



**Environmental Code of
Practice for River Works
(Horizons Regional Council, June 2010)**

The text with grey highlight is not incorporated into the One Plan.

Environmental Code of Practice for River Works

~~To Meet Requirements of Rule 16-13 of the One Plan~~



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PART ONE

~~GENERIC STANDARDS FOR GOOD PRACTICE~~

Generic Standards for Good Practice

~~1.3.2~~ 2.4.2 Generic Standards

- i. 1. Only contractors approved through the annual Plant Hire Register or through the formal contractor tendering process, and with a track record of using well maintained machinery, shall be engaged in river and drainage works.
- ii. 2. Machinery shall be kept out of water ~~as far as practicable~~ to the extent possible. Where this is unavoidable all measures shall be taken to minimise bed disturbance and release of sediment (eg. use only one crossing point, typically upstream of riffles, sediment control or minimisation measures).
- iii. 3. Appropriate machinery shall be used to ensure effective and efficient operations with minimal environmental impact.
- iv. 4. Machine refuelling and fuel storage shall occur where no fuel ~~could~~ can enter a water body in the event of a spillage.
- v. 5. All machinery, equipment and material shall be stored ~~in a safe site~~ above the anticipated flood level at the end of working day or when the site is unattended.
- vi. 6. Machinery leaking fuel, lubricants, hydraulic fluids or solvents shall not work within a water body.
- vii. 7. ~~On the completion of the activity~~ or in the event of anticipated extended suspension of works, all disturbed areas and access tracks, including public and recreational points, that have the potential to release sediment to water shall be reinstated.
- viii. 8. All spray and fuel containers shall be safely disposed of ~~off~~ at an authorised landfill site or re-used.
- ix. 9. On the completion of works all surplus vegetative material shall be either removed from the site or disposed of either by burying or burning as soon as ~~practicable~~ material and weather conditions allow.
10. Burning on public land shall be supervised at all times and fire control equipment shall be available at the site.
- x. 11. On the completion of works all surplus construction material shall be removed from the site.
- xi. 12. ~~Debris shall be cleared as soon as practicable where it~~ that has the potential to increase the risk of flooding or erosion will be cleared as soon as conditions allow and if possible in conjunction with programmed activities, to minimise the frequency of river intervention.
- xii. 13. On completion of the works all surplus excavated bed material shall be spread evenly ~~within the channel~~ leaving beaches well shaped and tapering uniformly from the water's edge to the river bank.
- xiii. 14. All stock animals shall be excluded from works area until vegetation is well established.

- xiv. 15. ~~Measures Fish passage shall be taken to maintain fish passage~~ maintained in rivers at all ~~times~~ flows during the execution of in-channel works.
- xv. 16. Risk management procedures shall be in place on all work sites to minimise the potential for damage arising from inclement weather and/or ~~elevated~~ river levels during the course of work.
- xvi. 17. In case of flood or other emergency while works are underway, ~~consider~~ matters such as resilience and the consequences of failure of the partially completed works, access to the site, notification of appropriate personnel, security of vehicles, gear and equipment ~~etc~~ shall be considered and actions taken as appropriate.
- xvii. 18. All works shall be undertaken in accordance with approved Hazard Management Plans and relevant Codes of Practice (eg. Traffic Management Plans, Tree Works Code of Practice).
- xviii. 19. Where the activity poses, or is likely to pose a risk to the public, the contractor shall erect warning signs adjacent to the site. These signs will be removed when the activities on the site are no longer a danger to the public.
- xix. 20. Activities shall not use any material that has a significant ecological effect on the environment.
- xx. 21. Activities shall comply with the New Zealand Electrical Code of Practice for Electrical Safe Distance (NZECP 34:2001).
- xxi. 22. Trees and vegetation planted shall comply with the Electricity (Hazards from Trees) Regulations 2003.
- xxii. 23. Machinery and plant shall maintain a minimum clearance distance of 4 metres from the transmission line conductors at all times.
- xxiii. 24. ~~Objectionable~~ The objectionable effect from the deposition of dust on neighbouring properties when undertaking activities shall be minimised by water spraying.
25. Concrete shall only be poured in a bunded area to prevent cement entering the watercourse.
26. Activities will comply with Horizons Regional Council's current Didymo action plan.
- xxiv. 27. In the event that human remains or artefacts are uncovered during any river and drainage activity, works shall cease immediately and Horizons Regional Council's Environmental Compliance Manager Compliance and the relevant iwi as noted in the iwi contact database will be informed and will subsequently advise when the activity may recommence.
28. Any discharge of sediment into water directly caused by an activity must not, after reasonable mixing, cause any conspicuous change in the colour of water in the receiving water, or any change in horizontal visibility greater than the target set in the visual clarity % change column of Schedule D of the One Plan, more than 24 hours after the completion of the activity. This standard does not include the activity "Drainage Channels/Modified Streams: Mechanical Cleaning".



PART TWO

~~GOOD PRACTICE STANDARDS FOR ACTIVITIES~~

Good Practice Standards for Activities

1. Bank Shaping

Activity

The purpose of this activity is to prevent lateral erosion through the regrading of over-steep banks and the establishment of protective ground cover.

The natural process of bank erosion creates small vertical "cliffs" along the stream or drain banks that will undermine banks and contribute to more rapid erosion.

Protective ground cover can be more readily established on battered banks. Geotextiles are occasionally used and are placed to manufacturers' standards and planting is undertaken to a prepared planting plan for the site in accordance with the tree planting activity standards.

This activity involves minor earthworks to shape the bank to create an appropriate alignment and batter shape. ~~Alignment should be on a curvature that fits the natural meander curvature of the river channel.~~

Resource Management Act 1991

These works are covered under s9 (use of land) and s13 (structures in the bed of a river) RMA.

Potential beneficial effects

- Lateral erosion is arrested – adjoining property and infrastructure is protected.
- Sediment discharged during high flow events is reduced.
- Stable channel alignment is maintained.
- River bed sedimentation is reduced, enhancing river bed habitat for some fish species.
- Threat of encroachment and ultimate collapse of adjoining infrastructure such as bridges is reduced. Community well-being is preserved.
- Opportunities for upper bank and bank toe (depending on materials used) habitat enhancement such as riparian planting.
- Visual enhancement of the river bank.
- Establishment of vegetative corridor.

Potential adverse effects

- Bank material is disturbed leading to short term sediment discharge, increased turbidity, and disturbance of habitat.
- Accidental discharge of fuels and lubricants from machinery.
- Temporary loss of amenity – dust/noise impact during construction.

- Short term increased erosion potential prior to vegetation reestablishment.
- Temporary disruption of vegetated banks.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. The bank shall be excavated to a grade appropriate to the soil conditions to minimise the need for additional intervention and to facilitate planting.
- iiii. 4. Geotextile layers shall be used where necessary to hold soil in place and reduce erosion and silt-laden run-off.
- iv. 5. Bank battering shall be appropriately transitioned into upstream and downstream bank alignment and slopes.
- v. 6. All exposed areas that have the potential to release sediment shall be revegetated as soon as practicable following shaping.
- vi. 7. Bank shaping shall only be undertaken above the water line and machinery shall only operate from on top of the bank.
8. Alignment should be on a curvature that fits the natural meander curvature of the river channel.

2. Beach Raking

Activity

The purpose of this activity is to enhance the mobility of the bed with the objective of maintaining flood carrying capacity and reducing lateral erosion.

This activity is conducted outside the wetted perimeter and typically involves the use of large wheeled or tracked machinery pulling tines. The objective is to loosen the top layer of gravel, which tends to have an armouring effect, and to encourage the movement of gravel through the system. Control of light vegetation, such as lupin, broom and gorse, is included in this activity. Beach raking is designed to simulate the processes a river bed experiences in a major flood event.

Beach raking can also be used to control lateral erosion of the river banks, while at the same time encouraging a degree of natural bed-load movement through the river system during flood conditions, with minimal adverse effects. The desired result is to have the bed-load moving at a natural rate managed flow down the river channel and not aggrading in particular areas and forming exceptionally high beaches, which force water flow against adjacent river banks aggravating and aggravate erosion problems.

Resource Management Act 1991

These works are covered under s13 RMA (disturbance of a river bed), and s15 RMA (potential discharge of sediment or vegetation into water).

Potential beneficial effects

- Channel capacity is increased and flood levels lowered.
- Some bird nesting habitat is enhanced by removal of beach vegetation.
- Stable channel alignment is maintained.
- River bed sedimentation is reduced, enhancing river bed habitat for some fish species.
- Beach build-up is managed and lateral erosion is arrested – adjoining property and infrastructure is protected.
- Sediment discharge during high flow events is reduced.
- Creation of a mobile, open gravel matrix that is beneficial for some fish habitat.

Potential adverse effects

- Beach material is disturbed leading to short term sediment discharge, increased turbidity, and disturbance of habitat.
- Accidental discharge of fuels and lubricants from machinery.
- Temporary loss of amenity – dust and noise impact during construction.

- Gravel beaches are disturbed – bird nesting is disrupted.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. Machinery used for beach management shall not enter the active flowing river channel other than to gain access to the beach being raked.
- iv. 4. Raking activity shall not be undertaken in flowing water.
- v. 5. Raking activity shall not be undertaken within 100 metres of a consented water intake without prior approval of the ~~relevant authority~~ owner of the intake.

3. Gravel Extraction

Activity

The purpose of this activity is to maintain the flood carrying capacity of the channel and maintain the effectiveness of lateral erosion protection works by removing ~~localized~~ localised gravel build-ups that confine and direct the river channel.

~~This activity covers gravel excavated above and below the water level.~~

Relatively small quantities of gravel extracted above the water level and not covered by a global consent will be undertaken under the standards set out below.

Gravel excavated below the water level will be carried out under a global consent that will generally dictate annual and long term extraction quantities, specific locations and conditions specific to a particular river. ~~Nevertheless, the good practice standards set out below will also apply.~~

In all instances gravel extractions are approved in terms of sites and quantities by a suitably qualified or experienced engineer.

Resource Management Act 1991

These works are covered under s13 RMA (disturbance of a river bed), and s15 RMA (potential discharge of sediment or vegetation into water).

Potential beneficial effects

- Channel capacity increased, flood levels lowered, concentration of flow against river banks and resultant lateral erosion, and localised bed scour are avoided.
- Stable channel alignment and optimum bed level is maintained.
- Threat of encroachment and ultimate collapse of adjoining infrastructure such as bridges is reduced. Community well-being is preserved.
- Open gravel beaches can provide good habitat for some birds.

Potential adverse effects

- Gravel beaches are disturbed – bird nesting is disrupted.
- Accidental discharge of fuels and lubricants from machinery.
- Disturbance of the natural meander pattern.
- Overall degradation of the river bed to realise localised river management benefits.
- Bed material is disturbed leading to short term sediment discharge, increased turbidity, disturbance of habitat.

- Temporary reduction in recreation access.
- Mauri of the river affected.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. On completion of the works, the beach shall be left well shaped, tapering uniformly from the water's edge to the river bank.
- iv. 4. On the completion of works, all surplus material, including vegetation, debris and excavated gravel, shall be removed from the site and not stockpiled within the flood channel.
- v. 5. The Scheme Manager shall keep ~~annual~~ records for the financial year of the quantity and location of all materials gravel removed from above the riverbed river bed water level, which shall be submitted to ~~the~~ Regional Council's ~~Manager~~ Environmental Compliance Manager by 31 December.
- vi. 6. The excavation site shall be rehabilitated so that it complements the existing landscape, aesthetic and amenity values of the surrounding area.

~~Gravel Extraction Above Water Level~~

- vii. ~~Where gravel is to be extracted above the water level, the extraction sites shall be accessed above water level where practicable.~~
- viii. 7. Where gravel is to be extracted above the water level, and where crossing of the river to access the site is unavoidable, a single crossing point shall be established, typically upstream of a riffle, to access the site.
- ix. 8. ~~Where gravel is to be extracted above the water level, gravel~~ Gravel shall only be excavated from dry gravel beaches ~~that are more than~~ and shall not reduce the gravel beach to less than 0.15 0.3 metres above the water level in the adjoining river at the time the excavation is being carried out.
9. Gravel extraction from the beach shall be undertaken in such a way that there will be no sediment released into the watercourse for the duration of the activity unless:
 - it is sediment released from vehicles accessing the site; or
 - as a result of natural fluctuations in water levels that may occur during the work period.
- x. 10. ~~Where gravel is to be extracted above the water level, excavation~~ Excavation shall be in strips not exceeding ~~3m~~ 3 metres in width aligned parallel to the main flow of the river.

- xi. ~~11.~~ ~~Where gravel is to be extracted above the water level, machinery~~ Machinery used to excavate gravel shall not operate on the parts of the river bed that are covered by water.
- xii. ~~12.~~ Where gravel is to be extracted ~~above the water level~~ and the width of the channel is less than ~~25m~~ 25 metres in the vicinity of any part of that beach, no more than 1,000 cubic metres from any gravel beach, and no more than 3,000 cubic metres for the entire river shall be excavated when the quantity is aggregated with the gravel excavated during the previous 12 months.
- xiii. ~~13.~~ Where gravel is to be extracted ~~above the water level~~ and the width of the channel is equal to or greater than ~~25m~~ 25 metres in the vicinity of any part of that beach, no more than 2,500 cubic metres from any gravel beach, and no more than 7,500 cubic metres for the entire river shall be excavated when the quantity is aggregated with the gravel excavated during the previous 12 months.

~~Gravel Extraction Below Water Level~~

- xiv. ~~Where gravel is to be extracted below the water level, a resource consent will be sought.~~
- xv. ~~Where gravel is to be extracted below the water level extraction shall be by an excavator and material shall be carted directly out of the channel by rubber tired vehicles.~~
- xvi. ~~Where gravel is to be extracted below the water level, extraction shall start at the downstream end of the site and work upstream to prevent the possibility of diverting river flow.~~
- xvii. ~~Where gravel is to be extracted below the water level, pools shall be photographed with a staff gauge as a reference and a similar depth shall be reinstated after extraction.~~
- xviii. ~~Where gravel is to be extracted below the water level the works supervisor shall visit the site every day the activity is undertaken and record the following:~~
- ~~a. reach being worked~~
 - ~~b. volume extracted over reach length~~
 - ~~c. excavated depth in relation to design profile~~
- xix. ~~Photographs shall be taken of the affected reach immediately before and after the activity.~~
- xx. ~~Before starting work on a reach, record the number of pools. Following works, there shall be no reduction the total number of pools or pool run-riffle sequences within that reach.~~

- ~~xxi. Where gravel is to be extracted below the water level from a reach that has a history of unstable alignment, a suitably qualified or experienced engineer shall determine a suitable alignment for that reach, having regard to stable meander curvatures, observable elsewhere in the river. The history of reach shall be determined using aerial photography held on Regional Council files from the preceding two decades.~~
- ~~xxii. Where gravel is to be excavated below the water level, the cross-sectional dimensions of the channel thus excavated shall be comparable to the cross sectional dimensions of adjacent stable reaches of channel after any aggraded gravel has been removed from those reaches. The cross sections shall be triangular in shape at the apex of the curves, trapezoidal in shape at the riffles in between the curves, and have a smooth transition in between.~~
- ~~xiii. Where gravel is to be excavated below the water level and where the activity has a linear length exceeding ten times the channel width, a channel bed will be formed to create either a pool and riffle sequence with a riffle spacing of between five and seven times the width of the channel, or one riffle per meander wavelength. In any event the length of any straight channel (one not containing riffles) formed by the works shall not exceed ten times the channel width (other than in existing urban areas where the proximity of established buildings adjacent to the channel, or where erosion and flood protection works constrain the width of the channel to an extent that precludes the channel being formed into pools and riffles).~~
- ~~Note: 'Channel width' is the horizontal distance between the toes of the riverbanks averaged over the reach where the works are undertaken.~~
- ~~xxiv. Where gravel has been excavated below the water level and a pool and riffle sequence has been created, pools and riffles will not be reinstated if subsequent river flows alter them.~~

4. Gravel Management

Includes channel realignment and diversions

Activity

The purpose of this activity is to achieve improved channel alignment by repositioning gravel within the channel.

The activity involves work in the bed of the river or stream to:

- achieve a natural meander pattern, ie. one that is harmonious with natural processes; and
- maintain design channel capacity and mitigate lateral erosion.

Also included in this activity are the minor channel widening and diversions that are often required in conjunction with erosion protection work. This involves pulling back beaches that have migrated towards an eroding bank. The effect of the minor channel widening and diversion work is that pressure is kept off the eroding bank to allow protection works and vegetation to establish.

This activity would be limited to diversions less than seven times the width of the channel and a lateral offset three times the width of the channel. The activity is not to permanently shorten the channel or to cut off meanders.

Diversions or cut offs would usually be commenced at the downstream end. Gravel is moved within the channel by excavation machinery sited on the river bank or in the waterway. The works would be of short duration, typically less than two (2) days' work in water at any site.

Resource Management Act 1991

These works are covered under s13 RMA (disturbance of a river bed), and s15 RMA (potential discharge of sediment or vegetation into water).

Potential beneficial effects

- Channel capacity maintained or increased, flood levels lowered, flow deflection and resultant lateral erosion avoided, localised bed scour reduced.
- Stable channel alignment and meander pattern, bed level is maintained.
- Threat of encroachment and ultimate collapse of adjoining infrastructure such as bridges is reduced. Community well-being is preserved.
- Associated vegetation removal can provide good habitat for some birds.
- Stable channel alignment is maintained, enhancing river bed habitat for trout spawning.
- Lateral erosion is arrested – adjoining property and infrastructure is protected.

- Sediment discharge during high flow events is reduced.
- The open gravel matrix left is beneficial for fish and encourages migration of mobile gravel bars.

Potential adverse effects

- Bed material is disturbed leading to short term sediment discharge, increased turbidity, and disturbance of habitat.
- Gravel beaches are disturbed – bird nesting is disrupted.
- Accidental discharge of fuels and lubricants from machinery.
- Short term disturbance of pool-run-riffle sequence.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. The activity shall be undertaken so as to minimise bed disturbance and the release of sediment ~~eg. gravel to be carried and not pushed across flowing water; bunds to.~~ Bunds shall be constructed where practicable to separate works from flowing water; realigned channel to be consistent with. The realigned channel will be on a curvature that fits the natural meander pattern and cross section curvature of the channel.
- iv. 4. Bed material shall not be bulldozed across any actively flowing channel. Bed material shall be picked up and moved across an actively flowing channel through the use of a digger, front-end loader, motor scraper or other similar machinery.
- v. 5. Gravel movement on beaches shall be in strips not exceeding ~~3m~~ 3 metres in width aligned parallel to the main flow of the river, commencing from the downstream end of the work area and moving upstream.
- vi. 6. On completion of the works, the beach shall be left well shaped, tapering uniformly from the water's edge to the river bank.
- vii. 7. The number of pools in any reach to be disturbed shall be recorded before work commences. On completion of works, there shall be no reduction in the total number of pools or pool-run-riffle sequences within that reach.
8. The activity includes temporary diversions that would be, at any one time, limited to a length of less than seven times the bed width and a lateral offset of three times the bed width.
9. The activity is not to permanently shorten the channel or to cut off meanders.

5. Channel Clearance

Activity

The purpose of this activity is to maintain clear channels for the efficient conveyance of flood flows; to prevent flow irregularities that could cause erosion; and to remove hazards to recreational users.

The activity typically involves the clearance of ~~superfluous~~ vegetation and debris from within the wetted channel, gravel beaches, river banks, bridges, and erosion protection structures (such as logs, cars, rubbish and other material of a similar nature). Vegetation is controlled on existing assets through the application of herbicides on the river banks and immediate berm areas of the channel. There is also an added purpose of eradicating undesirable ~~plant pests~~ pest plants, which are listed in Part Five of this Code.

Application of the chemical herbicide is either by spray gun or boom. This activity is normally carried out on a an annual basis, and is most likely to be carried out in either the autumn ~~and~~ or spring when vegetation is most receptive to chemical ingestion.

The clearance of ~~superfluous~~ vegetation and debris from within the wetted channel invariably involves the operation of machinery within, and the disturbance of the bed of the river.

Resource Management Act 1991

These works are covered under s13 RMA (disturbance of a river bed), s15 RMA (potential discharge of sediment or vegetation into water and discharge of contaminant onto land where it may enter water).

Potential beneficial effects

- Obstructions to flow are removed so that channel capacity being increased, flood levels are lowered, flow deflection and resultant lateral erosion avoided, localised bed scour is avoided.
- Stable channel alignment is maintained, enhancing river bed habitat.
- Bed sedimentation is reduced, enhancing river bed habitat for some fish species.
- Gravel beaches are maintained clear of vegetation – natural meander migration and pool/riffle development are facilitated.
- Hazards to recreational users are removed.
- Threat of encroachment and ultimate collapse of adjoining infrastructure such as bridges is reduced. Community well-being is preserved.
- Removal of undesirable plant species leads to improved habitat for native species.
- The removal of vegetation has benefits for birds nesting on gravel beaches.

- Prevents the deterioration of bank protection assets due to the unwanted growth of vegetation.
- Vegetation removal promotes the natural movement of gravel and minimises the uncontrolled build-up of sediment.

Potential adverse effects

- Spraying may be non-selective – desirable plant species may be eliminated.
- Deterioration of water quality as a consequence of decomposing weed (reduction in dissolved oxygen, increase of pH levels).
- Loss of vegetation as a habitat for aquatic life
- Deterioration of water quality as a consequence of the removal of vegetation that strips nutrients from surface run-off.
- Accidental discharge of herbicides.
- Bed material is disturbed leading to short term sediment discharge, increased turbidity, and disturbance of habitat.
- Gravel beaches are disturbed – bird nesting is disrupted.
- Accidental discharge of fuels and lubricants from machinery.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part ~~3~~ Three of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. Spraying shall not be carried out within any rare habitat, ~~or~~ threatened habitat or at-risk habitat as defined in the One Plan, except for the purposes of pest plant control.
- iv. 4. Spraying shall be undertaken in accordance with all mandatory requirements set out in the “NZS 8409:2004 Management of Agrichemicals”.
- v. 5. Notification of spraying activities to be undertaken on public land shall be ~~given~~ in local newspapers before the end of September each year for activities planned for the following 12 months.
- vi. 6. Notification by letter shall be given before the end of September each year to every holder of a resource consent for the taking of water for public or domestic water supply purposes within 1 km downstream of spraying activities ~~before the end of September each year~~ planned for the following 12 months.
- vii. ~~On the completion of works all surplus vegetative material shall be either removed from the site or disposed of either by burying or burning as soon as practicable.~~

- viii. 7. A single crossing point, typically upstream of a riffle, shall be used where a river channel must be crossed to remove a channel obstruction.
- ix. 8. A vegetated buffer strip shall be retained immediately adjacent to the water body where practicable, to reduce the potential for sediment discharge into the watercourse.
- x. ~~Spot spraying techniques shall be employed, and blanket spraying shall be avoided where practicable.~~
- xi. 9. Spraying shall not be undertaken in ~~unsuitable~~ weather conditions that will reduce the effectiveness of the chemical or that will increase the risk of spray drift onto non-target areas.
- xii. 10. All operations shall be carried out by herbicide applicators who hold the appropriate Growsafe Certificate or equivalent qualification.
- xiii. 11. The mixing of sprays shall not be carried out where contaminants could enter a water body in the event of a spillage.
- xiv. 12. Spraying the same river bank shall not occur more than twice within any calendar year.
- xv. 13. Spraying shall use an adjuvant (such as surfactant, wetter, sticker or filler) to reduce spray drift and enhance effectiveness of herbicides used.
14. All spray containers shall be safely disposed of at an authorised landfill site or re-used.
15. There shall be no removal of in-stream woody debris unless this is required to reduce the risk of flooding or erosion or to remove a hazard to recreational use.

6. **Bank Retaining Lateral Walls**

Activity

The purpose of this activity is to prevent lateral erosion by the placement of rigid structures along the lower section of river banks. ~~Bank retaining~~ Lateral walls are often used where there is insufficient space to place rock or concrete rubble and where live edge protection works will not give the desired level of protection to the bank. These structures will be designed by a suitably qualified or experienced engineer. Considerations in the choice of ~~bank retaining~~ lateral wall type include cost benefit, minimising the disruption to the environment, aesthetic and recreational impacts, practical construction constraints and future maintenance.

Timber Retaining walls

~~Timber retaining~~ walls are designed to provide lateral erosion protection, and may include rock riprap at the toe and extremities, and a variety of 'upper bank' treatments.

This activity typically involves ~~minor~~ earthworks to shape the bank to create an appropriate alignment and batter slope. A toe trench is excavated in the stream bed into which timber posts, railway irons or similar supports are driven. Supports are typically tied back to an anchor. Horizontal boards are fixed to the supports and backfilled between the wall and the stream bank with gravel or other suitable material. Rock is often placed on the river side toe of the ~~retaining~~ lateral wall to protect against under scour and loss of backfill.

Concrete walls

Concrete ~~bank retaining~~ walls provide lateral erosion protection, and may be constructed using pre-cast panels, poured in situ structures, or specialist pre-cast blocks ~~like~~ such as Mass Blocs. Concrete block walls may incorporate additional soil stabilisation works such as synthetic geogrids.

This activity typically involves ~~minor~~ earthworks to shape the bank to create an appropriate alignment and batter shape. For concrete block construction, a toe trench is excavated in the stream bed which is either compacted or a concrete pad established to provide a solid foundation for the wall. If poured concrete is used in the works a small bund will be constructed to prevent cement entering into the water. The blocks are placed on top of one another and backfilled between the wall and the stream bank with gravel or other suitable fill material compacted in thin layers to achieve specific designed criteria.

Sheet piling walls

Interlocking sheet piles are driven into the bed of the river along the bank to provide erosion protection.

These walls are expensive and aesthetically undesirable and are not commonly used ~~within~~ by the Operations Group. There may however be specific site conditions which dictate their use.

Either a crane or large excavator fitted with a driving dolly is used to drive the sheet piling deep into the river bed to prevent undermining. This type of work requires detailed design both for horizontal and vertical alignment profiles. Once the sheet piling is established it would normally be backfilled and capped in some manner.

Gabion baskets

Gabion baskets are wire mesh units filled with graded rock for placement along the bank toe to provide erosion protection. Gabion baskets are not used extensively on account of relatively high cost, limited life and questionable aesthetics.

This activity typically involves ~~minor~~ earthworks to shape the bank to create an appropriate alignment and batter shape. A toe trench is excavated in the stream bed into which the gabion baskets are founded. Completed structures are typically backfilled and a variety of upper bank treatments may be added.

Resource Management Act 1991

These works are covered under s13 RMA (disturbance and placement of a structure on the bed of a river), where work is undertaken on river banks or dry river bed areas.

Potential beneficial effects

- Lateral erosion is arrested – adjoining property and infrastructure is protected, hazards to recreational users avoided.
- Sediment discharged during high flow events is reduced.
- Bed sedimentation is reduced, enhancing river bed habitat for some fish species.
- Stable channel alignment is maintained, enhancing river bed habitat.
- Opportunities for upper bank and bank toe (depending on materials used) habitat enhancement, such as riparian planting
- Gravel beaches are maintained clear of vegetation – natural meander migration and pool and riffle development facilitated.
- Threat of encroachment and ultimate collapse of adjoining infrastructure such as bridges is reduced. Community well-being is preserved.
- Robust structures – durability results in reduced intervention.

Potential adverse effects

- Bed and bank material is disturbed leading to short term sediment discharge, increased turbidity, and disturbance of habitat.
- Accidental discharge of fuels and lubricants from machinery.
- May impede recreational access.
- Loss of habitat against smooth bank lining.
- Temporary loss of amenity – dust and noise impact during construction.
- Bank side water velocity may increase, which can impede habitat utilisation by fish.
- Aesthetic appeal and natural character can be reduced.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part ~~3~~ Three of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. Gabion baskets shall be manufactured from proven durable proprietary products.
- iv. 4. 'Hard' ~~retaining structures~~ lateral walls shall only be used where specific site conditions or constraints preclude the use of 'softer measures' or where close proximity of buildings or infrastructure dictates a high protection standard.
- v. 5. Material selection and design detail shall take account of aesthetic and habitat values.
- vi. 6. A primary design consideration shall be to achieve a high structural standard such that future maintenance and associated channel disturbance is minimised.
- vii. 7. Specific design shall take particular account of transition effects both upstream and downstream of the structure.
- viii. 8. The height of the wall shall be no greater than is necessary to ensure structural integrity. ~~Where practicable softer~~ Softer upper bank treatments shall be incorporated, ~~including in the design and may~~ include battering back and planting, or using a soil retaining textile and planting small shrub species that will cascade over and eventually cover sections of the structure.
- ix. 9. Foundation excavation will typically necessitate operation of machinery within the watercourse. Where practicable, the machinery operation area shall be bunded off from the stream flow to minimise sediment discharge.

- x. 10. ~~Completed structures shall not present any significant hazard to navigation or other recreation use. Health & and safety issues in relation to height will be considered.~~
- 11. Lateral walls shall be designed by an appropriately qualified design engineer.
- 12. Alignment will be on a curvature that fits the natural meander curvature of the channel.

7. Concrete Riprap

Activity

The purpose of this activity is to provide protection against lateral erosion through the placement of concrete rubble, usually sourced from demolition sites, directly against the lower section of a river bank. Concrete riprap has been commonly used in the past as a less costly alternative to rock linings in situations where softer erosion protection measures are not effective. However aesthetic considerations have dictated some restrictions on the use of demolition concrete in recent years. Concrete riprap does not in general provide protection that is as effective as rock riprap on account of the ~~inability to achieve~~ difficulty of achieving an appropriate grading of particle sizes.

~~Properly~~ Nevertheless, properly constructed concrete rubble riprap is ~~very effective because it locks together well to form a protective mattress that is well shaped in relation to the flood reach of the river~~ linings can provide cost effective erosion protection. The rubble is able to settle as the channel bed degrades. The rubble riprap also provides immediate protection compared to vegetation based protection measures that take time to establish. Maintenance will include ongoing topping up of the concrete rubble as it settles, debris clearance and vegetation control.

This activity involves minor earthworks to shape the bank to create an appropriate alignment and batter slope. A toe trench is excavated in the stream bed into which the concrete rubble is founded and then additional concrete rubble is carefully placed along the bank until the design height is achieved. Concrete rubble is usually stockpiled adjacent to the site prior to and during the works. Reinstatement of the stockpile site will be undertaken as part of this activity.

Resource Management Act 1991

These works are covered under s13 RMA (disturbance and placement of a structure on the bed of a river), where work is undertaken on river banks or dry river bed areas.

Potential beneficial effects

- Lateral erosion is arrested – adjoining property and infrastructure is protected, hazards to recreational users avoided.
- Sediment discharged during high flow events is reduced.
- Stable channel alignment is maintained, enhancing river bed habitat.
- River bed sedimentation is reduced, enhancing river bed habitat for some fish species.
- Opportunities for upper bank and bank toe (depending on materials used) habitat enhancement such as riparian planting.
- Threat of encroachment and ultimate collapse of adjoining infrastructure such as bridges is reduced. Community well-being is preserved.

- Generally robust structures – durability results in reduced intervention.

Potential adverse effects

- Bed/bank material is disturbed leading to short term sediment discharge, increased turbidity, and disturbance of habitat.
- Accidental discharge of fuels and lubricants from machinery.
- May impede recreational access or pose safety issues.
- Can impact on natural character and aesthetic values.
- Long term stability cannot always be assured – particles may wash downstream.
- Temporary loss of amenity – dust and noise impact during construction.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part ~~3~~ Three of this code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. Concrete riprap linings shall generally be used only in situations where alternative 'softer' measures will not provide an appropriate standard of protection, or where immediate protection is required and rock is not reasonably available, or as a backfill or foundation to rock linings.
- iv. 4. Concrete riprap linings shall not be constructed in locations that are utilised for or are readily accessible for recreational purposes or are readily visible from public roads or reserves, except as a temporary emergency protection measure that will be replaced by an appropriate protection structure as soon as practicable. Site specific details will be logged on the Non-Practicable Standards Form in Part Four of this Code.
- v. 5. Concrete riprap material used shall be clean, stable material, not readily broken down, and free of protruding steel, soil, mud, clay, contaminants, or any soluble material.
- vi. 6. Any demolition material having exposed reinforcing steel shall be separated at the demolition site and not carted to stockpile at a river works site.
- vii. 7. The size of individual rubble particles shall be such that they are able to be placed to produce an interlocking riprap lining having uniform cross section and profile without projections greater than ~~4m~~ 1 metre. No individual ~~particle~~ piece of riprap shall be less than ~~0.025m³~~ 0.025 cubic metre.
- viii. 8. All riprap linings shall be designed by ~~an~~ a suitably qualified or experienced engineer. Particular attention shall be given to batter slope, founding depth, riprap size, and alignment and transitional measures.

- ~~ix.~~ 9. The height of riprap linings shall be no greater than is necessary to ensure structural integrity. ~~Where practicable softer~~ Softer upper bank treatments shall be incorporated, ~~including in the design and may include~~ battering back and planting, or using a soil retaining textile and planting small shrub species that will cascade over and eventually cover sections of the structure.
- ~~x.~~ 10. In designing riprap linings, considerations shall be given to incorporating enhanced recreational access to the river.
- ~~xi.~~ 11. ~~The design of linings~~ Concrete riprap design shall ~~take account of~~ include future maintenance requirements and frequency. Note: Linings can settle as a result of post-construction toe scour and 'topping up' may be required. Clear access to the top of the lining is required for that purpose.
- ~~xii.~~ 12. Concrete riprap shall be carefully placed and interlocked to minimise the potential for subsequent dislodgment of smaller concrete particles. Any particles capable of being displaced by river flow, eg. large thin slabs or particles, shall be placed deep in the lining and well covered to prevent displacement.
- ~~xiii.~~ 13. Batter preparation, foundation excavation and rock placement shall be undertaken by machinery operating from the river bank where practicable. Where machinery has to enter the watercourse, measures shall be taken to minimise temporary adverse effects. ~~These include~~ such as temporary diversions, bunding off sections of the work and temporary causeways to elevate machinery above the water surface.
- ~~xiv.~~ 14. Excavation and placement operations shall be planned ~~such that the duration over one continuous works sequence to restrict the timing and frequency of river disturbance is minimised.~~ This will typically require stockpiling ~~include but not be limited to planning to stockpile~~ a large proportion of required material ~~in close proximity to~~ at the placement site, prior to the commencement of works.
- ~~xv.~~ 15. In selecting stockpile sites and access to them, consideration shall be given to minimising aesthetic, recreational and environmental ~~(eg. dust)~~ impacts, eg. dust.
- ~~xvi.~~ ~~Immediately upon the completion of placement works, all disturbed areas shall be levelled and grassed, debris burned or buried and 'topping-up' material left in a tidy appropriately sited stockpile.~~
- ~~xvii.~~ 16. On completion of placement, ~~silt material~~ locally sourced silt material shall be placed over the upper bank section of ~~rip rap and riprap,~~ appropriate vegetation established and 'topping-up' material left in a tidy appropriately sited stockpile.
- 17. Alignment will be on a curvature that fits the natural meander curvature of the channel.

8. Culverts

Activity

The purpose of this activity is to provide for permanent access across drains and natural watercourses, without either obstructing water flows or impeding fish passage, by the installation of culvert structures. Floodgated culverts are excluded from this activity.

Installation, maintenance and replacement of culverts would typically involve localised excavation, foundation works, installation of pre-cast concrete units and the construction of headwall structures in the watercourse. Bed armouring is often constructed to reduce the risk of scour at culvert outlets.

The activity would typically involve machinery working adjacent to the watercourse, and temporary damming and diversion of the watercourse. Any pouring of concrete would be carried out in the dry bunded area.

Resource Management Act 1991

These works are covered under s13 RMA, disturbance and placement of a structure on the bed of a river.

Potential beneficial effects

- Prevents stock and vehicles from disturbing the bed of the channel when crossing, thereby preventing sediment and pollutants from being released into the waterway.
- Properly designed culverts will have no impact on the movement of fish upstream and may improve upstream fish access if properly constructed and maintained.

Potential adverse effects

- Bed and bank material is disturbed leading to short term sediment discharge, increased turbidity, and disturbance of habitat.
- Accidental discharge of fuels and lubricants from machinery.
- May impede recreational access or pose safety issues, eg. navigation.
- Temporary loss of amenity – dust and noise impact during construction.
- May cause local flooding upstream of the culvert due to the culvert restricting the flow of water or debris accumulating at culvert inlets.
- Temporary loss of fish passage during construction and long term loss of fish passage in a poorly designed or maintained culvert.
- Discharge of contaminants such as concrete during the construction of the headwalls.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. Culvert installation shall be designed by suitably qualified or experienced engineering staff.
- iv. 4. Matters to be considered in the design shall include:
 - a. Flow capacity in accordance with scheme design parameters – a conservative design is preferable.
 - b. Culvert length – shall be no less than the average channel width at the top of the channel and no more than 20 metres in length.
 - c. Ability to pass debris, eg. single barrel culvert is preferable.
 - d. Culvert gradient – shall match the channel bed gradient.
 - e. Culvert invert – shall be ~~approximately~~ no less than 50 mm below bed invert.
 - f. Inlet and outlet headwalls – shall ensure integrity of the culvert and also facilitate smooth flow transition from open channel to structure and structure to open channel.
 - g. Provision of an overflow spillway section with appropriate armouring.
- v. 5. ~~Adequate bed~~ Bed armouring shall be undertaken, particularly at culvert ~~outlet~~ placed to the design engineer's specification to prevent channel scour ~~and~~ at the culvert outlet, potential risk of structural failure ~~and~~ to maintain fish passage. Only clean rock or concrete rubble shall be used for this purpose.
- vi. 6. Stream or drainage channel flows shall be temporarily dammed or diverted away from the site for the duration of culvert construction where practicable. Where this is not possible, the work shall be planned to ensure that the duration of in-flow works activity is kept to ~~an absolute~~ a minimum.
- vii. 7. All culverts shall be installed with respect to bedding, cover and compaction ~~as per manufactures specifications~~ to either the manufacturer's or the design engineer's specification.
8. All new designs shall provide for fish passage.

9. Detention Dam Maintenance

Activity

The purpose of this activity is to maintain the structural integrity of the detention dam to design specifications. The activity primarily involves the clearance of accumulated sediment and the shaping of the dam ponding area to restore the dam to its original design capacity. Also includes repair of erosion sometimes involving re-forming of dam batters.

The activity involves the excavation of material from a dry dam ponding area using a hydraulic excavator.

Material removed from the dam is disposed of in a manner that ensures it neither re-enters the channel nor impedes surface drainage.

Resource Management Act 1991

These works are covered under s13 RMA (disturbance and placement of a structure on the bed of a river), where work is undertaken on river banks or dry river bed areas.

Potential beneficial effects

- Adjoining property and infrastructure is protected from flooding.
- Peak flows are controlled to prevent scour and erosion downstream.

Potential adverse effects

- Accidental discharge of fuels and lubricants from machinery.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. Excavated material shall be placed ~~sufficiently clear of~~ so that it does not re-enter the dam ponding area ~~to ensure that they do not re-enter dam pond.~~
- iv. 4. The design profile of the dam shall be maintained.
- v. 5. The site shall be monitored for post-excavation problems such as slump erosion.
- vi. 6. Dam sides shall not be steepened nor undercut.

- vii. 7. Spillways and inlet structures ~~should~~ shall be maintained free of debris and obstructions to ~~flood~~ flows.
- viii. 8. Disturbed ground ~~should~~ shall be re-vegetated as soon as possible.

10. Drainage Channels/Modified Streams: - Mechanical Cleaning of Drainage Channels

Activity

The purpose of this activity is to maintain effective drainage through the mechanical removal of weed and other materials that may reduce drainage channel efficiency or capacity. The activity primarily involves the clearance of vegetation and the eradication of undesirable ~~plant pests~~ pest plants, which are listed in Part Five of this Code, which cannot be controlled through the application of herbicides. However, the removal of accumulated sediment and the shaping of drain banks is occasionally undertaken in order to restore drains to their original design capacity.

The activity involves the excavation of material from the drain using a hydraulic excavator with a cleaning bucket. A slotted, self-draining weed-cleaning bucket is normally used, although a solid bucket is used occasionally, particularly where accumulated sediment is to be removed from the bottom of the drain.

The excavator typically operates from one bank when cleaning a drain, although at times it may work from both banks ~~if of~~ for wider channels.

Material removed from the drain is disposed of in a manner that ensures it neither re-enters the channel nor impedes surface drainage.

Most drains are mechanically cleared at least once every five years, although some on the coastal sand country are more typically cleared once every 10 years. In drains subject to high silt or weed load and blockages, annual or even more frequent mechanical clearance may be necessary.

Resource Management Act 1991

There is potential for these works to be subject to s15 RMA (discharge of potential contaminant into water). The works are carried out under the Land Drainage Act 1908, and the drains are not defined as rivers under the Resource Management Act 1991. However, there may be some situations where drain cleaning may require resource consent pursuant to s15 discharge of contaminant (sediment) to water, in respect of the discharge at the outlet of the drainage system into a stream or modified watercourse. However, generally, the drainage areas where mechanical de-silting is undertaken are relatively closed systems, with little apparent discharge of contaminants into specific waterbodies.

Potential beneficial effects

- Maintenance of clear waterway – improved oxygen levels, improved drainage and flood carrying capacity, improved fish passage, and control of pest plants.
- Effective land drainage – improved productivity, diversification of land use, community well-being and safety.

- Removal of undesirable plant species – improved habitat for native species.
- Channel condition and stability are maintained.

Potential adverse effects

- Mechanical clearance is non-selective – desirable plant species may be eliminated.
- Short term deterioration of water quality from sediment release.
- Loss of cover and spawning vegetation for native fish and invertebrates.
- Deterioration of water quality as a consequence of the removal of vegetation that strip nutrients from surface run-off.
- Accidental discharge of fuels and lubricants from machinery.
- Short term adverse visual and odour impacts (silt and weed tailings).
- Removal of food source for bottom-living invertebrates.
- Accidental fish kill (removed from water body).
- Release of nutrients trapped within the sediment – downstream effect on water quality.
- Over draining of productive land, wetlands and swamps.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. All tailings shall be placed ~~sufficiently~~ clear of the drainage channel to ensure that they do not re-enter the drain. ~~Where the “tailings” consist mainly of vegetable matter, decomposition normally occurs within two to three weeks of its placement on the land. However, some “tailings” comprising a high proportion of sediment, may be placed to dry and then levelled and spread the following season.~~
- iv. 4. All drain clearing machinery shall be thoroughly cleaned of weed and silts before leaving any work site, in order to minimise the risk of spreading undesirable aquatic weeds.
- v. 5. Special care shall be taken to minimise disturbance to the bed of the drain during the mechanical removal of vegetation. The design profile of the channel shall be maintained ~~as much as possible~~. Note: In tidal areas, the grassed banks of the drains that flood at spring tide are important areas for fish spawning, and care shall be taken to preserve these sites during the works.
- vi. 6. Shade shall be retained over the channel to help reduce weed growth where practicable.

- vii. 7. The frequency of mechanical clearing of drains shall be no more than is needed to maintain design flows and water levels as determined by the scheme's asset management plan.
- viii. 8. The mechanical cleaning of drains upstream or downstream of ~~identified native fish habitats~~ whitebait migration and inanga spawning sites identified in the One Plan Schedule AB, shall be scheduled to avoid fish spawning and to minimise impacts on fish migration.
- ix. ~~Compaction adjacent to drainage channels shall be minimised where practicable by the use of wide tracked machinery.~~
- x. 9. Cleaned drains shall retain small imperfections on the bed to provide some habitat diversity while not compromising the hydraulic efficiency of the channel.
- xi. 10. Drains shall be monitored for post-excavation problems such as stream bank and slump erosion.
- xii. 11. Drain ~~banks~~ clearance shall not ~~be unnecessarily steepened nor undercut~~ affect the natural character or water level of any Site of Significance – Aquatic identified in the One Plan Schedule AB.

The schedule reference will need to be changed after appeals.

11. Drainage Channels/Modified Streams: - Weed Control by Herbicide Application

Activity

The purpose of this activity is to maintain effective drainage through the control of weed growth in drainage channels by the application of herbicides. The activity may also be undertaken with the express purpose of eradicating undesirable plant ~~pests~~ species, whether or not they are at the time restricting drainage.

Application of herbicide is either by spray gun or spray boom, and is carried out under the supervision of a certified Horizons Regional Council staff member or contractor. Certification shall entail the holding of the appropriate Growsafe or equivalent qualification.

Most drains are sprayed at least annually and in some cases two or three times a year. Often spraying is carried out in four out of every five years with the fifth year being reserved for mechanical clearance. Although weed clearance using herbicides can occur at any time of the year, most spraying is carried out in the autumn and spring when vegetation is most receptive to chemical ingestion.

Resource Management Act 1991

There is potential for these works to be subject to s15 RMA (discharge of potential contaminant into water).

Potential beneficial effects

- Maintenance of clear waterway – improved oxygen levels, improved drainage and flood carrying capacity, improved fish passage, and control of pest plants.
- Effective land drainage – improved productivity, diversification of land use, community well-being and safety.
- Removal of undesirable plant species – improved habitat for native species and upstream fish passage.
- Channel condition and stability are maintained.

Potential adverse effects

- Spraying may be non-selective – desirable plant species may be eliminated.
- Deterioration of water quality as a consequence of decomposing weed (reduction in dissolved oxygen, increase of pH levels).
- Loss of cover and spawning vegetation for native fish and invertebrates.
- Loss of vegetation as a habitat and food source for aquatic and bird life.

- Deterioration of water quality as a consequence of the removal of vegetation that strips nutrients from surface run-off.
- Accidental discharge of fuels and lubricants from machinery.
- Accidental discharge of herbicides.
- Short term undesirable visual and odour impacts (decomposing weed).

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 ~~Three~~ of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. Spraying shall not be carried out within any rare habitat, ~~or~~ threatened habitat or at-risk habitat as defined in the One Plan, except for the purposes of pest plant control.
- iv. 4. Spraying shall be undertaken in accordance with all mandatory requirements set out in the “NZS 8409:2004 Management of Agrichemicals”.
- v. 5. Notification of spraying activities to be undertaken on public land shall be given in local newspapers before the end of September each year for activities planned for the following 12 months.
- vi. 6. Notification by letter shall be given before the end of September each year to every holder of a resource consent for the taking of water for public or domestic water supply purposes, within 1 km downstream of spraying activities before the end of September each year planned, for the following 12 months.
- vii. 7. All herbicide application operations shall be carried out by applicators who hold the appropriate Growsafe or equivalent qualification.
- viii. 8. All herbicides shall be applied in accordance with label requirements.
- ix. 9. Spraying shall not be undertaken in unsuitable weather conditions that will reduce the effectiveness of the chemical or that will increase the risk of spray drift onto non-target areas.
- x. 10. No mixing of sprays; fuel storage or machine refuelling; storage or mixing of chemicals, storage or transfer of fuels; or washing of machinery and equipment shall be undertaken in any location where there is a potential for contamination of the water body in the event of a spillage.
- xi. 11. All spray containers shall be safely disposed of in at an environmentally safe place authorised landfill site or re-used.
- xii. ~~Spot spraying techniques shall be employed, and blanket spraying shall be avoided where practicable.~~

- xiii. 12. Spraying shall where necessary use an adjuvant (such as surfactant, wetter, sticker or filler) to reduce spray drift and enhance effectiveness of ~~herbicide~~ the herbicides used.
- xiv. 13. Upper bank vegetation shall be maintained to enhance bank stability where it has no effect on drainage channel efficiency.
- xv. 14. A vegetated buffer strip shall be retained immediately adjacent to the water body where practicable to reduce the potential for sediment discharge into the watercourse.

12. Grade Control Structures

Activity

The purpose of this activity is to control the bed of the watercourse by the placement of a structure across the full width of a channel. These structures artificially raise the bed level and thereby reduce the channel gradient and flow velocity. A vertical drop is created and the energy arising from that drop is dissipated on a short section of armoured bed or 'scour apron'.

This activity involves excavation of bed material followed by the construction of a rigid structure across the channel. The structures will generally be formed from quarried rock or river boulders, however other materials such as timber or culvert pipes may be utilised. In some situations piles may be driven to assist in retaining rock and maintaining structural shape and integrity.

Resource Management Act 1991

These works are covered under s13 RMA (disturbance and placement of a structure on the bed of a river).

Potential beneficial effects

- Lateral erosion is arrested through bed gradient control – adjoining property and infrastructure is protected, and hazards to recreational users avoided.
- Stable channel alignment is maintained, enhancing river bed habitat.
- River bed sedimentation is reduced, enhancing river bed habitat for some fish species.
- Stable bed profile reduces risk to integrity of infrastructure such as bridges and utilities. Community well-being is preserved.
- Robust structures – durability results in reduced intervention.
- Creation of pools for fish habitat.

Potential adverse effects

- Bed and bank material is disturbed leading to short term sediment discharge, increased turbidity, and disturbance of habitat.
- Accidental discharge of fuels and lubricants from machinery.
- Permanent loss of amenity - may impede recreational access or pose safety issues, eg. navigation.
- Particles may be dislodged and deposited downstream.
- Temporary dust and noise impact during construction.
- Fish passage may be impeded in low flows.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. Material used in new Grade Controls shall be clean, stable quarried rock ~~or~~, boulders, pre-cast concrete units or timber. Rubble shall not be used in new structures ~~and concrete units shall only be used in exceptional circumstances.~~
- iv. 4. All Grade Controls shall be designed by ~~an~~ a suitably qualified or experienced engineer. ~~Particular attention~~ Design shall be given specific to location within the river reach, crest height and profile, founding depth, material requirements, plunge pool effects, fish passage, bank erosion at the ends of the structures, as well as both upstream and downstream alignment and transitional measures.
- v. 5. In designing Grade Controls consideration shall be given to incorporating enhanced recreational access to the river, for example portage facility.
- vi. 6. The Grade Control design ~~of Grade Controls~~ shall ~~take account future~~ include maintenance requirements and frequency. Note: Grade Controls can settle as a result of plunge pool toe scour and 'topping up' may be required. Clear access to the structure is required for that purpose.
- vii. 7. All material ~~utilized~~ utilised in Grade Controls shall be carefully placed and interlocked to ~~minimize~~ minimise the potential for subsequent dislodgment of smaller particles.
- viii. 8. ~~The Batter preparation, foundation excavation for foundations and the rock placement of rock in Grade Controls will invariably involve the operation of~~ shall be undertaken by machinery with the river flow. However operating from the river bank where practicable. Where machinery has to enter the watercourse, measures shall be taken to minimise temporary adverse effects. These may include such as temporary diversions, bunding off sections of the work, and temporary causeways to elevate machinery above the water surface, and the use of 'long reach' excavation/ placement machinery.
- ix. 9. Grade Controls shall be designed and constructed in such a manner that fish passage is maintained at all times flows, and this may require the structure to be constructed in sections.
- x. ~~New grade controls shall be designed to allow fish passage of all fish species at all times.~~
- xi. 10. Excavation and placement operations shall be planned ~~such that the duration over one continuous works sequence to restrict the timing and frequency of river disturbance is minimized.~~ This will typically require stockpiling include but not be limited to planning to stockpile a large proportion of required material in close proximity to at the placement site, prior to the commencement of works.

11. New grade controls shall incorporate the recommendations of a suitably qualified fish habitat specialist to ensure fish passage is incorporated in the structure.
12. Grade controls shall be maintained to ensure that fish passage is maintained at all flows.

13. Groynes

Activity

The purpose of this activity is to modify channel alignment and mitigate lateral erosion through the placement of structures that protrude from river banks and reduce flow velocity immediately adjacent to those banks. Groynes may be classified as either permeable or impermeable and may take various forms and utilise a variety of materials.

The primary purpose of the works is to protect the adjoining river banks from erosion, shifting the higher velocities away from the river bank and encouraging the deposition of silts and gravels within the embayments created by the groynes.

Permeable

Permeable groynes allow water to pass through them, which ~~equalizes~~ equalises the water pressure on both sides of the structure and minimises some of the scouring effect generally associated with groynes. When the flowing water passes through the permeable structures, the turbulence is reduced, the horizontal loading is reduced and bed load deposition occurs.

Permeable groynes are often utilised to re-establish a riparian margin that has been lost to lateral bank erosion. The main benefit of permeable groynes is the silting they encourage, which in turn facilitates planting and ultimate restoration of ~~a desired~~ the bank alignment.

Permeable groynes are constructed by driving poles or railway irons into the bed of the river by a hydraulic excavator and threading wire ropes through them to form a fence-like structure. Alternative permeable groyne structures may use driven poles with mesh attached to the wire ropes and willow poles stapled to the mesh, which grow to further secure the structure. Permeable groynes can also take the form of brushy trees laid in a trench and anchored to the river bed.

Impermeable

Impermeable groynes do not allow water to pass through them and therefore have a more positive effect in terms of flow deflection. These structures are more robust and more expensive than permeable groynes.

Impermeable groynes are most commonly constructed from rock and must be specifically designed to withstand both over topping and localised bed scour. Well designed and constructed rock groynes may provide a more aesthetically acceptable solution than continuous rock lining, especially where long lengths of erosion require treatment.

Resource Management Act 1991

These works are covered under s13 RMA (disturbance and placement of a structure on the bed of a river), where work is undertaken on river banks or dry river bed areas.

Potential beneficial effects

- Lateral erosion is arrested – adjoining property and infrastructure is protected.
- Sediment discharged during high flow events is reduced enhancing river bed habitat.
- Scour pool development provides ideal fish habitat.
- Sheltered embayments created – facilitate vegetation establishment.
- Stable channel alignment is maintained, enhancing river bed habitat.
- Threat of encroachment and ultimate collapse of adjoining infrastructure such as bridges is reduced. Community well-being is preserved.
- Rock groynes are very robust structures – durability results in reduced intervention.

Potential adverse effects

- Bed and bank material is disturbed leading to short term sediment discharge, increased turbidity, and disturbance of habitat.
- Accidental discharge of fuels and lubricants from machinery.
- May impede recreational access or pose safety issues.
- Particles may be dislodged and deposited downstream.
- Temporary loss of amenity – dust/noise impact during construction.
- May present hazards to navigation.
- Projecting groyne elements may be visually undesirable and may trap unsightly debris.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. Specific groyne location and structural design shall be undertaken by a suitably qualified or experienced engineer.
- iv. 4. A primary design objective shall be to achieve a high structural standard such that future maintenance and associated channel disturbance is minimised, in particular, account shall be taken of transitional effects

both upstream and downstream of the structure, as well as localised and general scour potential.

- v. 5. Material selection and design detail shall take account of aesthetic and habitat values. No material shall be used that results in contamination of the water.
- vi. 6. Concrete rubble shall not be used in the construction of groynes.
- vii. 7. Groyne construction will typically necessitate the operation of machinery within the active watercourse. Where practicable, the machinery operating area shall be bunded off from the stream flow to minimise sediment discharge.
- viii. 8. Completed structures shall not present any significant hazard to navigation or other recreational users.
- ix. 9. Vegetation shall be progressively established within the embayments between groynes as siltation occurs.
- x. 10. Annual inspections shall be undertaken to ensure that groyne heads do not present hazards to recreational users.
- xi. 11. Redundant assets shall be removed to avoid adverse environmental ~~affects~~ effects, undesirable aesthetics and structures, ~~for~~ potential hazards.
- 12. Permeable groynes shall not be used at swimming spots.
- 13. Alignment will be on a curvature that fits the natural meander curvature of the channel.

14. Permeable Mesh Units

Activity

The purpose of this activity is to prevent erosion through the placement of prefabricated structural steel 'fence units' longitudinally along river banks. The activity includes the shaping of the river bank and the establishment of vegetation behind the fences.

The mesh units initially encourage siltation and aid vegetation establishment but remain as an integral part of permanent edge protection.

The activity typically involves bed excavation to facilitate placement of mesh units below scour depth, driving rails, fixing of pre-fabricated mesh units, hauling and placement of tree material and back filling, battering of banks and planting vegetation. Mesh units may be used for minor channel realignment.

Upstream erosion protection works should be included to prevent outflanking of Permeable Mesh Units (PMU) and internal elements may be included to enhance structure stability and encourage silt deposition.

The activity often unavoidably involves the operation of machinery within the bed of the river. In such situations measures are taken to minimise discharge of sediment.

Resource Management Act 1991

These works are covered under s13 RMA (disturbance and placement of a structure on the bed of a river), where work is undertaken on river banks or dry river bed areas.

Potential beneficial effects

- Lateral erosion is arrested – adjoining property and infrastructure is protected.
- Sediment discharged during high flow events is reduced.
- Stable channel alignment is maintained, enhancing river bed habitat.
- Bed sedimentation is reduced, enhancing river bed habitat for some fish species.
- Threat of encroachment and ultimate collapse of adjoining infrastructure such as bridges is reduced. Community well-being is preserved.
- Opportunities for upper bank and bank toe (depending on materials used) habitat enhancement such as riparian planting.

Potential adverse effects

- Bed and bank material is disturbed leading to short term sediment discharge, increased turbidity, disturbance of habitat.
- Accidental discharge of fuels and lubricants from machinery.
- May impede recreational access or pose safety issues.
- Temporary loss of amenity – dust and noise impact during construction.
- May present hazards to navigation.
- Negative long term impacts on natural character and aesthetic appeal.
- Progressive deterioration of material – visual and safety impacts.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. PMU structures shall only be used where a higher standard of protection than can be provided with standard tied tree bank protection is required.
- iv. 4. Specific design shall be undertaken by a suitably qualified or experienced engineer.
- v. 5. A primary design consideration shall be to achieve a high structural standard such that future maintenance and associated channel disturbance is minimised.
- vi. 6. ~~Specific~~ The design shall ~~take particular account of~~ include transitional effects both upstream and downstream of the structure, as well as localised and general scour surrounding the structure.
- vii. 7. The height of PMUs shall be no greater than is necessary to ensure structural integrity. ~~Where practicable softer~~ Softer upper bank treatments shall be incorporated ~~including in the design and may include~~ battering back and planting, or using a soil retaining textile and planting small shrub species that will cascade over and eventually cover sections of the structure.
- viii. 8. ~~Foundation~~ Batter preparation and foundation excavation will typically ~~necessitate operating of~~ shall be undertaken by machinery ~~within the active operating from the river bank where practicable.~~ Where machinery has to enter the watercourse. Where practicable, the machinery operating area, measures such as temporary diversions, bunding off sections of the work and temporary causeways to elevate machinery above the water surface shall be bunded off from the stream flow taken to minimise sediment discharge temporary adverse effects.

- ix- 9. Annual inspections shall be undertaken to ensure that mesh units do not present hazards to recreational users.
- x- 10. Redundant assets shall be removed to avoid adverse environmental ~~affects~~ effects, undesirable aesthetics and/or potential hazards.
- 11. Alignment will be on a curvature that fits the natural meander curvature of the channel.

15. Rock Linings

Activity

The purpose of this activity is to provide protection against lateral erosion through the placement of rock directly against the lower sections of river banks. The use of rock to armour banks is common on rivers where there is little tolerance for erosion on account of the close proximity of buildings or infrastructure, or where high erosive forces preclude the use of softer erosion protection measures.

The purpose of the work is to control lateral erosion of the banks, and rock linings work extremely well because they are well locked together and they are well shaped in relation to the flood reach of the river. The rock is able to settle as the channel bed degrades. The rock protection also provides immediate protection compared to vegetation based protection measures that take time to establish. Ongoing maintenance will include topping up of the rock as it settles, debris clearance and vegetation control.

This activity typically involves minor earthworks to shape the bank in order to create an appropriate alignment and batter shape. Where rock linings are used they shall be aligned along the natural meander pattern of the river channel. A toe trench is excavated in the stream bed into which the rock is founded and then additional rock is carefully placed along the bank until the designed height is achieved. Rock is usually stockpiled adjacent to the site prior to and during the works. Establishment and reinstatement of the stockpile site is part of this activity.

Resource Management Act 1991

These works are covered under s13 RMA (disturbance and placement of a structure on the bed of a river), where work is undertaken on river banks or dry river bed areas.

Potential beneficial effects

- Lateral erosion is arrested – adjoining property and infrastructure is protected and hazards to recreational users avoided.
- Sediment discharged during high flow events is reduced.
- Stable channel alignment is maintained, enhancing river bed habitat.
- River bed sedimentation is reduced, enhancing river bed habitat for some fish species.
- Opportunities for upper bank and bank toe (depending on materials used) habitat enhancement such as riparian planting.
- Threat of encroachment and ultimate collapse of adjoining infrastructure such as bridges is reduced. Community well-being is preserved.
- Very robust structures – durability results in reduced intervention.
- Visually desirable method of bank stabilisation.

Potential adverse effects

- Bed and bank material is disturbed leading to short term sediment discharge, increased turbidity, and disturbance of habitat.
- Accidental discharge of fuels and lubricants from machinery.
- May impede recreational access or pose safety issues.
- Small particle may be dislodged and deposited downstream.
- Temporary loss of amenity – dust and noise impact during construction.
- Permanent preclusion of riparian vegetation or bank shading.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. Long continuous rock linings shall only be used where necessary for the protection of ~~important~~ flood protection works and infrastructure.
- iv. 4. Rock material used shall be sound, clean quarry spalls ex-face or other suitable material, eg. boulders which are free of soil, clay or other soluble debris. ~~In places where natural character is important locally sourced material that is aesthetically sympathetic with the river cobbles shall be used.~~
- v. 5. All rock linings shall be designed by ~~an~~ a suitably qualified or experienced engineer. ~~Particular attention~~ Design ~~shall be given to~~ include: batter slope, founding depth, rock grading and alignment and transitional measures.
- vi. 6. The height of rock linings shall be no greater than is necessary to ensure structural integrity. ~~Where practicable softer~~ Softer upper bank treatments shall be incorporated, ~~including in the design and may~~ include battering back and planting, or using a soil retaining textile and planting small shrub species that will cascade over and eventually cover sections of the structure.
- vii. 7. In designing rock linings, consideration shall be given to incorporating enhanced recreational access to the river, (eg. launching of kayaks).
- viii. 8. ~~The design of linings must take account of~~ Rock lining design shall include future maintenance requirements and frequency. Note: Linings can settle as a result of post-construction toe scour and 'topping up' may be required. Clear access to the top of the lining is required for that purpose.
- ix. 9. Rock shall be carefully placed and interlocked to minimise the potential for subsequent dislodgment of smaller rock particles.

- ✕ 10. Batter preparation, foundation excavation and rock placement shall be undertaken by machinery operating from the river bank where practicable. Where machinery has to enter the watercourse, measures shall be taken to ~~minimize~~ minimise temporary adverse effects. ~~These include such as~~ temporary diversions, bunding off sections of the work, and temporary causeways to elevate machinery above the water surface.
- ✕i. 11. Excavation and placement operations shall be planned such that the duration of river disturbance is minimised. This will typically require stockpiling a large proportion of required rock in close proximity to the placement site, prior to the commencement of works.
- ✕ii. 12. In selecting stockpile sites and access to them, consideration shall be given to minimising aesthetic, recreational and environmental ~~(eg. dust)~~ impacts, eg. dust.
- ✕iii. 13. Immediately upon the completion of placement works, all disturbed areas shall be levelled and grassed, debris burned or buried and 'topping-up' rock left in a tidy appropriately sited stockpile.
- 14. Alignment will be on a curvature that fits the natural meander curvature of the channel.

16. Stopbanks

Activity

The purpose of this activity is to provide flood protection through the construction of earth embankments or other flood retaining structures. Stopbanking is the most effective and economical structural method of flood control for many New Zealand rivers. The stopbank activity includes building new or upgrading existing structures. Upgrading can include raising, widening, improving the structural integrity of, or relocating an existing structure. Stopbanks are major assets with a high capital value and their location and design is undertaken by a suitably qualified or experienced engineer.

The activity typically involves stripping vegetation and topsoil from affected areas, importation and placement of fill material, compaction, shaping, trimming, top soiling and re-grassing. All stopbank works are subjected to testing to ensure that compaction and permeability standards are achieved. Borrow areas are subjected to final shaping and top soiling and grass seeding.

Where stopbanks cross watercourses or where drainage outlet is required, floodgated culverts are installed through the embankment. This activity has the potential to cause a piping failure of the stopbank if not carried out properly, and therefore requires detailed design.

Resource Management Act 1991

These works are covered under s13 RMA (disturbance and placement of a structure on the bed of a river) where work is undertaken on river banks or dry river bed areas, and s9 RMA (use of land).

Potential beneficial effects

- Adjoining property and infrastructure is protected from flooding.

Potential adverse effects

- Bed and bank material is disturbed leading to short term sediment discharge, increased turbidity, and disturbance of habitat.
- Accidental discharge of fuels and lubricants from machinery.
- Reduces the river's capacity to spread and meander.
- Creates a barrier for ecosystems between the river corridor and the surrounding environment.
- Changes the pattern of bank overflows and floodable areas.
- Temporary reduction in flood protection during construction.
- Creates a barrier to overland flow paths and surface drainage, mitigated by floodgated culverts.

- Floodgates restrict the passage of fish and invertebrates.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. All stopbank design shall be undertaken by a ~~suitable~~ suitably qualified or experienced engineer.
- iv. 4. Specific design issues to be addressed shall include:–
 - Potential social and economic impacts on flood plain (positive & and negative);
 - Residual risk and mitigation measures;
 - Recreational access, aesthetic impacts and mitigation measures; and
 - Habitat impacts and mitigation measures.
- v. 5. All borrow areas shall be worked and fill material placed in a manner that prevents sediment entry to water and minimises dust discharge to the atmosphere. Vegetated buffer strips shall, where practicable, be maintained between borrow areas and channel edges to reduce the potential for sediment discharge into the watercourse.
- vi. 6. Stopbank crest levels shall be maintained at pre-construction levels throughout construction, unless a suitably qualified or experienced engineer's approval is obtained.
- vii. 7. Adequate machinery shall be maintained on site at all times during construction to respond to flood emergencies.
- viii. 8. All stopbank construction including vegetation re-establishment shall be programmed for expeditious completion.
- ix. 9. Specific design issues to be considered for floodgate structures shall include:–
 - Seepage control along outside of pipe (bedding, backfill, filter material, compaction standard, preventing expansion of pressurised pipes, and pipe jointing).
 - Scour protection (headwalls, and scour apron).
 - Floodgate (strength, top hung or side hung, fish passage, reliability of closure, debris passage, and maintenance access).
- x. 10. Where 'hard' structures (eg. concrete, sheet piling or timber walls) are incorporated in earth embankments, particular attention shall be given to transitional, seepage and safety issues.

- xi. 11. Conclusive evidence shall be presented that shows there shall be no measurable adverse flood impacts on the adjoining floodplain or upstream or downstream areas, that cannot be mitigated.

This shall be equivalent to a “*de minimis non curat lax*” standard. Impacts to be considered include:

- change in flood levels;
- velocity; and
- duration of flooding.

17. Tied Tree Edge Protection

Trenched willows, anchored willows

Activity

The purpose of this activity is to prevent lateral erosion of the river bank and maintain river alignment, by providing relatively heavy vegetative protection, developing strong root systems, and encouraging the deposition of sediment at the toe of the banks. Tied tree edge protection is the most common method of river bank erosion control utilised throughout the Region.

This activity involves the burying and anchoring of willow tree trunks into the river banks to stabilise and protect the banks from lateral erosion. Minor earthworks to shape the bank to create an appropriate alignment and batter shape may be required before the trees are placed. Appropriately sized trees for the size of channel are utilised and anchored in place with wire rope and either driven railway irons or concrete anchors to form a continuous protective live vegetation structure to buffer flows along the river bank. A hydraulic excavator is used to shape the bank, place the trees and anchors and drive the rails. Training groynes may also be used (refer other relevant references), often in conjunction with the trenched/ and anchored willows. Follow up planting is always carried out.

Resource Management Act 1991

These works are covered under s9 (use of land) and s13 (structures in the bed of a river) RMA.

Potential beneficial effects

- Lateral erosion is arrested – adjoining property and infrastructure is protected.
- Sediment discharged during high flow events is reduced.
- River bed sedimentation is reduced, enhancing river bed habitat for some fish species.
- Vegetated cover at water surface provides ideal fish habitat.
- Stable channel alignment is maintained, enhancing river bed habitat.
- Establishment of 'natural' front-line live edge protection – visually appealing.
- Establishment of vegetative corridor.

Potential adverse effects

- Bed and bank material is disturbed leading to short term sediment discharge, increased turbidity, and disturbance of habitat.
- Accidental discharge of fuels and lubricants from machinery.

- Temporary loss of amenity – dust/noise impact during construction.
- May present hazards to navigation if not maintained.
- Exposure or dislodgment of anchoring material due to damage.
- Periodic intervention for maintenance purposes.
- Short term visual impacts during establishment phase.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. ~~Ensure that all~~ All operations ~~follow~~ shall be undertaken in accordance with the Approved Code of Practice for Health and Safety in Tree Work~~s~~, Part Three~~s~~, River and Stream Operations, developed in collaboration with the Regional Council and issued by the Department of Labour.
- iv. 4. All tied tree works shall be designed by ~~an~~ a suitably qualified or experienced engineering practitioner. Particular attention shall be given to flow velocity, the founding depth, material requirements, localised and general scour potential, as well as both upstream and downstream alignment and transitional measures.
- v. 5. The design of tied tree works must take account of future maintenance requirements. Tied tree works, once established require maintenance works including layering and placing additional trees. Clear access to the works is required for that purpose.
- vi. 6. Batter preparation, foundation excavation and tied tree placement shall be undertaken by machinery operating from the river bank where practicable. Where machinery has to enter the watercourse, measures shall be taken to ~~minimize~~ minimise temporary adverse effects. These include temporary diversions, bunding off sections of the work, temporary causeways to elevate machinery above the water surface.
- vii. 7. To assist with minimising the period of river bank disturbance, as much material as possible shall be stock piled prior to commencement of works.
8. The extent of bank shaping and contouring will be the minimum required to establish the plants. Alignment will be on a curvature that fits the natural meander curvature of the channel.

18. Edge Vegetation Management

Tree layering and removal

Activity

The purpose of this activity is to prevent lateral erosion of the river bank and maintain river alignment, by developing and maintaining trees and other vegetation on channel banks. Tree planting will also provide tree material for subsequent layering or use in heavy tied tree erosion protection works.

This activity involves the ongoing maintenance of protection plantings on river banks, and includes layering, lopping and trimming, including mulching, and removal.

Tree lopping or layering is undertaken to increase the density of the existing live edge protection, and thus increase its effectiveness. Existing live edge protection trees are felled to the ground while maintaining an adequate connection with the stump such that vigorous re-growth is encouraged at bank level, where it is most useful. The root system is the primary method of bank protection, rather than the trunk and timber. The objective is to develop uniform vigorous low growth and prevent trees from becoming large ~~such that~~ they enough to obstruct flows or destabilise banks.

Trees used for layering are cut so that they fall and lie downstream of the cut stump. To avoid the layered trees being swept away in floods, a minimum connection of 25% of the tree's circumference shall remain uncut once the tree is felled. In many situations the connection is strengthened by way of mechanical (rope) attachment.

When trees are either diseased, or too large, or are growing in inappropriate locations so that they are reducing the channel capacity, or are undesirable species such as grey or crack willow, or where layering has resulted in channel narrowing, it is necessary to remove them.

Tree removal is usually carried out from the dry berm area, not the active river channel. Trees that are felled into the river channel shall be quickly removed. Usually, the root systems of felled trees are retained to retain bank stability.

Trees that are removed shall be stockpiled clear of floodplains either to decompose or for subsequent burning or off-site removal.

Resource Management Act 1991

These works are covered under s9 RMA (use of land), and s13 RMA (planting, removal of vegetation, or disturbance in the bed of a river), where work may be undertaken on river banks or dry river bed areas.

Potential beneficial effects

- Lateral erosion is arrested – adjoining property and infrastructure is protected.

- Stable channel alignment resulting in improved water quality through reduced sediment discharge.
- Improved water quality through the filtering of overland flow by ground vegetation in riparian margins.
- Vegetated cover at water surface provides ideal fish habitat through the provision of shade, litter, and habitat.
- Visual enhancement of the river bank.
- Establishment of vegetative corridor.
- Planting and maintenance of suitable species will reduce the potential for the riparian margins to become havens for plant pests, possums, and sawfly.
- Removal of large trees that may fall into the channel causing bank erosion, flow deflection, localised bed scour and increased sediment discharge.
- Removal of constrictions on the floodway capacity.

Potential adverse effects

- Bed and bank material is disturbed leading to short term sediment discharge, increased turbidity, disturbance of habitat.
- Accidental discharge of fuels and lubricants from machinery.
- Temporary loss of amenity – dust and noise impact during construction.
- May present hazards to navigation if not maintained.
- Exposure or dislodgment of anchoring material due to damage.
- Periodic intervention for maintenance purposes.
- Creates a barrier for recreation access to the river and could become a hazard for recreational use of the river, eg. canoeists.
- Layering reduces channel shading for fish and invertebrates over large reaches.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. All operations shall follow the Approved Code of Practice for Health and Safety in Tree Work; Part Three; River and Stream Operations, developed in collaboration with the Regional Council and issued by the Department of Labour.
- iv. 4. Trees shall be generally layered ~~at an age of 8-10 years, or between 100 mm and 300 mm trunk diameter~~ where practicable.

- v- 5. Layered trees shall be secured from floods by ensuring that a minimum connection of 25% of the tree diameter remains attached to the stump once the tree is felled.
- vi- 6. Where less than 25% of the tree diameter is attached, ~~ensure~~ mechanical anchoring of the tree is anchored to the main stump with ~~heavy tie plastic~~ Aquatech rope, wire rope or similar effective attachment, shall be undertaken.
- vii- 7. ~~Disturbance or damage~~ Removal of riparian ~~vegetation~~ and native trees shall be avoided where practicable.
- viii- 8. Tree layering operations shall be undertaken by machinery operating from the river bank where practicable. Where machinery has to enter the watercourse, measures shall be taken to minimise temporary adverse effects. These include temporary diversions, bunding ~~off~~ of sections of the work and temporary causeways to elevate machinery above the water surface.
- ix- 9. On the completion of works all surplus vegetative material shall be either removed from the site or disposed of either by burying or burning as soon as practicable.
- 10. On the completion of tree removal activities, all disturbed areas shall be revegetated.
- 11. Where practicable, the removal of undesirable tree species, such as grey and crack willow, shall take precedence during vegetation clearance and layering.

19. Tree Planting

Activity

The purpose of this activity is to prevent lateral erosion of the river bank and maintain river alignment, by planting trees that develop strong root systems to stabilise the river bank. Tree planting will also provide tree material for subsequent layering or use in heavy tied tree erosion protection works.

Willows continue to be the preferred species for primary erosion control immediately adjacent to the river channel. Willows are able to withstand the harsh environment of the river margins and may be specially bred so that they provide a good strong root system, do not spread readily, are not brittle, and are not readily palatable to stock and animal pests. In addition, the ability of the willow to be grown vegetatively from cut material means that it provides a potential resource, on site, for future protective works.

Outside a willow planting zone, native pioneer species or production species may be planted. This results in a multi-tiered vegetation regime that has good ground cover as well as shrubs and trees, which will help reduce the potential for undesirable weeds to establish.

It is important to note that it is extremely difficult to establish native vegetation in the harsh environment that typically exists directly on the river bank.

Resource Management Act 1991

These works are covered under s9 RMA (use of land), and s13 RMA (planting in the bed of a river), where planting may be undertaken on dry river bed areas.

Potential beneficial effects

- Lateral erosion is arrested – adjoining property and infrastructure is protected.
- Stable channel alignment resulting in improved water quality through reduced sediment discharge.
- Vegetated cover at water surface provides ideal fish habitat through the provision of shade, litter, and habitat.
- Improved water quality through the filtering of overland flow by ground vegetation in riparian margins.
- Establishment of vegetative corridor.
- Planting and maintenance of suitable species will reduce the potential for the riparian margins to become havens for plant pests, possums, and sawfly.
- Willows provide food for birds, fish and insects, including bees and native bats, shelter and shade.

- Planting diversified tree species for bank protection works will spread the biodiversity risk, such as willow sawfly, and will enhance the aesthetics of a river.

Potential adverse effects

- Bed and bank material is disturbed leading to short term sediment discharge, increased turbidity, and disturbance of habitat.
- Accidental discharge of fuels and lubricants from machinery.
- Smaller channels can be constricted, causing sediment retention which will affect the flood carrying capacity, and reduce the light reaching the water surface.
- Tree planting creates barriers for recreation access to the river and could become a hazard for recreational use of the river.
- Trees planted on inside bends can cause sediment retention and will affect the flood carrying capacity and will increase potential for erosion on the outside of the bend.
- Willow margin creates homogeneity of riparian habitat, reducing biodiversity and habitat value.

Standards for Good Practice

- i. 1. The specific Standards for Good Practice below shall be read in conjunction with the Generic Standards for Good Practice in Appendix B Part One.
- ii. 2. If the activity is undertaken in a site of special environmental value as listed in Part 3 Three of this Code, the activity ~~will~~ shall comply with the special standards specified for that site.
- iii. 3. All operations shall follow the Approved Code of Practice for Health and Safety in Tree Work; Part Three; River and Stream Operations, developed in collaboration with the Regional Council and issued by the Department of Labour.
- iv. 4. Edge protection plantings shall be fenced on their landward side if the area adjacent to them is used for stock grazing.
- v. 5. Specially bred willow/ and poplar species shall be planted that will not spread by seed and will not be prone to breakage.
- vi. ~~Planting shall aim to produce a multi-tiered canopy consisting of ground cover, shrubs and trees that will reduce the opportunity for weeds to flourish.~~
- vii. 6. Planting shall aim to produce a multi-tiered canopy consisting of ground cover, shrubs and trees that will reduce the opportunity for weeds to flourish ~~Plant exotic and native protection/production to utilise species such as flax inland of native to the protection planting where~~ locality as far as practicable.

- viii. 7. Species planted for potential productive purposes (eg. for use in tied tree protection) shall be located so that harvesting operations can be undertaken with minimal environmental effects, including no discharge of sediment or debris into the watercourse.
- ix. 8. Ecological characteristics and natural distribution factors shall be considered in selecting native species for riparian planting. Advice on particular species shall be sought for individual site conditions and opportunities.
- x. 9. When considering a site for native tree planting refer to Part Five of this Code.



PART THREE

~~SPECIAL STANDARDS FOR ACTIVITIES UNDERTAKEN IN SITES OF SPECIAL ENVIRONMENTAL VALUE AS NOTED IN THE ONE PLAN~~

Special Standards for Activities Undertaken in Sites of Special Environmental Value as Noted in the One Plan

1. Generic Special Standards

Where a site, reach or river ~~has a special environmental value and it is shown on the maps~~ is identified in Schedule AB^f of the One Plan as having one of the Values identified below, or is included in this part of the Code, the following generic special standards will apply:

1.1 Trout Spawning

- The use of mobile machinery ~~in or on the bed of a river or lake in a manner that disturbs the~~ wetted bed of the channel shall not take place in water bodies valued for the spawning of trout between 1 May and 30 September.

1.2 Whitebait Fishery Migration

The following standards shall apply in water bodies valued as sites of whitebait fishery migration:

- 1. The use of mobile machinery ~~in or on the bed~~ actively flowing channel of a river or lake in a manner that ~~disturbs the bed~~ releases sediment shall not take place in water bodies valued as sites of whitebait migration between ~~4 September~~ 15 August and ~~4 30 November~~ 30 November. For the avoidance of doubt, machinery operating above the water level to place rock or drive piles into the bed of the river is permitted so long as there is no associated excavation or bank shaping below the water level and subsequent sediment release.
- 2. Drain clearance (either mechanical or herbicidal) in these sites shall be avoided between ~~4 15 August~~ 15 August and ~~4 30 November~~ 30 November.

1.3 Inanga Spawning Sites

~~Tree clearance alongside Inanga Spawning Sites shall be undertaken to the following standards:~~

- ~~Other than removal of fallen or falling trees, tree removal shall not exceed 10m on any one bank per 1km reach between 1 February and 1 May.~~
- ~~Tree layering shall not be undertaken between 1 April and 31 July.~~
- ~~Any cleared area shall be revegetated as soon as practicable.~~
- ~~Notwithstanding standards 1 & 2, tree removal is permitted immediately adjacent (not upstream or downstream) to serious lateral erosion sites to the extent necessary to facilitate reinstatement of live edge protection work.~~

^f The schedule reference will need to be changed after appeals.

- ~~• Where tree material is required to reinstate erosion and no immediately adjacent material is available, it may be selectively sourced from non-frontline plantings either upstream or downstream of the erosion site.~~
- ~~• This does not apply to removal of pest plants in accordance with the Pest Plant Management Strategy.~~
- 1. New bank protection works that would preclude revegetation shall be designed to ensure that they are over-topped at high spring tide level so that water can reach the riparian vegetation (grasses) above.
- 2. Bank shaping activities shall not decrease the total length along the river of any areas that are over-topped at high spring tide level so that water can reach the riparian vegetation (grasses) above in reaches that are valued for inanga spawning.
- 3. Revegetation shall be ~~done~~ carried out with reference to the Planting Guide in Part Five using plant species which are known to enhance inanga spawning.
- 4. Vegetation clearance of any areas that are over-topped at high spring tide level, except tree removal, shall not take place between 1 February and 1 May.

Tree clearance alongside Inanga Spawning sites shall be undertaken to the following standards:

- 5. Other than removal of fallen or falling trees, tree removal shall not exceed 10 metres on any one bank per 1 km reach between 1 February and 1 May.
- 6. Tree layering shall not be undertaken between 1 February and 1 May.
- 7. Any cleared area shall be revegetated within one month where practicable. Where it is not practicable to revegetate the area within one month, the reason why shall be documented in accordance with the Code of Practice reporting and monitoring standards.
- 8. Notwithstanding standards 1 and 2, tree removal is permitted immediately adjacent (not upstream or downstream) to serious lateral erosion sites to the extent necessary to facilitate reinstatement of live edge protection work.
- 9. Where tree material is required to reinstate erosion and no immediately adjacent material is available, it may selectively be sourced from non-frontline plantings either upstream or downstream of the erosion site.
- 10. This does not apply to removal of pest plants in accordance with the Pest Plant Management Strategy. Note: An extract listing the pest plant to be controlled is included in Part Five of this Code.

1.4 Swimming Spots

- 1. Activities shall not result in suspended sediment being conspicuous at swimming spots beaches during weekends and public holidays between 1 December and 28 February.
- 2. Horizons Regional Council's ~~Manager~~ Environmental Compliance Protection Manager will be notified five working days prior to the commencement of works that will result in swimming spots beaches being ~~un-accessible~~ inaccessible during weekends and public holidays between 1 December and 28 February.

1.5 Hydrological Sites

1. ~~Horizons Regional Council Resource Data Manager will be notified five working days prior to the commencement of works within 500m~~ No work will be undertaken 500 metres upstream or 1000m and 1,000 metres downstream of a hydrological sites without the agreement of the Team Leader Hydrology or nominated deputy.

1.6 Tree Clearance Alongside Sites of Significance A1-A149 – Aquatic

Tree clearance alongside Sites of Significance – Aquatic (SOS-A) shall be undertaken to the following standards:

1. Bank protection works that would preclude revegetation shall be placed at or below the mean annual flood level.
- ~~4.~~ 2. Other than removal of fallen or falling trees, tree removal shall not exceed ~~40m~~ 10 metres on any one bank per 1 km reach between 1 April and 31 July.
- ~~2.~~ 3. Other than removal of fallen or falling trees, tree removal shall not exceed ~~400m~~ 100 metres on any one bank per 1 km reach within any 12 month period.
- ~~3.~~ 4. Tree layering shall not be undertaken between 1 April and 31 July.
- ~~4.~~ 5. Any cleared area shall be revegetated as soon as practicable.
- ~~5.~~ 6. Notwithstanding standards 1 & and 2, tree removal is permitted immediately adjacent (not upstream or downstream) to serious lateral erosion sites to the extent necessary to facilitate reinstatement of live edge protection work.
- ~~6.~~ 7. Where tree material is required to reinstate erosion and no immediately adjacent material is available, it may selectively be sourced from non-frontline plantings either upstream or downstream of the erosion site.

- ~~7.~~ 8. This does not apply to removal of pest plants in accordance with the Pest Plant Management Strategy. An extract listing the pest plant to be controlled is included in Part Five of this Code.
- ~~8.~~ ~~Bank protection works that would preclude revegetation shall be placed at or below the mean annual flood level.~~

2. Site Specific Special Standards

~~Where sites are not listed in the table below but fall within a scheme rating area, the rules in the One Plan will apply.~~

In addition to the generic and activity standards listed in Part One and Two of this code, and the Generic Special Standards listed above, the following site specific special standards will apply to any activities undertaken at the sites listed below, ~~and as shown on the maps included in this part of the Code or as identified in Schedule AB~~⁹ of the One Plan.

~~(Where sites are listed below but do not fall within areas with a Value of Flood Control and Drainage, Rule 16-13⁹ of the One Plan does not apply. Where sites are not listed in the table below but are specified as SOS-A, SOS-R or SOS-C in Schedule AB⁹ of the One Plan and fall within areas with a Value of Flood Control and Drainage in the One Plan, Rule 16-13⁹ in the One Plan also does not apply and a consent may be required.)~~

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
A41 (Round Bush Scenic Reserve and Tributary from approx. NZMS 260 S24:013-835 to source at approx. NZMS 260 S24:058-819)	Himatangi Scheme	Brown Mudfish	<p>No instream works (drain clearance) between 1 February and 30 April except for the reach upstream of State Highway 4. Mechanical drainage clearance is to occur on a maximum five year return cycle.</p> <p>Drain spraying is to occur on a maximum two year return cycle.</p> <p>No work is to occur during the spawning season (1 February to 30 April).</p> <p>A suitably trained person is to be present during the operation to retrieve brown mudfish, record numbers, and then replace them to the stream.</p>

⁹ The schedule reference will need to be changed after appeals.

⁴ The rule reference will need to be changed after appeals.

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p>A42 (Tokomaru River Tributary: from the confluence with the Tokomaru River at approx. NZMS 260 S24:243-705 to source);</p> <p>A43 (Tokomaru River Tributary: from the confluence with the Tokomaru River at approx. NZMS 260 S24:255-720 to source);</p> <p>A44 (Tokomaru River Tributary: from the confluence with the Tokomaru River at approx. NZMS 260 S24:259-734 to source)</p>	<p>Lower Manawatu Scheme</p>	<p><u>Redfin bully</u> <u>Koaro</u> <u>Banded</u> <u>Kokopu</u></p>	<p>No permanent barriers for fish passage will be introduced into the Tokomaru River.</p>
<p>A45 (Tokomaru River: from approx. NZMS 260 S24:198-776 to approx. NZMS 260 S25:240-698)</p>	<p>Lower Manawatu Scheme – mainstem of Tokomaru managed as far as State Highway.</p>	<p><u>Redfin Bully</u> <u>Koaro</u> <u>Banded</u> <u>Kokopu</u></p>	<p>No in-stream works (excluding flood-gate-outlet clearance) to be carried out between 1 July and 1 March (this includes anything that is carried out in-stream that could release sediment including but not limited to gravel extraction, channel clearance, instream-vegetation or debris removal).</p> <p>In January and February instream works may be carried out for erosion protection if the discharge of sediment as a result of the works is for no more than 5 days and for more than 12 hours in any one of these 5 days.</p> <p>Flood-gate-outlet-clearing within the exclusion time is allowed if work area banded to stop release of sediment.</p> <p>A consent will be required to undertake in-stream works at this site between 1 April to 30 September.</p> <p>In-stream works between 1 October and 1 February should be avoided where practicable. Where it is not practicable to avoid works, sediment from those works shall not discolour more than 25% of the width of the wetted channel at the works site and the reasons why works have been undertaken shall be documented in accordance with the Code of Practice reporting and monitoring standards.</p>

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
A46 (Makerua Swamp Wildlife Management Reserve: at approx. NZMS 260 S24:190-760)	Makerua Wetland	Brown Mudfish	(Note: the effects of clearing of drains that discharge into this area is considered minor and can be dealt with under generic standards in the Code of Practice). <u>No A consent will be required to undertake in-stream works at this site.</u>
A50 (Perawitis Wetland: at approx. NZMS 260 S25:094-688 and approx. NZMS 260 S25:095-688)	Koputaroa	Brown Mudfish	<u>No in-stream works (drain clearance) between 1 February and 31 May. A consent will be required to undertake work at this site unless work is for the purpose of wetland enhancement.</u>
A27 (Manawatu River Tributary: from the confluence with the Manawatu River at approx. NZMS 260 T24:410-937 to approx. NZMS 260 T24:444-940);	Lower Manawatu Scheme	Various Lamprey Banded Kokopu Shortjaw Kokopu Koaro Redfin Bully	<u>No A consent will be required to undertake in-stream works at these sites.</u>
A28 (Manawatu River Tributary: from the confluence with the Manawatu River at approx. NZMS 260 T24:392-929 to approx. NZMS 260 T24:413:902);			
A36 (Kahuterawa Stream and tributaries: from the confluence with the Manawatu River at approx. NZMS 260 S24:293-870 to source);			
A40 (Mangaone West Stream: from approx. NZMS 260 S23:258-050 to approx. NZMS 260 S23:236-064)			
A37 (Unnamed Wetland: at approx. NZMS 260 S24:223-877)	Lower Manawatu and Manawatu Schemes	Brown Mudfish	<u>Drain clearance 200m upstream of downstream of this site shall not be undertaken between 1 February and 31 May. A consent will be required to undertake work at this site.</u>
A47 (Mangaone Stream: from approx. NZMS 260 S24:142-711 to source);	Lower Manawatu Scheme	Shortjaw Kokopu Redfin Bully	<u>No A consent will be required to undertake in-stream works upstream of the SH57 bridge. Works downstream of the bridge are permitted if carried out under the Code of Practice standards Standards.</u>

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p>A48 <u>(Mangatangi Stream: from the confluence with the Mangaore Stream at approx. NZMS 260 S25:173-670 to source);</u></p> <p>A49 <u>(Mangaore Stream Tributary: from the confluence with the Mangaore Stream at approx. NZMS 260 S25:161-648 to source)</u></p>		<p><u>Koaro</u></p>	
<p>A35 <u>(Tiritea Stream: from the confluence with the Manawatu River at approx. NZMS 260 T24:302-880 to approx. NZMS 260 T24:341-866)</u></p>	<p>Lower Manawatu Scheme (Tiritea)</p>	<p>Lamprey</p>	<p>Before starting work on a reach, record the number of pools and ensure that works do not reduce the total number of pools within that reach. Indigenous vegetation shall only be removed if it has fallen into the bed of the stream. Willows shall be selectively cleared in accordance with the Code of Practice downstream of <u>State Highway SH57 bridge (at Massey)</u>. Works will be undertaken in accordance with the generic standards set out in the Code of Practice.</p>
<p>C2 <u>(Foxton Loop: specific sites within the reach from the confluence with the Manawatu River at approx. NZMS 260 S24:010-768 to source)</u></p>	<p>Lower Manawatu, Moutoa, Foxton East, Whirikino, and Pohangina Schemes</p>	<p>Longfin and shortfin eel (tuna)</p>	
<p>C3 <u>(Manawatu River: specific sites within the reach from the cross-river CMA boundary at NZMS 260 S24:2700963-6076686 to approx. NZMS 260 T24:477-949)</u></p>			
<p>C4 <u>(Oroua River: specific sites within the reach from approx. NZMS 260 S24:164-825 to a point approx. 150 m upstream of the State Highway 56 bridge at approx. NZMS 260 S24:176-842)</u></p>			
<p>C5 <u>(Pohangina River: specific sites</u></p>			

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p>within the reach from the confluence with the Manawatu River at approx. NZMS 260 T24:450-966 to approx. NZMS 260 T24:450-973)</p>	<p>Lower Manawatu Scheme</p>	<p>Dotterels Waders</p>	<p>Mud and silt dredging shall only occur as an incidental part of gravel extraction. Except at the gravel extraction sites specified below, between 1 August and 10 January 31 December, gravel extraction and bed disturbance on gravel beaches shall only take place:</p> <ul style="list-style-type: none"> • when an inspection of the site by a suitably trained person shows no dotterel are present; or • within 7 days following a flood of the area of beach that is the subject of the activity; or • where the extraction or disturbance commenced at the same location prior to 1 August and has not been interrupted for more than 7 days. <p>The gravel extraction restrictions specified above do not apply at the gravel extraction sites listed in Table 3.1 where gravel extraction may be carried out at anytime 100m upstream and downstream in accordance with the Code of Practice.</p>
<p>R18 (Manawatu River: from the cross-river CMA boundary at NZMS 260 S24:2700963-6076686 to approx. 100 m downstream of the SH1 bridge at approx. NZMS 260 S24:027-744); R19 (Manawatu River: from approx. NZMS 260 S24:101-715 to the confluence with the Oroua River at approx. NZMS 260 S24:164-825)</p>	<p>Lower Manawatu Scheme</p>	<p>Dotterels</p>	<p>Except at the gravel extraction sites specified below, between 1 August and 10 January 31 December, gravel extraction and bed disturbance on gravel beaches shall only take place:</p> <ul style="list-style-type: none"> • when an inspection of the site by a suitably trained person shows no dotterel are present; or • within 7 days following a flood of the area of beach that is the subject of the activity; or • where the extraction or disturbance commenced at the same location prior to 1 August and has not been interrupted for more than 7 days. <p>The gravel extraction restrictions specified above do not apply at the gravel extraction sites listed in Table 3.1 where gravel extraction may be carried out at anytime 100m upstream and downstream in accordance with the Code of Practice.</p>
<p>R9 (Manawatu River: from Teachers College at approx. NZMS 260 T24:332-891 to the Manawatu Gorge at approx. NZMS 260 T24:495-938); R13 (Manawatu River: from the confluence with the Oroua River at approx. NZMS 260 S24:164-825 to Teachers College at approx. NZMS 260 T24:332-891)</p>	<p>Lower Manawatu Scheme</p>	<p>Dotterels</p>	<p>Except at the gravel extraction sites specified below, between 1 August and 10 January 31 December, gravel extraction and bed disturbance on gravel beaches shall only take place:</p> <ul style="list-style-type: none"> • when an inspection of the site by a suitably trained person shows no dotterel are present; or • within 7 days following a flood of the area of beach that is the subject of the activity; or • where the extraction or disturbance commenced at the same location prior to 1 August and has not been interrupted for more than 7 days. <p>The gravel extraction restrictions specified above do not apply at the gravel extraction sites listed in Table 3.1 where gravel extraction may be carried out at anytime 100m upstream and downstream in accordance with the Code of Practice.</p>

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p>R1 – R8 (Manawatu River: from approx. NZMS 260 U23:708-003 to approx. NZMS 260 U23:737-025 (confluence with Mangatera Stream))</p> <p>R2 (Manawatu River: from approx. NZMS 260 T24:614-897 to approx. NZMS 260 U23:708-003)</p> <p>R3 (Manawatu River: from the confluence with the Tiraumea River at approx. NZMS 260 T24:553-871 to approx. NZMS 260 T24:614-897)</p> <p>R4 (Tiraumea River: from the confluence with the Manawatu River at approx. NZMS 260 T24:553-871 to the confluence with the Makairo Stream at approx. NZMS 260 T24:597-831)</p> <p>R5 (Mangatainoka River: from the confluence with the Tiraumea River at approx. NZMS 260 T24:557-856 to approx. NZMS 260 T24:495-786).</p> <p>R6 (Manawatu River: from the Manawatu Gorge at approx. NZMS 260 T24:495-938 to the confluence with the Tiraumea River at approx. NZMS 260 T24:553-871)</p> <p>R7 (Mangahao River: from approx. NZMS 260 T24:469-826 to approx. NZMS 260 T25:309-684)</p>	<p>South East Ruahine, Eastern Manawatu, Mangatainoka, Upper Manawatu / Lower Mangahao Schemes</p>	<p>Dotterels</p>	<p>Except at the gravel extraction sites specified below, between <u>Between 1 August and 10 January 31 December</u>, gravel extraction and bed disturbance on gravel beaches shall only take place:</p> <ul style="list-style-type: none"> when an inspection of the site by a suitably trained person shows no dotterel are present; or within 7 days following a flood of the area of beach that is the subject of the activity; or where the extraction or disturbance commenced at the same location prior to 1 August and has not been interrupted for more than 7 days. <p>The gravel extraction restrictions specified above do not apply at the gravel extraction sites listed in Table 3-1 where gravel extraction may be carried out at anytime 100m upstream and downstream in accordance with the Code of Practice.</p>

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
R8 (Mangahao River: from the confluence with the Manawatu River at approx. NZMS 260 T24:496-892 to approx. NZMS 260 T24:469-826)			

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p>A10 (Mangatainoka Tributary: from the confluence with the Mangatainoka River at approx. NZMS 260 S25:249-535 to source);</p> <p>A11 (Ngamaia Stream Tributary: from the confluence with the Ngamaia Stream at approx. NZMS 260 S25:243-568 to source);</p> <p>A12 (Mangatainoka River: from approx. NZMS 260 S25:262-562 to source);</p> <p>A13 (Mangatainoka River Tributary: from the confluence with the Mangatainoka River at approx. NZMS 260 S25:252-555 to source);</p> <p>A14 (Rawnsley Stream: from the confluence with the Mangatainoka River at approx. NZMS 260 S25:259-555 to source);</p> <p>A15 (Makotukutuku Stream: from the confluence with the Mangatainoka River at approx. NZMS 260 S25:279-576 to source);</p> <p>A16 (Tramway Creek: from the confluence with the Mangatainoka River at approx.</p>	<p>Mangatainoka</p>	<p>Various Shortjaw Kokopu Koaro Dwarf Galaxias</p>	<p>No A consent will be required to undertake in-stream works at these sites.</p>

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p><u>NZMS 260 T25:326-625 to source</u>;</p> <p>A17 (Bruce Stream Tributary: from the confluence with the Bruce Stream at approx. <u>NZMS 260 T25:332-510 to source</u>);</p> <p>A18 (Makakahi River Tributary: from the confluence with the Makakahi River at approx. <u>NZMS 260 S25:286-514 to source</u>);</p> <p>A19 (Makakahi River: from the confluence with a tributary at approx. <u>NZMS 260 S25:286-514 to source</u>);</p> <p>A1 (Manawatu River and tributaries: from the confluence with the Manawatu River at approx. <u>NZMS 260 U23:780-258 to source</u>)</p>	<p>South East Ruahine</p>	<p>Koaro Dwarf Galaxias</p>	<p><u>No A consent will be required to undertake in-stream works between 1 April and 1 June.</u></p> <p><u>A consent will be required to undertake in-stream works between 1 September and 7 January.</u></p>
<p>A2 (Mangatewainui River: from approx. <u>NZMS 260 U23:828-177 to approx. NZMS 260 U23:785-231</u>);</p> <p>A3 (Tamaki River including East and West Branches: from approx. <u>NZMS 260 U23:710-131 to source</u>);</p> <p>A4 (Kumeti/Mangapuaka Stream: from approx. <u>NZMS 260 T23:696-091 to source</u>);</p> <p>A5 (Rokaiwhana Stream: from the</p>	<p>South East Ruahine</p>	<p>Dwarf Galaxiid Galaxias Shortjaw Kokopu in Mangaatua</p>	<p><u>No A consent will be required to undertake in-stream works in Tamaki East between 1 May and 1 March.</u></p> <p><u>No A consent will be required to undertake in-stream works in Kumeti Site of Significance between 1 September and 31 December 7 January.</u></p> <p><u>No A consent will be required to undertake in-stream works in West Tamaki, Rokaiwhana, Mangapukakakahu, Otamarahu and Oruakeretaki Site of Significance's between 1 September and 31 December 7 January.</u> Machinery used for planting and layering work will be driven up the dry bed of the river in accordance with the standards in the Code of Practice, crossing the wetted channel a minimum number of times. <u>Avoid in-stream works in Site of Significance (A3) in Tamaki at State</u></p>

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p><u>confluence with the Tamaki River at approx. NZMS 260 T23:697-091 to source);</u></p> <p>A6 (Mangapukakakahu Stream: from the confluence with the Oruakeretaki River at approx. NZMS 260 T23:666-023 to source);</p> <p>A7 (Oruakeretaki Stream: from approx. NZMS 260 T23:642-045 to approx. NZMS 260 T23:618-067);</p> <p>A8 (Oruakeretaki Tributary: from the confluence with the Oruakeretaki Stream at approx. NZMS 260 T23:628-058 to source);</p> <p>A22 (Mangaatua Stream: from approx. NZMS 260 T24:590-992 to approx. NZMS 260 T23:574-023)</p> <p>A147; A148 (Waikawa Stream: Waikawa Stream mainstem from the cross-river CMA boundary at NZMS 260 S25:2691531-6055429 to source)</p>	<p>Ohau--Manakau Scheme</p>	<p>Shortjaw Kokopu Redfin Bully Keare</p>	<p><u>Highway 2 upstream of Top Grass Road between 1 September and 31 December 7 January where practicable. Where it is not practicable to avoid works, sediment from those works shall not discolour more than 25% of the width of the wetted channel at the works site and the reasons why works have been undertaken shall be documented in accordance with the Code of Practice reporting and monitoring standards.</u></p> <p><u>No in-stream works in Mangatūwainui Mangaatūwainui Site of Significance between 1 September and 31 December 7 January.</u></p> <p><u>No barriers for fish passage (temporary or permanent) will be introduced into the Mangaatua Stream.</u></p> <p><u>No A consent will be required to undertake in-stream works in the Mangaatua Site of Significance between 1 April and 30 June.</u></p>
<p>A147; A148 (Waikawa Stream: Waikawa Stream mainstem from the cross-river CMA boundary at NZMS 260 S25:2691531-6055429 to source)</p>	<p>Ohau--Manakau Scheme</p>	<p>Shortjaw Kokopu Redfin Bully Keare</p>	<p><u>No A consent will be required to undertake in-stream works in Waikawa River upstream of where it is crossed by North Manakau Road.</u></p> <p><u>No A consent will be required to undertake in-stream works in Waikawa River upstream of where it is crossed by State Highway SH1 between 1 March and 30 June.</u></p> <p><u>No A consent will be required to undertake in-stream works in the Waikawa River downstream of where it is crossed by State Highway SH1 between 1 September and 1 November.</u></p> <p><u>Avoid in-stream works in the Waikawa River between 1 November and 1 March where practicable. Where it is not practicable to avoid works,</u></p>

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p>A129 (Ohau River: from approx. NZMS 260 S25:982-578 to approx. NZMS 260 S25:039-574), A130</p>	<p>Ohau-Manakau Scheme</p>	<p>Redfin Bully Lamprey Shortjaw Banded Kokopu</p>	<p>sediment from those works shall not discolour more than 25% of the width of the wetted channel at the works site and the reasons why works have been undertaken shall be documented in accordance with the Code of Practice reporting and monitoring standards.</p> <p>No in-stream works in Makirekie Stream (A130):</p> <p>No A consent will be required to undertake in-stream works in the unnamed Muhunua East trout spawning tributary of the Ohau River.</p> <p>No in-stream works A consent will be required to undertake in-stream works in the Ohau River or tributaries between 1 September and 1 November.</p> <p>Avoid works in-stream between 1 November and 1 March where practicable. Where it is not practicable to avoid works, sediment from those works shall not discolour more than 25% of the width of the wetted channel at the works site and the reasons why works have been undertaken shall be documented in accordance with the Code of Practice reporting and monitoring standards.</p>
<p>A127, A128 (Ohau River: from approx. NZMS 260 S25:061-575 to approx. NZMS 260 S25:098-588), A145, A146</p>	<p>Ohau-Manakau Scheme</p>	<p>Various Redfin Bully Bluegill Bully Banded Kokopu</p>	<p>No A consent will be required to undertake in-stream works at these sites between 15 April and 1 March.</p>
<p>R39 (Ohau River: from the cross-river CMA boundary at NZMS 260 S25:2692921-6059503 to approx. NZMS 260 S25:007-569); R42 (Waikawa Stream: from the cross-river CMA boundary at NZMS 260 S25:2691531-6055429 to approx. NZMS 260 S25:000-511)</p>	<p>Ohau-Manakau Scheme</p>	<p>Dotterels Waders</p>	<p>Mud and silt dredging shall only occur as an incidental part of gravel extraction.</p> <p>Except at the gravel extraction sites specified below, between Between 1 August and 10 January 31 December, gravel extraction and bed disturbance on gravel beaches (beach raking) shall only take place:</p> <ul style="list-style-type: none"> • when an inspection of the site by a suitably trained person shows no dotterel are present; or • within 7 days following a flood of the area of beach that is the subject of the activity; or

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
A62 (Rangitikei River: from approx. NZMS 260 S23:184-206 to approx. NZMS 260 S23:210-222)	Porewa— and Rangitikei Schemes	Redfin Bully	<ul style="list-style-type: none"> where the extraction or disturbance commenced at the same location prior to 1 August and has not been interrupted for more than 7 days. <p>No removal of riparian vegetation downstream of confluence with Kuku Stream.</p> <p>Avoid in-stream works instream between 1 November August and 4 March 31 December where practicable. Where it is not practicable to avoid works, sediment from those works shall not discolour more than 25% of the width of the wetted channel at the works site and the reasons why works have been undertaken shall be documented in accordance with the Code of Practice reporting and monitoring standards.</p> <p>No instream A consent will be required to undertake works at this site.</p>
A63 (Tutaenui Stream Tributary: from the confluence with the Tutaenui Stream at approx. NZMS 260 S23:104-104 to source)	Tutaenui— and Rangitikei Schemes	Brown Mudfish	
A64 (Forest Road Wetland: from approx. NZMS 260 S23:016-028 to approx. NZMS 260 S23:040-034)	Forest Road and Rangitikei Schemes	Giant Kokopu	<p>No A consent will be required to undertake in-stream works (drain clearance) on the Amon Drain/Paranui No. 2 Drain between 40 January and 1 July 1 October and 31 December.</p> <p>Drain spraying of the Forest Road Main Drain shall be undertaken when the drain is not flowing.</p> <p>Mud and silt dredging shall only occur as an incidental part of gravel extraction.</p> <p>Except at the gravel extraction sites specified below, between 1 August and 10 January, gravel extraction and bed disturbance on gravel beaches shall only take place:</p> <ul style="list-style-type: none"> when an inspection of the site shows no detterel are present; or within 7 days following a flood of the area of beach that is the subject of the activity; or where the extraction or disturbance commenced at the same
R24	Rangitikei Scheme	Dotterels Waders	

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p>R22 (Rangitikei River: from approx. NZMS 260 S23:200-221 to approx. NZMS 260 S23:217-231);</p> <p>R23 (Rangitikei River: from approx. NZMS 260 S23:111-104 to approx. NZMS 260 S23:200-221)</p>	<p>Rangitikei Scheme</p>	<p>Dotterels</p>	<p>location prior to 1 August and has not been interrupted for more than 7 days.</p> <p>Between 1 August and 40 January 31 December, gravel extraction and bed disturbance on gravel beaches shall only take place:</p> <ul style="list-style-type: none"> when an inspection of the site by a suitably trained person shows no dotterel are present; or within 7 days following a flood of the area of beach that is the subject of the activity; or where the extraction or disturbance commenced at the same location prior to 1 August and has not been interrupted for more than 7 days.
<p>R14 (Oroua River: from approx. NZMS 260 T23:500-242 to approx. NZMS 260 T23:519-267);</p> <p>R15 (Oroua River: from approx. 200 m upstream of SH3 bridge at approx. NZMS 260 S23:243-005 to SH54 bridge at approx. NZMS 260 S23:293-044);</p> <p>R16 (Oroua River: from approx. 300 m upstream of Kopane Bridge at approx. NZMS 260 S24:218-965 to approx. 200 m upstream of SH3 bridge at approx. NZMS 260 S23:243-005)</p> <p>R17 (Kiwitea Stream: from approx. NZMS 260 T23:332-116 to approx. NZMS 260 T23:339-127)</p>	<p>Lower Manawatu, Kiwitea and Pohangina-Oroua Schemes (Oroua River)</p>	<p>Dotterels</p>	<p>Except at the gravel extraction sites specified below, between 1 August and 40 January 31 December, gravel extraction and bed disturbance on gravel beaches shall only take place:</p> <ul style="list-style-type: none"> when an inspection of the site by a suitably trained person shows no dotterel are present; or within 7 days following a flood of the area of beach that is the subject of the activity; or where the extraction or disturbance commenced at the same location prior to 1 August and has not been interrupted for more than 7 days. <p>The gravel extraction restrictions specified above do not apply at the gravel extraction sites listed in Table 3-3, where gravel extraction may be carried out at anytime 50m upstream and downstream in accordance with the Code of Practice.</p>
<p>R10 (Pohangina River: from approx. NZMS 260 T23:534-168 to approx.</p>	<p>Pohangina-Oroua (Pohangina River)</p>	<p>Dotterels</p>	<p>Between 1 August and 40 January 31 December, gravel extraction and bed disturbance on gravel beaches shall only take place:</p>

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p>NZMS 260 T23:577-213); R11 (Pohangina River: from approx. NZMS 260 T23:464-043 to approx. NZMS 260 T23:493-113); R12 (Pohangina River: from the confluence with the Manawatu River at approx. NZMS 260 T24:448-965 to approx. NZMS 260 T23:464-043)</p>			<ul style="list-style-type: none"> when an inspection of the site by a suitably trained person shows no dotterel are present; or within 7 days following a flood of the area of beach that is the subject of the activity; or where the extraction or disturbance commenced at the same location prior to 1 August and has not been interrupted for more than 7 days.
<p>A31 (Makawakawa Stream Tributary: from NZMS 260 T23:606-173 to source); A33 (Waitokanui Stream: from the confluence with the Pohangina River at approx. NZMS 260 T23:474-069 to source); A38 (Mangapikopiko Stream: from the confluence with the Oroua River at NZMS 260 T22:515-307 to NZMS 260 T22:538-317)</p>	Pohangina/Oroua	Various Species Koaro Redfin Bully Banded Kokopu	No in-stream A consent will be required to undertake works at these sites.
<p>A32 (Pohangina River: from approx. NZMS 260 T23:468-058 to approx. NZMS 260 T23:469-086)</p>	Pohangina Scheme	Koaro	No barriers to fish passage in the Pohangina River.
<p>A116-A121, A123-A125</p>	Whangaehu Scheme	Whio	No in-stream works at these sites.
<p>A122 (Taukoro Stream: from the confluence with the Mangawhero River at approx. NZMS 260 S22:083-566 to source)</p>	Whangaehu Scheme	Koaro	No barriers to fish passage in the Whangaehu River.

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p>R30 <u>Whangaehu River and tributaries: from approx. NZMS 260 T20:397-960 to source)</u></p> <p>R31 <u>(Makahikatoa Stream and tributaries: from approx. NZMS 260 T20:396-008 to source)</u></p> <p>R32 <u>(Wahianoa Stream: from approx. NZMS 260 T20:370-024 to source)</u></p> <p>R33 <u>(Unnamed tributary of the Tokiahuru Stream: from approx. NZMS 260 T20:359-022 to source)</u></p> <p>R34 <u>(Unnamed tributary of the Tokiahuru Stream: from approx. NZMS 260 T20:341-027 to source),</u></p> <p>R35 <u>(Unnamed tributary of the Te Unuunakapuataariki Stream: from approx. NZMS 260 T20:329-999 to source)-</u></p> <p>R36 <u>(Te Unuunakapuataariki Stream and tributaries: from approx. NZMS 260 T20:311-980 to source)</u></p>	<p>Whangaehu Scheme</p>	<p>Dotterels</p>	<p><u>Except at the gravel extraction sites specified below, between 1 August and 40 January 31 December, gravel extraction and bed disturbance on gravel beaches shall only take place:</u></p> <ul style="list-style-type: none"> when an inspection of the site by a <u>suitably trained person</u> shows no dotterel are present; or within 7 days following a flood of the area of beach that is the subject of the activity; or where the extraction or disturbance commenced at the same location prior to 1 August and has not been interrupted for more than 7 days.
<p>R37 <u>(Whangaehu River: from the cross-river CMA boundary at NZMS 260 S23:2690359-6128748 to the SH3 Bridge at approx. NZMS 260 S23:949-311)</u></p>	<p>Whangaehu Scheme</p>	<p>Dotterels Waders</p>	<p>Mud and silt dredging shall only occur as an incidental part of gravel extraction.</p> <p><u>Except at the gravel extraction sites specified below, between 1 August and 40 January 31 December, gravel extraction and bed disturbance on gravel beaches shall only take place:</u></p> <ul style="list-style-type: none"> when an inspection of the site by a <u>suitably trained person</u> shows no dotterel are present; or

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
A136 (Akitio River Tributary: from the confluence with the Akitio River at approx. NZMS 260 U24:955-866 to source)	Akitio Scheme	Banded Kokopu	<ul style="list-style-type: none"> within 7 days following a flood of the area of beach that is the subject of the activity; or where the extraction or disturbance commenced at the same location prior to 1 August and has not been interrupted for more than 7 days. <p>No instream A consent will be required to undertake works at this site.</p>
A137 (Middle Creek: from the confluence with the Akitio River at approx. NZMS 260 U25:986-654 to source)	Akitio Scheme	Redfin Bully Banded Kokopu	<p>No instream A consent will be required to undertake works at this site.</p>
A138 (Wakawaihine Stream: from the confluence with the Akitio River at approx. NZMS 260 U25:985-657 to approx. NZMS 260 U25:990-677)	Akitio Scheme	Redfin Bully	<p>Avoid works instream between 1 November and 1 March where practicable. Where it is not practicable to avoid works, sediment from those works shall not discolour than 25% of the width of the wetted channel at the works site and the reasons why works have been undertaken shall be documented in accordance with the Code of Practice reporting and monitoring standards.</p> <p>Between 1 July and 1 March, works that disturb the bed or riparian margin shall only take place:</p> <ul style="list-style-type: none"> when an inspection of the site shows no blue ducks are present; or within 7 days following a flood of the area of beach that is the subject of the activity; or where the works or disturbance commenced at the same location prior to 1 July and has not been interrupted for more than 7 days.
A138-A139 A65 (Mangatepopo Stream: from the confluence with the Whanganui River at approx. NZMS 260 S19:289-405 to approx. NZMS 260 T19:312-323; Okupata Stream: from the confluence with the Mangatepopo Stream at approx. NZMS 260 S19:288-398 to approx.	Upper Whanganui Scheme	Whio Koaro in Makatote River Shortjaw Kokopu in Makino Stream Tributary	<p>Avoid works instream between 1 November and 1 March where practicable. Where it is not practicable to avoid works, sediment from those works shall not discolour than 25% of the width of the wetted channel at the works site and the reasons why works have been undertaken shall be documented in accordance with the Code of Practice reporting and monitoring standards.</p> <p>Between 1 July and 1 March, works that disturb the bed or riparian margin shall only take place:</p> <ul style="list-style-type: none"> when an inspection of the site shows no blue ducks are present; or within 7 days following a flood of the area of beach that is the subject of the activity; or where the works or disturbance commenced at the same location prior to 1 July and has not been interrupted for more than 7 days.

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p>NZMS 260 S19:264-364; Tawhitikuri Stream: from the confluence with the Mangatepopo Stream at approx. NZMS 260 T19:309-361 to approx. NZMS 260 T19:311-338)</p> <p>A66 (Otamangakau Outlet: from the confluence with the Whanganui River at approx. NZMS 260 T19:354-409 to approx. NZMS 260 T19:359-411; Otamarautara Stream and tributaries: from the confluence with the Whanganui River at approx. NZMS 260 T19:329-408 to source; Otongokaku Stream: from the confluence with the Whanganui River at approx. NZMS 260 T19:319-405 to approx. NZMS 260 T19:321-398; Waipapaiti Stream: from the confluence with the Whanganui River at approx. NZMS 260 T19:309-401 to approx. NZMS 260 T19:312-395; Waione Stream: from the confluence with the Whanganui River at approx. NZMS 260 S19:276-427 to approx. NZMS 260 S19:245-396; Waipari Stream: from the confluence with the Whanganui River at approx. NZMS 260 S19:269-456 to approx. NZMS 260 S18:282-516; Waionenui Stream: from the confluence with the Waipari Stream at approx. NZMS 260 S19:289-476 to approx. NZMS 260 S19:292-478; Waione</p>			

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p><u>Stream: from the confluence with the Waipari Stream at approx. NZMS 260 S19:282-465 to approx. NZMS 260 S19:286-462; Whanganui River: from the confluence with the Whakapapa River at approx. NZMS 260 S19:188-496 to approx. NZMS 260 T19:334-332)</u></p> <p><u>A67 (Whakapapa River and Whakapapiti Stream: from to confluence with the Whanganui River at approx. NZMS 260 S19:188-495 to source)</u></p> <p><u>A68 (Pungapunga River: from approx. NZMS 260 S18:291-612 to source)</u></p> <p><u>A69 (Pungapunga River: from approx. NZMS 260 S18:234-573 to source)</u></p> <p><u>A70 (Ongarue River and tributaries: from approx. NZMS 260 T17:314-864 to source)</u></p> <p><u>A71 (Mangatukutuku Stream: from approx. NZMS 260 S18:166-770 to approx. NZMS 260 S18:204-729)</u></p> <p><u>A72 (Maramataha River: from approx. NZMS 260 S17:176-825 to source)</u></p> <p><u>A73 (Piropiro Stream: from the</u></p>			

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p><u>confluence with the Maramataha River at approx. NZMS 260 S17:251-804 to source)</u></p> <p><u>A74 (Paupangonui Stream: from the confluence with the Piropiro River at approx. NZMS 260 S17:265-819 to source)</u></p> <p><u>A75 (Totara Stream: from the confluence with the Maramataha River at approx. NZMS 260 S18:271-769 to source)</u></p> <p><u>A76 (Unnamed Maramataha River Tributary: from the confluence with the Maramataha River at approx. NZMS 260 S18:273-793 to source)</u></p> <p><u>A80 (Retaruke River: from the confluence with the Whanganui River at approx. NZMS 260 R19:890-309 to approx. NZMS 260 S19:027-213)</u></p> <p><u>A81 (Horomea Stream: from approx. NZMS 260 S19:947-252 to source)</u></p> <p><u>A82 (Morinui Stream: from approx. NZMS 260 S19:954-233 to source)</u></p> <p><u>A85 (Kaiwhakauka Stream: from approx. NZMS 260 R19:878-305 to source)</u></p> <p><u>A102 (Makatote River: from the confluence with the Manganui o te</u></p>			

Site Number and Locality Description	Scheme	Species	Special Standards for Good Practice
<p>Ao River at approx. NZMS 260 S20:128-119 to source)</p> <p>A103 (Manganui o te Ao River: from the confluence with the Whanganui River at approx. NZMS 260 R20:861-980 to source)</p> <p>A105 (Ruatiti Stream: from the confluence with the Manganui o te Ao River at approx. NZMS 260 S20:993-080 to source)</p>			



PART SEVEN

Definition of Terms

Definition of Terms

Where *italics* are used in this definition of terms, the definition is from section 2 of the Resource Management Act 1991.

<u>Accretion</u>	<u>The growth or increase by means of gradual additions.</u>
Aggradation	The building up of the land surface by the deposition of fluvial or marine deposits.
Aggregate	Crushed rock or gravel screened to sizes for use in road surfaces, concrete or bituminous mixes.
Amenity Values	<i>Those natural or physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes.</i>
Archaeological Site	Any place in New Zealand that – (a) Either; (i) Was associated with human activity that occurred before 1900; or (ii) Is the site of the wreck of any vessel where that wreck occurred before 1900; and (b) Is or may be able through investigation by archaeological methods to provide evidence relating to the history of New Zealand. (Section 2, Historic Places Act 1993)
<u>Bank</u>	<u>Includes the banks bounding either side of a river bed. Banks may be natural landforms such as terraces or artificial such as stopbanks.</u>
<u>Beach</u>	<u>In relation to any river, stream or lake, refers to the zone of unconsolidated material that extends landward from the waterline to where there is a marked change in material or physiographic form, or to the line of permanent vegetation.</u>
Bed	(a) <i>in relation to any river;</i> (i) <i>for the purposes of esplanade reserves, esplanade strips, and subdivision, the space of land which the waters of the river cover at its annual fullest flow without overtopping its banks; and</i> (ii) <i>in all other cases, the space of land which the waters of the river cover at its fullest flow with <u>without</u> overtopping its banks; and</i>

- (b) *in relation to any lake, except a lake controlled by artificial means;—*
 - (i) *for the purposes of esplanade reserves, esplanade strips, and subdivision, the space of land which the waters of the lake cover at its annual highest level without exceeding its margin:*
 - (ii) *in all other cases, the space of land which the waters of the lake cover at its highest level without exceeding its margin; and*
- (c) *in relation to any lake controlled by artificial means, the space of land which the waters of the lake cover at its maximum permitted operating level; and*
- (d) *in relation to the sea, the submarine areas covered by the internal waters and the territorial sea.*

Bed-load The material (sand, silt, gravel and rock detritus) transported down a river in or on the bed of a river, as opposed to material transported in suspension.

Bed material Includes all material within the bed of a river derived from catchment erosion processes. This includes all technical categories of clay, silt, sand, gravel and larger size particles.

Berm The floodway between the river and its stopbanks or terraces.

Bund A bank or structure (usually shallow) built to contain or hold fluid discharge.

Catchment The total area from which a single river collects surface run-off.

Channel width The horizontal distance between the toes of the river banks averaged over the reach where the works are undertaken.

Coastal Marine Area (CMA) *The foreshore, seabed, and coastal water, and the air space above the water;—*

- (a) *of which the seaward boundary is the outer limits of the territorial sea;—*
- (b) *of which the landward boundary is the line of mean high water springs, except that where that line crosses a river, the landward boundary at that point shall be whichever is the lesser of;—*

- (i) ~~One~~ 1 kilometre upstream from the mouth of the river; or
- (ii) the point upstream that is calculated by multiplying the width of the river mouth by five 5.

Construct	Includes create or build, alter, reconstruct, extend, remove and demolish.
Cross-sections	Vertical profiles of the surface contour across rivers and streams.
<u>Culvert</u>	<u>A drain crossing under a road or embankment. All culverts with floodgates are called floodgated culverts.</u>
<u>Degrade</u>	<u>The lowering of a river by erosion of its bed.</u>
<u>Deposition</u>	<u>The entrapment and/or settling out of sediment carried by a natural agency (eg. rivers, wind) in one location, leading to accretion.</u>
<u>Drainage channel</u>	<u>A watercourse, the bed of which is either artificial or has been modified away from its natural bed.</u>
Erosion	The process of the wearing away of the land's surface by natural processes and human activities, and the transporting of the resulting sediment.
Excavation	Removal by extraction or separation (from the original location).
Extraction	Removal by excavation or separation (from the original location).
Flood level	The vertical height reached by flood water at a particular site.
Floodplain	The surface of relatively smooth land built of alluvium, adjacent to a river channel, and covered with water during flooding of the river.
Floodway	An artificial passage for flood water.
Flow path	The land area between the bed of a river or drain and the crest of a stopbank.
Gravel	A collective term for the material in a bed of a river. It includes sand, silt, shingle, rocks and boulders.
Greywacke	An indurated, poorly sorted sandstone or mudstone.
<u>Habitat</u>	<u>A place or type of site where an organism or population naturally occurs.</u>

<u>Hapū</u>	<u>A sub-unit of a Māori social, political and economic structure comprised of whanau (extended families) all recognising descent from a common ancestor.</u>
Heritage place	A place of special interest by having special cultural, architectural, historical, scientific, ecological, or other interest (refer to section 189(2) of the <u>Resource Management Act 1991</u>).
Heritage values	The values associated with any place of special interest, character, intrinsic or amenity value or visual appeal, or of special significance for spiritual, cultural, scientific or historical (including archaeological) reasons.
Historic area	An area of land that: <ul style="list-style-type: none">(a) Contains an inter-related group of historic places; and(b) Forms part of the historical and cultural heritage of New Zealand; and(c) Lies within the territorial limits of New Zealand. (Section 2, Historic Places Act 1993).
Historic place	(a) Means: <ul style="list-style-type: none">(i) Any land (including an archaeological site); or(ii) Any building or structure (including part of a building or structure); or(iii) Any combination of land and a building or structure that forms part of the historical and cultural heritage of New Zealand and lies within the territorial limits of New Zealand; and <p>(b) Includes anything that is in or fixed to such land. (Section 2, Historic Places Act 1993).</p>
<u>Inanga</u> <u>(galaxias maculatus)</u>	<u>The adult of one of the juvenile life stages known collectively as “whitebait”.</u>
<u>Indigenous</u>	<u>In relation to species means plants and animals found naturally in New Zealand.</u>
Infrastructure	Networks, links and parts of facility systems, as in transport infrastructure (roads, rail, parking, etc) or water system infrastructure (the pipes, pumps and treatment works, etc).
<u>Inland toe of a stopbank</u>	<u>The point where the stopbank slope (usually 1 in 2) on the inland side of the stopbank meets the unaltered ground surface.</u>

<u>In-stream values</u>	<u>Those uses or values of rivers and streams that are derived from within the river system itself, and include those associated with freshwater ecology and recreational, scenic and educational uses.</u>
<u>In-stream works</u>	<u>Works that require the use of mobile machinery in the wetted channel or will release sediment in the watercourse.</u>
<u>Intrinsic values</u>	<i>In relation to ecosystems, means those aspects of ecosystems and their constituent parts which have value in their own right, including:–</i> <i>(a) their biological and genetic diversity; and</i> <i>(b) the essential characteristics that determine an ecosystem’s integrity, form, functioning, and resilience.</i>
<u>Iwi</u>	<u>A political unit of Māori social and economic organisation comprised of many sub groupings (hapū). A purpose oriented confederation based on genealogical ties.</u>
<u>Iwi authority</u>	<u>The authority which represents an iwi and which is recognised by that iwi as having authority to do so.</u>
<u>Kai awa</u>	<u>The food found in and around rivers and streams.</u>
<u>Kaitiakitanga</u>	<u>The exercise of guardianship by the tangata whenua of an area in accordance with tikanga Maori in relation to natural and physical resources; and includes the ethic of stewardship.</u>
<u>Maintenance</u>	<u>In relation to structures, means to keep or restore a structure to a state of good repair and includes the reconstruction or alteration of part of a structure, provided that:</u> <ul style="list-style-type: none"> <u>i. the maintenance does not result in any increase in the base area of the structure; and</u> <u>ii. the activity does not change the character, scale or intensity of any effects of the structure on the environment (except to reduce any adverse effects or to increase any positive effects)</u>
<u>Mauri</u>	<u>The essence of all being inherent in things both animate and inanimate.</u>
<u>Median flow</u>	<u>The flow in the stream or river which is exceeded 50% of the time.</u>
<u>Modified stream</u>	<u>A channel that has been constructed or modified primarily for land drainage purposes.</u>

Natural character	The qualities of the environment that give recognisable character to an area. These qualities may be ecological, physical, spiritual, cultural or aesthetic in nature. They include modified and managed environs.
Rehabilitation	To restore to a former level or state.
<u>Riparian margin</u>	<u>A strip of land which is frequently moist and is adjacent to a river or lake. A riparian margin generally extends from the perceived change in contour of the flood plain to the waterway itself.</u>
River	Means <i>A continually or intermittently flowing body of fresh water; and includes a stream and modified watercourse; but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation, and farm drainage canal).</i>
Sediment	Unconsolidated particulate material deposited, from a suspension, by physical, chemical or biological processes. In particular this refers to mud, silt, sand and gravel that has been deposited in the bed of a flowing river or stream.
Sedimentation	The settling out of particles (sediment) that have been transported by water.
Siltation	Infilling with silt.
Spillway	A passage in or about a hydraulic structure for escape of surplus water.
Stockpile	A pile of gravel that has been obtained from a river.
Stopbank	Barrier or embankment constructed near or alongside a river, and designed to contain flood flows and prevent high river flows flooding onto adjacent land.
Structure	<i>Any building, equipment, device, or other facility made by people and which is fixed to land; and includes any raft.</i>
Surface water body	<u>The fresh water in a river, lake, stream, pond, wetland or drain that is not located within the coastal marine area.</u>
Stream crossing	Any structure supporting a path, road or track over a stream bed including culverts, fords and bridges.
<u>Tangata whenua</u>	<u><i>In relation to a particular area, means the iwi, or hapū, that holds mana whenua over that area.</i></u>
Temporary stockpile	A stockpile that only exists while the site is being actively worked.

Territorial Authority	A district council or a city council (as defined in the Local Government Act 2002).
<u>Wāhi tapu</u>	<u>Includes sites, areas or localities associated with tapu. May include burial grounds, battle grounds or areas of spiritual significance.</u>
<u>Wāhi tūpuna</u>	<u>Includes sites, areas or localities of historical and spiritual significance to whānau, hapū or iwi but not necessarily tapu sites. Important pathways, village sites, boundary indicators etc are included as wāhi tūpuna</u>
Watercourse	The natural path that water in any river or stream follows over the land surface.
Water body	<i>Means Fresh water or geothermal water in a river, lake, stream, pond, wetland, or aquifer, or any part thereof, that is not located within the coastal marine area.</i>
Water's edge	The boundary between the water in a river or stream and the adjoining dry land.