Runoff from rainfall on the expressway (stormwater) needs to be managed carefully, both for the expressway and to protect the environment.

**Stormwater management involves:**

- Quantity of water, which can generate flooding, scouring and erosion.
- Quality of water, which can contain contaminants (including sediment).
- Wider floodplain issues as a result of the expressway obstructing flood flowpaths.
- Drainage of the expressway surface and how this is managed by sumps, pipes, swales (channels) and wetlands.
- Crossings of existing watercourses and wetlands with associated design of bridges and culverts.

**Our approach to stormwater management**

- Recognises the significance of the watercourses and wetlands.
- Uses best practice design approaches to meet KCDC, GWRC and NZTA standards which include, for example, requirements for climate change, flooding, treatment and fish passage.
- Recognises the opportunities for combined stormwater and ecological enhancements and benefits to both.
- Uses storage to hold back stormwater and slowly release it to avoid flooding (ie attenuation) – typically with swales and wetlands.
- Minimises the use of pipes to increase the potential for soakage into the ground where appropriate.

**Wetlands and groundwater**

The expressway crosses a mix of rural and urban catchments over both sand and peat with many drains, streams, creeks and the Waikanae River. There are also a number of wetlands in the lower lying areas. The expressway will interact with all of these features, many of which are environmentally and culturally significant.

Groundwater connectivity across the expressway, particularly important between wetlands, will be investigated, modelled, and measures included in the design so that the current groundwater connections are maintained.

**Wetland function**

Vegetation takes several years to flush

Expressway first flush stormwater kept separate from ecological wetland for treatment

Slow release of flood water

Slow release of treated stormwater

Overline

Typical outlet structure to control discharge

Graded maintenance areas

Existing new ecological wetland (where present)

New stormwater treatment wetland

Flood storage available above both areas

Vegetation varies with season

Existing permanent water body (swale with wattle grass)

Typical outlet arrangement for stormwater

Typical wetland arrangement for stormwater

Typical wetland arrangement for stormwater

Example of wetland in good condition after several years growth