

Table 1. Review of relevant EIS benefits and impacts as related to Hawkesbury City Council strategies and studies – negative impacts highlighted in the cells below.

Impact type	REFERENCE EIS Chapter 21 (Table 21-19) - Impact number of relevance to Hawkesbury LGA	EIS proposed mitigation type (paraphrased from EIS)	EIS residual significance rating (benefit +, impact -)	Alignment between EIS and Council strategies and studies
Property and land use	4. Operation — Reduction in the impacts of flooding (including reduction in the number of properties inundated by flooding and improved evacuation) in the LGA of Hawkesbury	<ul style="list-style-type: none"> • Operational protocols • Collaboration 	Extreme benefit	<p>The EIS identifies 32 affected suburbs and 3,500 residential properties as well as and 610 manufactured homes¹ being affected in a 1:100 flood event, based on 2018 figures. This is consistent with the mapping in the Hawkesbury Flood Policy (2020) and the Hawkesbury Flood Risk Management Strategy and Plan (2012) (HFRMSP), the latter of which identified 3,386 affected properties.</p> <p>These figures do not take new rezonings and developments into account that have been identified in the LSPS (2021 – page 19) and noting that Vineyard and Redbank developments are located in flood prone areas mapped in the HFRMSP (2012):</p> <p><i>Existing Residential Zonings within the Hawkesbury already provide for an additional 4,500 dwellings located at:</i></p> <ul style="list-style-type: none"> • Vineyard Stage 1 (2,500 dwellings) - • Redbank (1,400 Lots) – Redbank North Richmond • Jacaranda Ponds (580 Lots) – Glossodia <p>The LSPS identifies that if the 1867 flood were to happen again, 12,000 residential properties would be impacted, 90,000 people would need to be evacuated and damages would cost an estimated \$5 billion. It should be noted that the 1867 flood is equivalent to a 1 in 500-year event and, as such, much rarer than a 1 in 100-year flood event.</p> <p>The Hawkesbury Flood Policy identifies that ‘<i>Depths of floodwaters are high within the Hawkesbury Local Government Area and therefore most existing buildings are subject to potential failure during a flood</i>’ and estimates that approximately 15,172 buildings are within the floodplain, 13,418 of which are residential, however the Policy does not quantify how many of these could be directly affected.</p>

¹ Manufactured homes are defined as semi-permanent styles of housing such as cabins and caravans.

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	6. Decreased frequency but increased duration of inhibited access to and from low lying property due to longer duration of the FMZ discharge	<ul style="list-style-type: none"> • Emergency evacuation plans • Collaboration • Notifications/information 	Moderate impact	This is aligned with the HFRMSP and Hawkesbury Flood Policy, in respect to the largest impacts of flooding on people and properties being related to the timing (re evacuation), frequency, and extent and magnitude of flood events.
Environment	7. Alteration of visual amenity associated with release of the FMZ	n/a	Moderate impact	This is consistent with the LSPS, which references the Western City District Plan in identifying the river and surrounding agricultural lands as having untapped tourism potential.
	8. Avoidance of altered visual amenity due to reduction in the extent of flood inundation associated with most flood events	n/a	High benefit	This is consistent with the LSPS, which references the Western City District Plan, in identifying the river and surrounding agricultural lands as having untapped tourism potential.
	9. Operation — Disruption to the enjoyment of natural areas and the flora and fauna they support	<ul style="list-style-type: none"> • Offset of environmental impacts • Stakeholder consultation 	Low impact	<p>This is aligned with the Community Strategic Plan, which identifies the natural environment and the river as an important aspect of community health (CSP 4.3.1 <i>Provide a variety of quality passive recreation spaces including river foreshores, parks, bushland reserves and civic spaces to enhance our community's health and lifestyle.</i>).</p> <p>It is beyond the scope of this advice to consider environmental impacts as such, only the social benefits associated with the natural environment</p>
Community health and wellbeing	10. Enhanced safety of residential areas due to reduced extent and frequency of floods, including reduced risk of post-flooding infectious disease	<p><i>*note – the mitigation options for this benefit are repeated ad verbatim in all entries marked* below.</i></p> <ul style="list-style-type: none"> • Operating protocols during floods • Community awareness programs • Promote the project benefits/engagement 	Extreme benefit	See above (point 4). Risks associated with post-flooding infectious disease are not covered in Council key planning documents.

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	11. Enhanced safety due to improved ability to evacuate communities	Implementation of the Resilient Valley, Resilient Communities strategy *as above (a/a)	Extreme benefit	This is aligned with Council’s Flood Policy (2020) and the HRMSP (2012). The Flood Policy references the Resilient Valley, Resilient Communities Strategy and considers that: <i>Expanding urban development across the Valley means that flood exposure will increase in the future. Up to 134,000 people live and work on the floodplain and could require evacuation. The flood risk is heightened by a number of factors:</i> <ul style="list-style-type: none"> • <i>insufficient road capacity to safely evacuate the whole population in a timely fashion</i> • <i>a fragmented approach to managing flood risk</i> • <i>low community awareness about the flood risk.</i> <i>In addition to the above, there is a high risk of infrastructure failure of facilities and systems i.e., water, wastewater, power, gas etc. (Flood Policy 2020: 6)</i>
	12. Reduced risk to people living in highly vulnerable forms of housing	*a/a	Extreme benefit	The accuracy of this estimated significance rating is questionable, based on the EIS figures and calculations. For Hawkesbury, the benefits to people living in manufactured homes are likely to be low. The EIS (Table 8-12, Appendix M) identifies 610 manufactured homes currently affected in a 1:100 flood event. With the Project, this number is estimated to reduce to 540, representing an 11.5% reduction in number of affected manufactured homes. This is a low benefit, especially when compared to the 85% change in affected residential dwellings (from 3,500 to 530 in a 1:100 flood event). (Note also an error in the EIS calculations, which states a 74% reduction instead of 85% – See Table 8-12, Appendix M, page 202). Across all downstream communities, corresponding figures show only a low benefit. The EIS (Table 21-14, Chapter 21) identifies a 6% reduction in number of manufactured homes affected by a 1:100 flood event (from 1,700 reduced to 1,600 with the Project).

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				Corresponding figures and calculations for manufactured homes are not available in the Council documents.
	13. Reduced risk to vulnerable people living in social housing at risk of flooding	*a/a	Extreme benefit	<p>While there appears to be broad alignment between the findings of the EIS (Table 6 – 29, Appendix M) and the Draft Housing Strategy (2020) in terms of number of affected people in social housing, though exact comparison is not possible. The EIS identifies 1,600 affected social housing dwellings in the whole project area, and 810 social housing dwellings within Hawkesbury affected suburbs. The number of affected social housing dwellings per suburb are identified in Table 6-29 of Appendix M as follows: Bligh Park (113), Hobartville (38), Lower Portland (4)North Richmond (83), Richmond (131), South Windsor (375), Windsor (57).</p> <p>The Housing Strategy does not specify the number of social housing dwellings but notes that social housing proportionately is high in South Windsor (16.1 per cent), and Bligh Park has a significantly lower number of fully-owned households (18.7 per cent) compared to households with a mortgage (43.8 per cent) and rental households (total) (33.7 per cent). (Housing Strategy page 70).</p> <p>While vulnerable people living in social housing will likely benefit from the project, Council may wish to weigh these benefits against potential negative impacts, should the Project reduce housing affordability (e.g. from greater market confidence (see item 26 below).</p>
	14. Operation — Reduced levels of flood risk awareness, reduced (individual) flood disaster planning and increased complacency	*a/a and also: Community awareness regarding flood risks Update and implement emergency evacuation plans	Low impact	This is aligned with the Resilient Valley, Resilient Communities Strategy as well as Council’s Flood Policy (2020) which identifies low community awareness about the flood risk (page 6).
	15. Operation — Improved access to key services, and health facilities	*a/a	Extreme benefit	This aspect is not directly mentioned, though implied, in Council’s key planning documents (namely the Flood Policy (2020) and the Hawkesbury Floodplain Risk Management Study and Plan (2012)).

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	16. Operation — Occasional reduced access to services and health facilities during discharge of water from the FMZ	*a/a and also: Implement transport mitigation measures (cross ref to Transport EIS chapter) Emergency evacuation plans	Low impact	This aspect is not directly mentioned, though implied, in Council’s key planning documents (namely the Flood Policy (2020) and the Hawkesbury Floodplain Risk Management Study and Plan (2012)).
	17. Health risk relating to temporary reduction in water quality	Water monitoring Community awareness programs	Low impact	<p>This is aligned with Council’s LSPS, which recognises water quality issues generally. There may be an opportunity to monitor this aspect through Council’s identified initiative to monitor water quality:</p> <p><i>Council will consider actions within the Hawkesbury Sustainability Strategy to educate and create awareness to ensure that the health of the waterways within the Hawkesbury is enhanced and protected. Council understands that it’s paramount to have an integrated approach to the protection and management of waterways with comprehensive monitoring and reporting of the water health. Currently, Council in collaboration with the other Council’s within the Western City District is undertaking the “Western Parkland City Sensor Network Project” to monitor water quality of the Hawkesbury River. The project is a pilot and if successful will roll out to assess other waterways in the region. The project is funded through the Western City Deal. (LSPS page 85)</i></p>
	18. Reduced adverse effects on mental health due to reduced experience of severe flood events	Mental health support to people affected by flood events	Extreme benefit	Mental health, related to floods or otherwise, is not mentioned in Council’s key planning documents (LSPS or CSP).
	19. Reduced economic costs related to mental health issues associated with flooding	Mental health support to people affected by flood events	Extreme benefit	Mental health, related to floods or otherwise, is not mentioned in Council’s key planning documents (LSPS or CSP).
	20. Reduced health risk to water borne disease	Awareness raising and provision of health assistance to those affected by water borne disease	Extreme benefit	This aspect is not mentioned in Council’s key planning documents (LSPS, CSP, Flood Policy (2020) or the Hawkesbury Floodplain Risk Management Study and Plan (2012).

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Culture and heritage	21. Effects on Aboriginal cultural heritage	Impact is assessed being negligible and no mitigation required.	Low impact	While the impact is assessed as negligible and no mitigation required, Council has a role to <i>value, protect, and enhance our built environment as well as our relationship to Aboriginal and non-Aboriginal history.</i> (CSP: page 30). In light of this, Council may need to consider the Aboriginal Cultural Heritage Assessment (Ch18) to satisfy itself.
	22. Enhanced protection of non-Aboriginal cultural heritage	Collaboration with Aboriginal parties Promote the Project benefits/engagement Implementation of the Resilient Valley, Resilient Communities strategy	Extreme benefit	As above and noting CSP Action 5.2.1 <i>Our planning and actions will ensure that Aboriginal and Non-Aboriginal heritage are integral to our City.</i> (CSP: page 30). We note that the proposed mitigation measure includes collaboration with Aboriginal parties, which we assume to be a mistake, given this impact is about the protection of non-Aboriginal cultural heritage.
	23. Potential effects on listed cultural heritage due to release of the FMZ	*a/a and also: Develop and adopt an owner's guide to deal with the effects of flooding and prolonged exposure for heritage items impacted by the discharge of the FMZ.	Low impact	As above, in points 21 and 22.
Way of life	24. Positive economic effects due to reduced flood related damage to property	*a/a	Extreme benefit	This is aligned with Council's Flood Policy (2020) and the Hawkesbury Floodplain Risk Management Study and Plan (2012), which at the time calculated average cost of flood damage to houses to be about \$18 million, whilst the present value of damages over a 50-year period was calculated to be about \$211 million. These estimates do not include building failures or damages to the commercial / industrial sector, to infrastructure, to motor vehicles or to special uses such as caravan parks, RAAF base or the UWS campus (page xii).
	25. Reduced risk of people permanently and temporarily losing access to housing and accommodation	*a/a	Extreme benefit	See point 4 above regarding reduced risks to properties.

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	26. Improved confidence in housing market and potential reduction in insurance premiums	*a/a	Extreme benefit	<p>This is aligned with RV-RC Outcome 4 'Accessible contemporary flood risk information'.</p> <p>However, the rating does not appear to consider the indirect consequences of a more confident housing market, such as potential impacts on housing affordability, which is highlighted in the Hawkesbury Draft Housing Strategy (2020). This Council document notes:</p> <p><i>the steady decline in the supply of housing that is affordable to families and individuals on low to medium incomes for purchase or in the private or social rental housing sectors. [...] Council compiled evidence that the gap between household income and the cost of housing was widening with Hawkesbury households in the lowest and medium lowest income quartiles seeing the greatest negative growth. The continuing decline of affordable housing has been negatively impacting on the liveability for purchasers and renters in the low to middle-income brackets, leading to greater housing stress and homelessness for an increasing number of families and individuals.</i> (Draft Housing Strategy 2020: page 32)</p> <p>Council may wish to consider including this in its submission, perhaps recommending further investigation into indirect impacts such as potential decline in affordable housing and housing affordability as a consequence of the Project and a more confident housing market. Council may also wish to suggest the Government look into appropriate mitigation measures to address any such issues.</p>
	27. Potential reduction in insurance premiums at individual properties	*a/a	Extreme benefit	<p>The issues relating to insurance are not directly identified in Council's Flood Policy (2020), though it is noted (with reference to the Resilient Valley, Resilient Communities Strategy) that <i>the Insurance Council of Australia considers this Valley to have the highest single flood exposure in New South Wales, if not Australia.</i>"</p> <p>The Hawkesbury Floodplain Risk Management Study and Plan (2012) notes the complexities associated with insurance and also emphasises that some people</p>

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				<p>may not be able to afford insurance premiums; and that there is a general tendency for people to under insure their homes.</p> <p>The basis for the EIS assessment is the preliminary analysis provided by the DPI (2014a) report², which found: “Preliminary analysis undertaken by the Insurance Council of Australia found that due to a substantial reduction in average annual damages, the Project could result in reduced insurance premiums for property owners who are currently exposed”</p> <p>As this was report provided a preliminary analysis, Council may want to consider requesting further detail on the assessment of this impact, especially as the residual impact is assessed as ‘extreme benefit’.</p> <p>Furthermore, Council may wish to consider its role in the provision of information to insurance companies that could address barriers to the provision of affordable insurance. This may include the provision of accurate, updated flood modelling and mapping.</p>
	28. Reduction in flood related economic losses for agricultural and industrial businesses	*a/a	Extreme benefit	<p>Aligned with LPSP (2021), which includes planning priorities around managing rural lands (Planning Priority 5) and around the promotion and support of all sectors of industry and businesses in the Hawksbury (Planning Priority 7).</p> <p>The LPSP (2021) recognises the importance of agriculture and (to a lesser degree) industrial businesses and the role it plays in the social and economic fabric of the LGA (pg. 58)</p> <p>The EIS identifies that 820 commercial and industrial properties (which is assumed to include both agriculture, industrial, and tourism and recreation businesses) would be affected in a 1 in 100-year event. With the Project, this number is estimated to be 160 properties (pg. 21-56).</p>

² Hawkesbury-Nepean Valley Flood Management Review Stage One – Review Report, DPI, Office of Water

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				We note that the EIS does not identify the number of agricultural and industrial properties (as a portion of “commercial and industrial” properties, so it is difficult to determine the accuracy of the assessment. However, the majority of the land use in the LGA is agricultural and vulnerable to flooding (pg21-63).
	29. Occasional additional economic losses for agricultural and industrial businesses	*a/a	Moderate impact	<p>The EIS does not quantify the number of businesses that would be impacted by occasional additional economic losses, so it is difficult to comment on the accuracy of the residual significance rating.</p> <p>Council may wish to consider requesting further detail on the assessment of this impact, especially as the residual impact is assessed as ‘moderate impact’.</p>
	30. Reduction in flood related economic losses for tourism and recreation related businesses	*a/a	High benefit	<p>Aligned with the LPSP (2021), which includes planning priorities around the promotion and support of all sectors of industry and businesses in the Hawkesbury (Planning Priority 7). Also aligned with the Western City District Plan, with a focus on “Protecting the District’s natural landscapes, heritage and tourism assets, unique rural areas and villages” (pg. 28).</p> <p>The EIS identifies that 820 commercial and industrial properties (which is assumed to include both agriculture, industrial, and tourism and recreation businesses) would be affected in a 1 in 100-year event. With the Project, this number is estimated to be 160 properties (pg. 21-56).</p> <p>We note that the EIS does not identify the number of tourism and recreation properties (as a portion of “commercial and industrial” properties, so it is difficult to determine the accuracy of the assessment.</p>
	31. Occasional additional economic losses for tourism and recreation related businesses	*a/a	Low impact	<p>The EIS does not quantify the number of businesses that would be impacted by occasional additional economic losses, so it is difficult to comment on the accuracy of the residual significance rating.</p> <p>Council may wish to consider requesting further detail on the assessment of this impact, especially as the residual impact is assessed as ‘low impact’.</p>
	32. Improved community cohesion due to improved	*a/a	High benefit	There is no indication in Council’s key planning documents that reduction of flood risk is seen to improve community cohesion.

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	ability to control flood related risk and plan communities accordingly			

