



## 4 Environmental Effects and Consenting Issues

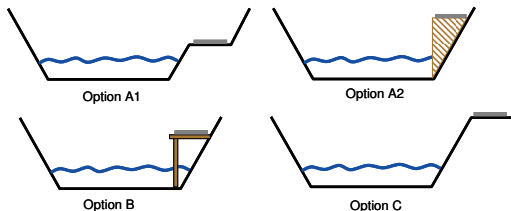
At this early route definition stage our team has considered the hydraulic and RMA issues of the proposed walkway. These are summarised below.

### 4.1 Environmental Effects: Porirua Stream

The Porirua Stream is an important watercourse for the conveyance of flood flows originating from the Tawa and Porirua area. It is currently below regular design capacity. As such, any modifications to the main channel or its lateral floodplain areas that reduces the existing cross-sectional area will have detrimental effects. Greater Wellington Regional Council (GWRC) will only accept a footpath design that causes no (or only minor local) water level rises. Additionally, GWRC needs to be able to access the stream along the entire length through Tawa with machinery for maintenance works. However, access from only one side of the stream should be sufficient, and it is possible to design the walkway such that maintenance vehicles will be able to drive on and operate from it.

Four design scenarios for the sections of walkway that pass close to Porirua Stream were considered in terms of any hydraulic or environmental effects:

- A1. Cutting the walkway into the existing stream embankment.
- A2. Back filling behind gabion walls.
- B. Provide raised boardwalk on piles supported by stream embankment.
- C. Provision of a walkway above embankment requiring stabilisation.



Option A2, backfilling behind gabion walls, is not a feasible design solution since it will considerably reduce the hydraulic cross-section. However, option A1, cutting the walkway into the existing stream embankment would increase hydraulic cross-section and therefore would be a favourable option worth considering.

Option B, providing a raised boardwalk on piles supported by the stream embankment, could be prone to clogging by debris, especially during flood flows which would result in a reduced hydraulic cross-section. This would also require intensified maintenance since debris accumulations would need to be removed from time to time. There is also a risk of structural failure due to extreme loads caused by accumulated debris and high flow velocities.

Option C, provision of a walkway above embankment requiring stabilisation, is a feasible design option, especially if the walkway stabilisation / foundation can be placed beyond the main channel and its embankments. This option may not be feasible in some locations due to limited space, in particular in the area of the Tawa Stream/Oxford Street esplanade reserve adjacent to the shopping centre. The cost of rip rap / rock armour protection is approximately \$70-\$80 per tonne and \$600-\$900 per basket for gabions<sup>1</sup>.

Due to the resulting reduction in the stream cross-section, backfilling behind gabion walls (option A2), and providing a raised boardwalk on piles supported by the stream embankment (option B) are not feasible options. However, cutting the walkway into existing stream embankment (option A1) and provision of a walkway above the embankment requiring stabilisation (option C) can be considered depending upon the specific conditions in each location. Any modifications or works in waterways will require some kind of environmental assessment as part of the consent application.

See also a more detailed Hydraulic and Environmental Comments in Appendix D

### 4.2 Environmental Effects: Earthworks

We have assumed that there would be earthworks along the route in order to accommodate the footpath. We have assumed that we will be able to dispose these earthworks on site.

Please refer to Appendix B for further information on earthworks for other options considered.

From our preliminary design, we noticed a problematic area at option G2 from approximately 100m south of Taylor Park to the start of Willowbank Reserve the terrain is very steep on the eastern side of the path. Detailed design would involve carrying out some measurements to ensure the stability of the slope. The options we have investigated are:

- Extensive earthworks with benching in between.
- Retaining wall. This could possibly require a consent

Any of these options would require geotechnical investigation in detailed design stages.

See also a more detailed Earthworks Comments in Appendix B

<sup>1</sup> See Appendix D for the assumptions these values are based upon.



#### 4.3 Environmental and Planning Consents

Given the assumptions made regarding the works and activities involved in the construction and use of the proposed walkway the following consents are anticipated to be required:

##### Wellington City Council District Plan

Under the Wellington City District Plan, the following land use consents are anticipated to be required:

Rule	Activity
5.1.9	Earthworks exceeding 250m <sup>2</sup>
7.4.7	Earthworks less than 5m from Porirua Stream

##### Greater Wellington Regional Council

Under the Regional Freshwater Plan the following consent may be required:

Rule	Activity
31	The erection and maintenance of bridges over rivers with a span of more than six metres
38	Gravel extraction greater than 15 cubic metres
49	The use of any river or lake bed that is not permitted by or cannot meet the requirements of rules 22 to 48. (River crossings)

Under the Regional Air Quality Management Plan the following consent may be required:

Rule	Activity
23	General rule covering dischargers to air not covered by rules 1-22.

See also a more detailed Preliminary Planning Assessment in Appendix C