



10 Proposed Measures to Avoid, Remedy or Mitigate Effects

10.1 Introduction

The assessment of actual and potential effects of the Project in **Section 9** has identified a variety of potential positive and adverse effects predicted to result from the construction and operation of the Project and also sets out measures to mitigate or remedy adverse effects where this is considered necessary.

The assessment of alternatives in **Section 7** discusses how the process for determining the Project design and proposed designations has led to the avoidance of various potential adverse effects. Potential adverse environmental effects may be further avoided or mitigated through the detailed design phase of the Project with the residual potential adverse effects requiring remediation or mitigation to ensure that they are appropriately managed throughout the construction and operation of the Project.

This Section summarises the mitigation, management and monitoring processes that are proposed prior to, during and post construction in order to avoid, remedy, or mitigate potential adverse environmental effects resulting from the Project.

10.2 Principles for Project delivery

The following principles form the basis for the development of the proposed conditions and management plans for the delivery of the Project:

- The construction and operation of the Project will use the best practicable options to avoid, remedy or mitigate adverse effects;
- All works are to be undertaken in compliance with current New Zealand standards and legislation;
- An integrated team approach has been and will continue to be used throughout development of the design and the methods to avoid, remedy or mitigate actual and potential effects. This means that no one particular discipline is more important than another; and
- Each technical specialist, consultant or contractor involved in the Project has equal responsibility to use best endeavours to avoid, remedy or mitigate adverse effects.

In addition to these principles, the methods used will seek to:

- Maintain on-going communication with AC who will be responsible for monitoring and enforcing conditions placed on the designations and resource consents sought;
- Maintain strong communication links with the directly affected landowners, Tangata Whenua, key stakeholders, affected landowners and the wider community; and
- Mitigate adverse effects during design and construction of the Project through which the above environmental principles will be implemented

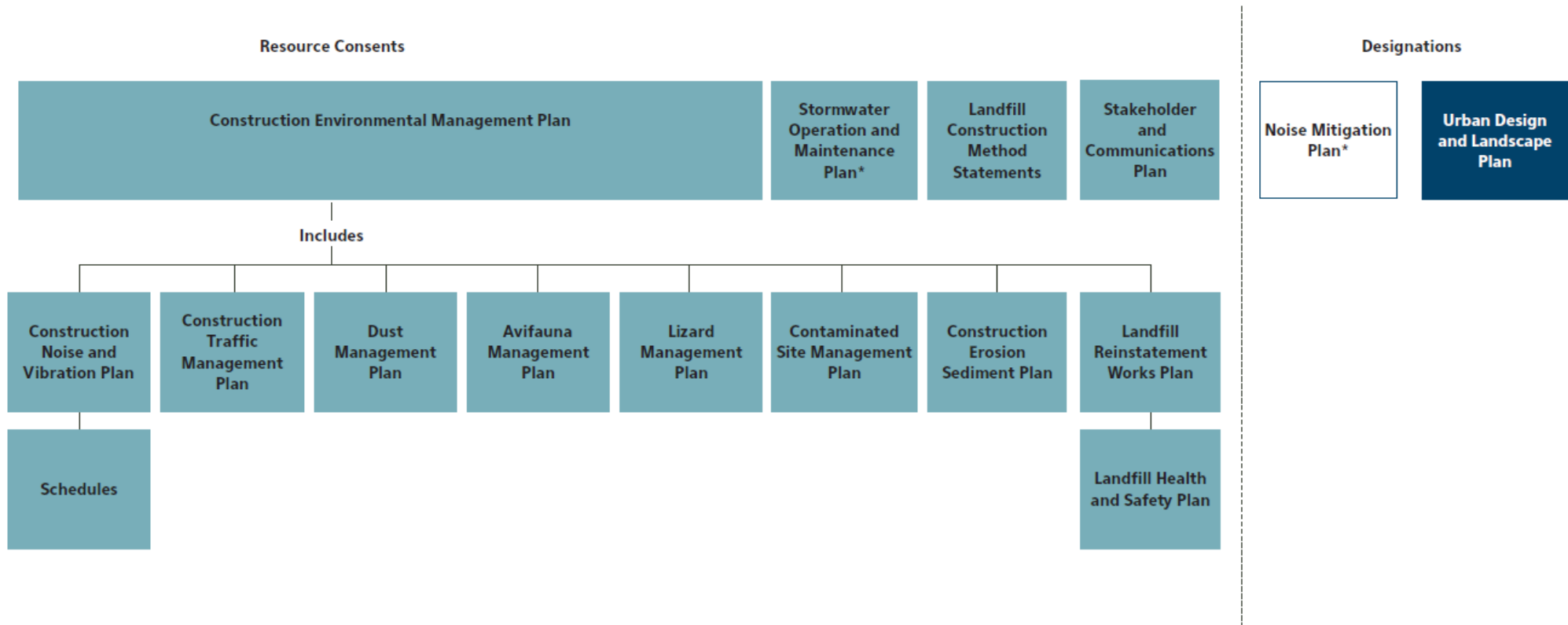
10.3 Methods to avoid, remedy or mitigate potential effects

The Project's design and methods to avoid, remedy and mitigate the potential adverse effects will be implemented through proposed designation conditions, Resource consent conditions and management plans.

- The proposed designation and resource consent conditions (provided at **Appendix A**) require the implementation of a suite of management plans.
- The proposed framework of management plans and their incorporation into the resource consent and designations conditions are illustrated in **Figure 50**.



Figure 50 Project Management Plan Structure



The draft conditions require:

- the management plans shaded blue to be provided to the Council for certification;
- the management plan shaded dark blue to be provided as part of the OPW.

* Indicates that the management plan regulates operation of the Project. All other management plans regulate construction only.



The CEMP will set out the overarching framework for how the environmental and social aspects of the project will be managed and measures to be employed to address the conditions of consent. Topic specific management plans, as appendices to the CEMP, consistent with the conditions of consent will detail specific risks and mitigation measures to be implemented prior to and during construction, including ongoing monitoring throughout the duration of the works. Plans for the longer term aspects following project completion are also specified.

10.3.1 Project stages and mitigation measures

The methods identified within the proposed conditions (NoR and resource consents), and proposed management plans/ plans can broadly be delineated between the three stages of project delivery:

- Pre-construction;
- Construction; and
- Operation.

10.3.1.1 Pre-Construction Mitigation Measures

Prior to the commencement of construction the following mitigation measures will be undertaken:

- Implementation of a Stakeholder and Communications Plan that would require engagement with stakeholders and establishment of a Community Liaison Group prior to commencement of construction;
- The draft CEMP will be provided to the IIG, and feedback sought during a hui;
- Additional baseline water quality and flow monitoring of Lucas Creek, Alexandra Stream and Oteha Stream Valley catchments;
- Undertake the following ecology surveys and or relocation programmes:
 - Avifauna nesting survey;
 - Lizards survey and relocation of identified specimens to habitat that will not be disturbed by the works; and,
 - Relocation of native fish and or eels located in watercourses that will be impacted by the works;
- Demarcating areas that are ecologically sensitive and not to be impacted by the works; and
- Completion of a Noise Mitigation Plan to confirm that the detailed design noise mitigation options meet the requirements of standards mandated by the conditions of Designations.

10.3.1.2 Construction Mitigation Measures

During the construction phase, the following will be implemented to mitigate actual and potential effects:

- Construction Environmental Management Plan, including:
 - The following sub plans as appendices:
 - Construction Noise and Vibration Management Plan;
 - Construction Traffic Management Plan;
 - Dust Management Plan;
 - Lizard Management Plan;
 - Avifauna Management Plan;
 - Contaminated Site Management Plan;
 - Construction Erosion and Sediment Control Plan;
 - Landfill Reinstatement Works Plan, which includes the Landfill Health and Safety Plan;
- Accidental discovery protocols;



- Landfill Construction Method Statements;
- Stakeholder and Communications Plan;
- Noise Management Plan; and
- Urban Design and Landscape Plan (to support OPWs).

10.3.1.3 Operational Mitigation Measures

Following the completion of the works and commissioning, compliance will be required with the following:

- Maintenance and treatment requirements for stormwater wetlands and devices consistent with a Stormwater Operation and Maintenance Plan;
- On-going maintenance of landscaping proposed as part of the Project under the Urban Design and Landscape Plan and Planting Plan; and
- The requirements of the Noise Mitigation Plan including maintenance of noise barriers and reporting.

10.4 Summary of Proposed Mitigation

To avoid, remedy or mitigate the adverse effects on the environment, the Project has adopted a process of initially utilising engineering design where feasible and, where residual effects remain, implementing a management plan framework.

The implementation of the management plans is to be required by the proposed resource consent conditions, the contents of which will ensure that the potential adverse effects that may arise from the construction of the Project will be adequately avoided, remedied or mitigated to a level necessary to achieve the purpose of the RMA.

Effects resulting from the operation of the Project are the subject of the proposed conditions on the NoRs.

Table 38 provides a summary of proposed mitigation of effects addressed through engineering design and management approaches. These effects could be further reduced during the detailed design phase of the Project.

Table 38 Summary of Mitigation of Effects

Effect	Mitigation	
	Engineering Design	Management approach
Preconstruction		
Terrestrial and Aquatic Ecology	Demarcation of disturbance areas prior to construction.	<ul style="list-style-type: none"> ■ Pre-construction ecology surveys and relocation of identified fauna; and ■ Water quality and flow baseline monitoring.
Cultural and Social	Minimise potential work within known culturally sensitive areas and private landholding.	Implementation of a Stakeholder and Communications Plan.
Construction		
Archaeology	Avoidance of known archaeological sites.	Implementation of an Accidental Discovery Procedure protocol included within the CEMP.
Air Quality/Dust		Implementation of: <ul style="list-style-type: none"> ■ Dust Management Plan.
Noise	Acoustic attenuation barriers to be constructed at specific locations.	Implementation of a Construction Noise and Vibration Management Plan.



Effect	Mitigation	
	Engineering Design	Management approach
Vibration		Implementation of a Construction Noise and Vibration Management Plan.
Transportation	<p>Temporary reduced speed limits and lane widths.</p> <p>Temporary parking spaces provided for Busway.</p> <p>Construction of a replacement McClymonts Road Bridge offline.</p>	Implementation of a Construction Traffic Management Plan.
Construction Water	<p>Temporary and permanent erosion and sediment control devices.</p> <p>Temporary and permanent surface water diversions.</p>	Implementation of a Construction Erosion Sediment Control Plan.
Terrestrial Ecology	<p>Design to avoid or minimise disturbance to ecologically sensitive areas.</p> <p>Implementation of stormwater treatment measures.</p>	<p>Implementation of:</p> <ul style="list-style-type: none"> ■ CEMP; ■ an Avifauna Management Plan; and ■ a Lizard Management Plan.
Freshwater Ecology	Fencing off proposed work areas.	Implementation of a Construction Erosion Sediment Control Plan.
Land contamination	Undertake a Detailed Site Investigation.	Implementation of a Contaminated Site Management Plan.
Rosedale Closed Landfill	Refuse removal and disposal to off-site licensed waste disposal facilities.	<ul style="list-style-type: none"> ■ Implementation of a: <ul style="list-style-type: none"> ■ Landfill Reinstatement Works Plan; ■ Landfill Health and Safety Plan; and ■ Landfill Construction Method Statements.
Social	NZ Transport Agency will acquire directly affected premises and will continue its Business Resettlement Assessment Strategy.	Implementation of a Stakeholder and Communications Plan.
Cultural	<p>Minimisation of disturbance areas</p> <p>Relocation of fish and eels within waterbodies impacted by the Project.</p>	<p>Implementation of:</p> <ul style="list-style-type: none"> ■ A Stakeholder and Communications Plan; and ■ An Accidental Discovery protocol.
Operation		
Noise	<p>Implementation of OGPA on new road surfaces along the main alignment.</p> <p>Dense asphalt on new road surfaces along ramps.</p> <p>Installation of noise attenuation barriers at specific locations.</p> <p>Installation of building modifications at receivers, if required.</p>	Implementation of a Noise Mitigation Plan.
Stormwater	<p>Permanent stormwater treatment devices.</p> <p>Permanent stormwater detention devices to manage flow and flood risk.</p>	Implementation of a Stormwater Operation and Maintenance Plan.



Effect	Mitigation	
	Engineering Design	Management approach
Freshwater Ecology	Permanent stormwater treatment devices.	Implementation of a Stormwater Operation and Maintenance Plan.
Landscape and Visual	Maintenance of planting.	Implementation of: <ul style="list-style-type: none"> An Urban Design and Landscape Plan consistent with the guiding principles identified in the indicative Urban Design Landscape Framework.
Rosedale Closed Landfill	Implementation of a two-tier gas migration barrier system as part of the works.	Assisting Auckland Council to alter the conditions of its existing resource consents, if necessary.
Cultural	Permanent stormwater treatment devices. Maintenance of indigenous plantings.	Implementation of a: <ul style="list-style-type: none"> Stormwater Operation and Maintenance Plan; and An Urban Design and Landscape Plan consistent with the guiding principles identified in the indicative Urban Design Landscape Framework.