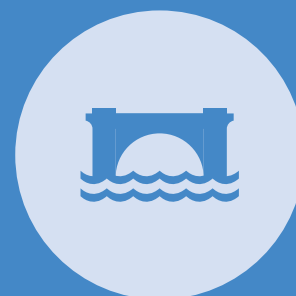


Crossings

3.3 Ford Crossings



Fords are generally used on low volume roads to cross broad, shallow *river*s and where alternative *river* crossings are not feasible. This makes it easy for the road grade to be brought down to the level of the *river* bed. Fords can be natural *river* beds or can have a concrete pad to assist with vehicle traction and to reduce *sedimentation* from vehicle passes.

The use of fords can create significantly more *sedimentation* than other forms of *river* crossings.



Clean ford with minimal *sediment* running down road into *stream*.

This guide is provided as a reference document and does not constitute a statutory obligation under the Resource Management Act 1991 or the National Environmental Standards for Plantation Forestry.

Please refer to the 'how to use' section of the introduction at <http://docs.nzfoa.org.nz/forest-practice-guides/> for advice on how to use this guide.

Version 2.0, January 2020

Crossings

3.3 Ford Crossings



A Where and when to use

1. Where traffic volume is light or traffic will be for a short duration (e.g. a small woodlot harvest with a very low productivity contractor – essentially only one truck and trailer per day).
2. Where crossings are broad, the water is shallow or intermittent, and the *river* bed is stable and shingle or rock.
3. As a secondary crossing point where bridges cannot provide access for heavy and large forestry machinery (e.g. haulers or construction machinery) due to weight or width restrictions.

B Where not to use

1. When there will be more than 20 axle crossings per day.

C Design

1. Decide on whether to use the natural *river* bed or to construct a concrete pad crossing. Factors to consider include *river* bed substrate, volume of traffic movement, acceptable risk of road closure, and downstream impact of *sediment* generation.
2. To reduce scour of the approaches, locate the crossing on a straight section of *river*, if possible.
3. Try to avoid locations that alter the natural course and gradient of the *river* or create erosion of the banks and bed of the *river*.
4. Identify suitable water depth and *river* bed substrate.
5. Ensure approaches have suitable gradient and transitions so that vehicles are not grounded, especially low loader transporters.
6. Consult with a forest engineer, hydrologist or other specialist to help with design and construction, if necessary.

D Construction

1. Construct in suitable weather and with low base water flows.
2. Check for any fish spawning timing constraints under the NES-PF.
3. Limit earthwork disturbance to the immediate construction site.
4. Minimise the need for machinery to operate in flowing water.
5. Limit *sedimentation* entering the ford from the approaches. Stormwater *run-off* from wheels is a major source of *sediment* generation.
 - a. Divert road surface water off the approaches, as close as practicable to the crossing, and ideally within 10 m. To limit *sediment* entry into the *river*, use stormwater and *sediment* control measures such as *berms*, *cut-outs*, *water table drains* and *culverts*, *flumes* and *sediment traps*. Build these above the annual flood flow level.
 - b. Avoid long steep road approaches, as these are ongoing sources of *sediment*.
 - c. Use clean gravel on approaches where the existing road surface would create a *sedimentation* problem.
6. Ensure fish passage is not impeded.
7. Divert the *river* during construction to assist in the foundation work, reduce the risk of contaminants entering water, and to minimise discharge of *sediment*.
8. Armour the leading edges of the ford with aprons. This will reduce erosion under the structure.
9. Check regularly during and on completion of construction. If the work does not meet the design plan and standards then initiate corrective actions.

Crossings

3.3 Ford Crossings



D Construction *continued*

Additional factors for natural river bed crossings

10. Locate where the *river* bed is hard and stable.
Avoid soft substrates as these generate *sediment* and may be difficult to strengthen or provide access for some vehicles.
11. Use clean rock *fill* where the carriageway requires strengthening on the *river* bed. Use graded rock that is large enough to resist displacement by the flow of water. Fill the voids with clean, small rocks or gravel to provide a better driving surface.

Additional factors for concrete pad crossings

12. Build a concrete pad only on stable and low gradient sites.
13. Design for flood flows. *Rivers* are prone to bed shifting. If water gets under the pad it can be undermined and displaced.
14. Divert the *river* during construction to assist in the foundation work, reduce the risk of contaminants entering water, and minimise discharge of *sediment*.
15. Armour the leading edges of the ford with aprons. This will reduce erosion under the structure.
16. Construct so that the pad extends well beyond the extent of the *river* channel occupied by medium flow events. This will help reduce entry and exit erosion at the transition from the concrete pad to gravel, and further reduce *sedimentation* from the wet area generated by vehicle wheels displacing water when exiting the crossing.

E Maintenance

1. Prepare a routine maintenance plan including heavy rainfall response measures.
2. Check ford crossings after heavy rain or a flood flow event. Fords can create serious safety issues if the *river* bed has shifted, or there is *river* bed erosion affecting a concrete structure.
3. Natural bed crossings are likely to need maintenance after most flood events.

F Other methods

1. Consider converting a ford to a drift deck, battery *culvert* or bridge crossing when traffic volumes increase at harvest. This will create a better structure and help reduce *sedimentation*.

National Environmental Standards for Plantation Forestry

Relevant regulations for fords are 37 – 49 and 97.

Refer also to the Department of Conservation **Fish Passage Guidelines:** <https://www.doc.govt.nz/nature/habitats/freshwater/fish-passage-management/nz-fish-passage-guidelines/>

Crossings

3.3 Ford Crossings



Examples



An example of a concrete pad crossing which will minimise *sediment* mobilisation caused by vehicle crossings.

Contact



Forest Owners Association
Level 9, 93 The Terrace
Wellington 6143



www.nzfoa.org.nz

Other Practice Guides in this series



3.1 Battery Culvert River Crossings



3.2 Drift Deck River Crossings



3.3 Ford Crossings



3.4 Single Culvert River Crossings



3.5 Single Span Bridge River Crossings



3.6 Temporary Crossings

Visit:

[https://docs.nzfoa.org.nz/
forest-practice-guides/](https://docs.nzfoa.org.nz/forest-practice-guides/)
to view all guides