Storm Water Consulting Pty Ltd
(ACN 105 078 377)
5 / 541 Old Cleveland Rd Camp Hill Q 4152
Ph (07) 3398 4992

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL
Approval no: DEV2019/1001
Date: 3 December 2019

Queensland Government

1 April 2019
Our Ref: J6483 JH

12 Auster Street Pty Ltd
10 Hudson Road
Albion QLD 4010

Flood Impact Assessment – Response to Information Request
6-12 Auster Street, Redland Bay

Dear Cameron,

This letter presents a response to Item 1 of the Information Request dated 19 March 2019 (DEV2019/1001) for the proposed residential development at 6-12 Auster Street, Redland Bay (subject site). Item 1 of the Information Request seeks additional information regarding flooding, as shown below. This report presents an assessment of the flood impacts of the development on Weinam Creek. Issues relating to stormwater quantity and quality management will be addressed separately by other project consultants.

Flooding and Stormwater

1. Submit a site based stormwater management plan (SBSMP) and flood impact assessment (FIA) report. The scope of the report is to include:
   a. Details of the stormwater management strategy (quality and quantity); and
   b. An assessment of the flood impacts on the proposed development, including earthworks.

The FIA report should demonstrate that:
   i. the development has no adverse flood impact to upstream and downstream properties;
   ii. the risk to life, property, and the environment have been considered and mitigated; and
   iii. the flood immunity and stormwater management approaches are drawn from this assessment.

When preparing the FIA and SBSMP consider:
- Redland City Plan 2018 has been signed off by the State Government. The July 2017 SPP levels for storm-tide inundation have been incorporated. Sea level rise is projected to be 0.8 metres from the present day to 2100. Ensure the application addresses the new defined storm tide event levels.
- As the site is located below the investigation threshold elevation of 5m AHD, acid sulfate soils should be taken into account.
- The Emergency Flood Evacuation Plan may require amendment once the outcomes of the flood impact assessment are known.

A report titled 'Weinam Creek Catchment Conceptual Stormwater Management Plan' was prepared by GHD for Redland Shire Council in September 2006. Hydrology was undertaken using XP-RAFTS in the Weinam Creek study. The hydrology results from the GHD report are summarised in Table 1 below.

Table 1 – Weinam Creek Hydrology

ARI years	Flows (Ultimate Development) m^3/s
2	22.6
5	34.4
10	41.4
50	50.4
100	64.1

An HECRAS hydraulic model was set up of the stretch of Weinam Creek affecting the site to identify the 1% AEP flood extent and flood level. The model was set up utilising the parameters presented in Table 2 below. The existing model cross section locations are presented in the attached figure.

Table 2 – HECRAS Model Parameters

Parameter	Value
Upstream Boundary Condition	Normal Depth
Downstream Boundary Condition	Highest Astronomical Tide = 1.54 m AHD
Model Inflow	XS 100: 64.1 m^3/s (GHD Report)
Manning's Roughness Coefficients	n = 0.035 average grass n = 0.100 dense vegetation

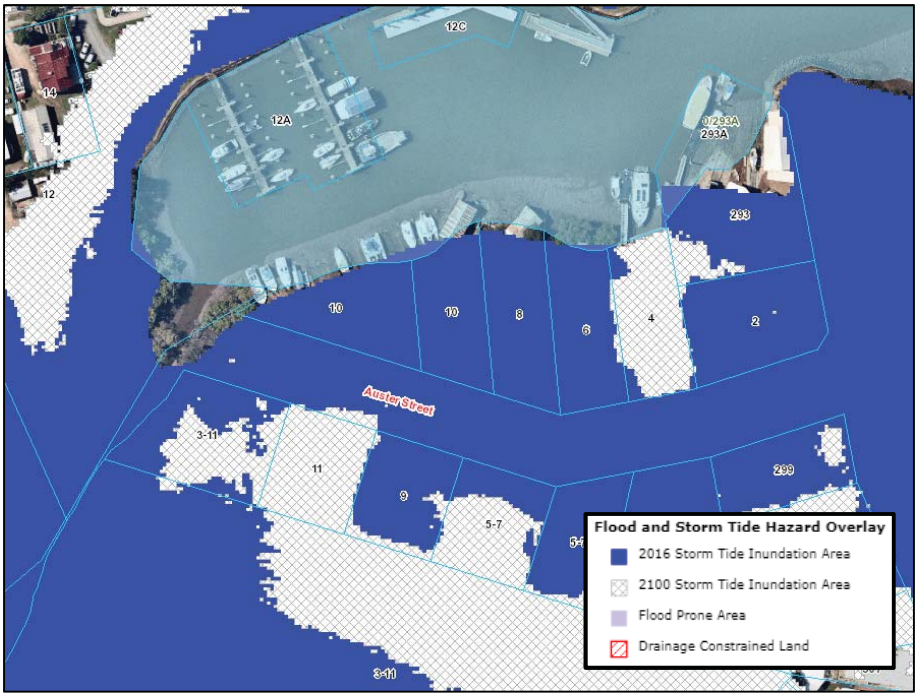
Table 3 below presents a comparison of the inundation levels at each cross section against the results of the TUFLOW analysis by GHD. Full HECRAS modelling results are appended to this report.

Table 3 – Existing Flood Levels

Cross Section XS	HECRAS by SWC	TUFLOW by GHD
	m AHD	m AHD
100	2.77	---
90	2.63	2.57
80	2.50	2.53
70	2.24	2.46
60	1.45	---
50	1.53	---
40	1.55	---
30	1.54	---

The results presented above indicate that the flood levels calculated in the HECRAS model are similar to those presented in the TUFLOW model by GHD. The 1% AEP flood extent is contained within Weinam Creek and does not exceed the creek banks (refer attached approximate 1% AEP flood extent plan). The 1% AEP flood level within the creek adjacent Auster Street is 1.53 m AHD, which is below the portions of the subject site undergoing development. As such, the proposed works would not be blocking the creek flow path and would therefore not result in a material worsening on adjoining properties.

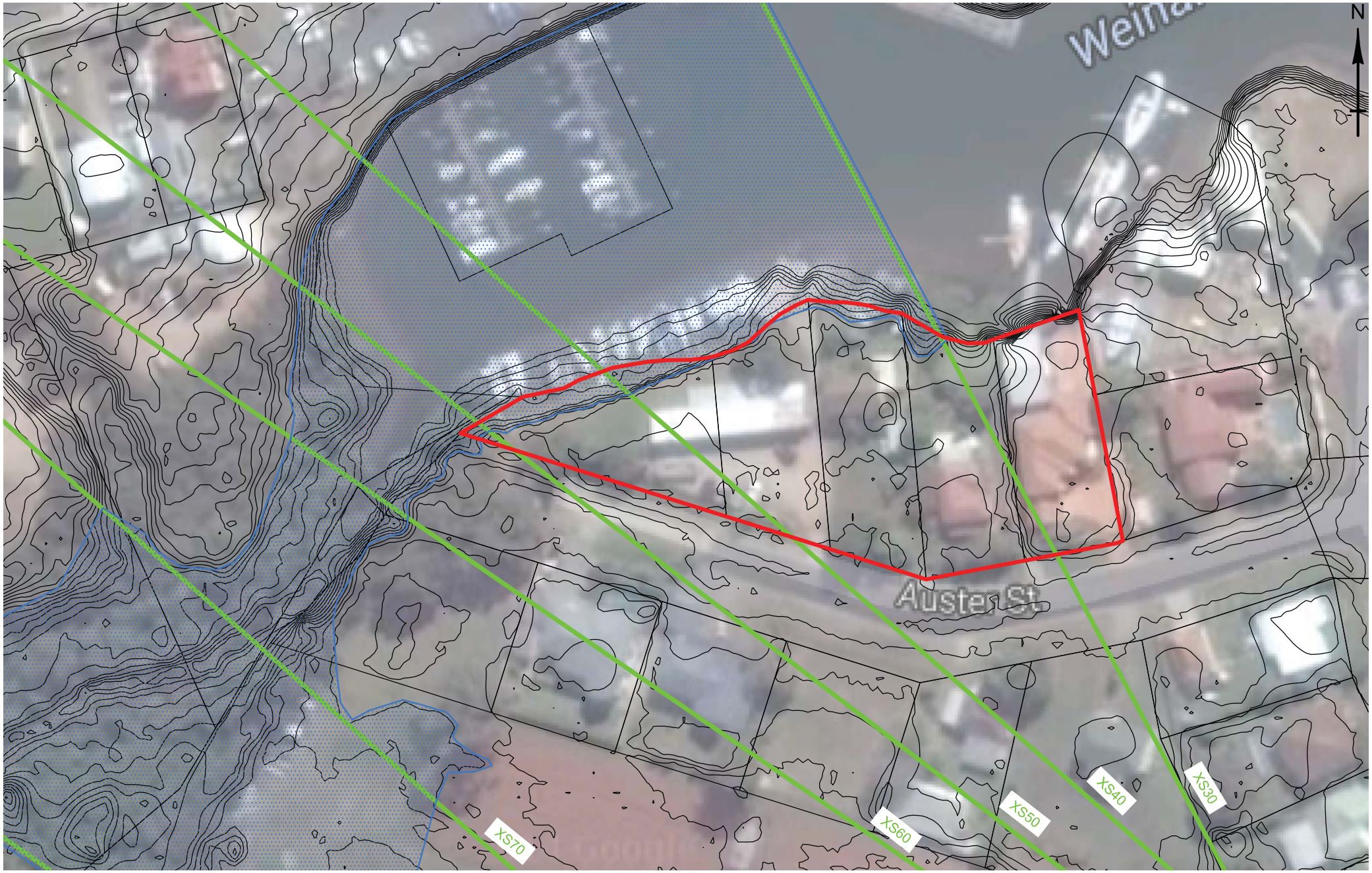
The subject site is also affected by flooding from storm tide (refer Redland City Council overlay mapping below). Storm tide flooding is the effect on coastal water levels of a storm surge combining with the normally occurring astronomical tide. Storm surge is a rise above normal water level due to the combined effects of surface wind stress and atmospheric pressure fluctuations caused by severe weather conditions such as tropical cyclones. During such events, there would be a significant amount of flood storage available along the coastline. As such, the proposed works would therefore not result in a material worsening on adjoining properties.



The previously prepared *Emergency Floodplain Risk Management Plan v1.1* dated 12 December 2018 addressed issues relating to the timing and frequency of access roads affected by flooding. The risk to life, property and environment are deemed to have been sufficiently considered within that report.

Yours faithfully,

Darren Rogers
BE Civil (Hons), MIE Aust, RPEQ 5016
Director
E darren@stormw.com.au



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Drawn	JH
Checked	DWR
Date	01/04/19
Scale	1:1,000 A4

6-12 Auster Street, Redland Bay

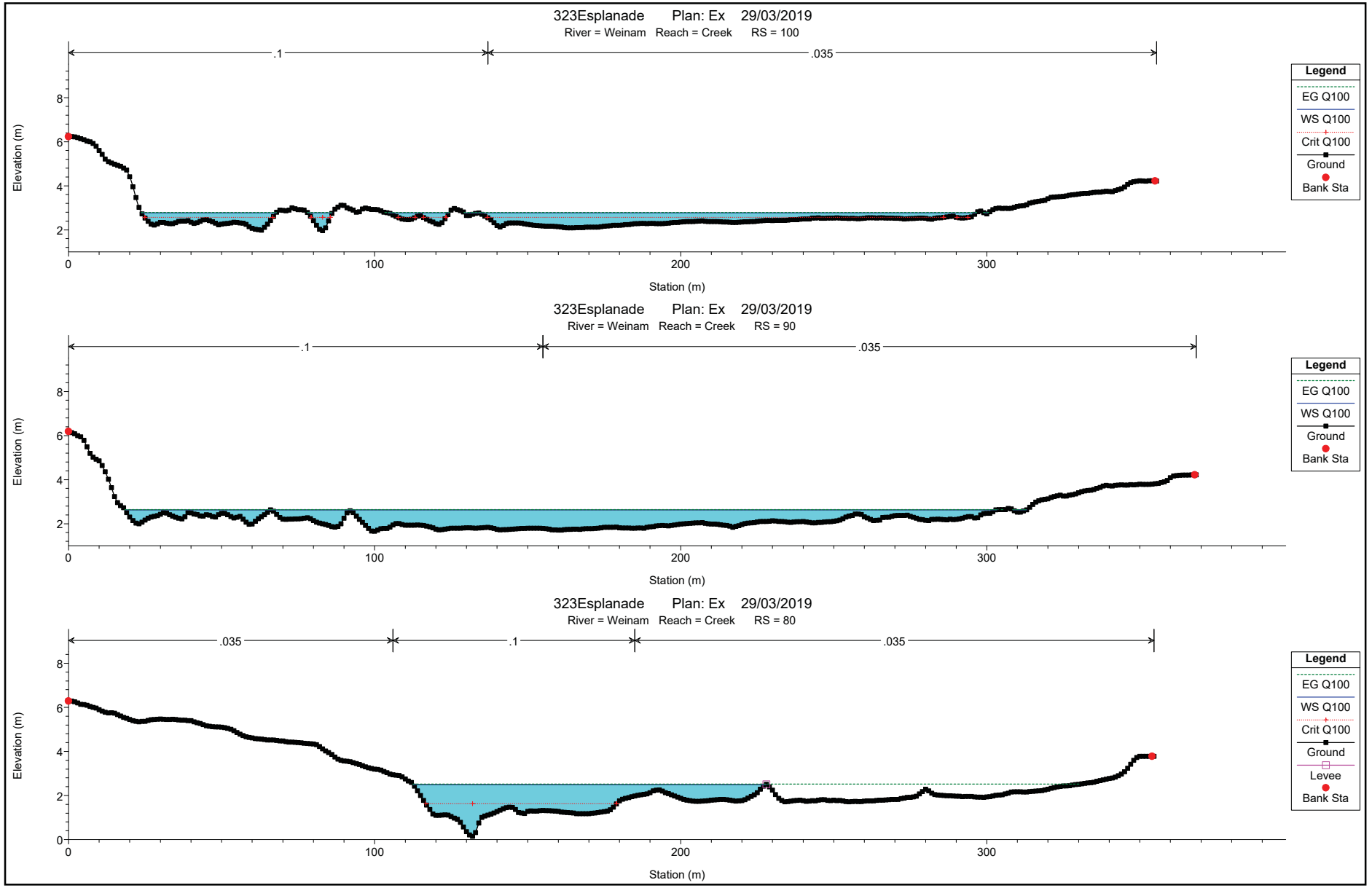
Job No. J6483

Figure A

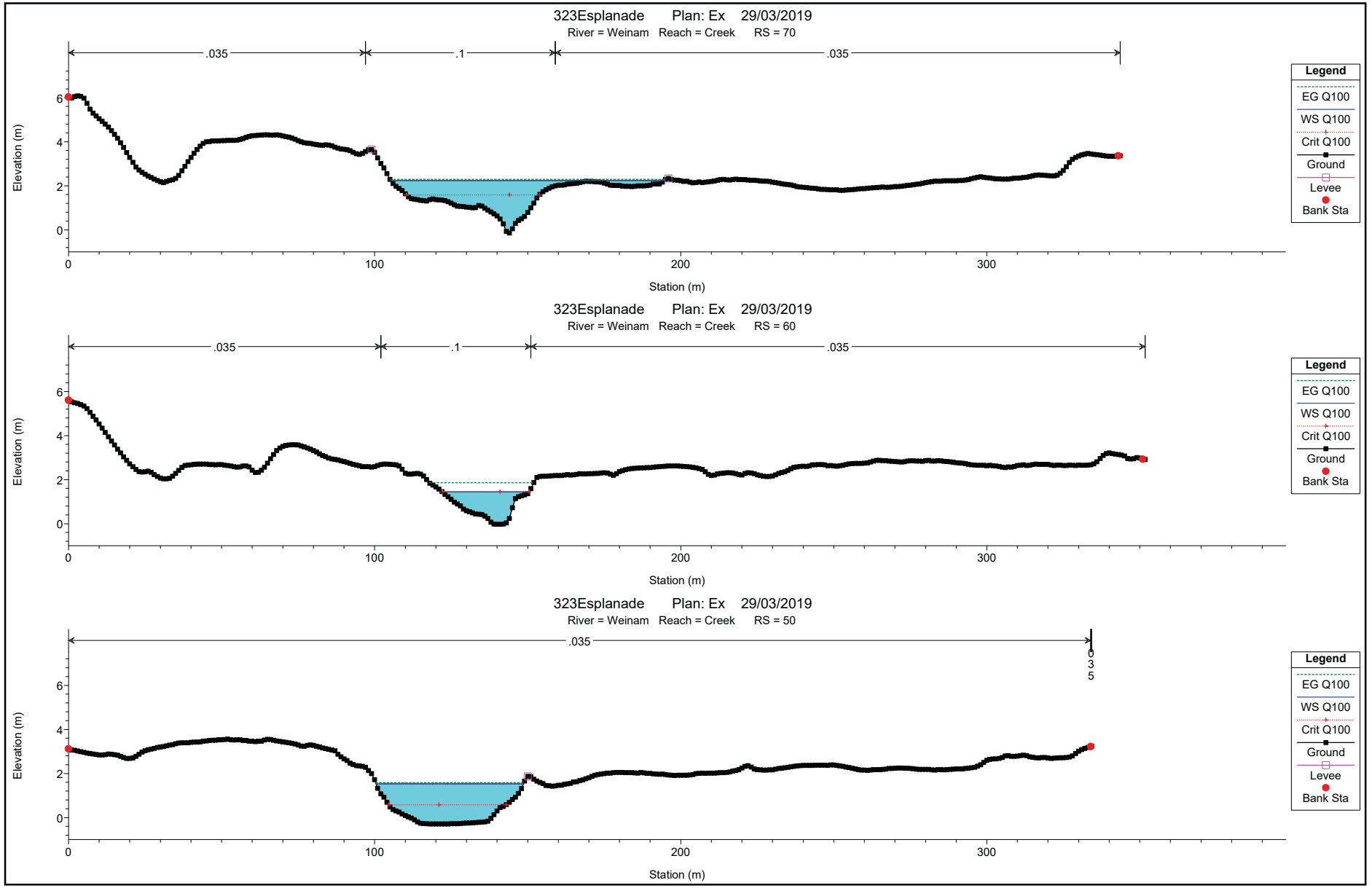
Approximate 1% AEP Creek Flood Extent Plot (HECRAS)

HEC-RAS Plan: Ex River: Weinam Reach: Creek Profile: Q100

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Creek	100	Q100	64.10	1.96	2.77	2.56	2.79	0.003439	0.70	91.54	240.29	0.36
Creek	90	Q100	64.10	1.66	2.63		2.64	0.000873	0.40	161.61	289.28	0.17
Creek	80	Q100	64.10	0.15	2.50	1.63	2.52	0.001840	0.56	113.69	115.42	0.18
Creek	70	Q100	64.10	-0.14	2.24	1.58	2.29	0.009140	0.99	64.61	89.29	0.37
Creek	60	Q100	64.10	-0.03	1.45	1.45	1.85	0.107047	2.81	22.80	28.32	1.00
Creek	50	Q100	64.10	-0.29	1.53	0.58	1.58	0.000716	0.95	67.34	48.16	0.26
Creek	40	Q100	64.10	-0.26	1.55		1.56	0.000208	0.56	114.71	72.09	0.14
Creek	30	Q100	64.10	-0.31	1.54	0.17	1.55	0.000118	0.43	147.57	88.35	0.11



1 cm Horiz. = 18 m 1 cm Vert. = 2.5 m



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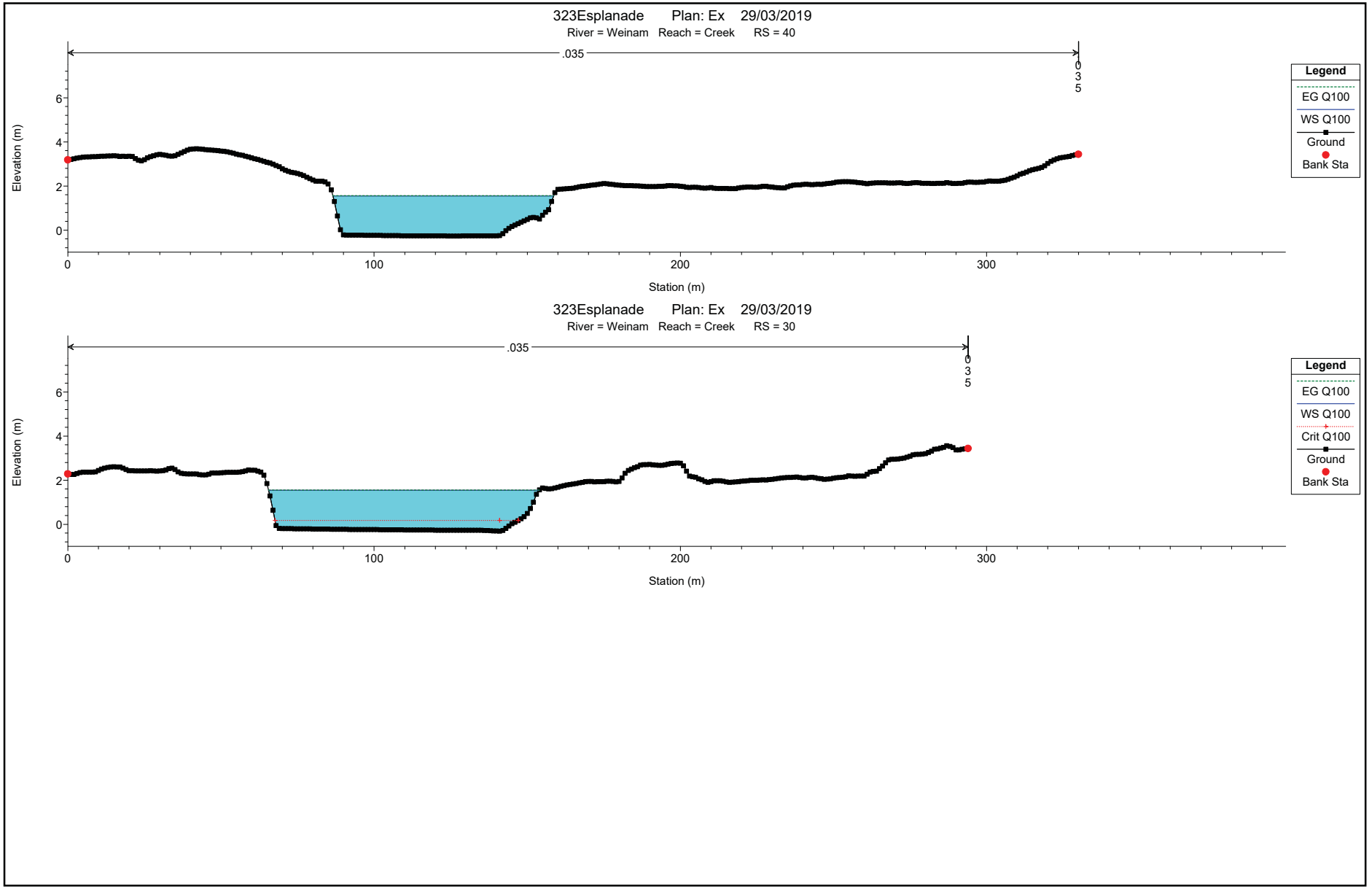

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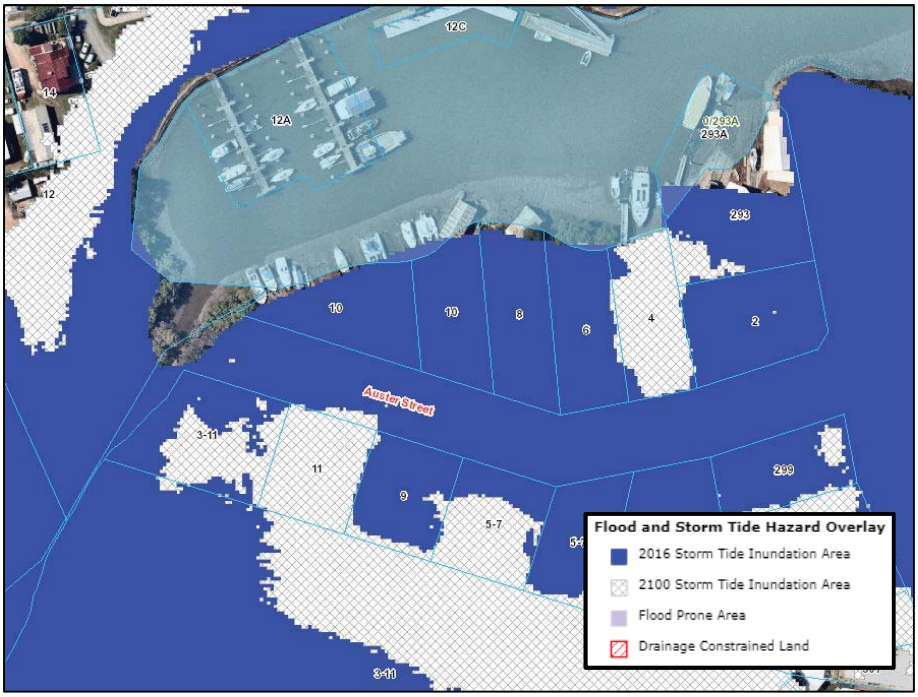

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