



## **Climate change impacts on the State highway network: Transit New Zealand's position July 2004**

Climate change impacts have the potential to impact adversely on planning, constructing and maintaining the State highway network ("the network"). Transit New Zealand has assessed the potential direct impacts of climate change on the network and developed a response based on available information.

### **Summary**

Transit's current response to climate change impacts is that:

- current asset management practice is generally adequate to manage climate change impacts for most of the network;
- Transit's specifications for bridge design are being amended to require designers to investigate, on a case-by-case basis, if it is value for money to design new bridges for future increased flood flows, including making provision for retrofitting bridges in the future; and
- Transit will monitor climate change data and developments regularly to determine when to review Transit's response to climate change.

### **Background**

Under the Resource Management (Energy and Climate Change) Amendment Act 2004 ("the Act"), all parties, including Transit, exercising functions and powers under the Act, must have particular regard to the effects of climate change.

#### What is climate change?

The Act defines climate change as:

"a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods."

#### Impacts of climate change

Climate change could have direct and indirect impacts on road infrastructure. Transit is focusing on the direct impacts of climate change because they pose a more immediate risk to the network than indirect impacts.

'Direct impacts' are physical impacts on the environment such as increasing flood flows exceeding the capacity of bridges and culverts.

'Indirect impacts' are secondary impacts that occur as a result of direct impacts. Indirect impacts include mass population migration and changing land-use, which affect demand for roads.

### **Rationale for climate change position**

---

Transit analysed the direct impacts of climate change on the network and identified the following assets as vulnerable to potential climate change impacts:

- bridges
- culverts
- causeways and coastal roads
- pavement surfaces
- surface drainage
- hillside slopes and batters

Transit used a two-stage screening process to identify areas for action in relation to the assets listed above.

### Stage One

The criteria used to assess the necessity of taking action now were:

- level of certainty in the impact occurring
- intended life of the asset
- current asset management practice

The assessment shows that the management of bridges and culverts with an intended life of over 50 years requires particular attention to ensure protection from climate change risks.

### Stage Two

Preliminary economic analysis was undertaken of bridges and culverts with an intended life of over 50 years to assess the merits of making provision for increasing flood flows in the design of structures.

The analysis found it will generally be uneconomic and risky to design new bridges for the possibility of increasing flood flows due to:

- uncertainty about the magnitude of the increase in flood risk; and
- the risk of a structure becoming obsolete.

The cost of making provision in the design of new bridges for retrofitting by enabling them to be lifted or widened later (if and when floods increase) should be considered on a case-by-case basis.

In the case of major new bridges (and culverts) where provision for retrofitting is not practical, future climate change impacts should be considered in the design.

## **Conclusion**

Current asset management practices will generally adequately manage climate change impacts. However, amendments to design specifications for bridges and culverts are necessary to ensure climate change impacts are considered at the design stage.

Given the uncertainties around climate change data and impacts, Transit will continue to monitor the situation and review its position as required.