REPORT: NSW Public Open Spaces Legacy Boardwalk - options paper

AUTHOR: Manager Recreation and Open Spaces
REPORT DATE: 22 August 2021
TRIM REFERENCE: ID21/1472

EXECUTIVE SUMMARY

Dubbo Regional Council was successful in securing $3 million from the NSW Public Open Spaces grant round, with the Macquarie River Boardwalk being the nominated project. The Macquarie River Boardwalk was identified in the Macquarie River CBD Master Plan that was adopted in April 2020.

In the Macquarie River CBD Master Plan the boardwalk was identified at being located immediately adjacent to the river's edge (RL of 252.50 metres). This is approximately 7.76 metres below the 1:20 year flood level.

As part of the design process the deign architects, LahzNimmo Architects, has undertaken a feasibility study on three options of the positioning of the boardwalk. At the river's edge, as shown on the adopted master plan, approximately halfway up the embankment and at the top of the embankment.

From the ensuring report the positioning of the boardwalk at the top of the embankment, with lookouts extending out over the bank, shall be the option recommended. This option significantly reduces the risk to the structure during periods of flooding and inundation and minimises environmental impacts that would be incurred during the construction of the other two options.

FINANCIAL IMPLICATIONS

The Macquarie River boardwalk project relates to $3 million grant funding, following a successful Department of Planning, Industry and Environment Public Spaces Legacy Program application, prepared by Director Liveability. Funding is conditional upon Council fulfilment of specified Development Approval quotas.

POLICY IMPLICATIONS

Implementation of the Macquarie River CBD master plan is consistent with Dubbo Regional Council's *Community Strategic Plan*, Community Leadership theme 4.3, "the resources of Council are appropriately managed"; Liveability theme 5.5, "the community has an opportunity to participate in a diverse range of lifestyle, sporting and passive recreational pursuits"; and the economy theme 3.8 "the Dubbo Central Business District… is strategically managed to promote occupation, activity and investment".

RECOMMENDATION

1. **That the report by the Manager Recreation and Open Space, dated 22 August 2021, be noted.**
2. **That the position of the boardwalk be relocated to the top of the Macquarie River embankment (approximate Reduced Level of 258.36 metres) to minimise the risk to the structure during periods of flooding and inundation, and to reduce environmental impacts during construction.**
3. **That the NSW Department of Planning, Industry and Environment, the grant administrator, be advised of the relocation of the boardwalk and the rationale behind the decision.**
4. **That the community be provided an update on the progress of the NSW Public Open Spaces Legacy Boardwalk.**

Ian McAlister
Manager Recreation and Open Spaces

REPORT

In April 2020 Council resolved to adopt the Macquarie River CBD Master Plan that was developed, following extensive Elected Member and community consultation. One of the major elements that was identified by Elected Members and incorporated into the master plan, developed by Group GSA, was a riverside boardwalk. This single element was also identified by the community as their most favoured enhancement to the Macquarie River CBD precinct.

Figure 1. Macquarie River CBD Master Plan. The positioning of the boardwalk is immediately adjacent to and overhanging the river's edge (Group GSA March 2020).

To help implement the adopted master plan $3 million conditional funding has been sought as a part of the NSW Department of Planning Industry and Environment - Public Spaces Legacy Program. The nominated project is the Macquarie River Boardwalk. Architectural firm LahzNimmo Architects, have since been engaged to undertake structural design of the boardwalk, through to Development Application stage.

As shown in figure 1, the boardwalk was identified at being located immediately adjacent to the river's edge (a reduced level of 252.50 metres). This is approximately 7.76 metres below the 1:20 year flood level. A feasibility study conducted by LahzNimmo Architects has indicated that this option is not feasible because of potential significant and costly damage to the structure, during periods of flooding and inundation. Achieving compliance with AS1428.1 Mobility and Access to the boardwalk from the existing path system is also problematic, with 90 metres of 1:14 gradient ramp required to overcome the 5.9 metres height differential.

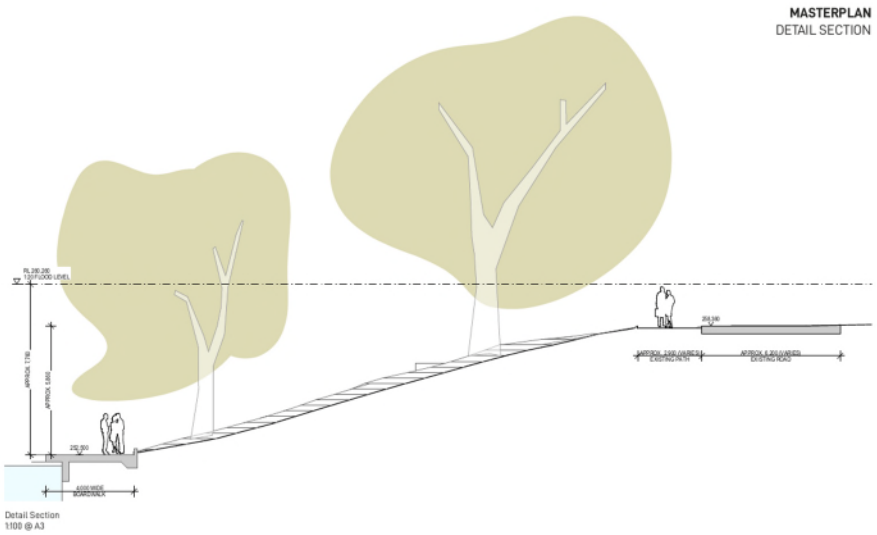


Figure 2. Height differential between original location of boardwalk, existing pathway and the 1:20 year flood level.

In addition, there would be significant and long term environmental damage to the vegetation within the riverine corridor during boardwalk construction. This includes formalisation of the river's edge using sheet piling, or similar, to prevent undermining of the structure; and removal of a significant volume of riverine vegetation. Based on this study, it is recommended that this option not be endorsed.

Two other options have been identified and shown below in Figure 3.

Figure 3. Alternate routes for the Macquarie River boardwalk.

The blue line (Option 1) is positioned approximately halfway up the embankment, and meanders through the trees, at approximately the same height as the existing pathway. The green line (Option 2) extends the existing shared pathway and provides for landings to be cantilevered, over the bank. A retaining wall on the western edge would help protect the structure being undermined during periods of flooding.

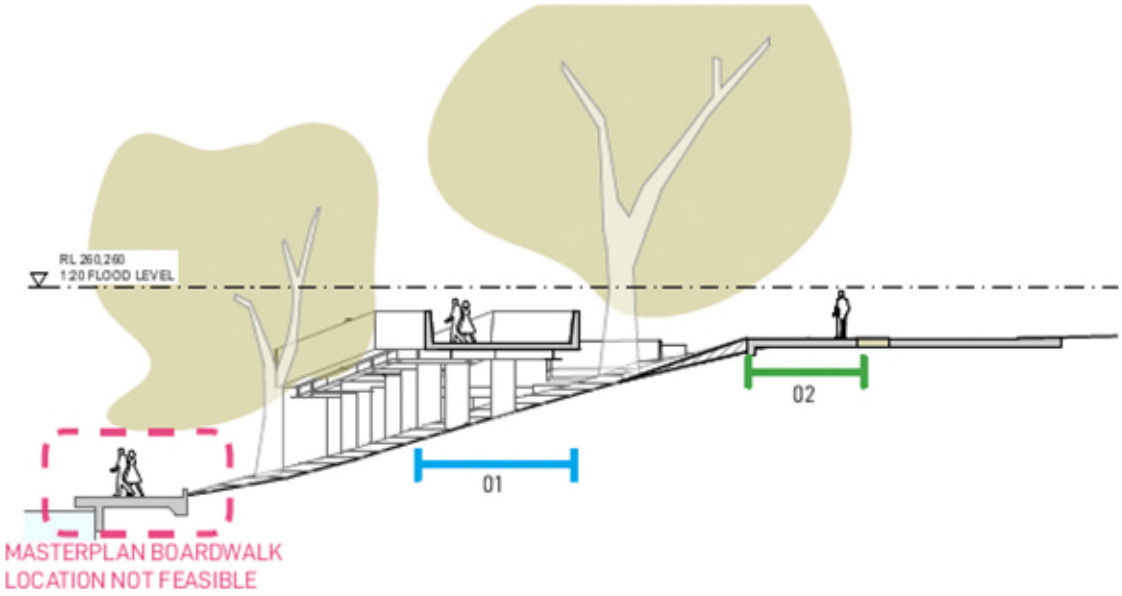


Figure 4. Boardwalk locations investigated.

Option 1 locates the boardwalk approximately halfway up the embankment. This option is constructed on piers (1,200 – 1,500mm diameter at 7 – 12 metre spacing) and raised to the approximate level of the top bank. The boardwalk would meander through the trees providing an immersive experience. This option has fewer impacts, but is not recommended. Of most concern is the potential catastrophic failure of the structure due to the forces it will experience during even a 1:20 year flood event, as shown in Figure 5.

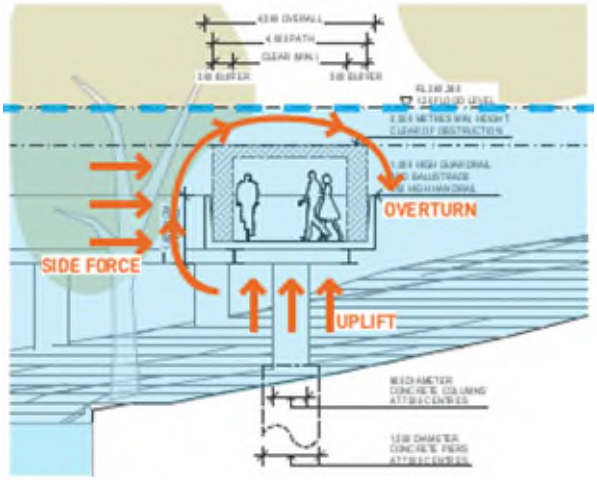
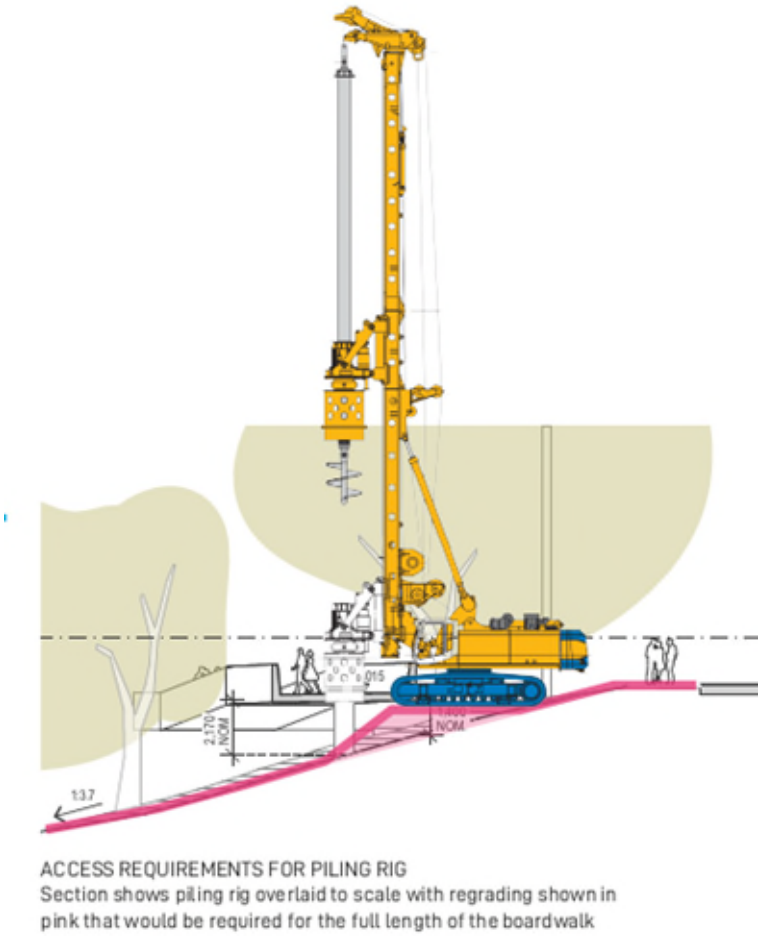


Figure 5. Predicted flood forces on the elevated boardwalk

Another significant concern is the environmental damage that is likely to be incurred during the placement of the piers. A substantial amount of mature riverine vegetation will need to be removed or heavily pruned, as well root zone impacts due to the regrading of the bank to provide a stable base along the length of boardwalk to provide drilling rig access, Figure 6.



ACCESS REQUIREMENTS FOR PILING RIG
Section shows piling rig overlaid to scale with regrading shown in pink that would be required for the full length of the boardwalk

Figure 6. Drilling rig impacts – option 1.

Option 2 locates the boardwalk at the top of the embankment, with the provision of lookouts extending out over the bank (not the river) to provide a level of immersion within the natural landscape – Figure 7.

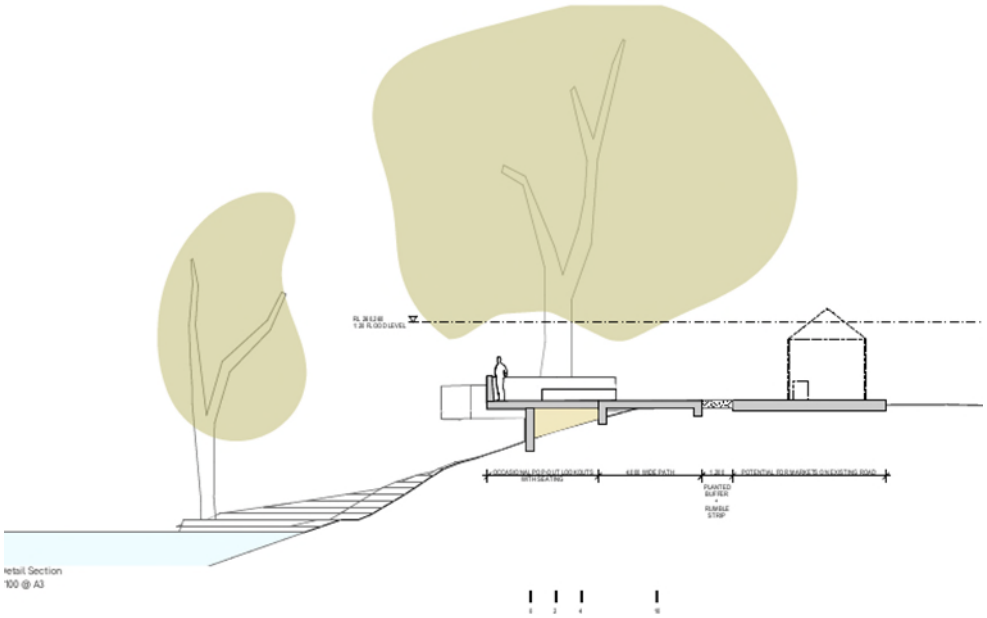


Figure 7. Cross section of Option 2 at a lookout point, showing integration of existing walkway and protective retaining wall structure.

Option 2 has the least amount of negative impacts to the environment, is less visually intrusive and the most cost efficient to construct. This position is 1.90 metres below the 1:20 year flood level, but water velocities are lower here than at the mid bank location, due the widening of the channel. From an engineering perspective this is the most durable structure as it is integrated into the bank, significantly reducing the risk of damage.

A minor concern is how best to integrate the existing boat ramp into the overall design. A more detailed survey of the area is currently being undertaken which will better inform the best way to proceed. It is expected that some regrading work may be required. However this can be staged and integrated into the development of the Church Street pedestrian plaza.

A comparison matrix has also been identified and is shown below in Figure 8.

From the considerations identified, Option 2 provides a significantly better overall outcome. While it is acknowledged that the immersive experience of the boardwalk is not as great as Option 1, in reality much of the existing vegetation would either need to be removed, heavily pruned or be impacted by earthworks around their root zones to achieve Option 1.

	OPTION 01 ELEVATED BOARDWALK THROUGH THE TREES	**OPTION 02** BOARDWALK ON GRADE
Accessibility: Score for how accessible the walkway is. Score reduced where steep ramping and/or stairs reduce the equitable access of the boardwalk for all users.		
Boat Ramp Integration: Score for how well the boardwalk option integrates with the existing boat ramp infrastructure.		
Boardwalk Function: Score for how well the boardwalk meets the brief of a shared boardwalk through the natural environment. Score reduced where this vision is compromised by other factors such as structure, accessibility requirements, etc.		
Environmental Impact: Score for how the boardwalk sits within the natural environment of the embankment. Scores reduced where environmental damage due to construction or setout of the boardwalk has a negative impact on the existing natural environment.		
Immersion: Score for the level of natural immersion that is achieved for people using the boardwalk. Scores increased where a greater level of interaction and immersion with the existing riverbank landscape can be achieved.		
Risk: Score for the risk level associated with the construction of the boardwalk in a flood zone. Scores decreased where high levels of risk are inherent in the structure that cannot be easily designed out and may leave the finished boardwalk vulnerable to future damage and/or failure due to flooding.		
Structure & Constructibility: Score for feasibility of the structural design to withstand flood and impact loads whilst maintaining visual amenity and natural landscape of the riverbank. Scores decrease where either of these factors cannot be achieved		
Cost: Turner & Townsend (Cost Management) have undertaken a desk top review of Options 1 and 2 for the Macquarie River Boardwalk to ascertain what we believe would be the most cost effective solution. Due to the following outlined items we believe that Option 1 will incur significantly more cost and therefore Option 2 is the most cost effective solution.	• Significant piling requirement for elevated boardwalk • Balustrades/Fall protection for each side of the boardwalk for the entire length. Option 2 would only require this at specific locations. • Steelwork required for frame of boardwalk • Pre-cast blanks for Boardwalk	• May attract cost if contamination is found during any excavation, however, we understand that this is unlikely.

Major PRO Considered a major positive factor	Minor CON Considered a minor negative factor
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SUMMARY

The NSW Public Spaces Legacy program boardwalk is an exciting project which will provide Dubbo residents and visitors an improved recreational experience, whilst utilising the Tracker Riley / river loop walking and cycling network. The original intent of the boardwalk was to provide a high level immersive experience by placing the boardwalk at the river's edge and the feasibility study has since shown that the proposed location comes with significant risk of failure and should not be considered further.

Two other options were also analysed. A boardwalk positioned midway up the embankment (Option 1) provides a higher immersive experience, but also poses risks of failure and significant negative environmental impacts. A boardwalk located at the top and integrated into the bank itself, provides a lower immersive experience, but has significantly lower risk of failure or damage during flood events.

On the basis of the report received, Option 2 is the preferred option to proceed.

Appendices:
1 Boardwalk Options - LahzNimmo NSW Public Open spaces Legacy Boardwalk