PART H: MANAGEMENT OF ENVIRONMENTAL EFFECTS

31 Environmental management and monitoring

Overview

The Project design process has sought to reconcile a diverse range of environmental, social, cultural and economic values. The starting position for this has been to try and avoid or reduce potential adverse effects, while maximising positive effects.

Potential adverse effects that are not able to either fully avoided or adequately mitigated through design measures incorporated into the Project will require careful management throughout the construction and operation of the Project.

The Project delivery framework described in this section sets out how the Project will be delivered through to commissioning. This identifies where, in addition to the design detail contained in the plans and application documentation filed for this application, there is a role for management plans and other key processes (such as community liaison).

The overall management plan framework is set out, with two tiers of management plan being proposed:

- an overarching Construction Environmental Management Plan (CEMP); and
- a series of topic specific management plans (such as for noise and air quality)

A CEMP and topic specific management plans have been prepared and are contained in Volume 4. Some of the management plans or their components necessarily have to remain in draft form until statutory approvals are in place and further detailed design work is undertaken. The detailed design work will inform Management Plan finalisation via a certification process with either the Regional or District Council depending on who has statutory responsibility for the matter.

These Management Plans provide detail about how potential environmental effects will be dealt with. The management plans also cover proposed environmental monitoring which will be undertaken prior to, during and following construction to monitor potential effects, and provide a mechanism through which additional measures can be implemented during construction and operation if necessary.

31.1 Introduction

The assessment of environmental effects in Volume 2 identifies a wide range of positive and adverse actual and potential environmental effects predicted to result from the construction and operation of the Project.

Many potential adverse effects have been avoided completely or at least significantly reduced through design measures that have been incorporated into the Project.

There remain a range of adverse effects that will require remediation and/or mitigation. This includes monitoring and management of specified matters prior to, during and post construction.

This Chapter provides a discussion of these proposed environmental management.

The remainder of this Chapter provides the following:

- the Project delivery framework, which identifies how conditions and management plans will be implemented through the detailed design and construction phases of the Project (Section 33.2)
- the proposed management plan framework (Section 33.3); and
- a summary of the measures proposed to adequately manage potential adverse effects (Section 33.4).

It is proposed that the suite of proposed mitigation, remediation and monitoring measures summarised in Section 33.4 are formalised through the placement of conditions on the designation and resource consents. The summary of measures provides a reference to the relevant proposed conditions.

Proposed conditions are set out subsequently:

- proposed conditions of the designations (Chapter 34); and
- proposed conditions of the resource consents (Chapter 35).

31.2 Project delivery framework

The description provided of the Project and its component project elements, supported by information in the Technical Reports (Volume 3) and the accompanying plans (Volumes 4 and 5), enable the scale and nature of the Project to be understood.

Many measures to avoid, remedy or mitigate the potential adverse effects on the environment have been designed into the Project and thus have also been described.

The key to the future management of effects is the additional development and implementation of a suite of measures that include conditions, management plans and monitoring and maintenance. This is referred to as the Project delivery framework. This includes the need to:

- manage areas of environmental sensitivity,
- to recognise environmental risk issues; and,
- to identify the mechanisms to avoid, remedy or mitigate these actual and potential effects.

This overall process for delivery of the Project is shown in Figure 31.1.

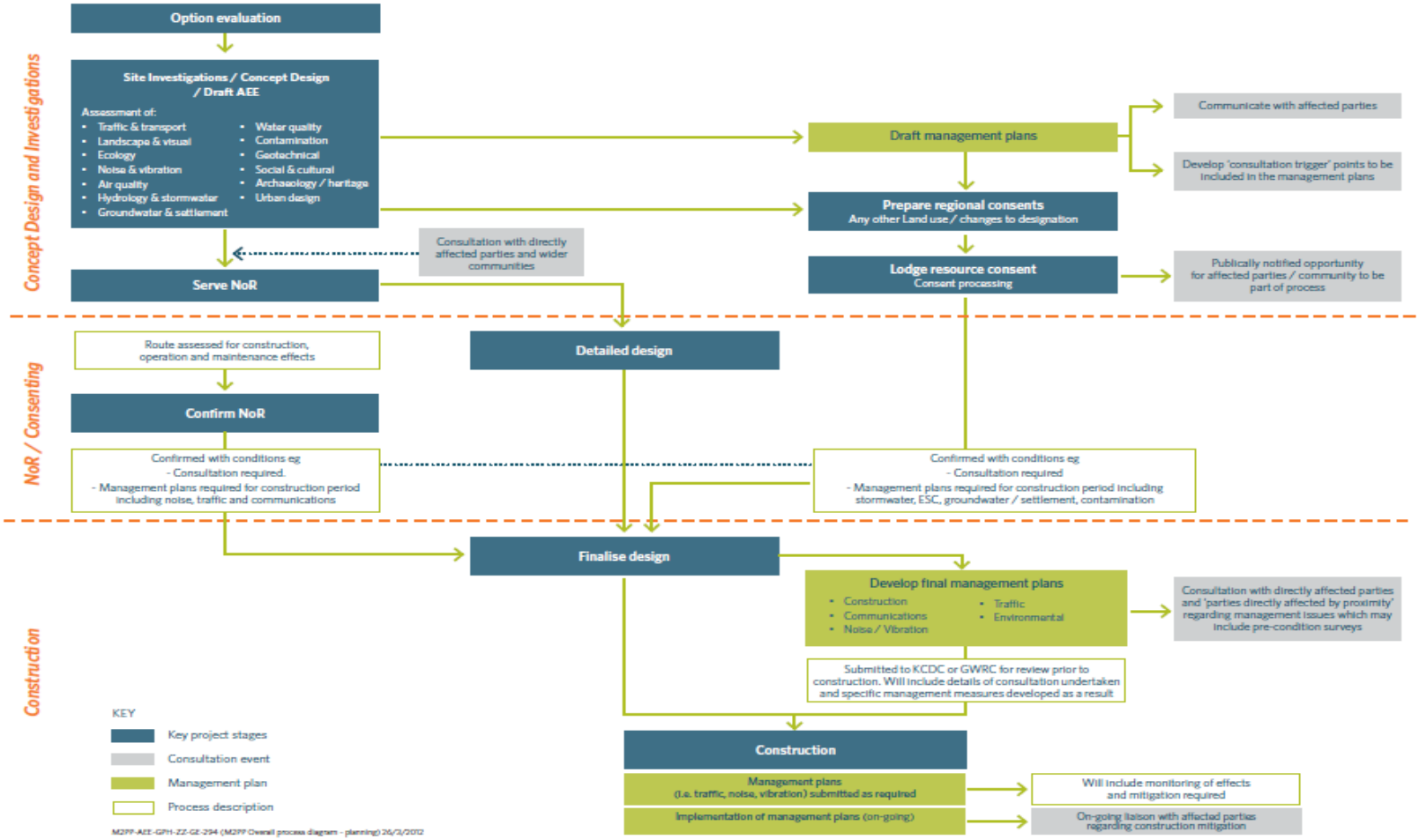

Figure 31.1: Overall Project delivery process

31.2.1 Principles for Project delivery

The following principles form the basis for the development of the application documents and additional plans and conditions that will dictate the delivery of the Project, its operation and maintenance:

- All works are to be undertaken in compliance with current New Zealand standards and legislation;
- The construction and operation of the Project will use the best practicable option[243] to avoid, remedy or mitigate adverse effects;
- An integrated team approach to development of the design and the methods to avoid, remedy or mitigate actual and potential effects means that no one particular discipline is more important than another;
- Each technical specialist, consultant, or contractor involved in the Project has equal responsibility to strive to avoid, remedy or mitigate adverse effects.

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

- Maintain on-going communication with the Greater Wellington Regional Council and Kāpiti Coast District Council who will be responsible for monitoring and enforcing conditions placed on the designation and resource consents sought;
- Maintain strong communication links with the directly affected landowners, tangata whenua, key stakeholders and the community;
- Mitigate adverse effects during design and construction of the Project through which the above environmental principles will be implemented.

31.2.2 Methods to avoid, remedy or mitigate

The following methods to avoid, remedy and mitigate actual and potential adverse effects are proposed:

- designation conditions
- consent conditions
- management plans

This section sets out actual and potential adverse environmental effects, and methods that would be used to manage them. Following that, management plans and conditions are discussed and described.

[243] 'Best Practicable Option' is defined in the Resource Management Act in relation to the effects from the discharge of contaminants or emission of noise, and guided by established case law. However, the principles of BPO are widely understood and applied in other areas of environmental management to develop measures to prevent or minimise many other types of effects.

31.3 Management plan framework

This section sets out the framework of management plans required to avoid, remedy and mitigate effects. The proposed framework is shown in Figure 31.2.

GWRC	KCDC	Department of Conservation	Historic Places Trust	Road Controlling Authorities
Resource consents	Designation	(for information)	Authority (HPA)	Other (LGA etc)
Construction Environmental Management Plan				
Accidental Discovery Protocol				
			Archaeological Management Plan	
Construction Air Quality Management Plan				
Ecological and Landscape Management Plans				
Erosion and Sediment Control Plan				
Contaminated Soils and Groundwater Management Plan				
Hazardous Substances Management Plan				
Resource Efficiency and Waste Management Plan				
Groundwater (level) Management Plan				
Settlement Effects Management Plan				
	Construction Noise and Vibration Management Plan			
	Construction Traffic Management Plan			
				Road Opening Notice
	Stakeholder Communications Management Plan			
Design and Construction Method				
	Network Utilities Management Plan			
As built plans - all streamworks	As builts (KCDC and GWRC) - note also Building Act Requirements			

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KEY

Provided as draft

Proposed conditions (but not provided at this stage)

Figure 31.2: Proposed management plan framework

31.3.1 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) has been prepared for the Project (Refer Volume 4). The CEMP documents set out in detail how effects are to be managed. Some sections do however require finalisation by the Project contractor prior to construction once all detailed design is complete.

This will be required to be generally in accordance with the CEMP in Volume 4, and the final CEMP will be provided to GWRC and KCDC for certification prior to construction commencing.

The CEMP is an overarching strategy document. Most other management plans fall under this main plan. The CEMP provides the strategy for how the Project is going to be physically constructed. It sets out the methods and tools to be implemented by the construction contractors to avoid, remedy and mitigate potential adverse environmental effects in order to meet the proposed resource consents and designation conditions, relevant legislation and the NZTA's environmental objectives.

The CEMP includes the principles and general approach to managing the environmental effects, along with setting out a methodology and detail for delivering construction. The delivery of detailed management plans is a critical part of the Project Delivery Framework during construction.

The CEMP covers all anticipated construction elements and presents a framework of principles, environmental policy, objectives and performance standards, plus detail for most matters. It establishes the relationship with the related environmental management plans that address specific topic areas, for example construction noise, traffic, and air quality, which are included as appendices to the CEMP.

Implementing the CEMP (including its second tier management plan appendices) will serve to appropriately avoid, remedy or mitigate any potential adverse environmental effects of the Project's construction. A range of proactive and reactive communication tools will be employed that require a constructor to clearly demonstrate that the community is engaged and informed.

The proposed designation and consent conditions for the CEMP also provide flexibility to review and modify practices according to construction specific circumstances. Making sure the CEMP is current and relevant is critical to its successful implementation. The CEMP details the tools for the implementation of good environmental management including monitoring and review requirements of the CEMP, auditing procedures, corrective actions and management reviews of the CEMP.

The contractor will be required to undertake all construction activities on site in accordance with the provisions of the relevant management plans as part of their contractual arrangements.

31.3.2 Topic specific environmental management plans

The CEMP and environmental sub-plans may require review and amendment during the life of the Project to reflect changes to activities, risks, mitigation measures, responsibilities and management processes. The ability to make changes to the CEMP is an important aspect of continually improving the effectiveness of the CEMP.

Changes to further develop and finalise necessary matters of detail for the CEMP will be required once the consents and designations are obtained. The contractors will undertake this as part of the process of finalising detailed design and those elements of construction not able to be provided until later in the Project. The process for modifications is set out in the CEMP and includes a process involving inputs from Councils and key stakeholders.

The CEMP and its second tier plans are to be consistent with and complement the Project's AEE. The technical assessment reports contained in the AEE inform the specific environmental management, monitoring and mitigation measures described within the sub-plans. The contractor will implement these to manage actual and potential environmental effects during construction.

31.3.3 Summary of environmental effects and corresponding management plans

The following table provides a summary matrix relating relevant actual and potential effects on the environment to the relevant construction management plans.

Table 31.1: Proposed management of environmental effects via management plans

Environmental effect (Construction)		Management of effect	Relevant management plan	Reference within Volume 4 of the AEE
Designation				
Noise	Noise	▪ Implementation of construction in accordance with the Construction Noise and Vibration Management Plan. ▪ Maintenance of an issues & complaint register.	CEMP CNVMP	CEMP CNVMP, Appendix F
Vibration	Vibration effects	▪ Implementation of construction in accordance with the Construction Noise and Vibration Management Plan. ▪ Maintenance of an issues and complaint register.	CEMP CNVMP	CEMP CNVMP, Appendix F
Air	Air Quality effects	▪ Implementation of construction in accordance with the Construction Air Quality Management Plan. ▪ Maintenance of an issues and complaint register.	CEMP CAQMP	CEMP CAQMP, Appendix G
Social responsibility	Social effects	▪ Minimise disturbance with appropriate timing / sequencing of construction. ▪ Careful management of construction, including selection of techniques. ▪ Accurate and regular communications with potentially affected parties to manage understanding and expectations.	CEMP SCMP CNVMP CTMP CAQMP	CEMP SCMP, Appendix S CNVMP Appendix F CTMP, Appendix O

Environmental effect (Construction)		Management of effect	Relevant management plan	Reference within Volume 4 of the AEE
Culture and heritage	Archaeological, built heritage, tangata whenua	■ Archaeologist part of the construction team. ■ Works to be in accordance with the NoR and any HPT approvals. ■ Iwi liaison protocols followed	CEMP CNVMP ELMP Accidental Discovery Protocols for wetland areas	CEMP CNVMP Appendix F EMP Appendix M Appendix 4 of Technical Report 9, Volume 3
Site operation	Site facilities	■ To be managed in accordance with the CEMP. ■ Landscape and visual effects management applies.	CEMP ELMP	CEMP ELMP, Appendix M
Traffic	Construction traffic	■ Construction traffic to be managed as per the CTMP.	CEMP CTMP	CEMP CTMP Appendix O
Visual and Landscape	Construction site facilities, yard and buildings	■ Landscape mitigation planting applies where practicable.	CEMP LMP	CEMP LMP Appendix T
	Visual mitigation	■ Landscape mitigation plan sets out staged planting plans for management of effects during construction, as well as mitigation for permanent works.	CEMP LMP	CEMP LMP Appendix T
Resource Consents				
Land *Water resources*	Erosion and Sediment Control and Stormwater Management	■ Implementation of erosion and sediment control procedures. ■ Sediment ponds. ■ Stabilisation of inactive work areas. ■ Diversion of clean water. ■ Proactive weather forecasting, monitoring and risk management.	CEMP ESCP	CEMP ESCP Appendix H
Ecology	Planting and habitat management/ replacement	■ Species/habitat translocation. ■ Enrichment planting. ■ Freshwater & wetland habitat restoration. ■ Pest management ■ Landscaping.	CEMP EMP	CEMP EMP, Appendix M

Environmental effect (Construction)		Management of effect	Relevant management plan	Reference within Volume 4 of the AEE
Groundwater Levels and Settlement	Temporary and long term changes to groundwater levels and ground settlement effect	■ Implementing the management and design of construction activities in accordance with the Groundwater (Level) Management Plan. ■ Implementation of construction in accordance with the Settlement Effects Management Plan. In particular: ■ Monitoring of consolidation and mechanical settlements; and ■ Monitoring and management of buildings, services and infrastructure that have the potential to be impacted by settlement.	CEMP GWMP SEMP	CEMP GWMP, Appendix I SEMP, Appendix J
Spill response, waste and contamination	Contamination	■ Implementation of CSGMP.	CEMP CSGMP HSMP REWMP	CEMP CSGMP, Appendix K HSMP Appendix L REWMP, Appendix N
	Hazardous Substances	■ Storage and use in accordance with the Dangerous Good regulations; relevant licences and approvals obtained in CEMP; incident form to be filled in and recorded if hazardous spill occurs.		
	Refuelling/ maintenance areas	■ Spill management procedure as part of the CEMP and implemented by the construction team; use and maintenance of spill kit; spills to be cleaned up and recorded in accordance with the CEMP. ■ Waste to be removed from site back to main bins at Otaihanga Yard. Waste to be sorted according to type as detailed in the Resource Efficiency & Waste Management Plan.		
	Management of construction waste	■ Construction waste to be removed from site back to the main bins at Otaihanga Yard. Waste to be sorted according to type as detailed in the Resource Efficiency & Waste Management Plan.		
Site operation	Site facilities	■ To be managed in accordance with the CEMP. ■ Contingency measures.	CEMP	CEMP

31.4 Summary of mitigation, monitoring and other measures to manage adverse effects

A range of mitigation, remediation, management and monitoring measures has been developed for the Project, in order to avoid, remedy or mitigate potential adverse effects. These measures are summarised in Table 31.2. Where relevant, a reference is provided to proposed condition(s).

Table 31.2: Proposed mitigation and monitoring

Construction effects
Operational effects

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
Traffic and transport				
Project induced traffic increases occurring on some local roads may require specific management or design changes after proposed Expressway opening. Locations identified are: ■ Kāpiti Road in the vicinity of the Kāpiti Road Interchange ■ Poplar Avenue, east of Matai Road ■ Park Avenue, north of Te Moana Road ■ Paetawa Road	An agreed traffic monitoring and review regime agreed with Kāpiti Coast District Council to ensure effects are within the expected range.	Traffic monitoring on a quarterly basis for a one year period to inform a post-construction review.	A post-construction review of functioning of specified roads one year after project commissioning for: ■ Kāpiti Road in the vicinity of the Kāpiti Road Interchange ■ Poplar Avenue, east of Matai Road ■ Park Avenue, north of Te Moana Road ■ Paetawa Road	■ Technical Report 32, Volume 3 ■ Technical Report 34, Volume 3
Land Use and property				
Temporary occupation of private properties for construction	A condition of consent is recommended to review the	N/A	■ Designation – uplift of parts of the new	■ Technical Report 3, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
purposes.	designation areas once construction is completed. Note: Temporary occupation for construction is managed through the Public Works Act.		designation not required for the operation of the Expressway once construction completed.	■ Technical Report 20, Volume 3
Access to water supply will be severed for some private properties.	Alternative water supply will be provided for all those with lawfully established water rights.	N/A	■ CEMP ■ Designation – Arrangements for alternative water supply determined prior to construction commencement.	■ NZTA requirements
Access to some private properties will be severed temporarily as a result of the Expressway alignment and new local road configuration.	Provision for permanent alternative access arrangements are part of the project. Temporary measures for are needed to ensure provision and management	N/A	■ CTMP for temporary works	■ Assessment of Environmental Effects, Volume 2
Services/Network Utilities				
Dust from construction activities could potentially interfere with Transpower infrastructure.	Dust suppressant is proposed to limit potential spread of dust. If necessary some of the Transpower infrastructure may need to be cleaned of dust.	Dust effects on assets will be monitored in liaison with Transpower during construction.	■ Designation – NUMP	■ Agreement between NZTA and Transpower
Project alignment is close to two Transpower towers.	Detailed design will confirm works adjacent to the towers. Communication is ongoing with Transpower to confirm whether any mitigation measures are needed.	N/A	■ Designation – NUMP	■ CEMP, Volume 4
Potential for construction to cause physical damage to Network Utility infrastructure.	Clearly identifying the location of infrastructure and how these will be protected. Carefully coordinated onsite	Ongoing monitoring throughout the construction period.	■ Designation – CEMP – NUMP ■ Rectification of any damage	■ CEMP, Volume 4 ■ Consultation Summary Report

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	management set out within the CEMP.			
Urban Form and Function				
Waikanae town centre and nearby businesses will experience reduced volumes of through traffic. Some businesses draw on this passing trade which may have an effect on their turnover.	Signage from Expressway to town centre.	N/A	▪ Provision of signage to town centres from Expressway interchanges.	▪ Technical Report 5, Volume 3 ▪ Technical Report 6, Volume 3
Significant impact on the existing character of urban, rural and open space areas. New Expressway structures, vehicle movements and associated traffic noise are some of the potential adverse effects that will be introduced into the environment.	Location specific combinations of mitigation measures will be used to maintain, as best as practicable, the character of urban, rural and open space areas. Methods include: ▪ Earthworks sympathetic to the natural landscape for example contouring around existing topographical features where practicable. ▪ Site specific landscape treatment. ▪ Visual barriers for noise attenuation. ▪ Sculptural design of bridge structures. ▪ Treatment of underbridge areas to maintain safe and attractive pedestrian and cyclist areas.	As specified for individual project monitoring elements.	Designation Condition 1 sets our requirement for Project development in general accordance with design elements detailed in application (Plan Set and proposed conditions)	▪ Technical Report 5, Volume 3 ▪ Technical Report 6, Volume 3
The interchange at Peka Peka may encourage unplanned urban development pressures.	No mitigation is proposed based on Project design solution (i.e., partial interchange). The provisions of	KCDC District Plan assessments and monitoring to addresses this. Therefore, no	N/A	▪ Technical Report 5, Volume 3 ▪ Technical Report 6, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	the existing District Plan are considered appropriate to control any development that is not in accordance with the District Plan rules.	additional monitoring proposed.		
Visual and Landscape				
Temporary visual effects of earthworks (particularly those associated with preloading) and associated vegetation removal. The residential areas immediately adjacent to the proposed preloading sections of the Expressway, and potentially the most affected by earthworks are the communities at Leinster Avenue, Raumati Road/Rata Road, and Midlands.	■ The extent of earthworks will be confined to the area within the construction designation boundary and are temporary. ■ During the site establishment phase of construction, the Project team shall minimise permanent loss and damage to vegetation to the minimum required to undertake the works. ■ Progressively, upon completion, the earthworks will be hydroseeded to minimise soil erosion and scouring; in places artificial materials such as coconut or brush may be required to replace or to complement the hydroseeding. ■ Tree and shrub planting of the earthworks will be carried out in optimal environmental conditions to maximise plant survival and establishment. The hydroseeded areas will be spot or blanket sprayed prior to planting and all planted areas will be mulched.	Monitoring will occur as outlined within the LMP. With respect to landscape values there will be qualitative monitoring during the construction and transition phase, focused on earthwork activities especially within the dune landforms, retention of valued vegetation in the construction footprint and implementing the planting plans throughout the alignment	Requirements set out in CEMP (including ESCP) and LMP to address	■ CEMP, Volume 4 ■ LMP (being CEMP Appendix T, Volume 4) ■ Technical Report 7, Volume 3 ■ Technical Report 5, Volume 3 ■ Technical Report 20, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	▪ For short-term pre-load areas (i.e., less than 6 months) a top layer of clean granular material, sub base course or mulch (straw, hay or wood) will be applied over sand to minimise wind disturbance of the surface and to minimize dust. For the pre-load areas that will remain in place longer than 6 months, a layer of topsoil will be applied and then grassed. ▪ Any complaints will be managed through the process outlined in the CEMP and ESCP.			
The Expressway and all associated structures (noise bunds and walls, embankments, bridges, overbridges, interchanges) are designed to minimise the impact on the notable remnant dunes along the alignment. However, large areas of dunes will be modified or in places removed.	Re-shaping the dunes and mass planting on the embankments (along with other techniques described in Landscape and Visual Chapter 17 of this report) will assist to integrate the road into the landscape.	Monitoring of the dune reshaping construction activities as outlined within the LMP. ▪ Monitoring of the dune reshaping construction activities shall require the Project Landscape Architect and Civil Engineer to be on site at critical phases during the final shaping of the earthworks through and on the edge of dune landscapes. ▪ The inception meetings will arrange timely site visits for the Project Landscape Architect, Civil	Specify requirements for monitoring in LMP	▪ CEMP, Volume 4 ▪ LMP (being CEMP Appendix T Volume 4) ▪ Technical Report 7, Volume 3 ▪ Technical Report 5, Volume 3 ▪ Technical Report 20, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
		Engineer and Project team (specifically the machine operators) to discuss the daily, weekly, monthly approach to the works. It is likely that regular site visits during the most critical stages will be required and 'hold points' allow key experts to meet, assess, and report on progress, before the machinery and Project teams move on to another site or activity. ■ Critical phases shall be photographed and appropriately reported on by the Project team and the Project Environmental Manager and representatives from KCDC will inspect the finished earthworks and post-mitigation planting phase.		
The Expressway alignment will remove areas of native and exotic vegetation, and wetlands which are valued as part of the character of the landscape. It is noted, however, that through appropriate planting plans, devised from an ecological and landscape amenity perspective,	■ Through recognised techniques particularly at the 'site establishment' phase of construction, groups of trees, stand alone mature trees, residual amenity plantings from residential properties can be retained and protected. ■ The mitigation package for each Landscape Character	Monitoring and maintenance of retained and newly planted vegetation as outlined in the EMP and LMP. ■ Prior to construction works, there will be an on-site inception meeting with Project Landscape Architect, Project Ecologist and Project team to	Replacement or restoration to at least original extent of areas lost. Specify matters for EMP and LMP to address	■ CEMP, Volume 4 ■ EMP (being CEMP Appendix M, Volume 4) ■ LMP (being CEMP Appendix T, Volume 4) ■ Technical Report 7, Volume 3 ■ Technical Report 5, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
the stormwater network proposed can be an opportunity to create visual and ecologically important areas.	Area also includes substantial planting to bolster remnant areas of native vegetation protected along the alignment. This is detailed in the EMP. ■ The areas of vegetation to be retained are identified in the Vegetation Map Series (details are provided in Appendix 3 of the EMP). ■ The contractor shall minimise activities that have the potential to result in the permanent loss or damage of wetlands outside of the Project footprint (as outlined within Table 8 of the ELMP). ■ Maintenance of the planted areas is to follow a maintenance schedule drafted by the Project Landscape Architect and Project Ecologist.	discuss planting plan detail and best way of implementation. Agreement will be made on 'hold points', site visits and regularity of monitoring and reporting. For quality assurance purposes, reporting will comprise of written documentation detailing progress against anticipated outcomes (the Planting Specifications), and include photos to illustrate these outcomes. ■ Following the practical completion of planting (pending defects liability requirements) a two-year maintenance period is proposed for planting on embankments, batter slopes, wet and dry swales, and for riparian planting. A four year maintenance period is proposed for the ecological, stormwater treatment and planted flood storage wetlands.		■ Technical Report 20, Volume 3
The cuts to the dunes will expose the earth to colonisation of pest plants and weeds.	Immediate hydroseeding will be necessary.	Monitoring of pest plant species is essential to trigger the planning and implementation of pest plant management. Monitoring methods are	Specify matters for EMP and LMP to address	■ CEMP, Volume 4 ■ EMP (being CEMP Appendix M, Volume 4) ■ LMP (being CEMP Appendix T, Volume 4)

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
		outlined within the ELMP. Inspections will be required during and post construction, particularly for newly planted and established landscaped areas and areas to be restored and revegetated.		■ Technical Report 7, Volume 3 ■ Technical Report 5, Volume 3 ■ Technical Report 20, Volume 3
Amenity value effects and change in landscape character from the large scale of the Expressway, overbridges and interchanges, traffic movements and increased ambient noise. The magnitude of these effects increases where they are visible to both resident and transient viewing audiences, and when the visual change detracts from existing views and outlooks. Positive effects accrue where traffic reduces on current SH1 and the local network.	For large sections of the Expressway the proposed earth bunds, noise walls and planting will screen views of the moving traffic. Mitigation planting is proposed throughout the Expressway Alignment. There are several types of mitigation planting, depending on the landscape and ecological features, and the works and structures of the Expressway. All proposed planting areas are identified on the Planting Plan Map Series (and corresponding key) and details are provided in Appendix 3 of the LMP.	Monitoring of the areas to be restored and revegetated as discussed above and in the ELMP. The monitoring effort will be tapered off once the planted areas become well established, with a 3 year limit on the extent of maintenance.	■ Specify matters for LMP to address	■ CEMP, Volume 4 ■ EMP (being CEMP Appendix M, Volume 4) ■ LMP (being CEMP Appendix T, Volume 4) ■ Technical Report 7, Volume 3 ■ Technical Report 5, Volume 3 ■ Technical Report 20, Volume 3
Lighting				
Construction yard and activity lighting, while temporary, has the potential to cause light spill effects to nearby residents and glare effects to drivers of vehicles. Construction yard lighting has not yet been designed.	The Construction Environmental Management Plan (CEMP, Volume 4) will manage the potential impacts of temporary lighting during construction. Lighting design plans for construction yards will be	It is recommended that the contractor monitor lighting during construction every 2 months or response to any complaint. Monitoring should include visual tests to check that luminaires have not been	■ Specify matters for CEMP to address	■ Technical Report 8, Volume 3 ■ CEMP, Volume 4

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	submitted by an accredited Illumination Engineer as part of the CEMP. The contractor will be required under the CEMP to use luminaires that do not produce environmental spill light above that required by relevant Kāpiti Coast District Plan standards.	re-aimed inappropriately		
There are two specific areas where lighting (from the cycleway/walkway) could intrude into residential properties and be a source of irritation. Along the southern approach to the Kāpiti Road interchange (refer to drawings CV-MF-730 and CV-MF-740, Volume 5); and Along the northern section, immediately before the Mazengarb Road connection (refer to drawing CV-MF-741, Volume 5).	Mitigation (to achieve 3 lux or less in these locations) is proposed and will be achieved through a selection or combination of: ■ detailed design features; and/or ■ installing the lighting onto the acoustic fence; and/or ■ reducing the height of the cycleway light poles within these sections.	Monitoring of lighting in response to complaints.	■ Specify standards and/or outcomes to be achieved in the design of lighting ■ CEMP	■ Technical Report 8, Volume 3
Noise and Vibration				
Construction noise and vibration has the potential to cause disturbance to residents in close proximity to the alignment.	Compliance with the construction noise standard and vibration standards. Where the CNVMP determines that adverse noise or vibration effects are significant residents in close proximity will be consulted and depending on the circumstances a variety of options will be considered to	As required by the CNVMP, including monitoring: ■ noise limits ■ At locations considered to be sensitive receivers, or otherwise in response to complaints.	■ Specify matters for CNVMP to address	■ CNVMP ■ Technical Report 16, Volume 3 ■ Technical Report 17, Volume 3 ■ Technical Report 18, Volume 3 ■ Technical Report 19, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	avoid or mitigate noise as far as practicable.			▪ Technical Report 20, Volume 3
Operational traffic noise has the potential to cause disturbance to residents in close proximity to the alignment.	Project design includes site specific mitigationto mitigate noise where necessary. Methods employed to mitigate operational noise include: low noise road surfacing (OGPA), designation width, contoured earth bunds and noise walls/barriers.	No monitoring required except as set out in the CNVMP.	Specify matters for CNVMP to address	▪ Technical Report 15, Volume 3 ▪ Technical Report 17, Volume 3 ▪ Technical Report 18 ▪ Technical Report 19 ▪ Technical Report 20, Volume 3
Air Quality				
Dust generated by earthworks and road construction activities can be a nuisance to the public, has the potential to affect plant life and can contribute to sediment loads in waterways.	Dust from construction activities will be managed through the CAQMP. The primary management approach will be the suppression of dust at its source, allowing potential adverse effects on air quality to be appropriately managed.	A dust monitoring programme is proposed, based on regular visual monitoring in all areas, continuous monitoring of total suspended particulate matter (TSP) at one or two of locations, continuous monitoring of meteorological monitoring at one or more locations and prompt responses to complaints from the public and regulatory authorities.	Specify matters for CAQMP to address	▪ CAQMP ▪ Technical Report 14, Volume 3 ▪ Technical Report 20, Volume 3
Construction vehicles have the potential to cause adverse air quality effects under certain meteorological conditions, generating excessive smoke and odour from diesel-fuelled heavy vehicles, generators and other machinery.	The CAQMP includes requirements to maintain vehicles and equipment in accordance with manufacturer specifications and immediately service units discharges excessive exhaust smoke. Adherence to the CAQMP practices for construction	The CAQMP describes measures to be undertaken to control and monitor construction vehicle emissions (section 3.1.4), including requirements to maintain vehicles and equipment in accordance with manufacturer	Specify matters for CAQMP to address	▪ CAQMP ▪ Technical Report 14, Volume 3 ▪ Technical Report 20, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	vehicles will ensure that all potential adverse effects associated with emissions will be adequately managed.	specifications and immediately service units discharges excessive exhaust smoke.		
When pre-cast concrete units are removed from the mould, hand-held grinders are often used to remove surface flaws, and occasionally water-blasting is required to obtain a suitable surface finish. Both of these activities have the potential to generate dust emissions.	Dust generation will be minimised by using diamond-tooth grinders for hand-held grinding wherever possible. Water blasting is usually not necessary and it is estimated that this may need to be carried out approximately 10 times during the construction phase of the Project. The concrete pre-casting site is located 250m from the nearest sensitive activities.	A dust monitoring programme is proposed, based on regular visual monitoring in all areas, continuous monitoring of total suspended particulate matter (TSP) at one or two of locations, continuous monitoring of meteorological monitoring at one or more locations and prompt responses to complaints from the public and regulatory authorities.	Specify matters for CAQMP to address	▪ CAQMP ▪ Technical Report 14, Volume 3 ▪ Technical Report 20, Volume 3
Excavation may disturb land contaminated with organic wastes (such as closed landfills) or waterlogged soils that may be anaerobic, such as peat.	It is not considered that excavation works along the alignment will release any odour.	In the instance of an unexpected disturbance, monitor in response to complaints made. The specific requirements for managing complaints associated with dust/odour/vehicle exhaust nuisance effects are detailed within the CAQMP	Specify matters for CAQMP to address	▪ CAQMP (CEMP, Appendix G) ▪ Technical Report 14, Volume 3 ▪ Technical Report 20, Volume 3
Cumulative PM_{10}, NO_2, CO and benzene concentrations have the potential to increase in the vicinity of the Expressway when it is commissioned. Concentrations adjacent current SH1 and on parts of the local	The result of the dispersion modelling indicates that the operation of the Project is unlikely to cause exceedances of any relevant air discharge assessment criterion of air pollutants caused by vehicles	In the instance of an unexpected disturbance, monitor in response to complaints made. The specific requirements	Specify matters for CAQMP to address	▪ Technical Report 13, Volume 3 ▪ Technical Report 20, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
network may reduce due to traffic now using the Expressway.	using the Expressway. No mitigation or monitoring is considered necessary.	for managing complaints associated with dust/odour/vehicle exhaust nuisance effects are detailed within the CAQMP.		
Traffic modelling indicates that there will be some changes to traffic on local roads, including increases in vehicle numbers on Kāpiti Road, Poplar Ave, Mazengarb Road and Park Road. Positive effects will accrue on existing SH1 and parts of the local network due to traffic decreases due to diversion to using the Expressway.	These increases are unlikely to have a significant impact on concentrations of air pollutants at nearby receptors.	In the instance of an unexpected disturbance, monitor in response to complaints made. The specific requirements for managing complaints associated with dust/odour/vehicle exhaust nuisance effects are detailed within the CAQMP	Specify matters for CAQMP to address	■ Technical Report 13, Volume 3 ■ Technical Report 20, Volume 3
Terrestrial Ecology				
The indirect effects of construction on terrestrial ecology are limited to those related to dust, fire and weed invasion.	Any potential for these effects has been sufficiently mitigated through their inclusion in the Construction Environmental Management Plan and its associated management plans.	Refer to monitoring of fire within the CEMP. Refer to monitoring of weeds and pest plants within the ELMP. Refer to monitoring of dust within the CAQMP.	Specify matters for LMP and EMP and CEMP and CAQMP to address.	■ LMP (CEMP, Appendix T) ■ EMP (CEMP, Appendix M) ■ CAQMP (CEMP, Appendix G, Volume 4) ■ CEMP, Volume 4 ■ Technical Report 26, Volume 3 ■ Technical Report 27, Volume 3 ■ Technical Report 28, Volume 3 ■ Technical Report 29, Volume 3
Loss of terrestrial vegetation (including wetlands), in particular kanuka and mahoe forest.	Mitigation proposed is detailed within Chapter 21 of this report).	Specialist ecological advice	Specify requirements for CEMP and EMP to address	■ EMP (CEMP, Appendix M) ■ LMP (CEMP, Appendix T)

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
It is noted that stormwater treatment wetlands and flood storage areas that will be formed along the route and will subsequently provide additional ecological benefits.	▪ Use BPO to avoid identified sites within designation during detailed design. ▪ 5.4ha of wetland restoration be created as mitigation for the loss of 1.8 ha of wetland. ▪ It is recommended that a minimum of 7.6ha of mass planting along the Expressway alignment (refer to Chapter 17 for a description of mass planting) be provided as mitigation for the loss of terrestrial vegetation (kanuka forest, regenerating mahoe and mature indigenous forest) within the Project footprint. This approach has been taken to maintain and overall improve the wider ecological corridor benefits along the length of the Expressway. ▪ Adaptive management	during detailed design. Monitoring and maintenance of retained and newly planted vegetation as outlined in the ELMP. ▪ Prior to construction works, there will be an on-site inception meeting with Project Landscape Architect, Project Ecologist and Project team to discuss planting plan detail and best way of implementation. Agreement will be made on 'hold points', site visits and regularity of monitoring and reporting. For quality assurance purposes, reporting will comprise of written documentation detailing progress against anticipated outcomes (the Planting Specifications), and include photos to illustrate these outcomes. ▪ Following the practical completion of planting (pending defects liability requirements) a two-year maintenance period is proposed for planting on embankments, batter		▪ CEMP, Volume 4 ▪ Technical Report 26, Volume 3 ▪ Technical Report 27, Volume 3 ▪ Technical Report 28, Volume 3 ▪ Technical Report 29, Volume 3 ▪ Technical Report 7, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
		slopes, wet and dry swales, and for riparian planting. A four year maintenance period is proposed for the ecological, stormwater treatment and planted flood storage wetlands.		
Lizard mortality resulting from vegetation clearance	■ Artificial refuges should be set at the key locations outlined within the herpetofauna survey (Technical Report 28, Volume 3) as part of pre-construction site inspection (prior to any vegetation clearance). Any lizards captured should be released in other suitable habitat of sufficient distance from the Expressway alignment. ■ Prior to any construction in the vicinity of the El Rancho Wetland (Weggery), a series of tracks should be cut through the scrub within the Project footprint to allow the area to be searched for arboreal lizards.	Baseline and post construction monitoring	Specify requirements for CEMP and EMP to address	■ EMP (CEMP, Appendix M) ■ CEMP, Volume 4 ■ Technical Report 26, Volume 3 ■ Technical Report 27, Volume 3 ■ Technical Report 28, Volume 3 ■ Technical Report 29, Volume 3
Displacement or mortality of fernbird during construction and operation. Loss of fernbird habitat during construction.	■ Mapping of territories (fernbird habitat surveys) within the Te Harakeke/Kawakahia Wetland - Nga Manu Nature Reserve area prior to any construction-related	A scheduled and ongoing programme of maintenance and monitoring of the habitat buffering in the fernbird habitat areas.	Specify requirements for CEMP and EMP to address	■ EMP (CEMP, Appendix M) ■ CEMP, Volume 4 ■ Technical Report 26, Volume 3 ■ Technical Report 27, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	activities; ■ Wetland habitat creation away from the Expressway (ideally a minimum of one year prior to any vegetation clearance). This could include the new flood storage wetlands proposed north of the Kakariki Stream and the proposed riparian planting in the Kakariki Stream, both areas of which are likely to be within the fernbird territories; ■ A bridge structure across the Kakariki Stream that provides riparian vegetation and sufficient clearance underneath that a corridor can be created to facilitate movement under the Expressway rather than across; ■ Maintenance of a mown grass buffer along the Expressway (so as to not encourage birds to the road edge); and ■ Any clearance of vegetation within identified fernbird territories should only occur outside of the breeding season.			■ Technical Report 28, Volume 3 ■ Technical Report 29, Volume 3
Freshwater Ecology				
Construction will result in freshwater habitat loss and	■ Use BPO to avoid streams not directly affected by stream works.	■ Adaptive management to establish a baseline of pre-construction	Specify requirements for CEMP and EMP to address	■ CEMP, Volume 4 ■ EMP (CEMP, Appendix M) ■ Technical Report 26,

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
modification. A total of 1,119m of perennial and intermittent stream habitat will be lost as a result of culvert and bridge construction, and 1,525m of stream habitat lost due to stream diversions and modifications. It is noted that new sections of stream (seven) connecting the Expressway works to stormwater ponds outlets to existing watercourses will result in new stream habitat.	▪ Stream restoration on the watercourses affected upstream and downstream of the Project. This involves retiring and riparian planting a minimum of 4,973m of stream habitat. ▪ Provision of an additional 257m of restoration by mass planting of wetland plant species within the approximately 13ha of flood storage areas where these areas provide for fish passage. ▪ Best practice erosion and sediment control mechanisms during construction will also assist in reducing potential sediment-laden run-off reaching the ecologically sensitive downstream receiving environments.	ecological conditions against which changes are measured. ▪ Monitoring and maintaining ESC devises during construction (as discussed in "Water Quality" above).		Volume 3 ▪ Technical Report 30, Volume 3
Construction activities may result in freshwater fauna species loss as a result of stream diversions, culverting and bridge construction. Due to the quantity of stream length that will be lost or modified during construction there is potential for significant loss of native freshwater fish.	▪ A suitably qualified ecologist will be involved in the design and the key construction phase of all instream works in perennial and intermittent streams, including temporary and permanent culvert installations, temporary and permanent fords, diversions and weirs. ▪ Fish relocation will be carried out during the construction of culverts and stream	Fish community monitoring: ▪ The test of an absence of adverse effect will be the comparison of sites that during baseline had repeated taxa presence, again having those taxa post construction. It is therefore not suggested to monitor fish during the construction period but to set a good baseline (at least 4 detailed study	Specify requirements for CEMP and EMP to address	▪ CEMP, Volume 4 ▪ EMP (CEMP, Appendix M) ▪ Technical Report 26, Volume 3 ▪ Technical Report 30, Volume 3 ▪ Technical Report 22, Volume 3 ▪ Technical Report 24, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	diversions. ■ Works in stream beds will be minimised during periods of fish migration (Spring 1 Oct – 30 Dec; Autumn 1 April – 30 May) to ensure work is only undertaken in short, prescribed periods during this time with appropriate ecological supervision. ■ Works will be phased in the drier months of the year to minimise potential effects on freshwater fauna.	periods), and then to resample with the same effort 6 months or 1 year (after a migration period) post construction. Macro-invertebrate monitoring: ■ Monitoring of macro-invertebrate populations in the Wharemauku Stream, Mazengarb Stream, Muaupoko Stream, Waikanae River, Waimeha Stream, Ngarara Drain, Kakariki Stream, Paetawa Drain and Hadfield/Kowhai Stream will be undertaken on two occasions each year, one in summer and one in winter at sites upstream and downstream (beyond the mixing zone) of the works. This is followed by the biannual routine monitoring programme commencing during the construction period and continuing until the Regional Council is satisfied that no adverse effects have or are likely to occur, but up to a maximum time of 3 years following the opening of the Expressway. Trigger Event Monitoring		

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
		▪ As with the devices monitoring, there may be additional sampling required within the freshwater habitats in response to events.		
Potential for increased levels of sediment or contaminants entering freshwater from earthworks.	▪ The primary opportunity for management of risk of sediment discharge to valued streams and the marine environment rests with monitoring and adaptive management of the site, systems for erosion control, the capture and treatment of sediment laden water, and its discharge. ▪ The Erosion and Sediment Control Plan recommends a range of mitigation measures to minimise sediment discharge levels, particularly where there are sensitive downstream receiving environments. ▪ The potential for hazardous substances to be released into waterways following a spill will be prevented by implementation of methods outlined in the Hazardous Substances Management Plan (CEMP Appendix L, Volume 4)	The freshwater monitoring programme has two primary components, being "devices" monitoring and habitat monitoring. Habitat monitoring is discussed in the EMP and "Devices" monitoring is covered in the ESCP. Section 4.5 of the EMP provides an indicative freshwater aquatic monitoring plan, which uses baseline data to establish triggers for changes to turbidity, sediment deposition and aquatic health and guidance for how the results of this monitoring will feed into an adaptive management processes. This plan is to be implemented consistent with the early warning storm plan as outlined in the Erosion and Sediment Control Plan.	Specify requirements for CEMP (ESCP) and EMP to address	▪ CEMP, Volume 4 ▪ EMP (CEMP, Appendix M) ▪ ESCP (CEMP, Appendix H) ▪ HSMP (CEMP, Appendix L, Volume 4) ▪ Technical Report 26, Volume 3 ▪ Technical Report 30, Volume 3 ▪ Technical Report 22, Volume 3 ▪ Technical Report 24, Volume 3
Potential to adversely affect fish	▪ Culverts to have fish friendly	Immediately following	Specify requirements for	▪ CEMP, Volume 4

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
passage. It is expected that fish passage can be provided (and maintained) to all streams traversed by the Expressway where indigenous freshwater fish may be present.	design features.	formation of diversions and prior to livening of the new channel an appropriately qualified ecologist will inspect and confirm that any structures within the diversion will provide fish passage for all native species currently known to occur or are reasonably likely to occur within this stream. On-going monitoring and maintenance of culverts will occur during the operation of the Project.	CEMP and EMP to address	■ EMP (CEMP, Appendix M) ■ Technical Report 26, Volume 3 ■ Technical Report 30, Volume 3 ■ Technical Report 22, Volume 3
Project design includes measures to manage drawdown or dam effects on groundwater immediately surrounding the Expressway. Potential remains however for some adverse effects on wetland hydrology adjacent to the Expressway.	Adaptive management to measure water levels in the Raumati/Manuka Wetland, Otaihanga Southern and Northern Wetlands and El Rancho Wetland (Weggery): ■ In addition to the baseline wetland condition monitoring undertaken as part of the ecological investigations, baseline hydrological monitoring will be undertaken in these wetlands prior to construction to determine existing water levels and the range of seasonal variation. ■ Through the construction phase, ongoing monitoring of water levels and the ecological condition of	Monitoring of water levels and the ecological condition of wetlands will be undertaken as part of an adaptive management approach. Details are provided within the EMP and GWMP.	Specify requirements for CEMP, GWMP and EMP to address	■ EMP (CEMP Appendix M, Volume 4) ■ GWMP (CEMP Appendix I, Volume 4) ■ Technical Report 26, Volume 3 ■ Technical Report 30, Volume 3 ■ Technical Report 24, Volume 3 ■ Technical Report 21, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	wetlands will be undertaken as part of the adaptive management approach. ■ As part of the adaptive management approach, a range of options have been developed to manage construction-related effects associated with drawdown or damming, including consultation with statutory authorities.			
The discharge of contaminated stormwater from the Expressway to local streams and estuaries has the potential to impact on water and habitat quality.	■ Stormwater attenuation, off-set storage areas, treatment and conveyance. ■ Culvert inlets and outlets and structures protected from scour and erosion through rock rip rap armour and planting or using similar means of protection	A water quality treatment plan will monitor the stormwater treatment ponds and proprietary devices during the initial 2 of operation to ensure these devices are operating effectively to meet the target removal rates.		■ Technical Report 26, Volume 3 ■ Technical Report 30, Volume 3 ■ Technical Report 24, Volume 3 ■ Technical Report 22, Volume 3
Marine Ecology				
Assessment of Project Design and construction concludes there is no effect on Marine Ecology beyond that occurring through natural processes. Potential for sediment discharge from construction activities to adversely affect the marine environment is recognised as requiring monitoring for assurance purposes.	Management of risk of sediment discharge to the marine environment is best achieved through monitoring and adaptive management of the site and systems for erosion control, the capture and treatment of sediment laden water and its discharge. For construction sedimentation discharge it is recommended that the following management	Section 4.6 of the EMP provides an indicative marine monitoring plan which uses baseline data to establish triggers for changes to sediment deposition and the health of the marine environment and guidance for how the results of this monitoring will feed into an adaptive management processes. This plan is to be	Specify requirements for CEMP (ESCP) and EMP to address	■ CEMP, Volume 4 ■ EMP (CEMP, Appendix M, Volume 4) ■ Technical Report 26, Volume 3 ■ Technical Report 31, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	and monitoring occurs: ■ Staging of construction works and establishment of maximum open earth worked area to reduce risk. ■ Erosion management and sediment control to exceed regional guidance. ■ Risk management plan, including earthworks stabilisation procedures, for significant storm event monitoring and response.	implemented consistent with the early warning storm plan as outlined in the Erosion and Sediment Control Plan. The structure of the monitoring will involve three levels of monitoring, being Baseline, Scheduled Annual Monitoring and Triggered Monitoring. The Baseline data will provide a bench-mark against which to measure the construction phase data sets. The Scheduled Monitoring will involve routine twice yearly studies of prescribed ecological parameters. The Triggered Monitoring will be in response to potential adverse effects having happened, as identified by pre-determined “triggers” having occurred.		
Potential for stormwater discharge to adversely affect marine ecology.	Stormwater attenuation, off-set storage areas, treatment and conveyance.	■ A water quality treatment plan will monitor the stormwater treatment ponds and proprietary devices during the initial 2 years of operation to ensure these devices are operating effectively to meet the target removal		■ Technical Report 26, Volume 3 ■ Technical Report 31, Volume 3 ■ Technical Report 22, Volume 3 ■ Technical Report 24, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
		rates.		
Hydrology and Stormwater				
Temporary changes to watercourse environment(s) as part of construction works, including bridging and culverting	▪ Correct installation and on-going maintenance of ESC measures and devices ▪ Construction staging	▪ Erosion and sediment control measures ▪ Visual assessments of receiving watercourses ▪ Weather forecasts	Specify requirements for CEMP and ESCP to address	▪ CEMP, Volume 4 ▪ ESCP (CEMP, Appendix H, Volume 4) ▪ Technical Reports 22, Volume 3 ▪ Specify requirements for CEMP and ESCP to address Technical Report 24, Volume 3 ▪ Technical Report 25, Volume 3
Replacement of existing pervious surfaces with impervious surfaces resulting in a greater peak flow rate and volume of runoff, and increased potential for flooding downstream	▪ Attenuation of peak flows from the Expressway through the use of swales and/or wetlands. ▪ Refinement of the outlet design will see the swales meet the target attenuation for all events.	▪ Monitoring of swale / wetland attenuation functioning	Monitoring of stormwater treatment devices and water quality	▪ Technical Reports 22, Volume 3 ▪ Technical Report 24, Volume 3
Infilling of floodplains and/or from constraints resulting from culverts and bridges could potentially lead to flooding in areas that do not currently flood.	▪ Provision of large areas of offset storage to lower flood levels across the Project area ▪ Attenuate of flood flows (swales and wetlands) to reduce the need for offset storage ▪ Bridges designed to span width of watercourse and floodplains where appropriate to span watercourses and their floodplains			▪ Technical Reports 22, Volume 3 ▪ Technical Report 24, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	▪ Reduced skew (shorter) culvert alignments will be investigated during later design stages			
Groundwater				
The following activities have potential to affect groundwater. ▪ construction of the embankments; ▪ stormwater devices and cuts associated with the Expressway; ▪ during construction the groundwater contribution to rivers and streams may reduce by up to 1.5% (peak) as a result of the water take. ▪ any related drawdown will be transient in nature and unlikely to extend beyond the Project designation excavation in the peat may require dewatering	▪ Lining and other refinements to the design of large storm water devices where they involve excavations below the water table; ▪ Optimising construction activities, including: -Drilling a larger number of construction water take wells spread out along the alignment, with each taking a small volume at different times depending on the construction programme rather than relying on fewer wells pumping continuously at a higher rate; -Limiting the open length of excavation to that which can be backfilled in the same day to reduce the area and period of any dewatering; and -Using the starter layer in embankment construction as a drainage blanket to minimise damming effects up-gradient of surcharged peat.	Monitoring groundwater elevation, flow and quality and respond appropriately. Groundwater monitoring bores will be monitored for at least twelve (12) months prior to commencement of the construction works (where permissible), during construction, and for twelve (12) months, but up to three (3) years, after construction is complete. In cases where post-construction mitigation is implemented, monitoring specific to such mitigation may be continued for a longer period if the collected data do not indicate a return to pre-construction groundwater levels or establishment of a new equilibrium. The frequency and type of monitoring will vary depending on the stage of construction.	Specify requirements for CEMP and GWMP to address	▪ CEMP, Volume 4 ▪ GWMP (CEMP, Appendix I, Volume 4) ▪ Technical Report 21, Volume 3
The level of drawdown	Mitigation measures to reduce	Groundwater monitoring as	Specify requirements for	▪ CEMP, Volume 4

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
anticipated is unlikely to have an adverse impact on existing users, but if these are very shallow low volume wells the yield could be affected and a temporary replacement supply or longer term solution may be required.	the amount of drawdown and associated effects (should maximum consented drawdowns be exceeded) include: ■ Monitoring groundwater elevation, flow and quality and responding appropriately; ■ Altering the excavation methodology to reduce the period of time that excavations are drained; ■ Altering the peat treatment methodology to balance drawdown / damming effects; ■ Using active drainage measures beneath embankments (e.g. pipe) to facilitate flow through the embankment; ■ Redirecting treated surface water to wetlands or surface water bodies; ■ Where private water supply wells are affected, tankering water from construction wells to users or deepening wells to increase the available drawdown; and ■ Controlling the recharge of groundwater to limit the amount of drawdown. Appropriate mitigation method(s) would be selected by the Project Team at the time	above.	CEMP and GWMP to address	■ GWMP (CEMP, Appendix I, Volume 4) ■ Technical Report 21, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	that the need for mitigation is identified, with the method selected dependent on the nature, extent and location of the exceedance.			
Settlement				
Settlement effects on road embankments	If this effect does occur: ■ Change the ground improvement approach where the Expressway is constructed over peat deposits by treatment methods of: -Excavate and Replace; or -Preload and Surcharge. ■ Modify the ground improvement approaches such as a load transfer platform combined with foundations, to avoid excavating or loading the underlying peat. ■ Reduce the embankment footprint over localised areas. This may be achieved by using geogrid reinforcement to allow steepening of embankment slopes, to	Settlement monitoring regime and methodology is outlined within the SEMP. It is expected that settlement monitoring will occur: ■ 12 months preconstruction ■ Quarterly during construction ■ Monthly during active[244] construction. If the monitoring results indicate the movements are outside the expected range, or if there are other reasons for concern, then the monitoring frequency and / or extent can be increased to cover those areas of concern. The settlement monitoring	Specify requirements for CEMP and SEMP to address Note: The SEMP relies on other management plans within the wider CEMP, Volume 4, in particular the Groundwater (Level) Management Plan (CEMP Appendix I, Volume 4).	■ CEMP, Volume 4 ■ SEMP (CEMP, Appendix J, Volume 4) ■ GWMP ■ CNVMP ■ Technical Report 35, Volume 3

[244] Active construction' can be defined as: starting when earthworks commence within 500m of a particular location and ending when pavement construction is complete at that location, and starting when excavation in front of a retaining wall comes within 50m of a section and ending when the permanent wall supports are in place beyond a distance of 50m.

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	increase the distance between the construction activity and the sensitive items.	outlined in this section is proposed to extend beyond the earthworks extent and the expected area of resulting effects, as described in Chapter 26 of this report.		
Lowering of the groundwater level and associated settlement level during construction may be of a greater magnitude than has been modelled.	If this effect does occur: ■ Change the construction methodology, including: ■ Alternative peat treatment; ■ Lining (temporary and/ or permanent) of cuts below the groundwater level; ■ Limit the length and drained duration of temporary excavations; ■ Local cut off (clay bund or slurry wall); ■ Recharge trenches/ walls.	Ground water monitoring as specified above.	Specify requirements for CEMP and SEMP to address	■ CEMP, Volume 4 ■ SEMP (CEMP, Appendix J, Volume 4) ■ Technical Report 35, Volume 3 ■ Technical Report 21, Volume 3
Lateral movement of embedded retaining walls (as the ground is excavated in front of them) may exceed the anticipated limits.	If required, the following actions may be taken: ■ Remove surcharge close to the wall; ■ Place a berm in front of the wall; ■ Reduce the extent of temporary over excavation in front of the wall; ■ Install additional or stiffer piles; ■ Install props or ground anchors.	Settlement and groundwater monitoring as described above.	Specify requirements for CEMP and SEMP to address	■ CEMP, Volume 4 ■ SEMP (CEMP, Appendix J, Volume 4) ■ Technical Report 35, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
Settlement effects may result in minor damage to buildings.	If this effect does occur: ■ General repairs required. These repairs may include repointing of brickwork, repainting and redecorating. ■ In a severe case, repairs may require some partial re-building work, although this is considered highly unlikely. The timing of such repairs would depend on the stage of construction, the building owner's preference and the degree of damage.	Settlement and groundwater monitoring as described above.	Specify requirements for CEMP and SEMP to address	■ CEMP, Volume 4 ■ SEMP (CEMP, Appendix J, Volume 4) ■ Technical Report 35, Volume 3
Settlement effects may result in structural damage to buildings.	If this effect does occur: ■ A detailed evaluation undertaken by a Structural Engineer and recommendations for repair and an increased level of monitoring arising from this evaluation will then be implemented. ■ If an extreme case arose where local repair or re-construction is not sufficient, then additional measures such as underpinning or strengthening may be required. ■ In the event of a "substantial injurious affection" to a person's land resulting from the construction of the MacKays to Peka Peka	Settlement and groundwater monitoring as described above.	Specify requirements for CEMP and SEMP to address	■ CEMP, Volume 4 ■ SEMP (CEMP, Appendix J, Volume 4) ■ Technical Report 35, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	Expressway, section 63 of the Public Works Act would entitle that person to compensation.			
Services located below the footprint and founded above the base of the peat deposits can potentially be damaged by a change in grade.	If this effect does occur: ■ Relocation or active protection due to either the settlements effects or physical construction works. ■ These works agreed with the service providers prior to Project works commencing.	In addition to the settlement and groundwater monitoring described above, monitoring will be undertaken using CCTV inspections of some stormwater and wastewater services will be carried out to assess the effects of the settlement.	Specify requirements for CEMP and SEMP to address	■ CEMP, Volume 4 ■ SEMP (CEMP, Appendix J, Volume 4) ■ Technical Report 35, Volume 3
Services located outside the earthworks extent may be subject to a change in grade as a result of works within the earthworks footprint.	If this effect does occur: ■ Undertake detailed investigation of the area and affected services promptly. Include detailed examination of the site, and coordination with the relevant service providers to ascertain what effects their network is experiencing, and assess what remedial action is required. Any remedial works will be carried out as soon as possible. If the investigation reveals no immediate damage, the services will continue to be monitored closely until all parties are satisfied no damage has occurred. ■ Permanently divert the service through another nearby service and abandon the	In addition to the settlement and groundwater monitoring described above, monitoring will be undertaken using CCTV inspections of some stormwater and wastewater services will be carried out to assess the effects of the settlement.	Specify requirements for CEMP and SEMP to address	■ CEMP, Volume 4 ■ SEMP (CEMP, Appendix J, Volume 4) ■ Technical Report 35, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	original service line (the capacity of the nearby service would need to be checked). ■ Temporarily divert the service and repair the original service. ■ Expose the service and undertake a repair. Replace the service. In cases of severe damage, a length of the service may be replaced.			
Settlement may result in grade changes and differential movements on nearby local roads.	If this effect does occur: ■ Overlay the road surface to raise to the previous level and re-shape any differential movements. ■ Reconstruct the kerb and channels, and footpaths to mitigate changes in grade and/ or differential settlements. ■ Install additional drainage if new areas of ponding are identified.	Settlement and groundwater monitoring as described above.	Specify requirements for CEMP and SEMP to address	■ CEMP, Volume 4 ■ SEMP (CEMP, Appendix J, Volume 4) ■ Technical Report 35, Volume 3
Settlement may continue to occur post-construction.	N/A	Monitoring of settlement and groundwater levels will take place Quarterly for 6 months, reducing to half yearly and results reported to GWRC.	Specify requirements for CEMP and SEMP to address	■ Technical Report 35, Volume 3
Contamination				
Contaminant risk to human health and/or ecological values during land disturbance activity	These potential effects can be avoided through various mitigation measures including	A Contaminated Land Specialist will be engaged by the Project team to	Specify requirements for CEMP and CLGMP to address	■ CEMP, Volume 4 ■ CSGMP (CEMP Appendix K, Volume 4)

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
And Potential for hazardous materials to be discovered during construction resulting in human health risk (largely for workers).	by: ■ adherence to the procedures within the Contaminated Soils and Groundwater Management Plan; ■ adherence to the procedures within Construction Air Quality Management Plan; ■ adherence to the procedures within the Erosion and Sediment Control Plan; ■ resource consent conditions; ■ containment of contaminants on–site; and, ■ disposal of contaminated soil to licensed landfills.	monitor, supervise and report on all works that may disturb contaminated land. Tasks include the following: ■ Coordinate contaminated land assessments and testing; ■ Advise on classification of excavated material for reuse and disposal; ■ Coordinate contaminated groundwater management and disposal; and ■ Train staff in contaminated land identification and control procedures. Monitoring as required within the CAQMP and ESCP will be undertaken.		■ CAQMP (CEMP Appendix G, Volume 4) ■ ESCP (CEMP, Appendix H, Volume 4) ■ Technical Report 23
Water Quality				
Discharge of sediment in watercourses during: ■ land disturbance; ■ temporary stockpiling; ■ pumping of water from excavation areas; and, ■ while working at watercourses.	■ Correct installation and on-going maintenance of ESC measures and devices and review of measures and devices where required. ■ Construction staging. ■ Storm warnings.	■ Erosion and sediment control device monitoring to ensure they remain effective. ■ Visual assessments of receiving watercourses. ■ Weather forecast monitoring.	Specify requirements for CEMP and ESCP to address.	■ CEMP, Volume 4 ■ ESCP (CEMP, Appendix H, Volume 4) ■ Technical Reports 22, Volume 3 ■ Technical Report 24, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
		This monitoring will be carried out by suitably trained members of the ESC team.		▪ Technical Report 25, Volume 3
Contaminants entering stormwater from vehicles on Expressway road surface	Treatment of road run-off prior to discharge	A water quality treatment plan will monitor the stormwater treatment ponds and proprietary devices during the initial 2 of operation to ensure these devices are operating effectively to meet the target removal rates.	Monitoring of stormwater treatment devices and water quality	▪ Technical Reports 22, Volume 3 ▪ Technical Report 24, Volume 3 ▪ Technical Report 25, Volume 3 ▪ Technical Report 26, Volume 3
Economic				
Net positive benefits will arise from the project. Construction activity and traffic will cause temporary negative economic effects in localised areas.	The specific routes and locations that will be affected have been identified and assessed and measures to address these detailed in the Construction Environmental Management Plan (CEMP) and Construction Traffic Management Plan (CTMP).	N/A	Specify requirements for CEMP and CTMP to address.	▪ CEMP, Volume 4 ▪ CTMP (CEMP, Appendix O, Volume 4) ▪ Chapter 29 of the AEE, Volume 2
Disruption of current dynamics for passing traffic to be aware of business offerings at Paraparaumu and Waikanae, and to know how to navigate to these offerings.	Provide interchange signage to clearly identify the presence of Paraparaumu and Waikanae town centres and the routes to these.	Existing KCDC District Plan assessments and monitoring already address this. No further monitoring required.	Refer to conditions as outlined within Chapter 29 of this report.	▪ Chapter 29 of the AEE, Volume 2
Business relocation of activities reliant on current SH1 passing trade at Waikanae and	Current State Highway 1 revocation achieved as soon as practicable after Expressway	Existing KCDC District Plan assessments and monitoring already	N/A.	▪ Chapter 29 of the AEE, Volume 2

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
Paraparaumu.	opening to enable identified 'revitalisation' opportunities to be pursued by KCDC.	addresses this. Therefore, no additional monitoring proposed.		
Social				
Daytime disturbance produced by construction noise in sensitive areas.	Refer to "Noise and Vibration" above. Mitigation as recommended in the Noise and Vibration Chapter 19, and as set out in CEMP (Volume 4) and the CNVMP (being Appendix S of the CEMP, Volume 4).			■ CEMP, Volume 4 ■ SCMP (CEMP, Appendix S, Volume 4) ■ CNVMP (CEMP, Appendix F, Volume 4) ■ Technical Report 20, Volume 3
Disturbance to human health and nuisance caused by dust produced by construction.	Refer to "Air Quality" above. Mitigation as recommended in the Air Quality Chapter 20, and as set out in CEMP (Volume 4) and the CAQMP (being Appendix G of the CEMP, Volume 4).			■ CEMP, Volume 4 ■ CAQMP (CEMP Appendix G, Volume 4) ■ SCMP (CEMP, Appendix S, Volume 4) ■ Technical Report 20, Volume 3
Visual effects of construction activities taking place throughout the district over four years.	Refer to "Landscape and Visual" above. Mitigation as recommended in the Landscape and Visual Chapter 17, and as set out in CEMP (Volume 4) and the ELMP (being Appendix M of the CEMP, Volume 4).			■ CEMP, Volume 4 ■ ELMP, (CEMP, Appendix M, Volume 4) ■ SCMP (CEMP, Appendix S, Volume 4) ■ Technical Report 20, Volume 3
Recreational opportunities along streams, in streams, in QE Park may be temporarily disrupted.	■ A cycleway / walkway constructed parallel to the Expressway for it length from Poplar Avenue to Peka Peka. Northern sections will include provision for a bridleway. ■ A cycleway / walkway	In regard to water quality, refer to monitoring above.	■ Condition relating to the provision of cycleway/walkway and bridleway. ■ Work with GWRC on potential for re-established QE Park land	■ CEMP, Volume 4 ■ CTMP (CEMP, Appendix O, Volume 4) ■ ESCP (CEMP, Appendix H, Volume 4) ■ SCMP (CEMP, Appendix S,

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	constructed through Queen Elizabeth Park in conjunction with DOC / GWRC. ■ Equivalent area of land in QE Park permanently taken for Project re-established in alternative location. ■ The Construction Traffic Management Plan recognises horse riders are present on local roads, and includes a focus on making linkages clear. ■ Effects on water quality are managed through methods for erosion and sediment control.		in alternative location. ■ Specify requirements for CEMP, CTMP, ESCP and SCMP to address.	Volume 4) ■ Technical Report 20, Volume 3
Possible anxiety effects caused by lack of certainty of construction effects.	■ Implementation of Stakeholder and Communication Plan. ■ Implementation of the Construction Environmental Management Plan (CEMP). ■ Implementation of Project monitoring and response processes, including social impact specific monitoring. ■ Establishment of local liaison groups with representatives of affected communities. ■ Provision of updates on construction to local and wider communities, with contact details and processes for engaging.	Feedback from local liaison groups and other sources	Specify requirements for CEMP and SCMP to address	■ CEMP, Volume 4 ■ SCMP (CEMP, Appendix S, Volume 4) ■ Technical Report 20, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	▪ Post construction return of land that is not required for Project operation as soon as is practicable.			
Disruption to local traffic and temporary lack of access to various local facilities caused by construction traffic.	The Construction Traffic Management Plan (CTMP) and the availability of alternative public access points elsewhere will ensure impacts on people's way of life will remain acceptable and be appropriately managed.	On-going assessment of Key Performance Indicators as outlined in the CTMP. The three KPIs which are proposed for the Project are Traffic Management Auditing, SH1 Travel Times and Stakeholder Surveys.	Specify requirements for CEMP and CTMP to address	▪ CEMP, Volume 4 ▪ SCMP (CEMP, Appendix S, Volume 4) ▪ CTMP (CEMP, Appendix O, Volume 4) ▪ Technical Report 20, Volume 3
Physical disruption of communities– disruption of residential and business areas, perceptions of severance between communities	Setting Expressway into surrounding environment and design elements for structures, landscaping and maintaining local connections. Provision of new pedestrian/cycle/bridle access across and along the Expressway. Provision of clear information, discussion and clarity. Collaborative negotiation with business owners.	A post construction assessment and monitoring for three years to evaluate severance effects related to the Project.	Specify requirements for CEMP and SCMP to address	▪ Technical Report 20, Volume 3
Operational noise and vibration can negatively affect sensitive areas near to the Expressway.	Refer to "Noise and Vibration" above.			▪ Technical Report 20, Volume 3 ▪ Technical Report 15, Volume 3 ▪ Technical Report 18, Volume 3
Impacts on air quality will increase around interchanges.	Refer to "Air Quality" above.			▪ Technical Report 20, Volume 3 ▪ Technical Report 13,

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
				Volume 3
Visual and amenity effects caused by having an Expressway where before there was an undeveloped designated corridor.	■ Noise bunds and planting incorporated as set out in Landscape and Visual Chapter 17. ■ Quality design of structures to mitigate adverse visual effects as set out in Urban Form & Design Chapter 16. ■ In the vicinity of Takamore Wāhi Tapu the mitigation for effects on amenity are set out in Chapter 31 ■ Community engagement and liaison over construction on detailed landscaping design elements and opportunities to include the community in the implementation of these (e.g. community planting days)	Monitoring of planting as per landscape	■ Project developed as specified in Volume 5 Plan Set.	■ Technical Report 20, Volume 3 ■ Technical Report 7, Volume 3 ■ Technical Report 5 and 6, Volume 3
Local character will be impacted to varying degrees along the alignment, in both urban and rural areas.	■ The design of urban area bridges and structures applies CPTED principles to encourage safe and useable facilities. ■ Community engagement and liaison on design details for significant features in the local environment to maintain a sense of involvement and engagement in the Project		■ Project developed as specified in Volume 5 Plan Set.	■ Technical Report 20, Volume 3 ■ Technical Report 7, Volume 3
Tangata Whenua and Cultural Heritage				
Impacts on the cultural landscape	Assistance provided to Te Āti Awa ki Whakarongotai to map and identify significant cultural	Active supervision by iwi representative during earthworks in sensitive	■ Iwi liaison protocols followed	■ CEMP, Volume 4 ■ Technical Report 11,

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
Includes: archaeology, sites of significance, landscape features	sites and places within their tribal jurisdiction – database. Historic reserve designation under the Reserves Act 1977 – lands surrounding the Takamore urupā. Refer below for archaeological monitoring protocols.	areas and cultural training for contractors.	▪ Accidental Discovery Protocol to be followed ▪ Refer to other conditions as outlined within Chapter 31 of this report.	Volume 3 ▪ Technical Report 12, Volume 3 ▪ Technical Report 9, Volume 3 ▪ Technical Report 10, Volume 3 ▪ Technical Report 7, Volume 3
Environment and Biodiversity	Iwi engagement in the preparation of management plans for ecology, water etc.	Active supervision by iwi representative during earthworks in sensitive areas and cultural training for contractors.	▪ Iwi liaison protocols followed ▪ Refer to conditions as outlined within Chapter 31 of this report.	▪ CEMP, Volume 4 ▪ Technical Report 11, Volume 3 ▪ Technical Report 12, Volume 3 ▪ Technical Report 26, Volume 3
Impacts on Water Quality	Iwi engagement in the preparation of management plans for ecology, water etc. Creation of habitat storm water ponds.	Active supervision by iwi representative during earthworks in sensitive areas and cultural training for contractors.	▪ Iwi liaison protocols followed ▪ Refer to conditions as outlined within Chapter 31 of this report.	▪ CEMP, Volume 4 ▪ Technical Report 11, Volume 3 ▪ Technical Report 12, Volume 3 ▪ Technical Report 26, Volume 3 ▪ Technical Report 25, Volume 3
Wāhi Tapu/Wāhi Taonga	Acknowledgement of wāhi tapu site. Historic reserve designation under the Reserves Act 1977 – lands adjacent to the Takamore urupā. Interpretation promoting the cultural importance of identified areas.	Active supervision by iwi representative during earthworks in sensitive areas and cultural training for contractors.	▪ Iwi liaison protocols followed ▪ Accidental Discovery Protocol to be followed for wetland areas ▪ Refer to conditions as outlined within Chapter 31	▪ Technical Report 11, Volume 3 ▪ Technical Report 12, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
	▪ [Advisory note: HPA authorisation conditions to be followed]		of this report.	
Archaeology and Built Heritage				
The destruction or damage of 14 archaeological sites arising from construction of the Expressway.	Archaeological investigations under Historic Places Act authorisations will take place. A series of interpretation panels are also proposed at significant or strategic locations along the proposed pedestrian/cycle way to enhance the experience and reflect on the area's cultural significance and history of occupation in the area. Surveying and recording of burials of tūpuna are to be marked out.	▪ Systematic investigations of discrete sections of the proposed Expressway that have a high archaeological probability. The investigative work would be undertaken by a team of archaeologists and take place prior to construction. ▪ Monitoring during the course of constructing sections of the proposed Expressway that have a low to moderate archaeological probability, and where site density is not anticipated to be high.	Accidental discovery protocols. Nominated archaeologist.	▪ CEMP, Volume 4 ▪ Technical Report 9, Volume 3
Construction is likely to result in the damage or destruction of unknown or yet to be identified archaeological sites e.g. the area between Te Moana Road and Ngarara Road.	Archaeological investigations are proposed in conjunction with monitoring during the course of construction. Areas where there is a very low archaeological probability will be covered under the accidental discovery protocol.	Monitoring as described above.	Accidental discovery protocols for wetland areas of Project. [Advisory note: separate Historic Places Act management and conditions will apply to other parts of the alignment.]	▪ CEMP, Volume 4 ▪ Technical Report 9, Volume 3
Noise, visual, vibration and amenity effects on the Stringer	The relocation of the house from its current site to a	Given that the house will be relocated, monitoring is not	N/A	▪ Technical Report 9, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/ reference(s)
'Wind Rain' House arising from the construction and operation of the Expressway.	suitable alternative location on the Kāpiti Coast to ensure the association between the house and the area is maintained.	required.		

31.5 Proposed conditions

Based on the mitigation and monitoring measures summarised in Table 31.2, a suite of conditions is proposed to manage the effects of construction. These can be broken up into two broad categories:

- conditions dealing with human health and nuisance effects; and
- conditions dealing with other environmental, ecological, and water effects.

For the most part the human health and nuisance effects are dealt with under the designation conditions, and the other environmental, ecological, and water effects are dealt with in the regional consent conditions.

A suite of conditions is also proposed to manage the effects of operation. These mainly relate to maintenance, including maintenance of the road and associated structures, surface runoff and maintenance of vegetation planting. The NZTA has an existing network maintenance contract and has a number of measures in place for the ongoing operation and maintenance of its assets. Maintenance measures include, for example:

- landscape maintenance;
- road surface maintenance;
- stormwater management; and
- graffiti removal.