



MAJOR CAPITAL WORKS PROJECTS

CONSTRUCTION AND ENVIRONMENTAL MANAGEMENT PLAN - TURITEA

Proposed by: Rae Camons

Signature

Date

Reviewer: Stuart Lush

Signature

Date

Approved by: John Foote

Signature

Date

Revision:

Date: 30 March 2010



Table of Contents

Table of Contents.....	2
Part A: Overview	5
1 Project Description	5
2 Statutory Requirements.....	5
3 Document Overview	6
4 Provisional Construction Methodology and Programme.....	6
4.1 Anticipated Stages of Construction	7
4.2 Indicative Construction Programme	8
4.3 Contract Delivery	8
Part B: Mighty River Power Requirements.....	9
5 Purpose of this Document	9
6 Context and Related Documentation.....	9
7 Objectives and Goals.....	14
8 Roles and Responsibilities.....	14
Part C: Transition Management and Requirements in Common.....	17
9 Transition Framework.....	17
10 ECO Management System.....	17
11 Handover Processes	19
11.1 Completion of Project Development Phase	19
11.2 Completion of Construction Phase	25
Part D: Contractor Requirements	26
12 Environmental Management Plan: Delivery	26
12.1 Contractual Requirements to be addressed in EMP:D	26
12.2 Permits and Authorisations.....	26
12.3 Training and Competencies of Personnel.....	27
13 Project Specific Environmental Management Plans and Aspects (SEMP).....	27
13.1 SEMP Preparation.....	28
13.2 SEMP Review	29
13.3 Implementation, Inspections and Monitoring.....	29
13.4 Auditing and Reporting	29
13.5 ESCP Preparation.....	31
13.6 ESCP Review.....	32
13.7 Implemented, Inspections and Monitoring	32

13.8	Auditing and Reporting	32
14	Environmental Procedures	34
14.1	Pre-works Requirements	34
14.2	Vegetation Removal	35
14.3	Earthworks, Stockpiling and Archaeological Discovery	35
14.4	Erosion and Sediment Control	37
14.5	Works in Watercourses.....	38
14.6	Re-vegetation	39
14.7	Dust Management.....	41
14.8	Refuelling and Maintenance of Equipment.....	41
14.9	Washdown Areas.....	42
14.10	Noise Control.....	42
14.11	Storage of Fuels, Lubricants and Hazardous Materials	43
14.12	Waste Management	44
14.13	Sewage.....	45
14.14	Weed Control.....	45
14.15	Site Tidy Up.....	45
14.16	Tracking of Mud.....	45
14.17	Fire Prevention.....	45
14.18	Design and Operation Related Criteria.....	46
15	Environmental Emergency Response Procedures.....	46
15.1	Discharges of Sediment.....	46
15.2	Discharges of Fuels, Lubricants and Hazardous Materials	46
15.3	Air Discharges	47
15.4	Noise	47
15.5	Fire.....	48
15.6	Reviewing.....	48
16	Contractor Inspections, Monitoring and Reporting.....	48
16.1	General Site Monitoring.....	48
16.2	ECO Register	49
16.3	On-site Monitoring Summary.....	52
16.4	Environmental Monitoring.....	54
17	Appendix I - Forms.....	56
18	Appendix II: Construction Timeframe.....	57
19	Appendix III: Specific Erosion and Sediment Control for Land Disturbing Activities Including Example Plans	58
20	Appendix IV: Archaeological Discovery Procedure.....	80
21	Appendix V: Potential Spoil Areas	81
22	Appendix VI: Road & Disposal Area Cross Sections.....	82



23 Appendix VII: Water Quality Monitoring Plan83

DRAFT

Part A: Overview

1 Project Description

The Turitea Wind Farm site is located approximately 10 kilometres (km) south-east of Palmerston North city centre primarily along a 14km ridge in the northern Tararua Ranges. The environment includes a number of existing wind farms including the Te Apiti, Te Rere Hau, Tararua 1, 2 and 3 wind farms to the north of the Turitea site. The Turitea Wind Farm site development is designed to have an installed capacity of 288MW and involves the construction of:

- A maximum of 104 wind turbines standing a maximum of 125m in height (tower and blade) and installed on level earthworked platforms;
- Individual transformers placed at each turbine that may be either within the turbine or placed adjacent to the turbine, dependent on final turbine selection;
- Two substations;
- Two temporary concrete batching plants;
- Three permanent wind monitoring masts up to 80m height;
- Temporary storage of diesel and lubricants;
- The construction and upgrading of 47km of internal access track, including 5 stream crossings;
- Placement and revegetation of surplus earthworks material at designated spoil disposal sites;
- 145km of underground cabling (with some overhead cabling) connecting the turbines to the substations;
- A 6.1km transmission corridor comprising pylons connecting the two substations;
- A 5.2km transmission line comprising monopoles connecting the substations to the national grid at Linton substation; and
- A substation connection at Linton substation.

2 Statutory Requirements

The site is within the jurisdiction of Manawatu-Wanganui (Horizons) Regional Council, Palmerston North City Council, and Tararua District Council. Relevant planning and policy documents include the:

- Proposed Manawatu-Wanganui (Horizons) One Plan;
- Operative Regional Plan: Land and Water;
- Operative Regional Plan: Beds of Lakes and Rivers;
- Horizons Regional Plan: Air;
- Operative Palmerston North District Plan (and Proposed Plan Change 42);

- Operative Tararua District Plan;
- Proposed Tararua District Plan; and
- Manawatu Catchment Water Quality Plan.

Activities not permitted by a rule in a regional or district plan require a resource consent. Resource consents are being sought by Mighty River Power (MRP) from Horizons Regional Council, Tararua District Council and Palmerston North City Council in relation to land-use and discharges consents. A full statutory assessment and overview of statutory requirements of the potential effects upon the environment are contained within the following documentation:

- Turitea Wind Farm, Applications and Assessment of Environmental Effects (August 2008; the AEE);
- Turitea Modifications (January 2009);
- Turitea Wind Farm, Requests for Further Information Consolidated Responses (January 2009); and
- Assessment of Environmental Effects – Turitea Wind Farm Redesign (February 2010)

The environmental effects of the project are to be managed in accordance with the Resource Management Act 1991 (RMA). This document (Construction and Environmental Management Plan; CEMP) establishes the project specific framework through which this will be achieved.

This section will be updated to cross-reference specific consent conditions with the requirements contained within this document, once consents have been granted.

3 Document Overview

This Construction and Environmental Management Plan (CEMP) document describes the objectives and goals for environmental performance and establishes the environmental management framework for the project. This CEMP shall be read in conjunction with, and in the context of, the overarching Mighty River Power Environmental Vision and Policy (refer to Mighty River Power *PR-POL-05 Generation Development Group Projects Environmental Policy and Procedures Manual* (EPPM)).

The CEMP is a project-specific and is a live document. The CEMP is used as a tool to inform the resource consent process, and must be updated to include all conditions of consent and any other requirements arising out of environmental statutory and approval processes. The CEMP will then inform the preparation of the Employer's Requirements and thence the Environmental Management Plan: Delivery (EMP:D). The CEMP can therefore form the point of reference for audits of Contractor environmental performance.

4 Provisional Construction Methodology and Programme

Construction will take several years to complete due to the size and location of the wind farm. The geographical distribution of turbines within and outside the Turitea Reserve means that the construction will be staged. To assist in the preparation of the resource consents, assessment of environmental effects, and the CEMP, a provisional construction methodology and programme was developed as indicated below.

Browns Flat is the location of one of two main 33kV/220kV substations from which the external transmission line runs north to connect the wind farm to the national grid at Linton Substation. The Browns Flat Substation and external transmission connection will be constructed early in the programme, along with a number of turbines, so that electricity generation can begin. Installation of the remaining turbines will be in proceeding stages.

4.1 Anticipated Stages of Construction

The construction is anticipated to proceed in the sequence set out below. However, the specific sequence will be confirmed during the detailed design phase, and the CEMP allows the staging to be altered at a future date. Stage 1 will develop the western side of the wind farm. Stage 2 will develop the eastern side of the wind farm.

Up to 50 turbines will be constructed as part of Stage 1, which comprises the following:

- Site establishment;
- Upgrading to the Water Catchment Access Road, Green's Road and the existing access-way on to Part Section 276 Town of Fitzherbert (WN45A/638) (Love property driveway);
- Civil earthworks and roading;
- Upgrade to Linton Substation;
- 220kV double circuit transmission line mounted on steel monopoles between Linton Substation and Browns Flat Substation;
- 33kV/220kV substation construction at Browns Flat;
- Construction of turbine foundations on the western side of the wind farm;
- Internal Reticulation;
- Turbine Installation;
- Turbine Commissioning; and
- Site Rehabilitation.

Up to 54 turbines will be constructed as part of Stage 2¹, which comprises the following:

- Civil earthworks and roading;
- 33kV/220kV substation construction at Pine Plantation;
- 220kV double circuit transmission line mounted on steel lattice towers linking the Pine Plantation Substation and Browns Flat Substations;
- Construction of turbine foundations;
- Internal Reticulation;
- Turbine Installation;
- Turbine Commissioning; and
- Site Rehabilitation.

¹ The configuration for Stages 1 and 2 when combined will not exceed 104 turbines.

4.2 Indicative Construction Programme

The construction period for the project is expected to take around three years. Appendix II includes a schedule of works and an indicative construction programme.

4.3 Contract Delivery

It is expected that the project delivery of the Turitea Wind Farm will be design-build. This CEMP has been scoped and developed to reflect this approach (which is described in more detail within the following sections of the document). The Contractor will be required to prepare an environmental management plan in response to this CEMP and to confirm the specific actions as to how potential environmental effects will be appropriately avoided, remedied, or mitigated. This CEMP aims to maintain flexibility for the Contractor through the subsequent design-build process, whilst maintaining certainty of environmental outcome and performance.

Part B: Mighty River Power Requirements

5 Purpose of this Document

This document establishes the management framework through which Mighty River Power will avoid, remedy, or mitigate effects upon the environment during the construction and commissioning of the Turitea Wind Farm. This CEMP is therefore a key project document and is designed to ensure the Mighty River Power Project Managers and Contractors to have a clear understanding of all project environmental requirements, including the conditions of consent, third party agreements, and any contractual obligations.

The purpose of this CEMP is to:

- Establish the environmental management requirements for project construction and commissioning activities;
- Deliver compliance with the requirements of the applicable permitted activity rules and resource consent documentation / conditions; and
- Avoid, remedy or mitigate any adverse environmental effects associated with project construction and commissioning.

6 Context and Related Documentation

This CEMP is supported and defined by an overarching MRP environmental management system, which includes the following Vision and Policy:

Vision

Mighty River Power's vision is to be recognised as a well-managed, environmentally responsible electricity generator, wholesaler and retailer. In creating sustainable value from our relationships and resources, we are committed to caring for the environment in which we work and live, and to sustaining its quality for future generations.

Policy

To achieve our environmental vision, Mighty River Power will:

- *Continue to prioritise protection of the environment in accordance with our commitment to sustainable development.*
- *Continually improve our environmental performance and use of resources.*
- *Reduce, reuse and recycle materials to minimise waste.*
- *Minimise environmental effects, including emissions and impacts from our operations through effective monitoring, and continual improvement of performance.*
- *Continually work towards understanding what is important to our communities and addressing their concerns about operations.*
- *Build long-term partnerships with communities, our business partners and other stakeholders to create sustainable environmental improvements.*

To support this policy, Mighty River Power commits to:

- *Our leaders being accountable for action plans to deliver environmental improvements, and allocation of resources to achieve these plans.*
- *Comply with environmental legislation.*
- *Implement and maintain environmental management systems, including measurable objectives and targets.*
- *Promote employee, contractor and community awareness of environmental issues through on-going training, communication programmes and external reporting of our environmental performance.*
- *Regularly review this environmental policy.*

Within the MRP Generation Development Group, project environmental requirements (as documented within this CEMP) are in turn guided by *PR-POL-05 Generation Development Group Projects Environmental Policy and Procedures Manual* (the EPPM), which supports the Vision and Policy by implementing a tiered approach. Environmental expectations and outcomes of the Generation Development Group are summarised in Figure 1.

This CEMP forms part of the overall Turitea Project Management Plan (PMP; refer to Figure 2 and Table 1 below). This document addresses Tier 3 in the suite of the Mighty River Power's environmental management documentation as outlined in Table 1.

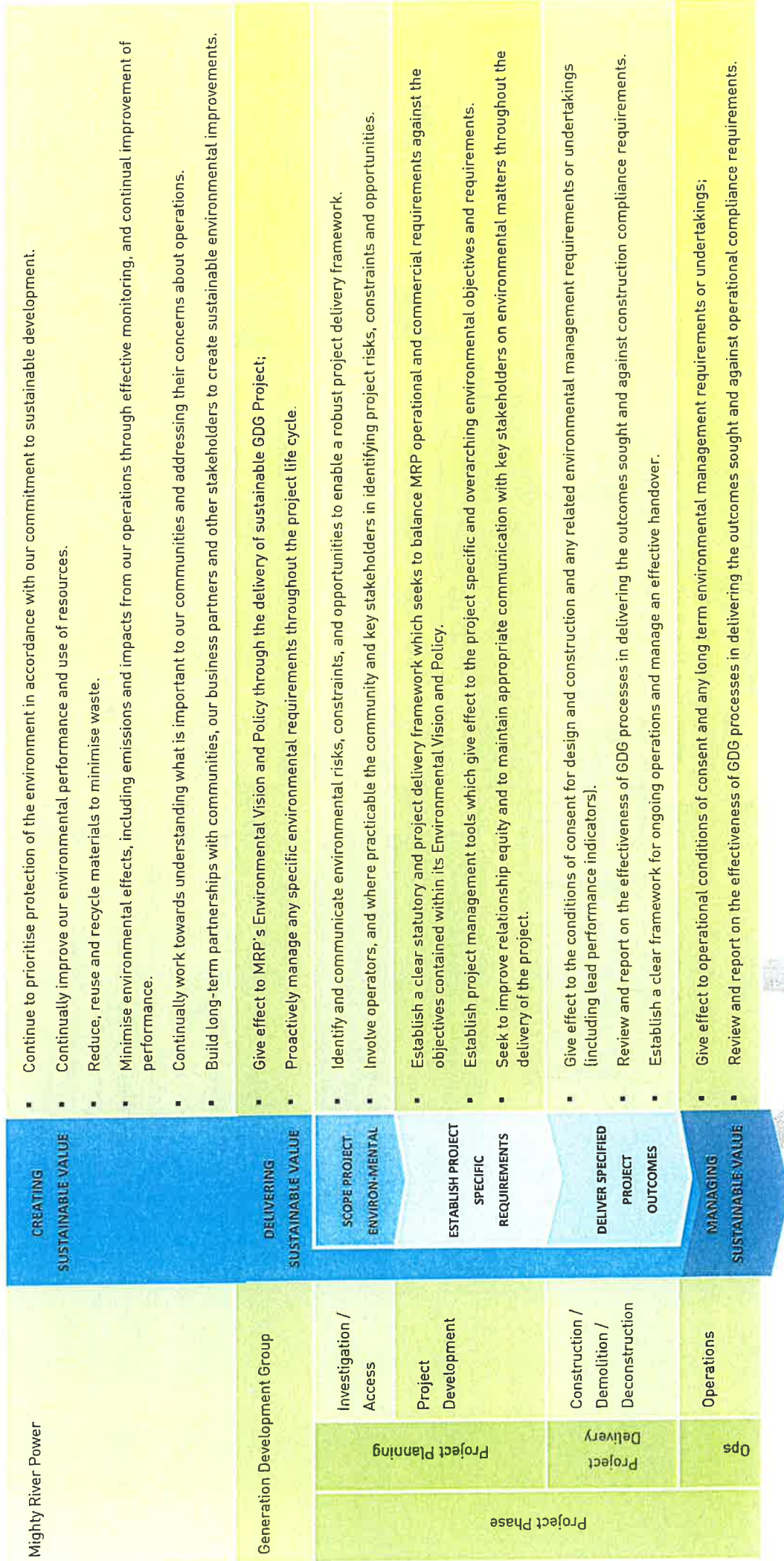


Figure 1: Environmental Expectations and Outcomes – Generation Development Group
source: PR-POL-05 Generation Development Group Projects Environmental Policy and Procedures Manual

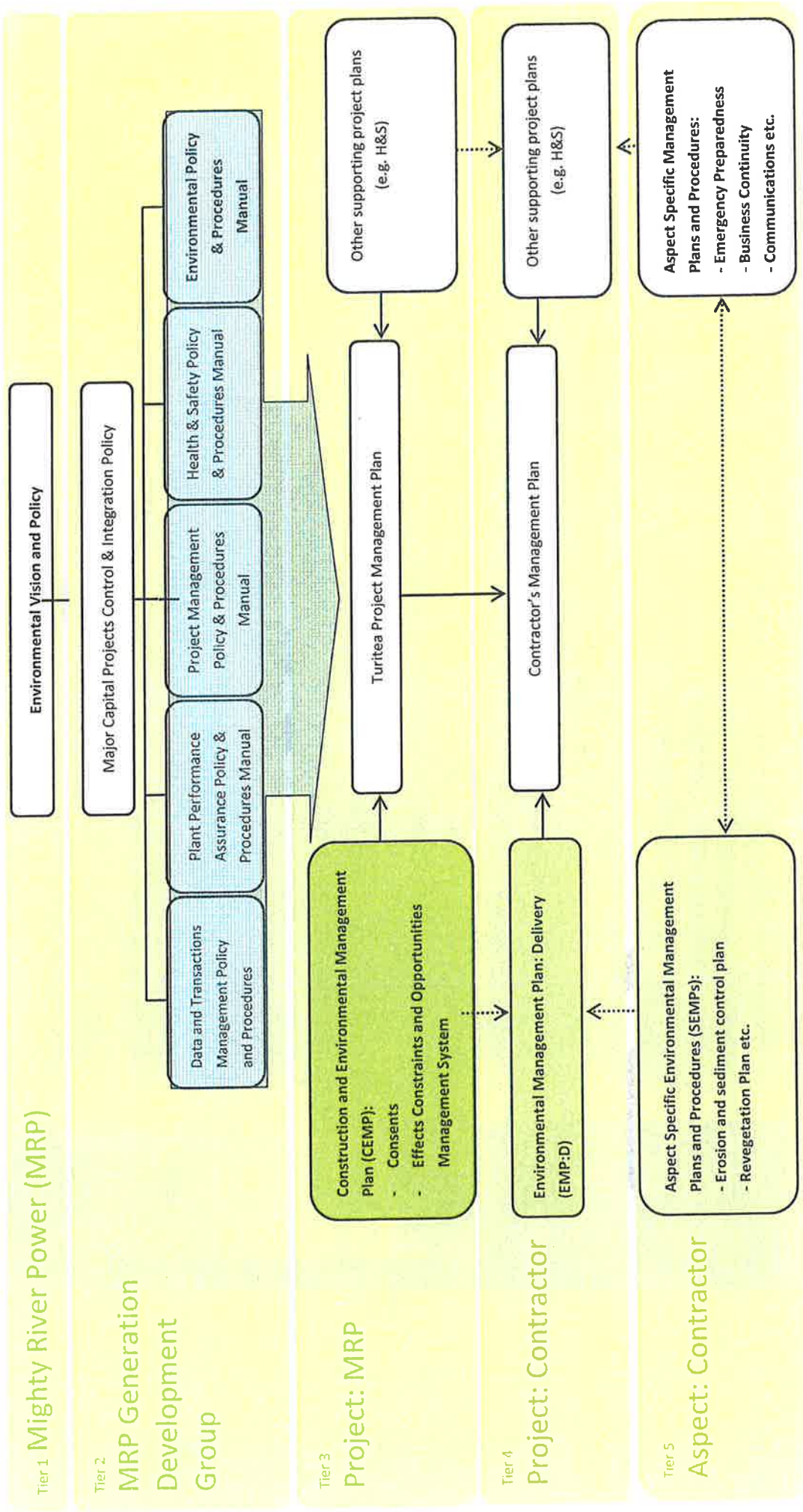


Figure 2: Environmental Context and Framework

Source: Adapted from the PR-POL-05 Generation Development Group Projects Environmental Policy and Procedures Manual

Table 1: Environmental Management Framework – Generation Development Group

source: PR-POL-05 Generation Development Group Projects Environmental Policy and Procedures Manual

Tier	Document	Operating Level
Tier 1 – High level company guidance and direction. MRP document.	MRP Environmental Vision and Policy	MRP
Tier 2 – Policies and Procedures Manuals. MRP documents that set out requirements applicable to Generation Development Group (GDG) projects. The EPPM establishes the environmental management framework and forms the basis of project requirements to be incorporated into procurement and project management processes.	Environmental Policy and Procedures Manual (EPPM)	GDG
Tier 3a – Project specific requirements and procedures. Provides a roadmap to environmental requirements. MRP document. Augments Employer's Requirements (including the Project Management Plan) and may be used to support resource consents.	Construction and Environmental Management Plan (CEMP)	MRP
Tier 3b – Environmental register / system used as the basis for establishing Issues and Aspects and any specific requirements of the CEMP. Live document – accountability to be transferred as project progresses and subsequently managed by the Contractor throughout project development and delivery.	Effects Constraints and Opportunities (ECO) Management System	MRP to Contractor to MRP
Tier 4 – Project-specific plan to give effect to the CEMP. Describes who does what, when, where, and how. Contractor document. Externally auditable against CEMP and conditions of consent.	Environmental Management Plan: Delivery (EMP:D)	Contractor
Tier 5 – Monitoring, audits, and review. Contractor records to demonstrate overall project compliance. Shows that the EMP:D (consents and MRP environmental outcomes) have been achieved. Information to feed into ongoing operations also required to support ongoing compliance against EPPM and MRP Policy. Includes the Operational Environmental Requirements (OER) to be prepared by the Contractor and the Handover Document to be prepared by the GDG Project Manager.	Project Plans and files including Specific Environmental Management Plans (SEMPs), the Operational Environmental Requirements (OER), and the Handover Process	Aspect

The CEMP defines Mighty River Power's **minimum** environmental requirements for the project. The CEMP has been developed using the guidelines contained in Mighty River Power's EPPM.

The CEMP is project specific and is the means through which the project environmental requirements are compiled and collated.

As directed by the EPPM, the CEMP has been prepared early to support initial project development. The CEMP is to be used as a tool to inform the resource consents process, and will be updated to include all conditions of consent and any other requirements arising out of environmental statutory and approval processes.

The CEMP will inform the preparation of the Employer's Requirements and thence the Contractor's Environmental Management Plan: Delivery (EMP:D).

7 Objectives and Goals

Mighty River Power in consultation with the Contractor, shall establish a set of integrated lead performance indicators to:

- Create and maintain a culture of management ownership;
- Have a set of metrics reflecting environmental performance;
- Focus on accountability for performance; and
- Focus on behaviours.

8 Roles and Responsibilities

There are three groups with responsibility for environmental management of the project:

- Mighty River Power as the project owner and holder of the resource consents;
- The Contractors undertaking the works (a main civil contractor, an electrical services contractor and the turbine suppliers); and
- Horizons Regional Council, Palmerston North City Council, Tararua District Council and Mighty River Power's consultants, who audit the works and monitor compliance with resource consent conditions, the CEMP EMP:D.

Key Mighty River Power personnel or agents with project responsibilities include:

- **Project Manager:** Overall delivery of the project for Mighty River Power.
- **Engineer (to the Contract):** Formal responsibility for contractual matters under the provisions of each construction contract.
- **Environmental Representative:** Individual on site responsible for supervision of each construction contract.
- **Environmental Specialist:** Person responsible for the overall environmental performance and compliance of the project.
- **Geotechnical Engineer:** Person responsible for the overall environmental performance and compliance of the project.
- **Ecologist:** Specialist responsible for advising on ecological effects of the works.

Key Contractor's staff shall include:

- **Site Manager:** Contractors' representative on site – relates contractually to Engineer and/or Engineer's representative.
- **Environmental Manager:** Responsible for environmental performance and compliance of the works under that contract.

The main civil Contractor will be responsible for the whole site except for the areas that are under the direct control of the other two main contractors, which are the electrical and turbine supply and erection contractors who are responsible for areas under their direct contract.

A summary of environmental responsibilities is provided within Table 2.

Table 2 - Environmental Management Responsibilities

Organisation	Role	Responsibilities
Mighty River Power	Project Manager / Environmental Advisor	<ul style="list-style-type: none"> ▪ Consent Holder and Engineer to the Contract. ▪ Overarching compliance with the RMA and conditions of resource consent. ▪ Acceptance of Contractor's EMP:D and SEMP and any additional permits. ▪ Audit and inspection of works to assess compliance with CEMP (inclusive of conditions of consent), EMP:D and SEMPs. ▪ Initial establishment of ECO Management System. ▪ Manage environmental handover processes to MRP operational team.
Main Contractors	Site Manager / Environmental Manager	<ul style="list-style-type: none"> ▪ Compliance with the RMA and conditions of resource consent. ▪ On-site compliance with consent conditions. ▪ Overall responsibility for site environmental management. ▪ Preparation of EMP:D and SEMPs (including ESCPs). ▪ Update and maintenance of ECO Register. ▪ Reviewing environmental performance. ▪ Inspections and reporting. ▪ Establishment and maintenance of Complaints Register. ▪ Training and sub-contractor briefings. ▪ Preparation of the Operational Environmental Requirements (OER) document.
Sub-contractors		<ul style="list-style-type: none"> ▪ Compliance with the RMA and conditions of resource consent. ▪ Adherence with EMP:D, and SEMPs . ▪ Preparation of SEMPs including ESCPs, and work plans as required.
Manawatu-Wanganui (Horizons) Regional	Consents Manager	<ul style="list-style-type: none"> ▪ Commenting on CEMP, EMP:D and SEMPs. ▪ Auditing to assess consent conditions are being met.

Organisation	Role	Responsibilities
Council		
Palmerston North City Council	Resource Planning Manager	<ul style="list-style-type: none"> ▪ Commenting on CEMP, EMP:D and SEMP. ▪ Auditing to assess consent conditions are being met.
Tararua District Council	Resource Planning Manager	<ul style="list-style-type: none"> ▪ Commenting on CEMP, EMP:D and SEMP. ▪ Auditing to assess consent conditions are being met.

DRAFT

Part C: Transition Management and Requirements in Common

9 Transition Framework

The Environmental Constraints and Opportunities (ECO) Management System and the preliminary Register provided in Table 3 below, together with the consents, Assessment of Environmental Effects (AEE), this CEMP, and third party agreements, shall be established through the following:

- Loaded into CS-Vue by Mighty River Power to assist the development of the Employer's Requirements and overall compliance management;
- Before being transferred to the Contractor (and maintained as an ECO Register); and
- Before being transferred back in to CS-Vue for use by Mighty River Power operations and in subsequent projects.

9.1 Mobilisation

A kick off meeting will be held between Mighty River Power and the Contractor/third parties prior to:

- Handover of the site(s), known as the place of work, making known prior to Contractor mobilization;
 - Any known site environmental hazards;
 - That the Contractor is in control of the place of work;
 - That the Contractor has responsibility for the Environmental aspects of its own (Contractor) employees and activities; and
- Clarification of responsibilities relating to consents, AEE, this CEMP, and third party agreements;

The kick off meeting will describe:

- Any site access and control requirements;
- The extent of the Contractor's work site and its demarcation with other Contractors;
- The nature of activities conducted by other Contractors or by existing operations, should these impact on each other;
- The nature of any protocols for communicating with third parties;
- The nature and co-ordination of emergency evacuation requirements; and
- All meeting and frequency requirements.

10 ECO Management System

The purpose of the Environmental Constraints and Opportunities (ECO) Management System is assist the systematic identification, assessment and management of environmental issues, aspects, and undertakings.

The main construction activities proposed are:

- Site Establishment;
- Removal and stockpiling of topsoil and vegetation, excavation or soil and rock, and placement in spoil areas or fill;

- Upgrading and formation of roads, laydown areas, foundation pads and crane platforms;
- Concrete batching;
- Enabling and temporary works (e.g. retaining structures, services, and diversions);
- Construction and commissioning of substations;
- Construction of transmission lines;
- Cable trenching;
- Construction of foundations, the erection and commissioning of turbines; and
- Re-spreading topsoil and revegetating.

The construction activities identified above have the potential to cause the following environmental effects:

- Accelerated erosion of exposed earth surfaces causing instability and slips;
- Contamination of water bodies with sediment-laden stormwater runoff;
- Disturbance of stream beds from construction of cable crossings;
- Potential spills of runoff of hazardous materials including cement, bitumen, fuel hydrocarbons, oils and greases, contaminating ground and water bodies;
- Loss of topsoil through poor storage and handling;
- Loss of native plants and effects upon animal species and habitats through uncontrolled vegetation removal and other effects such as stream works;
- Spread of pest and weed species;
- Air pollution from dust and exhaust fumes;
- Visual effects;
- Noise pollution;
- Contamination of ground and water bodies from sewage; and
- Disturbance of sites of cultural and historical significance.

A preliminary assessment of the potential effects and proposed solutions to avoid and/or mitigate environmental damage based on this assessment is provided within Table 3 and forms the preliminary ECO Register. This preliminary ECO Register will be used by Mighty River Power to populate its in house ECO Management System and will be augmented by other relevant environmental and project information derived from:

- Consents;
- Consent application information (e.g. AEE); and
- Third party agreements.

A Site Plan will be prepared as part of the ECO Management System showing areas of ecological, cultural and/or historical sensitivity. This information will be drawn from the archaeology and ecology reports, and will identify areas on site that will need due attention in Project Plans for that particular location.

The ECO Management System will be used as a reference and reminder of the environmental management requirements throughout the lifespan of the project. The information will be transferred to the Contractor during the Project delivery phase to inform the development of the EMP:D. The EMP:D shall be the means through which the Contractor will manage the identified environmental constraints and opportunities such that:

- Constraints are appropriately anticipated and prevented in the first instance and otherwise avoided, remedied, or mitigated; and
- Opportunities are protected and implemented in accordance with statutory or project requirements.

At the completion of construction, the ECO register will then be transferred back to Mighty River Power ECO Management System to aid operational compliance. The evolution of the ECO Management System is described within the EPPM.

11 Handover Processes

11.1 Completion of Project Development Phase

At the completion of the Project Planning Process (i.e. once consents have been obtained), there will be two handover paths:

- There may be ongoing environmental requirements and obligations that arise from the consents process that immediately become operational issues (i.e. they are not delegated to the Contractor of project delivery team); and
- There will be requirements arising out of the CEMP, consents, and/or third party agreements that will need to be incorporated into delivery documentation.



Table 3 – Preliminary Environmental Constraints and Opportunities (ECO) Register

Adverse Effect Adverse Effect	Cause	Likely Activity	Avoidance	Mitigation	Contingency	SEMP and Environmental Procedure Reference
Accelerated erosion	Creation of erodible surfaces	Earthworks Vegetation Removal	Use the permit system to minimise creation of erodible surfaces; limit the period that surfaces are left in an erodible state Design cut and fill batters to minimise exposed surfaces	Compaction or coverage of surfaces Prompt re-vegetation	Re-establishment of surfaces	All SEMP Vegetation Removal Plan Erosion and Sediment Control Plan Re-vegetation Plan
Sediment discharges to waterways	Stormwater containing sediment runoff	Earthworks Vegetation Removal	Installation of cut off drains to divert stormwater around disturbed areas. Avoiding concentration of stormwater flows. Provide ponding areas	Collection of runoff in grit traps and sediment ponds. Use of dissipation structures	Installation of additional controls	All SEMP Vegetation Removal Plan Earthworks Plan Erosion and Sediment Control Plan
	Rock spill from earthworks in steep areas		Appropriate methodology and equipment			
	Stormwater containing sediment runoff	Earthworks Vegetation Removal	Installation of cut off drains to divert stormwater around disturbed areas	Use of silt fences, sediment ponds and grit traps	Increase capacity and scale of sediment controls	All SEMP Vegetation Removal Plan Earthworks Plan Erosion and Sediment Control Plan
	Stream bed disturbance	Cable crossings in stream beds Construction of road culverts	Temporary diversion of water away from construction area, including 'dry bed' construction	Armouring of disturbed area to minimise erosion potential Sediment barriers	Additional armouring of disturbed area	Applicable SEMP Works in Watercourses Plan

Mighty River Power Generation



Title: PR-PER-01 Major Capital Works Projects
Construction and Environmental Management Plan - Turitea

Responsibility: Project Manager – Development

Date Issued: March 2010

Adverse Effect Adverse Effect	Cause	Likely Activity	Avoidance	Mitigation	Contingency	SEMP and Environmental Procedure Reference
Discharge of contaminants to ground and water bodies	Discharging of oil, fuel, grease, cement/lime, sewage, waste or hazardous materials	Refuelling and maintenance activities Cement batching plant Access road construction Washroom facilities Any waste producing activity	Providing proper storage facilities Training operators in handling procedures Refuelling, truck washing and maintenance undertaken at designated locations outside the water catchment area Concrete batching undertaken at the designated area outside the water supply catchment Concrete/liming works not undertaken if rain is forecast Contained washroom facilities provided Minimise and avoid waste production	downstream of disturbance	Emergency response for oil spills and concrete spills Spill kits to be carried with tankers or stored at tanks Spill kits near roading works	Applicable SEMP's Refuelling and Maintenance Plan Washdown Areas Plan Storage of Fuels, Lubricants and Hazardous Materials Plan Waste Management Plan Erosion and Sediment Control Plan
Loss of topsoil	Topsoil lost from stock piles or not recovered	Earthworks	Stock piles located away from surface waters or areas of overland flow Soil compacted to reduce losses from wind erosion Topsoil respread and compacted as quickly as possible Operator training	Supervision Use of appropriate equipment	Covering of stockpiles	All SEMP's Earthworks EP Vegetation Removal EP



Adverse Effect Adverse Effect	Cause	Likely Activity	Avoidance	Mitigation	Contingency	SEMP and Environmental Procedure Reference
Discharge of contaminants to air	Dust discharges	Earthworks Stockpiles Roads Transport of materials Aggregate crushing Concrete batching General construction activities	Prevention through minimising areas of disturbance Minimise stockpiling Control vehicle speeds, cover loads Training operators	Suppress dust sources using water carts Dust covers on equipment	Stop work until conditions improve	All SEMPs Vegetation Removal Plan Earthworks Plan Dust Management Plan
	Emissions from equipment	Any activity involving machinery	Keep construction plant in good working condition	Design of charge and detonation system Blasting materials where appropriate	Stop work until machinery repaired	All SEMPs Refuelling and Maintenance Plan
	Fly material from blasting	Blasting	Blasting in accordance with approved blasting plan prepared by qualified person		Stop work until amended blasting plan prepared Remove fly material if appropriate	Applicable SEMPs Earthworks Plan
Nuisance noise emissions	Equipment in poor condition Unusual climatic conditions	Any activity involving machinery General site conduct	Keep equipment in good condition Undertake noisy operations during daytime working hours Operators	Fit noise reducing equipment to machinery Use noise boxes	Stop work until equipment repaired or climatic conditions allow work to resume	All SEMPs Refuelling and Maintenance Plan Noise Control Plan

Mighty River Power Generation



Title: PR-PER-01 Major Capital Works Projects
Construction and Environmental Management Plan - Turitea

Responsibility: Project Manager – Development

Date Issued: March 2010

Adverse Effect Adverse Effect	Cause	Likely Activity	Avoidance	Mitigation	Contingency	SEMP and Environmental Procedure Reference
Loss of vegetation	Overclearing for earthworks	Earthworks Vegetation removal	Using the permit system and hold points such that there is minimum clearance undertaken Using site plan to identify important species to remove and relocate Early consultation with ecologist for any deviations to plan Clearly marked boundary of area to be cleared Strict supervision by contractor	Transfer clumps or sods of native species to temporary sites prior to placement in areas to be revegetated	Re-vegetation	All SEMPs Vegetation Removal Plan Re-vegetation Plan
Weeds infestation	Fire Seeds brought on-site from dirty earthmoving equipment	Hot works High fire risk conditions Welding and gas cutting Earthworks	Using the hot works permit system identification of high fire risk conditions All machinery is to be clean before coming onto site	Fire-fighting equipment to be readily available No hot works close to flammable material Weeding	Use of fire-fighting equipment Re-vegetation Spraying with appropriate weed killer	Applicable SEMPs Fire Prevention Plan All SEMPs Weed Control Plan
	Weed seeds in re-	Re-vegetation	Using certified seed mixes	Weeding	Spraying with appropriate weed	

Mighty River Power Generation



Title: PR-PER-01 Major Capital Works Projects
Construction and Environmental Management Plan - Turitea

Responsibility: Project Manager – Development

Date Issued: March 2010

Adverse Effect Adverse Effect	Cause	Likely Activity	Avoidance	Mitigation	Contingency	SEMP and Environmental Procedure Reference
	vegetation seed mix				killer	
Disturbance or destruction of cultural and historical sites	Earthworks	Earthworks	Using Site Plan to identify known sites of significance Training operators to identify unknown sites Fencing off sites prior to earthworks	Following accidental discovery procedure	Bringing in an appropriate expert to advise	All SEMP's Earthworks Plan

The Project Development Manager shall prepare a Development Phase Handover Package for each of the above pathways. This shall include as a minimum:

- Updated ECO Register;
- Consents and any compliance certificates; and
- Any baseline monitoring records.

Where appropriate, the Handover Package shall also include the Owner's Environmental Requirements (OER).

The Mighty River Project Project Development Manager is responsible for passing on the Handover Package to either the GDG Project Manager Construction and/or Mighty River Power Operations Group in an appropriate and timely manner.

11.2 Completion of Construction Phase

Ongoing environmental obligations, including consent compliance, may exist at project completion and can pose a risk to Mighty River Power if not effectively communicated. To reduce the risks associated with project completion and handover, the Contractor shall develop an OER at the completion of each project.

The OER need not be an exclusively environmentally focussed document; however, the minimum requirements to comply with the EPPM are as set out within Appendix 5 of the EPPM – Generic Tender Set Environmental Requirements.

The Mighty River Power Project Construction Manager is responsible for accepting the OER from the Contractor and for passing it on to the Mighty River Power Operations Group as part of the overarching Handover Package. The Package shall include as a minimum:

- OER;
- Updated ECO Register;
- Consents and any compliance certificates; and
- Monitoring Records.

The Mighty River Power Project Construction Manager is responsible for passing on the Handover Package to Mighty River Power Operations Group in an appropriate and timely manner.

Part D: Contractor Requirements

12 Environmental Management Plan: Delivery

Mighty River Power's Contractor will develop an Environmental Management Plan: Delivery (EMP:D) to demonstrate how the Contractor proposes to give effect to the CEMP, address the matters identified within the Contractor's ECO register, and to comply with any conditions of consent (and other statutory requirements). The EMP:D shall address the design and construction phase of the project and shall be a live document which is regularly updated at key milestones.

12.1 Contractual Requirements to be addressed in EMP:D

The minimum requirements for the EMP:D are set out in the EPPM. With respect to Turitea, the EMP:D will also include.

- **Method Statements:** The Contractor will prepare a method statement that contains a section on environmental management, including control of runoff water and hazardous substances etc.
- **Erosion and Sediment Control Plans:** The Contractor will prepare detailed site-specific Erosion and Sediment Control Plans (ESCPs) that show how sediment runoff will be managed throughout all stages of the earthworks on each site, in general accordance with the representative ESCPs included in this Plan.
- **Control of Dust:** The Contractor will take all necessary steps to ensure dust is not a nuisance to adjacent properties, crops, pedestrians and road traffic.
- **Control of Noise:** The Contractor will comply with NZS 6803:1999 "The measurement and assessment Noise from Construction, Maintenance and Demolition Work".
- **Monthly Contract Reports:** The monthly reporting requirements including comments on environmental management and public feedback.
- **Environmental Compliance Meetings:** The Contractor is to attend meetings to review compliance and the EMP:D and Project Plans.
- **Complaints Register:** The Contractor will maintain a complaints register.
- **Historical and Cultural Issues:** The contractor is required to follow Mighty River Power's Archaeology Discovery Procedure (Appendix IV).
- **Comply with Permitted Activity Rules and Resource Consent Conditions:** The Contractor will comply with all relevant permitted activity rules and resource consent conditions.
- **Fire Protection:** The Contractor will comply with the Site Fire Plan.

12.2 Permits and Authorisations

The Contractor will be accountable for obtaining all other permits and authorizations for the work in accordance with the EPPM.

The Contractor shall use the permit system to authorize all ground clearance activities, blasting and hot works. A permit application for these works will be submitted to the Engineer for approval. No work will commence without an approved permit.

Ground clearance is defined as being the removal or disturbance of vegetation or topsoil over an area exceeding 100m².

Hot works includes any welding activities undertaken outside an enclosed space. Hot works in confined spaces are not envisaged as part of this project. In the unlikely event that this is required, an approval permit will be required. The blasting permit will be needed for use of any explosives on site.

Further specific requirements are contained in the Health and Safety Plan.

12.3 Training and Competencies of Personnel

Raising environmental awareness is viewed as a crucial element in the appreciation and implementation of the EMP:D. The Contractor shall implement a programme for the education of employees and subcontractors such as all personnel are briefed on environmental issues and methods of mitigation prior to commencing work. All people working on the project (contractors, sub-contractors, Mighty River Power staff and consultants) shall be required to undertake induction training. In addition, environmental issues shall be an agenda item on the weekly toolbox talks for contractors and sub-contractors.

Suitable induction training shall, as a minimum, include:

- The significant or potential environment impact, of construction work and the importance of mitigation;
- Consent and regulatory obligations and site-specific applications;
- The importance and relevant of management plans;
- Roles and responsibilities in relation to compliance with consents, permits and project procedures;
- Spill response and emergency procedures; and
- Accident, incident, spill reporting and methods for prevention of environmental effect.

Ongoing toolbox talks will stress the importance of effective and efficient environmental management practices, and will allow an opportunity for feedback and suggestions for improvement on-site. Individual contract managers, the site manager or the construction manager will consider and may action any suggestions. Live manager and supervisors shall arrange for suitable training for all personnel engaged in activities that may have an impact on the environment, where necessary, to check that they are competent to carry out their duties. A record shall be kept of all training and toolbox talks.

13 Project Specific Environmental Management Plans and Aspects (SEMP)

The preparation of activity and/or location specific SEMP is a key component of the management of environmental effects during construction. The EMP:D is required to identify the process by which these will be prepared.

Table 4 shows the possible breakdown of SEMP's and the locations / activities covered. This list is indicative, and has been included in order to signify the scale and types of works which will be covered by each SEMP. Several SEMP's might be combined into one document in the event that design details are available and environmental requirements are similar.

Table 4 - Primary Work Zones

Plan No	Location or Activity
1	Road X (12 Turbines)
2	Road X (10 Turbines)
3	Road X (15 Turbines)
4	Road X (12 Turbines)

Plan No	Location or Activity
5	Road X (14 Turbines)
6	Road X (12 Turbines)
7	Road X (10 Turbines)
8	Road X (13 Turbines)
9	Road X (15 Turbines)
10	Road X (12 Turbines)
11	Road X (13 Turbines)
12	Construction of Substations, 220kV transmission lines and cable trenching
13	Road upgrading
14	Concrete batching plant
15	Turbine erection

Further detail on construction works undertaken in these areas such as substations, transmission lines, cable trenching, access roads and concrete batching plants can be found in Appendix III Construction Activities.

The EMP:D and the SEMP's are working tools that provide environmental management practices and procedures to address the important site values and risks in a broad environmental and community context. The information content of the SEMP's will be sourced from the ECO Register, EMP:D and other relevant documents.

An Erosion and Sediment Control Plan (ESCP) will be prepared by the Contractor for each SEMP area. Each ESCP will stand in parallel to its relevant SEMP, and will address the stage-by-stage management of earthworks controls that the contractor will implement throughout the construction process.

13.1 SEMP Preparation

For SEMP's which involve significant vegetation clearance and/or earthworks, or are near ecologically sensitive areas, a walk-over of the area will be undertaken by the Engineer or their representative, the main civil Contractor's representative, subcontractors, Palmerston North City and/or Tararua District and Horizons Regional Councils' representatives, and the Environmental Specialist for Mighty River Power. The purpose of the walk over is to confirm how the works will be undertaken, the scale of the works and to identify suitable measures to avoid any adverse environmental effects. If necessary, the ECO Register will be updated accordingly.

The content of individual SEMP's will differ but will include the following information, as appropriate:

- Location plan and site description (including soil types, vegetation, natural features, flood plains, waterbodies, climate);
- Site situation (the immediate, connecting and ultimate receiving environment);
- Contractor and personnel details including contract information;
- Description of works (the nature and scale of works being undertaken including the total vegetation area on site, area of vegetation clearance, total length of exposed roads, trenches and tracks and volume of proposed earthworks);

- Detailed maps (with bar and ratio scale, showing roads, boundaries, location of surface water courses and crossing requirements, any existing stormwater reticulation and outfalls, directions of groundwater flow);
- Limits of disturbance (show on the map all "limits of disturbance" bounding protected areas);
- An outline work programme;
- Identification of the ground area to be disturbed including estimates of topsoil to be recovered, and native vegetation to be uplifted and stored, including designated storage areas;
- Identification of stockpile and spoil disposal areas;
- Identification of the nature and extent of re-vegetation to be undertaken, and re-vegetation method;
- Re-vegetation maintenance requirements;
- Monitoring (details of proposed monitoring to assess the effectiveness of the control measures); and
- Any activities or procedures not identified in the CEMP.

Following the walk-over the main Contractor will prepare an Erosion and Sediment Control Plan (ESCP) which will be inserted later into the SEMP.

13.2 SEMP Review

Draft SEMP's are to be submitted to the Regional and District Councils and the Engineer for review. Comments received will be considered and where appropriate, incorporated into the final plan by the Contractor. The final SEMP will be submitted to the Regional and District Councils for their information and to satisfy any resource consent requirements. A copy of all final SEMP's will be provided to the Councils by the Engineer.

13.3 Implementation, Inspections and Monitoring

All SEMP's will need to be submitted by the Contractor (via the Engineer) to the Regional and District Council before any works commence. Works will proceed according to the final SEMP, including following any procedures outlined and correctly installing any environmental controls as required by the CEMP. Inspections and monitoring actions will be carried out by the main Contractor and Mighty River Power's Environmental Specialist regularly, including site walk-overs to monitor erosion and sediment controls to check that they are functioning correctly.

13.4 Auditing and Reporting

The Contractor will provide regular reports to the Regional and District Councils (via the Engineer) to meet resource consent monitoring obligations. (refer to Table 5 Planning and Implementation of SEMP's, and the specific requirements for auditing and reporting in this document).

Table 5: Planning and Implementation of SEMP's

Step	Description	Action	Purpose	Participant	Output
1	SEMP Preparation	Walk over the site	Identify appropriate natural site features, works to be undertaken, stockpile and disposal areas, revegetation requirements, and erosion and sediment controls to be	Construction Manager Environmental Specialist The Engineer The Contractor Regional	Draft SEMP to be prepared by the Contractor. Contractor prepares draft ESCP.

Step	Description	Action	Purpose	Participant	Output
			implemented.	Council District Councils	
2	SEMP Review	The draft SEMP is to be submitted to the Regional Council and MRP's Engineer and Advisor for review and comment.	Comments from the review will be provided to the Contractor who will take these into consideration and finalise the plan.	Regional Council District Councils The Engineer MRP Environmental Specialist	Final SEMP to be submitted to the Regional and District Council for their information and to satisfy any resource consent requirements.
3	Implementation of the SEMP and Monitoring	Works continue according to SEMP. Erosion and sediment controls installed according to Contractor's ESCP.	To ensure the works continue according to the final SEMP. To install the erosion and sediment controls shown on the final ESCP. Check the controls have been installed correctly and to a high standard.	The Contractor	The appropriate erosion and sediment controls in place (as CEMP the final ESCP), and appropriate procedures to be used to the satisfaction of the Construction Manager enabling work to commence.
		Walk over the site and monitor procedures and controls.	Regularly monitor the site to check all procedures are being followed.	Contractor (daily) The Engineer (or Advisor) (fortnightly)	All control measures are correctly installed, do not require maintenance and are operating correctly, and procedures and being followed. Issue Corrective Actions if required
4	Auditing/ Reporting	Walk over the site and a meeting.	Audit of compliance with the EMP:D, SEMP and resource consent requirements.	Construction Manager Environmental Specialist The Engineer The Contractor Regional	Record of audits. These will be used to modify the current and subsequent SEMP. List of Corrective Actions

Step	Description	Action	Purpose	Participant	Output
				Council District Councils	
5	Corrective Action	Rectify defect	Record and action non compliance with EMP:D and SEMP and resource consent requirements	Construction Manager Environmental Specialist The Engineer The Contractor Regional Council District Councils	Record of CARs

13.5 ESCP Preparation

ESCP's are working tools that will provide environmental management practices and procedures to address the requirements of the CEMP, and identified risks of the site and its broader environmental and community context. They will be prepared prior to works commencing, and the controls designed and constructed to Greater Wellington Regional Council guidelines (2002) (which have been accepted by Horizons as appropriate for the proposed works). Where devices followed exact Wellington guidelines are not appropriate, the best practicable option will be adopted.

The ESCPs will be prepared by the main contractor to include erosion and sediment control measures identified through the walk over. This will be based on initial information provided in Appendix III on the representative areas that have been identified for the purpose of erosion and sediment control. The ESCPs will include (but not limited to) the following:

- Site description – soil types, vegetation, natural features, subcatchment/drainage boundaries, flood plains, waterbodies, climate;
- Site situation – the immediate, connecting and ultimate receiving environment;
- Description of proposed development – the nature and scale of works being undertaken including the total earthworks area on site, total length of exposed roads, trenches and tracks and volume of proposed earthworks.
- Detailed map – a detailed location map of the site with a north point and bar scale as well as a ration scale, showing roads, boundaries and location of surface water bodies, any existing stormwater reticulation and outfalls, directions of groundwater flow;
- Limits of disturbance – the map is to include all the “limits of disturbance” bounding protected areas. On site, the limits of disturbance will be shown using fences, signs and flags;
- Erosion and sediment controls – a detailed map showing the erosion and sediment controls proposed; and
- Monitoring – details of proposed monitoring to assess the effectiveness of the control measures.

The distinction between the SEMP and the ESCP is that the ESCP is the Contractor's statement as to how, on a day-to-day basis, they will carry out the works in such a way as to effectively implement the provisions of the SEMP that was prepared by Mighty River Power.