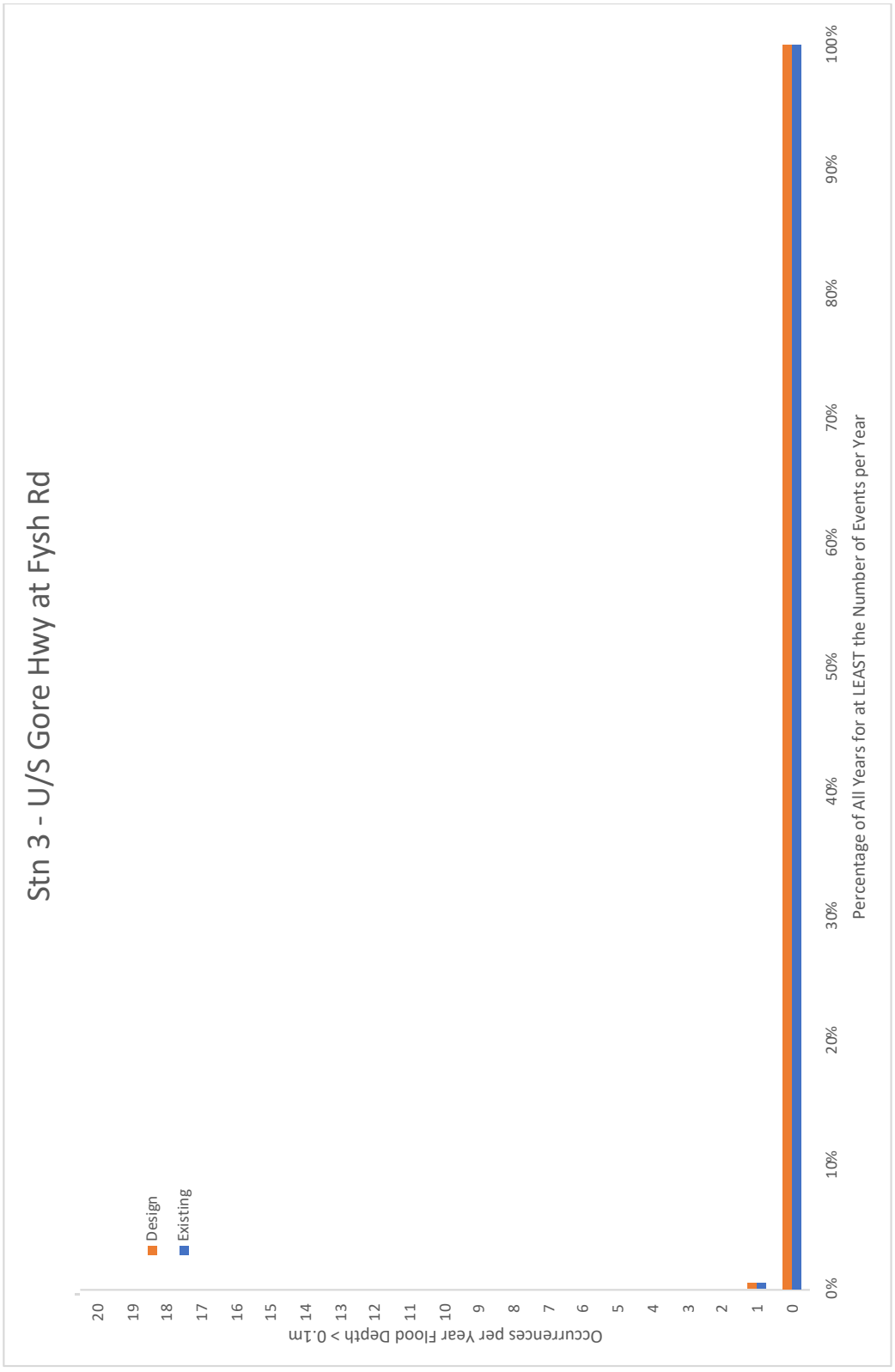

Figure A.6 – Flood Event % of Years Summary @ Stn 5 - Farm at Gibbs Rd

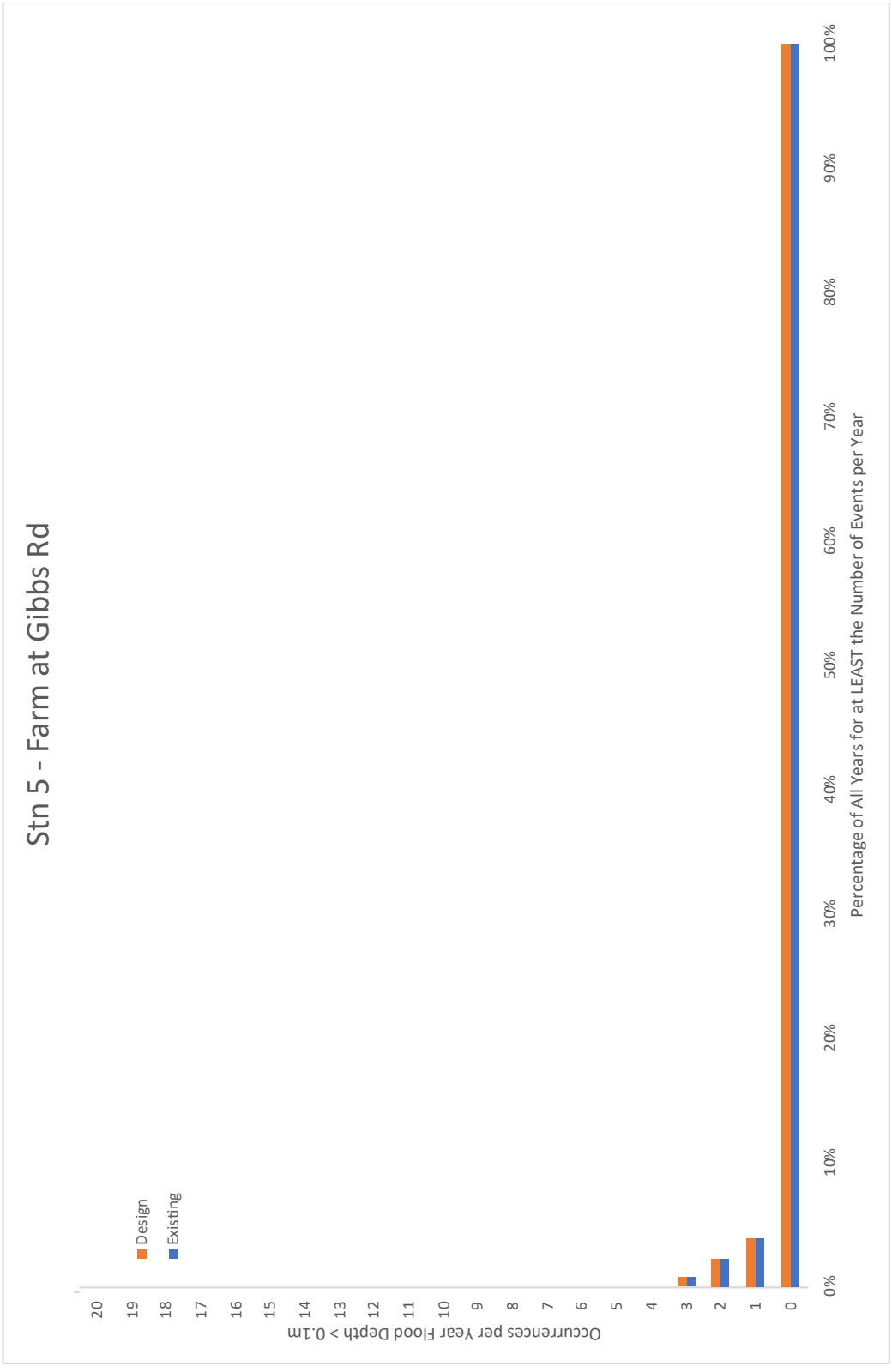

Figure A.7 – Flood Event % of Years Summary @ Stn 8 - Ring Tank at Pampas Horrane Rd

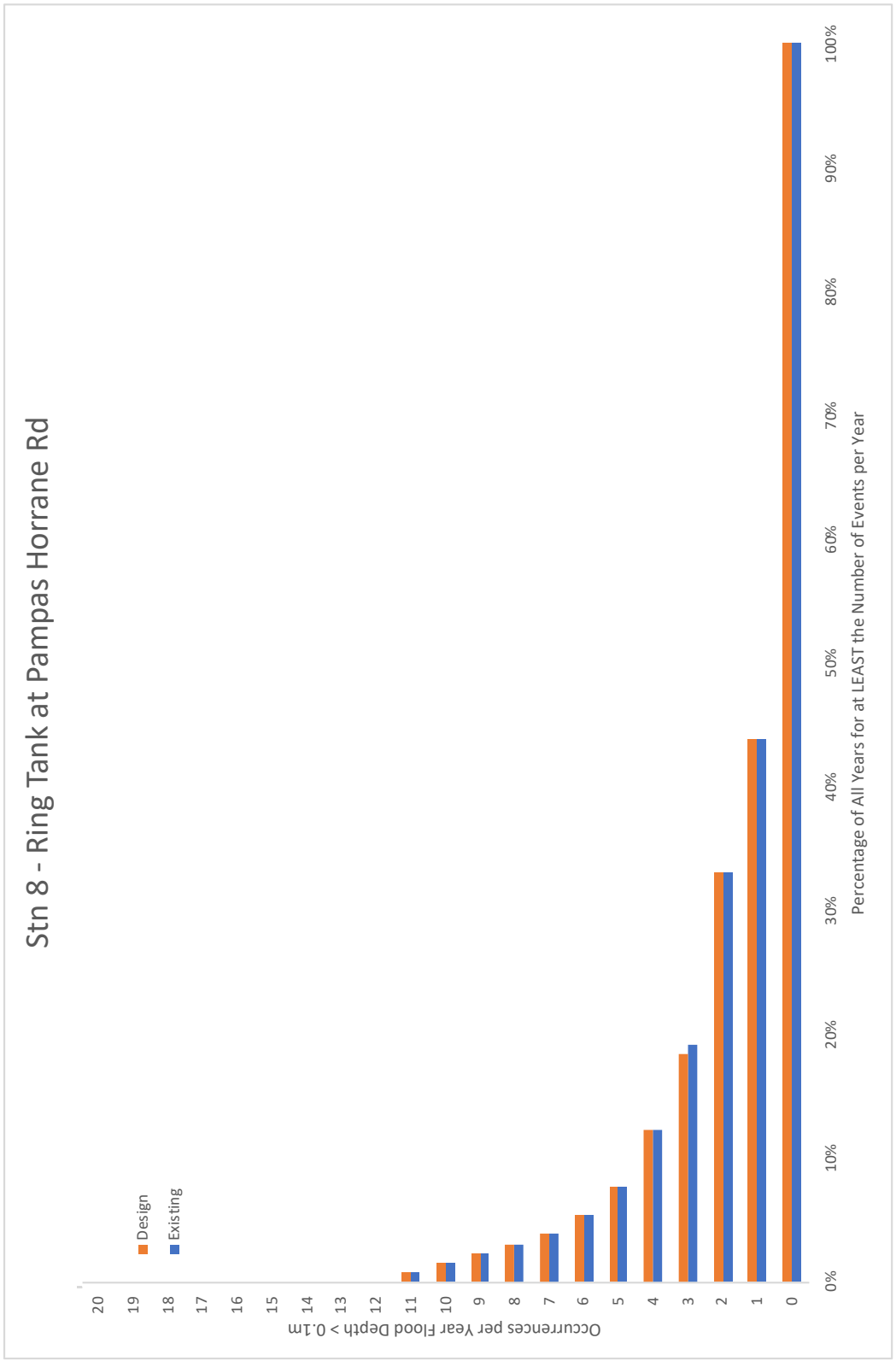

Figure A.8 – Change in Peak Flood Height @ 1 in 2 AEP Event

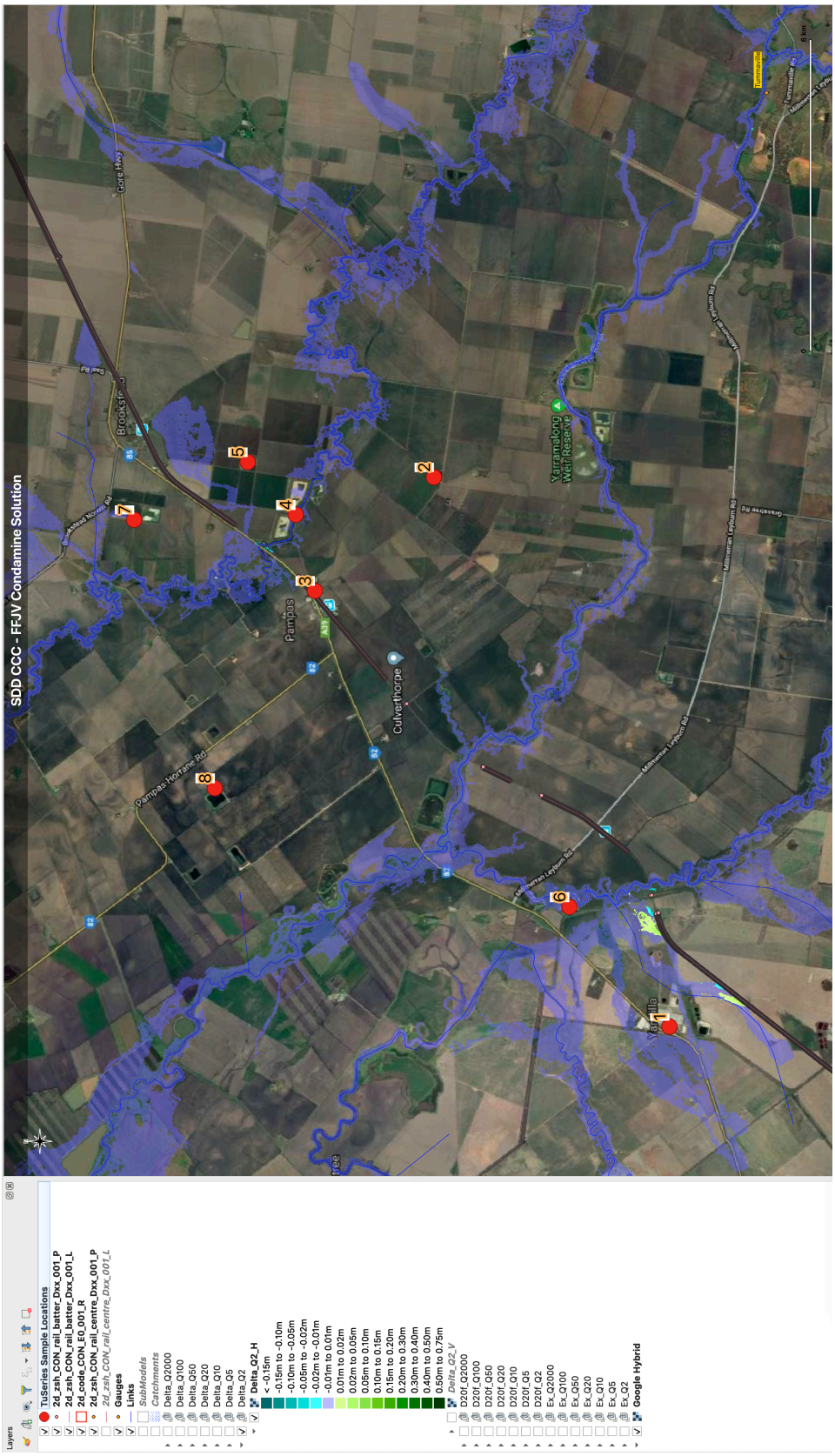

Figure A.9 – Change in Peak Flood Height @ 1 in 5 AEP Event

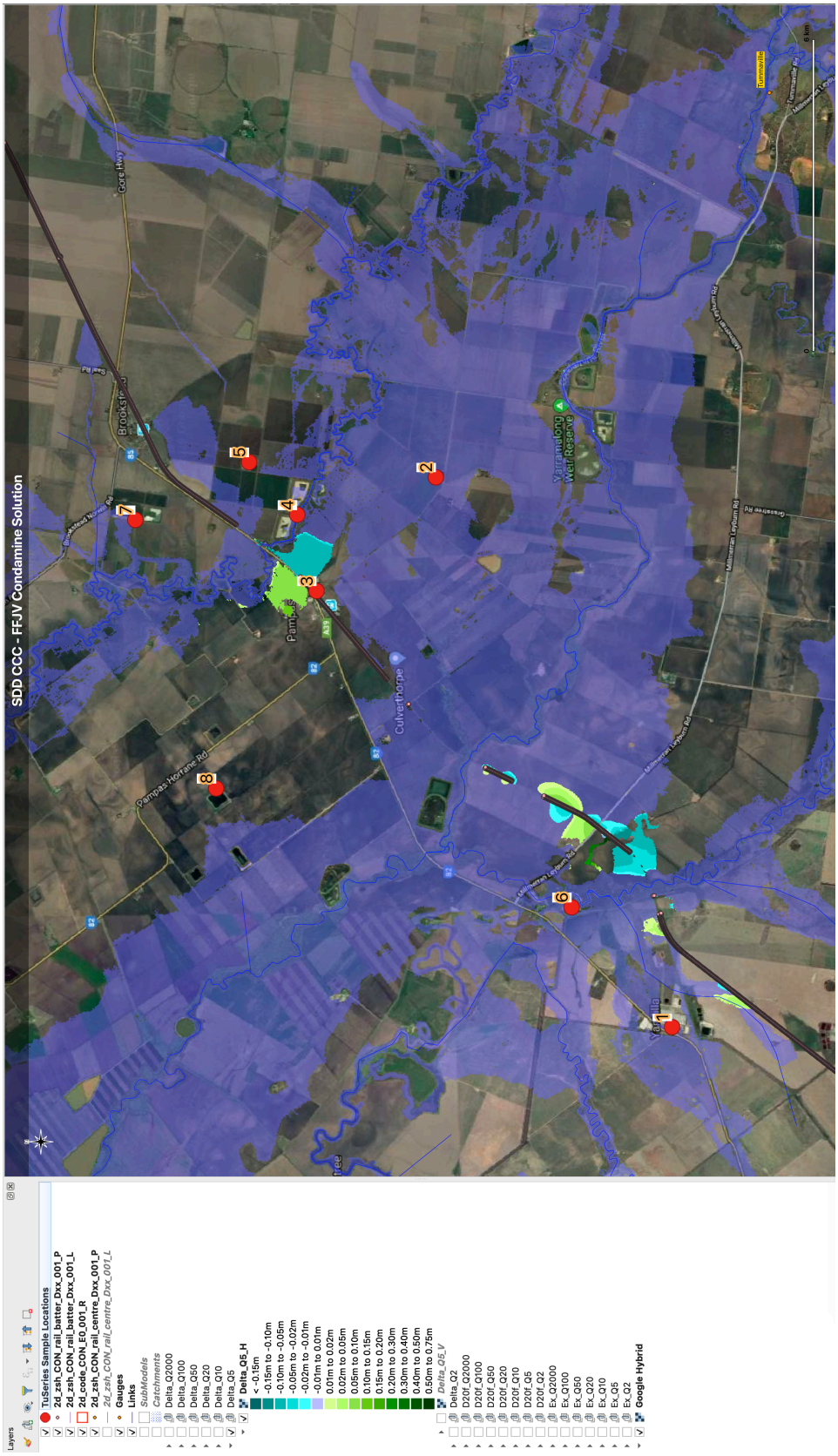

Figure A.10 – Change in Peak Flood Height @ 1 in 10 AEP Event

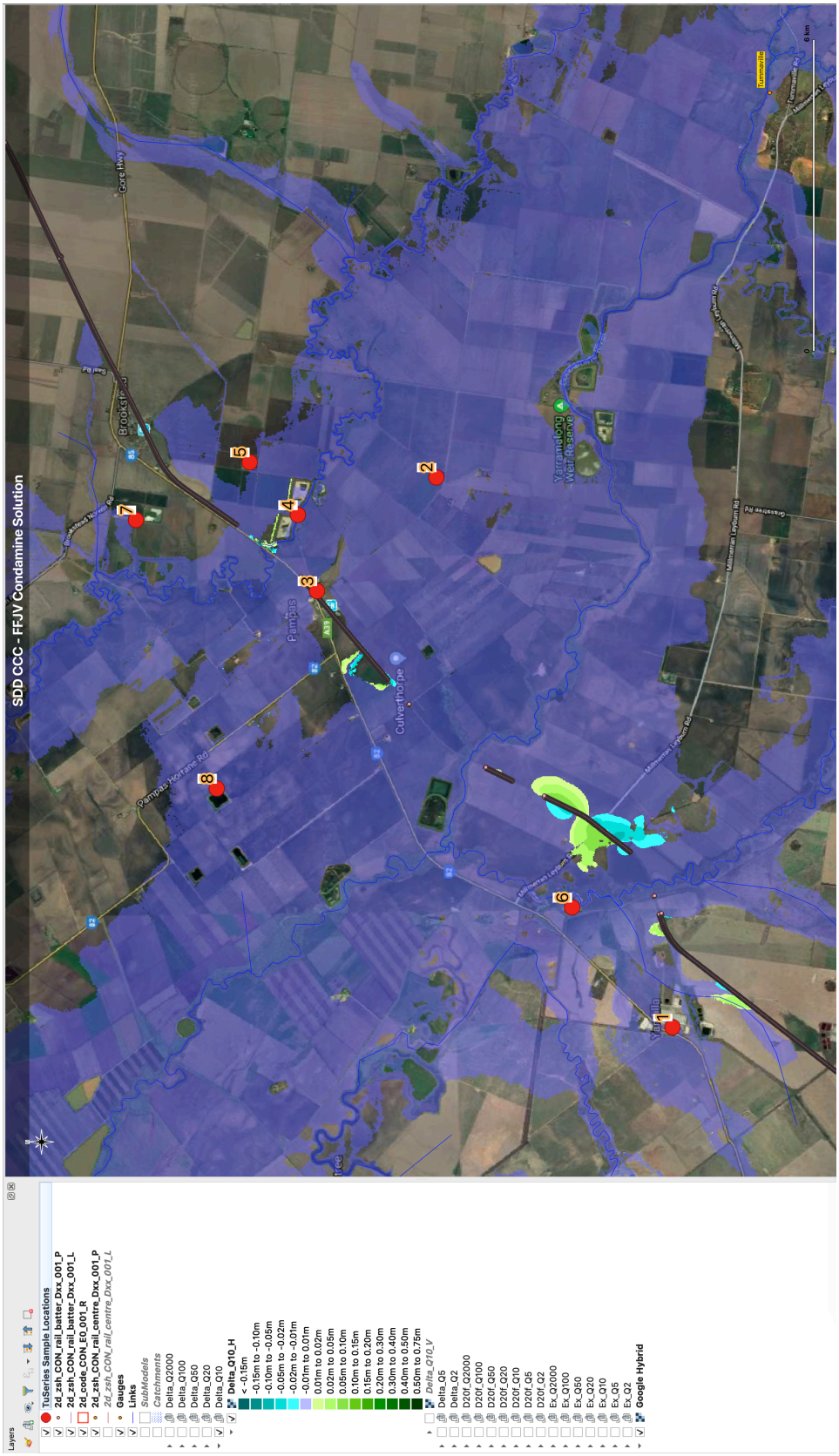

Figure A.11 – Change in Peak Flood Height @ 1 in 20 AEP Event

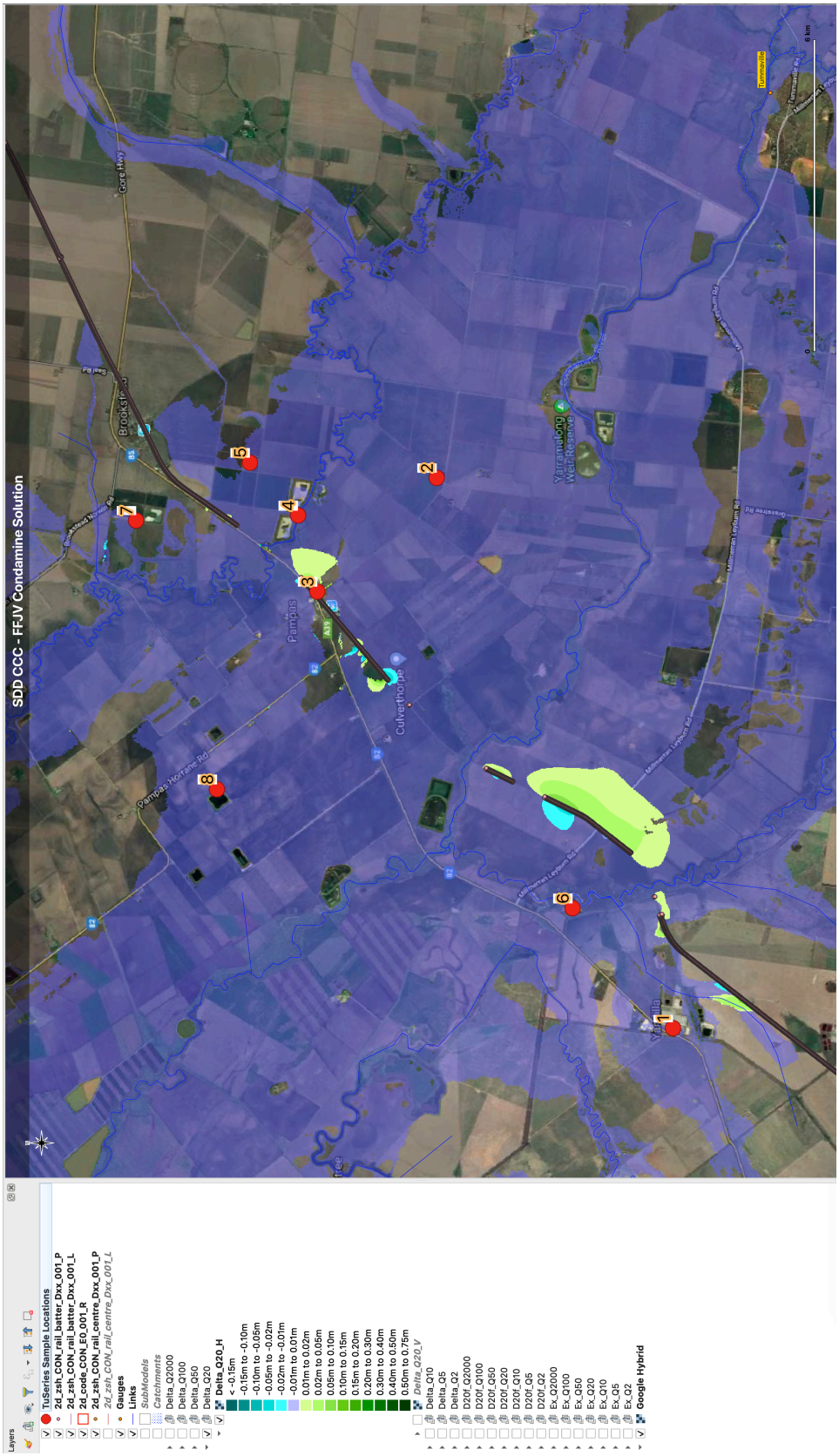

Figure A.12 – Change in Peak Flood Height @ 1 in 50 AEP Event

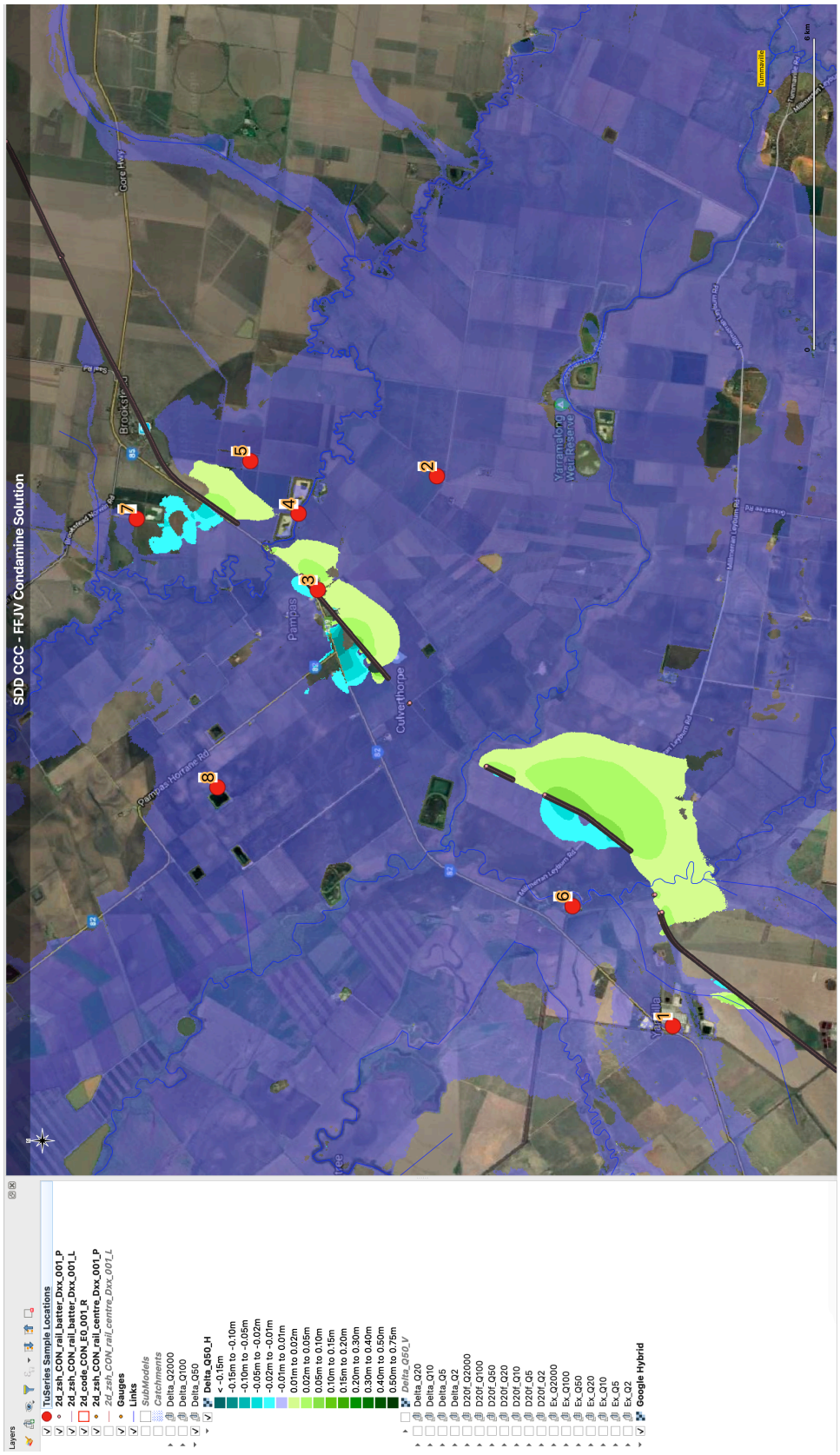

Figure A.13 – Change in Peak Flood Height @ 1 in 100 AEP Event

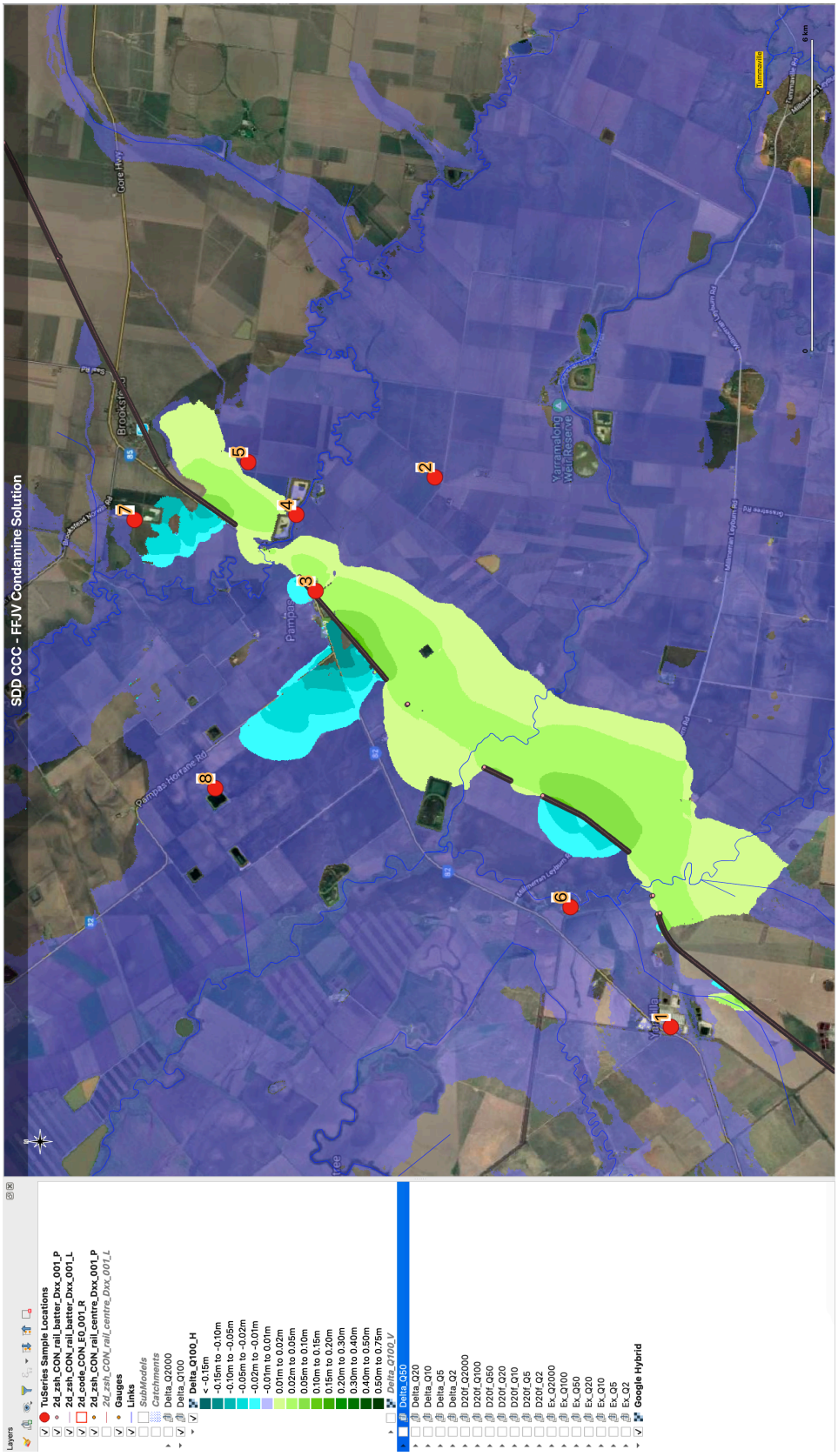

Figure A.14 – Change in Peak Flood Height @ 1 in 2,000 AEP Event