



# Eketahuna Waste Water Treatment Plant Wetland

Tararua District Council  
Erosion and Sediment Control Plan (ESCP)



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**Note:** This is a draft ESCP in current preparation. Additional and updated information will be included as further design and proposed construction

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## 1 Project Description

Tararua District Council (TDC) propose to enhance the existing waste water treatment plant at Eketahuna, using a constructed wetland to “polish” treated wastewater prior to discharge to receiving environments. The location of the works is north of the existing treatment ponds and is displayed in Figure 1 below.

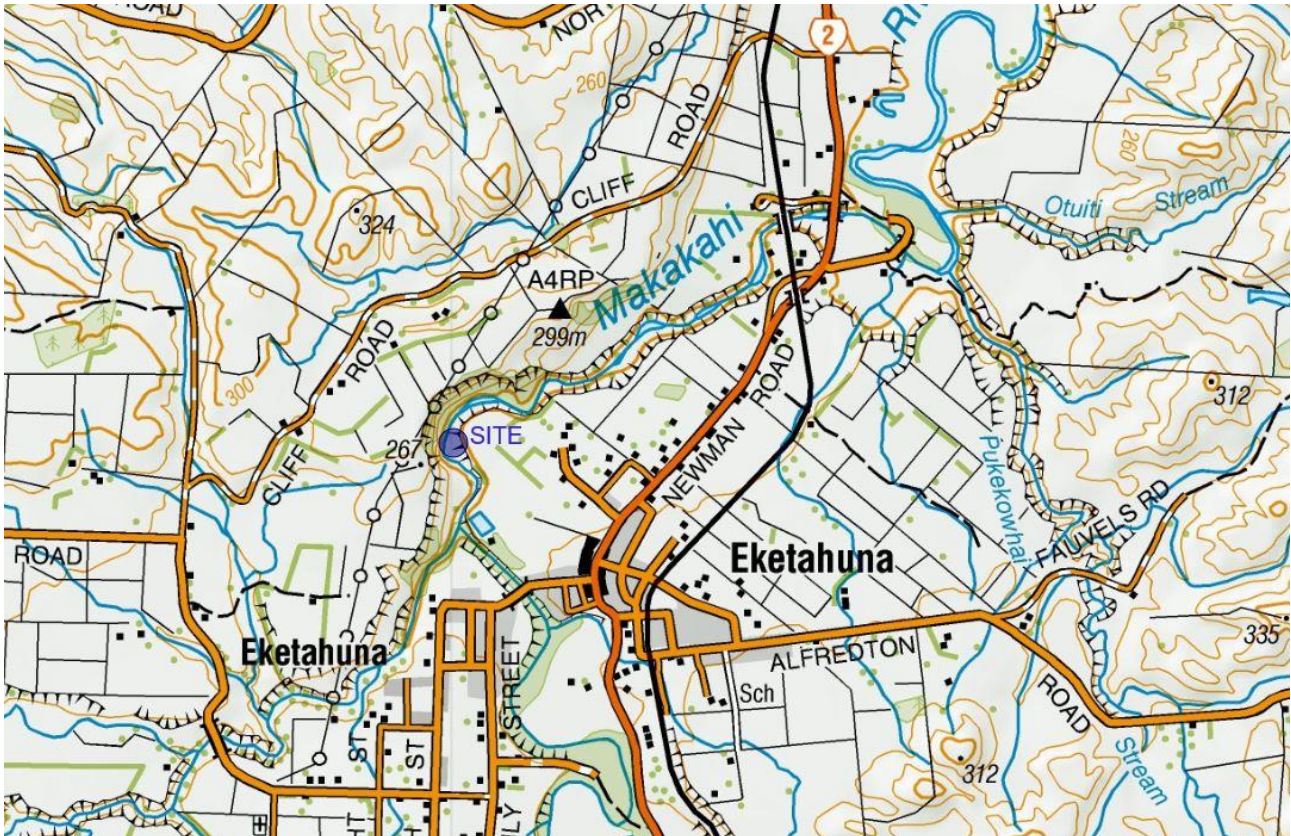


Figure 1: Site Location

Works will involve formation of a shallow pond and an outlet flow control weir. The lower pond will discharge via a stabilised outlet to the Makakahi River bed. The wetland will have a selection of native wetland species established to provide organic matter (carbon) for the N- conversion process.

A total cut volume of approximately to 2800 m<sup>3</sup> is proposed, with an estimated 800 m<sup>3</sup> cut to fill and 2000 m<sup>3</sup> cut to waste. Cut to waste material will used to form a 230 m berm along the southern and western margin of the pond, generally around 1.8 m high with a 2 m wide crest, a 1:2 batter on the eastern (pond) side and a 1:3 batter on the western (river) side. The norther end of the bund will adjoin the control weir, and will comprise a 10 - 12 m section with reduced height.

The area of the main excavation is approximately 5500 m<sup>2</sup> and the total works area, allowing for berm formation and construction traffic, is approximately 8,430 m<sup>2</sup>.

A concept plan is displayed in Figure 2 below.



Proposed works will generally be more than 10 m away from a waterway and on terrain <20° slope, but will exceed 2500 m<sup>2</sup> per year and fall under HRC Rule 13-2 (Large-scale land disturbance, including earthworks), which requires the preparation and implementation of an appropriate Erosion and Sediment Control Plan.

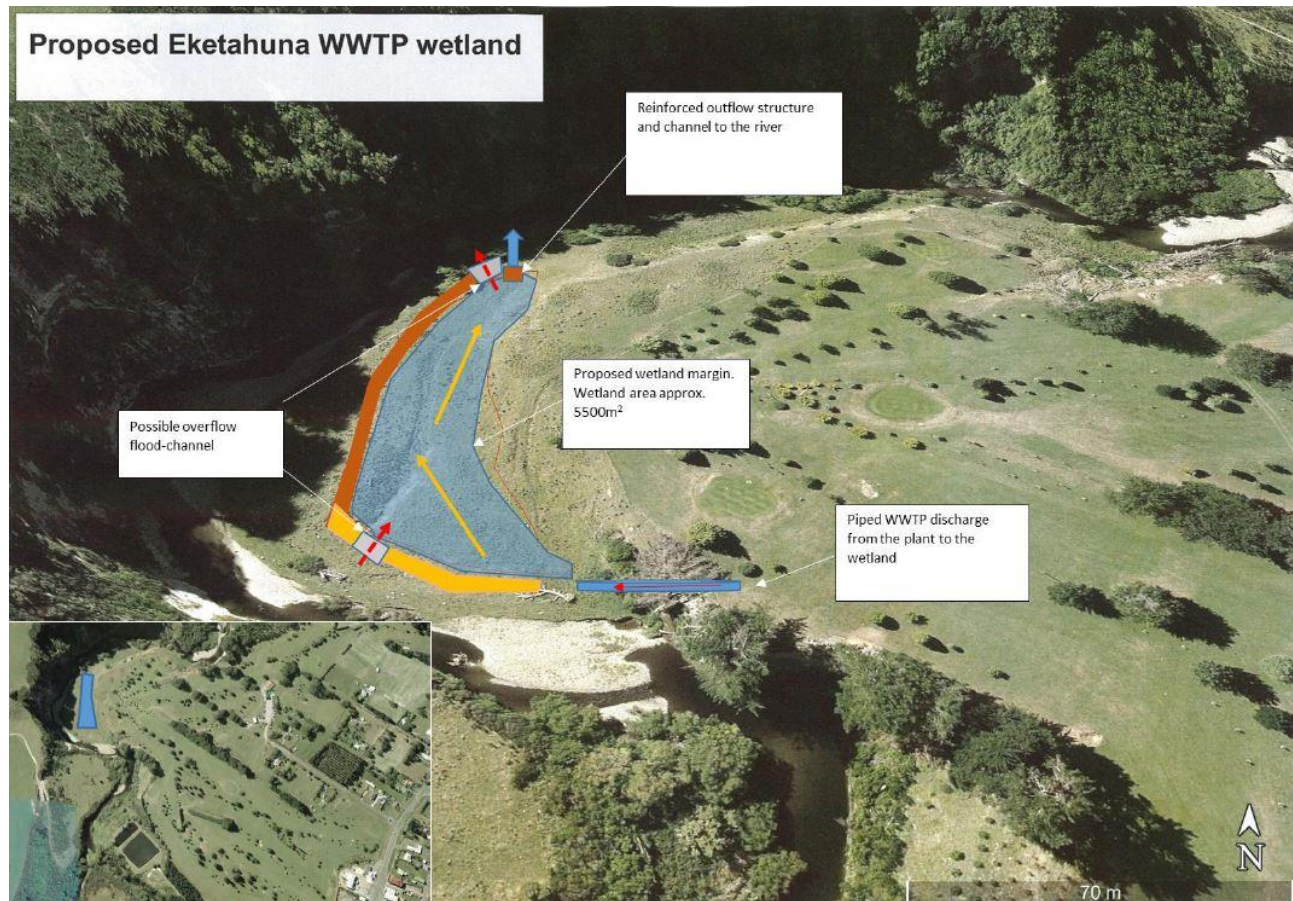


Figure 2: Works concept plan

## 2 Estimate of Sediment Loss

The estimate of sediment loss from the site is based on the Universal Soil Loss Equation (USLE).

$$A \text{ (Annual Soil Loss)} = R \times K \times LS \times C \times P$$

The Sediment Yield is based on a number of factors applied to the Annual Soil Loss; which include:

- Area of Exposure
- Sediment Delivery Ratio
- Sediment Control Measure efficiency
- Duration of Exposure.

From site investigations, soils are alluvial in nature and the texture class of soils present on the site appears to be predominantly sandy silt.

If there were uncontrolled earthworks on the retreat site, the potential sediment generation for the site is estimated to be 1.60 tonnes over 8 weeks.

With management of storm water runoff flows and use of sediment control devices the potential sediment yield for the site has been reduced to an estimated 0.27 tonnes over 8 weeks (see Appendix A for USLE calculation).

### 3 Principles for Minimising Sediment Discharge

#### ESCP Design Standards

***Erosion and Sediment Control Guidelines for the Wellington Region***  
(GWRC, 2002) – cited below as 'Reference A'.

***Best Practice Erosion & Sediment Control*** (IECA, 2008)

The principles of this ESCP is to identify approaches that reduce potential for erosion and sedimentation effects of the access road construction i.e. proactive approaches to achieve the following.

**Minimise Disturbance:** *Fit land development to land sensitivity. Some parts of a site should never be worked and others need very careful working. Watch out for and avoid areas that are wet (streams, wetlands, and springs), have steep or fragile soils or are conservation sites or features. Adopt a minimum earthworks strategy (low impact design) - ideally only clear areas required for structures or access.*

Site Specific Detail:

Exposed areas will be limited during construction to reduce the potential for generating erosion. The limits of disturbance have been clearly identified in the ESCP in Appendix B. A minimal earthworks strategy has been adopted where areas will be cleared for excavation in accordance with staging.

Work sites will be managed where practicable to ensure that the area of exposed/disturbed soil does not exceed 0.2ha at any stage to limit potential sediment discharge to sediment control devices.

**Staged Construction:** *Carrying out bulk earthworks over the whole site maximises the time and area of soil that is exposed and prone to erosion. "Construction staging", where the site has earthworks undertaken in small units over time with progressive revegetation, limits erosion. Careful planning is needed. Temporary stockpiles, access and utility service installation all need to be planned. Construction staging differs from sequencing. Sequencing sets out the order of construction to contractors.*

Site Specific Detail:

Works are proposed over an eight-week period, during a relatively low rainfall time of year. The nominated period is 21 January 2019 to 15 March 2019, subject to final contract arrangements. Earthworks will be undertaken and staged as follows:

- Site establishment and construction of erosion and sediment controls and demarcation of works limits.
- Stripe and stock pile topsoil.
- Excavation of ponds and construction of connecting weirs/spillways.
- Formation of berm on western margin.
- Lining of pond excavations with clay and re-spread of topsoil.
- Planting of ponds will follow at a later date.

The proposed ESC construction sequencing is as follows:

- Installation of Perimeter controls - Clearwater Diversion bund (CW), Silt Fences (SF) and U-shaped sediment trap (UST) as per the ESCP Drawing (Appendix B).
- Sediment Retention Pond (SRP) installed at pond outlet point.
- Pond formation progresses north to south, working up-gradient and configured on a daily basis to provide dirty water flow paths to the SRP.
- Cut batters will be stabilised with geotextile (coco mat).
- Topsoil re-spread on pond & berm, berm covered with geotextile (coco mat).
- Outlet structure installed, SRP decommissioned and pond invert level restored.
- Wetland species planting in pond and revegetation planting of surrounds.

Locations of all sediment control devices are indicated on the ESCP drawings in Appendix B.

**Protect Steep Slopes:** Existing steep slopes should be avoided. If clearing is absolutely necessary, runoff from above the site can be diverted away from the exposed slope to minimise erosion. If steep slopes are worked and need stabilisation, traditional vegetative covers like top soiling and seeding may not be enough - special protection is often needed.

Site Specific Detail:

- Existing steep vegetated slopes immediately above and adjacent the cut sites will not be disturbed.
- Slopes outside of the fill area will not be disturbed
- Cut and fill batters will be protected with geotextile on completion.

**Protect Water bodies:** Existing streams, watercourses, and proposed drainage patterns need to be mapped. Clearing may not be permitted adjacent to a watercourse unless the works have been approved. Where undertaken, works that cross or disturb the watercourse are also likely to require resource consents.

Site Specific Detail:

- Clean water table drain diversions will be used to prevent upslope surface flows from entering works areas.
- Dirty water from pond excavations will be treated with a Sediment Retention Pond (SRP-1). Further information on the construction and operation of SRP's is given in Reference A, Section 5.1.
- Runoff flows in the site access table drain will be treated with a U-Shaped sediment trap (UST). Further information is attached in Appendix E, *U-Shaped Sediment Traps*.
- Pond batters will be stabilised in accordance to the design specifications.

**Stabilise Exposed Areas Rapidly:** The ultimate objective is to fully stabilise disturbed soils with vegetation after each stage and at specific milestones within stages. Methods are site specific and can range from conventional sowing through to straw mulching. Mulching is the most effective instant protection.

Site Specific Detail:



- Topsoil will be stripped as required and stockpiled in designated areas (SP). Topsoil will be re-spread promptly following completion of earthworks, and geotextile (coco mat) will be placed on all batters.
- Geotextile treated areas on the berm will be oversown with grass seed to provide ongoing ground cover protection before and during revegetation planting establishment
- All disturbed areas adjacent cut and fill works, not subject to placement of geotextile, will be re-grassed, and irrigation will be used if required to maintain soil moisture and assist grass establishment. Further detail of this method is given in Reference A - Section 4.10.2.

**Install Perimeter Controls:** Perimeter controls above the site keep clean runoff out of the worked area - a critical factor for effective erosion control. Perimeter controls can also retain or direct sediment laden runoff within the site. Common perimeter controls are diversion drains, silt fences and earth bunds.

Site Specific Detail:

- Clean water diversions (CW) will be installed upslope of excavation works (see ESC construction sequence), at locations indicated on the ESCP drawing in Appendix B, in accordance with guidelines set out in Reference A - Section 4.1, and will be designed to accommodate flow from a 5% AEP storm event.
- The CW draining to the north end of site will discharge to flat vegetated terrain via a level spreader (LS). Further information on level spreader design and operation (IECA Australasia) is provided in Appendix D
- Sediment controls will be installed at the downslope end of the site access track table drain at the location indicated on the ESCP drawing in Appendix B, and will comprise a narrow U-shaped sediment trap (UST). Further information on U-Shaped sediment trap design and operation (IECA Australasia) is provided in Appendix E.
- Silt fencing will be installed on the western side of the site in preparation for placement of temporary topsoil stockpiles and berm formation.

**Employ Detention Devices:** Even with the best erosion and sediment practices, earthworks will discharge sediment-laden runoff during storms. Along with erosion control measures, sediment retention structures are needed to capture runoff so sediment generated can settle out. The presence of fine grained soils means sediment retention ponds are often not highly effective. Ensure the other control measures used are appropriate for the project and adequately protect the receiving environment.

Site Specific Detail:

- Silt fences (SF) will be placed on contour downslope of stockpile areas and the perimeter of berm formation works. Further detail of the installation and management of this device is given in Reference A - Section 5.3. Additional information on silt fence installation and maintenance (refer <https://www.austieca.com.au/documents/item/130> ) is contained in Appendix C.
- A Sediment Retention Pond (SRP) will be constructed at the downslope/outlet end of the pond formation, with volume calculated on a 2% contributing

catchment area. The SRP may not be constructed to the exact dimensions as indicated on the ESCP, however it will be formed to meet the volume requirement and the specifications for SRP construction as set out in Reference A - Section 5.1.

- The SRP will use a decant device constructed and maintained in accordance with guideline information set out in Reference A - Section 5.1 g.
- As a precautionary measure a narrow U-shaped sediment trap (UST) will be placed to intercept clean water diversion adjacent the main construction access track table drain, to treat any inadvertent sediment discharge from construction traffic. Further information on U-Shaped sediment trap design and operation (IECA Australasia) is provided in Appendix E.

**Experience and Training:** A trained and experienced contractor is an important element of an E&SCP. These people are responsible for installing and maintaining erosion and sediment control practices. Such staff can save project time and money by identifying threatened areas early on and putting into place correct practices.

Site Specific Detail:

A pre-construction meeting shall take place with the Contractor and a representative from Horizons Regional Council (HRC). This meeting is to ensure that the requirements of HRC in terms of the implementation of the ESCP are understood and met by the Contractor.

**Assess and Adjust:** An intense storm may leave erosion and sediment controls in need of repair, reinforcement or cleaning out. Assessment of controls and making repairs without delay reduces further soil loss and environmental damage.

Site Specific Detail:

All ESC devices to be regularly monitored to identify any damage or impacts on effectiveness, and will be promptly repaired and will have accumulated sediment removed for appropriate disposal. It will be the responsibility of the contractor to ensure that all devices are maintained.

**Management of materials:** The effective management of materials on site will have a substantial effect on the transportation of sediment from site.

Site Specific Detail:

- Temporary stockpiling of soils, or other materials, will be away from sensitive areas such as watercourses or flow path margins.
- Material stockpiles should be located adjacent vegetated areas that can act as runoff buffers, and be shaped/compacted to minimise rain splash and wind erosion stockpile.

## 4 Design of Erosion and Sediment Control (ESC) Devices

The works will involve excavation (2800 m<sup>3</sup>) and fill (2800 m<sup>3</sup>), pond and weir formation and channel works. Construction earthworks are proposed during a relatively low (average) annual rainfall period, and the construction site is largely of low gradient with a sandy silt soil texture.

A Decanting Earth Bund, Silt Fences, a U-shaped Sediment Trap and a Clean Water Diversion will be used to control potential sediment discharge from site. Given the proposed timing of works these measures provide an appropriate response to seasonal risk.

All ESC devices will be installed and maintained in accordance with the **Greater Wellington Erosion and Sediment Control Guidelines (2002)**, and also reference other authoritative guidelines (i.e. IECA Australasia) for additional ESC measures and information.

## 5 Timetable and Nature of Site Stabilisation

Cut and fill batters will have stabilisation measures applied progressively, in close succession to final trim of levels. Any disturbed grass bordering the construction area will be re-grassed at the completion of construction works. Supplementary irrigation will be used if necessary to maintain soil moisture and support grass cover establishment.

The Contractor shall be responsible for maintaining all topsoiled and grassed areas until a strong, stable covering of grass has been established, and in any event, until the conclusion of the defects liability period for the Contract.

The Contractor shall also be responsible for ensuring dust risk is managed until the conclusion of the defects liability period for the Contract.

## 6 Maintenance, Monitoring and Reporting

All ESC will be inspected each morning for any obvious damage. A general inspection will be undertaken weekly on all sediment control measures to ensure they are effective, and after any significant rainfall event. All weather access will be maintained to the control devices and the fill sites.

The Site Manager will register with NZ MetService to receive severe weather and thunderstorm warnings, and all ESC measures will be inspected prior to any forecast significant rainfall event.

Silt fences will be maintained in accordance with guidelines set out in Reference A – Section 5.3 f. Sediment will be removed from SRP before the volume of accumulated sediment reaches 20% of the total volume. Sediment will be removed from UST devices when it exceeds 150 mm depth. Removed sediment can be disposed of in any non-structural fill site where it will be contained in a bunded area.

The performance of ESC will be reported monthly to the client, along with other contractual issues through normal contract reporting requirements.

## 7 Heavy Rainfall Response and Contingency Measures

The Contractor will register with NZ MetService for serve weather warnings. Following any heavy rainfall warning the ESC measures will be inspected and

repaired/cleaned. Exposed surfaces will be prepared by removing loose material and compacting the surface of fills and stockpiles to "seal" the surface.

The following contingency measures are proposed:

- Sediment control devices will have sediment removed and storage capacity increased if necessary.
- Proposed construction sequencing can be varied depending on likelihood of rainfall.
- Temporary surface stabilisation measures can be applied with tackified straw mulch, or by use of a suitable soil binder product used in accordance with the manufacturer's directions.
- Ensure any temporary stockpiled material is away from drainage paths and water bodies, and machinery is not parked in flow paths or potential flood zones.
- If alternative or additional de-watering is required, this should be undertaken in accordance with the *Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region* (Auckland Council 2016), Section G1.0. An example of a suitable filter bag product which could be used for this purpose is presented in Appendix D.
- Contingency measures will be recorded on a Sediment Control and Maintenance Sheet.

## 8 Procedures for review and/or amendment to ESCP

Implementation of the ESCP shall be monitored and reviewed monthly by the appointed TDC representative.

Any minor changes (amendment to installed ESC measures) will be discussed with the relevant HRC staff. Any major changes (redesign or substitution of ESC measures) will be documented and an amended ESCP will be submitted to HRC for approval.

## 9 Site Responsibilities

The Contractor shall have a nominated person for the works who will be responsible for the implementation and maintenance of the Erosion and Sediment Control measures, and updating the ESCP as required during the works. The Site Supervisor or Foreman will likely be responsible for the day-to-day maintenance of the sediment control measures. The implementation and performance will be monitored by the TDC representative.

## 10 Construction Timeline

The proposed construction timeframe/staging will be completed between 21 January 2019 to 15 March 2019.

## 11 Contractor Input

Once a contractor is appointed, and prior to start of the main construction works, a Quality Plan will be prepared, which will set out the detail of the



proposed construction methodology and the measures to be taken to ensure compliance with the contract documents.

In addition, an Environmental Management Plan (EMP) will be prepared by the contractor prior to the start of work. The EMP shall as a minimum address:

- Dust Control;
- Erosion and Sediment Control;
- Construction Noise Control;
- Vibration Control;
- Accidental Discovery Protocol;
- Any other measures necessary to meet all conditions laid down within the Project Specification and
- resource consent conditions.

This ESCP report and drawings may be optimised by the Contractor before the start of any activity on site. Any proposed changes to the documents must be approved by TDC and HRC prior to works commencing. It is anticipated that the environmental controls, including Erosion and Sediment Controls, on site will be subject to periodic environmental audit by the TDC.

# Appendix A

# Appendix B

# Appendix C



# Appendix D

# Appendix E

