

CEMP Appendix T

Landscape Management Plan

Revision History

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Document Acceptance

Action	Name	Signed	Date
Prepared by	Claire Forster Pratt		7 March 2012
Reviewed by	Boyden Evans & Steve Dunn		8 March 2012
Approved by	Boyden Evans		9 March 2012
on behalf of	Boffa Miskell Limited		

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Executive Summary

This Landscape Management Plan (LMP) is one of several management plans comprising the overall Construction Environmental Management Plan (CEMP, Volume 4) for the MacKays to Peka Peka Expressway Project (the Project). This LMP is integral to the Landscape and Visual Effects Technical Report (Technical Report 7, Volume 3) as it outlines methods and monitoring necessary for managing landscape amenity during the construction phase of the Project.

It is anticipated that this document will be a 'live' document and will be updated and revised as the construction methodology, regulatory environment and requirements for managing landscape effects change over time. This adaptive process reflects the fact that the construction methodology will not be finalised until a detailed design is completed, at which time the impacts will be understood more comprehensively.

1 Introduction

This Landscape Management Plan (LMP) forms part of a comprehensive suite of environmental controls within the Construction Environmental Management Plan (CEMP, Volume 4) for the construction phase of the MacKays to Peka Peka Expressway Project (the Project). This LMP addresses all aspects of the Project's landscape amenity management and monitoring initiatives during the construction of the Expressway.

1.1 Purpose and Scope

The purpose of the LMP is to outline the methods and measures to avoid, remedy and mitigate adverse effects on the landscape amenity, over the four sections of the proposed Expressway Alignment, during the construction phase of the Project. This LMP documents the permanent mitigation measures such as planting and dune reshaping.

The LMP outlines the necessary monitoring during the construction phase and the transition to the operational phase of the Expressway (refer to the CEMP, Volume 4). In particular, there will be qualitative monitoring during the construction and transition phase, focused on earthwork activities especially in relation to the dune landforms, and in the areas subject to amenity landscape planting plans throughout the Alignment.

The LMP will be updated throughout the course of the Project to reflect material changes associated with changes to construction techniques or the environment.

1.2 Performance Standards

1.2.1 Designation Conditions

The relevant designation conditions are outlined in the AEE

1.2.2 NZTA's overall environmental goals

NZTA's Environmental Plan has the following Visual Quality objectives:

- VQ1 Incorporate multi-purpose landscaping as an integral part of all new State highway construction projects.
- VQ2 Improve the visual quality of the existing State highway network.

1.3 Environmental Plans and Maps

The LMP is one of 12 specialised management plans which sit under as "sub-plans" to the main CEMP (Volume 4) document.

2 Environmental Values and Potential Effects

2.1 Introduction

The Expressway traverses 16 km of an undulating dune and peatland landscape. The scale of the Expressway footprint and required geometric design parameters mean substantial changes to the landforms and existing visual experience along the Alignment.

The Landscape and Visual Effects Assessment (Technical Report 7, Volume 3) is based on the 12 landscape character areas identified and describes and evaluates the actual and potential landscape and visual effects of the route and includes a landscape mitigation plan. Both temporary and permanent adverse landscape and visual effects were evaluated in the AEE.

The LMP provides mitigation measures in relation to temporary construction effects on landscape and visual amenity, including:

- Earthworks
- Structures
- Temporary fencing
- Temporary buildings and yards.

For example, the Alignment and design has wherever possible avoided areas of intact dunes. Further avoidance and integration of earthworks into the natural landforms, as far as is practicable, is a key mitigation measure during the construction phase(s).

Permanent structures including the proposed bridges, retaining walls, noise (fences and bunds) structures will in several places, have adverse effects on the landscape values and visual amenity. To reduce the intensity and magnitude of these effects, substantial mitigation planting is proposed as part of the overall Project design. Refer to Appendix T.A and Appendix T for the Planting Plan Map Series and Planting Types guide.

The entire Alignment will have tracts of amenity planting, which has been-designed in response to the location and its function. The different types of ‘landscape mitigation’ planting are set out in Technical Report 7, Volume 3 and are included in this LMP in Appendix T.C. The document describes the type of mitigation, lists key species and details for the distinctive areas of visual amenity planting. Some of the key areas that have required special attention because of their landscape values or because of the scale of visual effects include:

- the Waikanae River ONL corridor;
- the bridge and embankments crossing Wharemauku Stream;
- the interchanges at Kāpiti Road and Te Moana Road; and
- the southern connection at Queen Elizabeth Park.

2.2 Summary of construction activities which have the potential to impact on landscape values

Through the sequence of construction phases there are different construction activities that have the potential to affect landscape values.

Table 1 Summary of construction activities which have the potential to impact on landscape values or generate visual effects

Activity	Potential Effect	Landscape Receptor
Contouring of earthworks	Removal and/or modification of dune landscapes and biophysical features.	■ Sand dune landscapes along Alignment
Land disturbance	Damage or disturbance to vegetation through excavation, undercutting, or encroachment into the dripline of existing vegetation to be retained for landscape mitigation purposes.	■ Existing vegetation to be retained
Construction of pre-loading embankments; and temporary stockpiling of	Height of stockpiles will be greater than the final earthwork levels	■ Short – medium term effects on visual amenity in rural and residential environments along

the peat.		the Alignment.
Establishment of 11 construction areas along Alignment (Project, Bridge, Intersection).	<ul style="list-style-type: none"> ■ Change to landscape from new temporary buildings, machinery, construction yards, surplus peat disposal; ■ Glare from use of floodlights by contractors at the bridge sites; ■ New buildings, fences, structures visible from the public roads and residential areas. 	<ul style="list-style-type: none"> ■ Amenity of nearby residents. ■ Local road users
Bridge construction	Glare of floodlights towards residential properties or towards roads.	<ul style="list-style-type: none"> ■ Amenity of nearby residents. ■ Local road users
	Effects on prominent landforms and natural character	<ul style="list-style-type: none"> ■ Riparian Vegetation ■ Adjoining landforms
	Temporary closure of walking tracks and permanent realignment of tracks on both sides of the Waikanae River.	<ul style="list-style-type: none"> ■ Residents – recreational users and commuters
Construction of noise bunds,	Inappropriately shaped bunds, in relation to the flat or dune landscape.	<ul style="list-style-type: none"> ■ Urban environments (Raumati South, Paraparaumu, Waikanae)
Construction of noise walls and fences	<ul style="list-style-type: none"> ■ Visual effect of concrete noise walls, without earth ramps and planting. ■ Visual effect (from road user view), and change in amenity of some private residents. 	<ul style="list-style-type: none"> ■ Expressway corridor ■ Future road users ■ Some residential properties.
Implementing Planting Plan along route	<p>Positive effects on amenity through:</p> <ul style="list-style-type: none"> ■ retention of existing amenity vegetation along the Expressway route; ■ mass planting (native and exotic, depending on composition of surrounding area) ■ canopy tree, specimen tree species, and larger exotic or indigenous trees. 	<ul style="list-style-type: none"> ■ Immediate and distant view of Expressway, noise walls, integrate Expressway planting with existing adjacent vegetation, interchange areas.

2.3 Landscape and Visual Effects Assessment

The Landscape and Visual Effects (Technical Report 7, Volume 3) is based on the 12 landscape character areas identified over the four Sectors of the Expressway Alignment. The assessment

describes and evaluates the actual and potential landscape and visual effects of the route, and lists the proposed landscape mitigation measures applicable to each Sector.

For the purpose of this LMP, the key landscape changes and the landscape mitigation proposed is set out in Appendix T.C of this document and should be read in conjunction with the Appendix T.A Planting Plan Map Series. Together, these documents explain why landscape mitigation is necessary, what it involves and shows where different types of landscape mitigation planting are to be implemented along the length of the Alignment.

3 Implementation and Operation

There are a number of proposed management measures designed to avoid, remedy, minimise and/or mitigate the potential adverse ecological effects associated with the construction phases of the MacKays to Peka Peka Expressway Project. The following section details the landscape mitigation for the temporary construction effects, and the implementation of the landscape mitigation planting.

It is important to understand the roles and responsibilities for implementing this LMP and also the necessary training the Project team¹ must go through so the landscape values principles are understood.

3.1 Roles and responsibility

Section 3.2 of the CEMP (Volume 4) details roles and responsibilities associated with managing environmental factors from construction of the Project. The Environmental Manager has the responsibility for supporting the implementation of all required landscape mitigation, monitoring, reporting and communicating any issues to the Project Management Team and the NZTA.

A Project Landscape Architect will be nominated to monitor the effects of construction within dune landscapes and mitigation planting on the desired outcome for landscape and visual amenity.

All personnel working on the Expressway Project, including Project team members and subcontractors, have a responsibility for following the requirements of this LMP.

¹ This Management Plan refers to the Project team as carrying out works on behalf of and as contracted by the NZTA. The NZTA is the requiring authority and the consent holder.

3.2 Training

Environmental training for all staff will be undertaken as part of the site induction programme as described in the CEMP (Volume 4). This requires all new staff to go through an induction training session when they commence work and then as part of annual refresher courses.

Environmental Induction will include information on the following aspects of this plan:

- Information about the activities and stages of construction that may cause impact to landscape features and values;
- An explanation of the significance of identified trees, areas of amenity vegetation (both exotic and native) and how they are to be protected from direct and indirect construction activities;
- Earthworks near or within dunes and the reshaping of dunes as part of the finishing earthworks;
- Consent and designation requirements;
- Landscape monitoring procedures.

3.3 Earthworks

3.3.1 Earthworks in the remnant dune landforms

While the land along much of the route is flat, sand dunes of various heights and inter-dunal hollows are key landforms that significantly contribute to landscape character; they also provide considerable scope to assist with integrating the Expressway into the landscape.

Given the level of disturbance that will occur to the dunes, how the cut faces and batter slopes are tied in both physically and visually with the adjoining, undisturbed dunes will be critical. Sometimes this will entail re-shaping a much larger area than that simply required to construct the road itself in order that all the 'faces' of a modified landform are tied in and approximate a 'natural' appearance.

Civil earthworks engineering design tend to show earthworks in terms of cuts and batter slopes as very evenly formed and graded whereas in reality with natural landforms, such as dunes, there is much more subtlety with small hollows and irregularities. An even form and gradient is certainly appropriate for grassed areas that will be regularly mown but generally not so when dealing with natural landforms that are planted in woody vegetation. While drawings can illustrate the form to be achieved, it is generally reliant on the skill of contractors, especially machine operators rather than trying to use detailed drawings and cross sections, etc to do this. Refer to Appendix T.D for the design principles and illustrative cross sections of various dune shaping situations.

a. Inception Meeting

Once engineering earthwork drawings are finalised, the Project Landscape Architect and Project team (particularly the machine operators) shall meet on-site to go through the drawings and discuss

how to approach the earthworks within dune landscapes and in particular the reshaping. This inception meeting is an effective and efficient way of obtaining the best method to undertake this type of earthworks. At this inception meeting, 'hold points' should be identified and agreed to, in order for timely site visits by the Project Landscape Architect to monitor works before the next phase of activity commences. Communication between the Project team and the Project Landscape Architect is necessary to ensure progress updates reflect coordinated site visits.

3.3.2 Permanent Noise Bunds

Noise bunds and bunds to provide visual screening and adjoin dunes in many places but are also located on flat land. The shape of bunds are important in that they need to relate to their context and ideally, have a 'natural' appearance. The way these tie in with existing and new landforms will require careful attention at the detailed design stage.

a. Inception Meeting

Once engineering earthwork drawings are finalised, the Project Landscape Architect and Project team (particularly the machine operators) shall meet on-site to go through the drawings and discuss how to approach the way the noise bunds will tie into the existing landforms.

3.3.3 Pre-loading

Pre-loading of the actual carriageway is a key ground improvement measure; this involves building up the earthworks in the peat areas with fill material to levels higher than the final road levels in order to surcharge the peat and compact it to provide a firm base for road construction. The preload material is removed once the road surface has settled to its final level.

The pre-loaded areas generally occur in predominantly rural or low population areas, Poplar Avenue, Raumati South, Wharemake Basin, Otaihanga and Peka Peka, which are well away from residential areas. The residential areas immediately adjacent to the proposed preloading sections of the Expressway, and potentially the most affected are;

- Eastern end of Leinster Avenue,
- Conifer Court - Raumati Road/Rata Road area
- Observation Place and Milne Drive in the Midlands subdivision

The heights of the pre-loading will vary from 2.0m to 3.9m above the finished road level. The finished road level compared to the existing ground level varies along the route. In places it may be at a similar height to the existing ground level but at interchange areas it would be up to 7.0m above existing ground. The pre-loading will need to remain in place for 6-24 months depending on the location. Refer to Appendix T.E for Figure 64 from Technical Report 7, Volume 3 which shows the areas where pre-loading will occur and the approximate depths of the pre-load material relative to the final level of the Expressway.

a. Cover and Dust mitigation

Technical Report 7, Volume 3 identifies the following management techniques to assist reduce the temporary visual and dust effects from the pre-loading areas.

- For short-term pre-load areas (ie 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 minimise 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.

3.3.4 Stockpiling of Peat

In other parts of the route where it traverses particularly deep areas of peat, the peat will be excavated and replaced with imported fill material in order to provide a suitable base for road construction. This peat will be excavated and stockpiled along either side of the route to enable it to dry out sufficiently. Some of the peat will be mixed with other material and used as growing medium for the extensive planting that will be done as an integral part of the Project.

The temporary stockpiling of the peat along the edges will mean that for a period during the construction, the height of the earthworks will be greater than the final earthworks levels.

a. Planting/hydroseeding

Once the earthworks have been finally shaped they will be bare until planted/hydroseeded but this is likely to be for a short time only. Progressively, upon completion, the earthworks will be hydroseeded to minimise soil erosion and scouring; in places artificial materials such 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.

3.4 Structures

3.4.1 Construction Areas- buildings and lighting

All of the activities within the construction Designation will be fenced and the defined within the 11 construction yards proposed along the route. The extent of these will vary according to their purpose – Project Yard, Bridge Yard or Intersection Yard. All yards will be fully fenced and made secure.

The Expressway Project Office and Yard will be established at the Otaihanga landfill and waste transfer site on Otaihanga Road, which is about at the mid point of the Expressway route and within

1km of SH1. This main site will be 20,000m² in area and comprise one Project office building and one workshop covering approximately 10,500m² and the pre-cast yard approximately 12,000m². The site will be fenced with 2.0m high mesh and it will be lit at night to provide security.

Each Bridge Yard and Intersection Yard will comprise a small construction yard for material and plant storage, and facilities for staff. Bridge Yards will be located at Raumati Road, Wharemauku Stream, Mazengarb Road, Waikanae River, Ngarara Road and Smithfield Road. Intersection Yards will be established at Poplar Avenue, Kāpiti Road, Te Moana Road and Peka Peka Road. Each yard will be fenced with a 2.0m high mesh security fence. Intersection Yards will be lit at night but not Bridge Yards. However, during night time bridge construction operations Bridge Yards will be lit.

a. Setbacks and Glare

The Project Office and Yard site was selected because of its location, good access off Otaihanga Road and that it is well segregated from adjoining residential and other areas. However, to avoid potential glare effects from this main site or any of the other Yards the following must be implemented:

- The design and installation of all construction yards to be carried out using best practice to minimise adverse or stray lighting effects.
- The lighting of construction yards to be fully compliant with the relevant lighting standards of the Kāpiti Coast District Plan and relevant clauses of the Australian Standard (AS 4282)
- A 10.0m buffer zone between any equipment requiring light and a residential boundary and lighting layout and design for the construction yards will be reviewed and approved by an accredited illumination engineer to ensure avoid adverse environmental effects from lighting prior to it being installed.
- Contractors using portable or temporary floodlights during night time bridge construction operations will ensure the glare is not directed towards any residential properties or towards roads and also ensure the correct selection of the type of luminaire.

3.4.2 Temporary fencing

The extent of the construction yards and activities will be securely fenced. This will secure the construction site in terms of health and safety perspective and will also ensure that areas of vegetation within the construction Designation but outside of the fenced area, which have been identified to be retained as part of landscape mitigation, are not inadvertently damaged or disturbed.

a. Type of fencing

The fencing will be 5-wire stockproof farm fencing for much of the route. However, in the areas where there is public access 2.0m high mesh fencing will be erected.

3.5 Amenity Planting

3.5.1 Retaining Existing Amenity Vegetation

There is a level of planned vegetation removal within the Expressway Alignment (the Project Footprint) to enable the construction and operation of the Expressway. However, through good environmental management there are opportunities during the construction phases to protect and minimise the amount of vegetation removal required, within the Project Footprint, thus enabling greater integration of existing amenity trees and vegetation with new landscape mitigation planting.

The Project team shall be aware of the mapped amenity vegetation within each of the Sectors and carry out various construction activities in accordance with the following management measures.

a. Site Establishment

- Any vegetation with visual and landscape value shown within the Project Footprint and on the boundary of the Designation will be confirmed with the Project Landscape Architect on site and fenced off.
- Minimise damage to any vegetation outside those areas to be cleared.
- Vegetation clearance boundaries will be clearly defined with marker tape pegs or by marking perimeter trees.
- Individual specimen/established trees will need to be clearly identified and fenced to avoid and prevent unnecessary disturbance or damage.
- Wherever practical, trees within the actual Alignment area will be felled into Alignment areas that have been previously cleared or are about to be cleared for construction purposes (e.g. plantation pine, large specimen trees etc.).
- Timbers that cannot be utilised, together with branches and leaves, shall be mulched for landscaping or temporary stabilisation on this Project in the first instance.

b. Land Disturbance

- Careful selection of appropriate machinery to minimise disturbance.
- Ensure no land disturbance within the dripline of trees or vegetation that is to be retained during construction works.
- While working in close proximity to vegetation that is to be retained, ensure that machinery is kept well clear of the vegetation canopy and that any excavations do not undermine the vegetation stability or endanger its health.
- Where there is a deviation from an approved route or outside the construction zone, any vegetation in the new construction area will be checked first by the Project Landscape Architect. Approval for removal will be required and areas to be retained are to be marked out on site by the Project Landscape Architect before proceeding further.

3.5.2 Planting plan along the Expressway Alignment

Landscape mitigation planting is proposed throughout the Expressway Alignment. There are a range of different planting designs that address specific landscape and visual amenity impact, such as:

- To screen views of Expressway,
- To screen views of noise walls;
- To integrate Expressway planting with existing adjacent vegetation;
- To enhance cycleway/walkway amenity;
- To add additional trees to ensure successful establishment of taller trees species;
- To enhance visual amenity at interchange areas, or to provide shade/shelter in open interchange areas;
- To reflect existing vegetation structure and/or create distinct identity;
- To integrate adjoining pastureland with Expressway corridor to carriageway edge;
- To reflect and enhance the existing tree structure (differing between rural and urban character);
and
- To integrate the new cycleway/walkway.

The implementation of the planting plan requires the following measures to be carried out:

a. On-site inception meeting

Inception meeting with Project Landscape Architect and Project team to discuss planting plan detail and best way of implementation. Agree 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.

b. Hydroseeding

All areas disturbed by earthworks will be hydroseeded on completion to provide stability and to control runoff. For the areas being returned to grazing, pasture grasses will be used as this will be the final vegetation cover.

c. Site Preparation

Areas to be planted in woody vegetation will be either blanket sprayed or spot sprayed depending on the type of planting being carried out as part of site preparation.

d. Mulch

All areas planted in woody vegetation will be mulched. Depending on the particular situation, mulch will be mechanically applied, blown on to areas or applied by hand. Various areas of woody and

other vegetation along the route will be cleared and for those species that will not cause problems (ie contain pest plants/unwanted plant species) it will be mulched and used.

e. Hardening off Plants

All plants will be 'hardened off' either in a local nursery where they are propagated or in a suitable nursery holding area for at least two months prior to being planted.

f. Weed Control

Controlling pest plant and animals will be a key to plant survival and establishment. Where pest plants or animals are likely to be a threat then a removal / control programme will be initiated well in advance of planting.

g. Fencing / Restricting Access

After the planting phase is finished, where appropriate, new planting areas potentially at risk are to be appropriately identified and mechanisms put in place to prevent access by subsequent construction activities and personnel, and the public. This is to avoid accidental and careless damage to planted areas, and also plant theft.

h. Maintenance Schedule

Maintenance of the planted areas is to follow a maintenance schedule drafted by the Project Landscape Architect.

From final completion, (subject to the defects liability period) 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, flood storage wetlands and stormwater treatment wetlands.

3.6 Sector Specific Approach

Appendix T.C identifies the key landscape changes and the mitigation proposed, as set in Technical Report 7, Volume 3 along the extent of the Expressway Alignment.

4 Monitoring

4.1 Overall Approach

Where required, baseline information on landscape values and features potentially affected by the Project will be collected before works commence. Visual monitoring of vegetation and dune

landscapes shall be undertaken before, during and after construction works are completed. Monitoring of each aspect is detailed in the following sub sections.

4.2 Response to Indicators of Significant Effects

4.2.1 Adaptive Management

Adaptive management requires monitoring, research and review. Once monitoring has occurred, the assessment of monitoring results will lead to 'adapted' development and operation, either to anticipate potential problems identified by the monitoring, or to ensure any effects of the existing activity are reduced to acceptable levels. Review conditions provide flexibility to either expand or cut back activity should the research suggest it is necessary.

4.3 Implementing the Planting Plan

4.3.1 Inception Meetings

Prior to works, an on-site inception meeting will be arranged with the Project Landscape Architect and Project team to agree the most effective way to establish the site and implement the planting plans. They will agree on 'hold points', site visits and regularity of monitoring and reporting.

Prior to works commencing an assessment should be undertaken to give an updated condition of the vegetation.

This assessment will be used as a baseline data set to monitor any change in the condition of this vegetation throughout the construction process. A photographic record of each area of vegetation should be undertaken prior to works commencing and at the completion of works.

Monitoring reports should include dates of visits, condition of the vegetation, condition of protective fencing, works undertaken in the vicinity over the past fortnight and any action required. As part of this monitoring process, the Project Landscape Architect can make recommendations to the Project team to improve the health or safety of the retained and newly planted vegetation.

Following the practical completion (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.

4.3.2 Weed Control

Newly planted and established landscaped areas are particularly susceptible to weed invasion. It is important that these areas are monitored and all weeds, including pest plants, within new landscape plots are managed.

Generally, the newly planted areas associated with the Expressway will fall under a maintenance period lasting 2 – 4 years. This timeframe would depend on the type of planting.

It is the responsibility of the Project team and ultimately the Project Environmental Manager to monitor and maintain these areas, including pest plant control. Regular inspections will take place to ensure plant establishment and weed control is appropriate as per the Planting Specifications. Inspections will involve identifying pest plant species and severity of weed infestation, as well as identification of appropriate controls and implementing these controls immediately.

4.4 Dune Landscapes

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 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.

4.5 Reporting

Compliance reports on the implementation of the landscape mitigation planting will be forwarded to the Kāpiti District Council by the Project team on an "as-required" basis to demonstrate compliance with the designation conditions.

4.6 Complaints

Complaints will be managed through the process included in the Construction Environmental Management Plan (CEMP, Volume 4).

Any complaints received relating to landscape activities will be reported to the Project Landscape Architect for discussion on the appropriate response with the Environmental Manager.

5 Review of the Landscape Management Plan

The LMP will be reviewed by the Project Landscape Architect and Project team after confirmation of the Waikanae River corridor amenity planting design, and designation conditions. The LMP will be revised in accordance with those conditions. The LMP will be updated, with the necessary approval, throughout the course of the Project to reflect material changes associated with changes to construction techniques or the landscape mitigation plan. Approval from the Kāpiti Coast District Council is likely to be required for any relevant revisions of a material nature to the LMP.

A management review of the LMP will be undertaken at least annually by the Project team. The management review will be organised by the Project's Environmental Manager and the Project Landscape Architect and Project team will be informed of any changes to this Plan through the regular Project communications processes. The review will take into consideration:

- any significant changes to construction activities or methods;
- any significant change in the related sub-plans;
- key changes to roles and responsibilities within the Project;
- changes in industry best practice standards or recommended pollution controls;
- changes in legal or other requirements (social and environmental legal requirements, the NZTA objectives and relevant policies, plans, standards, specifications and guidelines);
- results of inspection and maintenance programmes, and logs of incidents, corrective actions, internal or external assessments; and
- any public complaints.

Reasons for making changes to the LMP will be documented. A copy of the original LMP document and subsequent versions will be kept for the Project records, and marked as obsolete. Each new/updated version of the LMP documentation will be issued with a version number and date to eliminate obsolete LMP documentation being used.

References

Assessment of Landscape and Visual Effects, Technical Report 7, Volume 3 of the MacKays to Peka Peka AEE.

Appendix T.A

Planting Plan Map Series (Figures 3-6 from Landscape and Visual
Effects Assessment)

Refer to Technical Report Appendices, Report 7, Volume 5

Appendix T.B
Planting Types (Figure 2 from Landscape and Visual Effects
Assessment)
Refer to Technical Report Appendices, Report 7, Volume 5

Appendix T.C
Landscape Mitigation by Sector

Expressway Sectors	Key Landscape Change	Mitigation
Sector 1: South		
a) Queen Elizabeth Park Character Area	<ul style="list-style-type: none"> ■ Expressway footprint extending approximately 20m into QE Park at the southern end and up to 120m at the northern end by Poplar Avenue. ■ Removal of dense, 5.0m wide buffer of indigenous vegetation between SH1 and QE Park at southern end. ■ New stormwater swale planted with wetland species between SH1 and QE Park ■ Interchange at Poplar Avenue including Expressway embankments (up to 7.0m high) and over bridge, on/off ramps and two round-a-bouts. ■ Overhead lighting on ramps and at Poplar Avenue. Under bridge lighting on Expressway overbridge. ■ Temporary Project yard (Bridge Yard) on clean fill site adjacent to Poplar Avenue. 	<ul style="list-style-type: none"> ■ Establish dense buffer (10.0m wide) of indigenous vegetation between the Expressway and QE Park at southern end and up to 20.0m wide at Poplar Avenue. ■ Mass planting of indigenous vegetation at Poplar Avenue interchange, between ramps, Expressway and cycleway/walkway path. ■ 320m of riparian planning along realigned drain (20m wide).
b) Raumati South character area	<ul style="list-style-type: none"> ■ Approximately 500m Expressway footprint through Leinster Avenue residential properties adjacent to SH1. ■ Approximately 1km of 'greenfields' Expressway through 	<ul style="list-style-type: none"> ■ Mass planting of indigenous vegetation both sides of Expressway, and wetland to west. ■ Retain existing vegetation- semi-mature kanuka and

Expressway Sectors	Key Landscape Change	Mitigation
	<p>small rural properties and undeveloped land currently in the existing Western Link Road (WLR) designation (low dunes and drained wetland) supporting gorse, rank grass, and exotic trees.</p> <ul style="list-style-type: none"> ■ Expressway on elevated 2.0m high embankment across the low lying ground and cuts into the dunes at the northern end with 5.0m-6.0m high cuts. ■ Removal of semi- mature kanuka and loss of small area of wetland ■ New 500m long right-of- way to provide access to residential properties whose access is severed by the Expressway. ■ 2.0m high earth noise bund between right-of-way and Expressway with shared 3.0m wide cycleway/walkway on top. ■ Pedestrian bridge across Expressway between chainage 3000 and 3300, Position and design not finalised ■ Formation of stormwater treatment wetlands and flood storage areas planted with eco-sourced indigenous wetland and other species adjoining Expressway. ■ No Expressway lighting. 	<p>mature exotic trees (pine, macrocarpa) where possible.</p> <ul style="list-style-type: none"> ■ Retain area of manuka-dominated wetland with sphagnum and carex. ■ Planting of 6.0m wide median begins near Upper Drain 7 crossing

Expressway Sectors	Key Landscape Change	Mitigation
c) Raumati Road landscape character area	<ul style="list-style-type: none"> ■ Expressway footprint including swales, requires significant modification of (cutting into) dune landforms. ■ Expressway elevated above some of the surrounding residential properties. ■ Expressway overbridge elevated approximately 5.0m above Raumati Road. ■ Shared cycleway/walkway located on western side of Expressway, and crosses Raumati Road on Expressway bridge. ■ 2.0m high concrete noise walls; on the eastern side of the Expressway (chainage 4100-4450) and western side between 4550-4800. ■ Lighting under the Expressway bridge and in-ground uplighting of piers. ■ Lighting on cycleway/walkway begins here and continues north to Mazengarb Road. 	<ul style="list-style-type: none"> ■ Retain as many of the existing groups and individual mature exotic trees as is practicable. ■ Planting additional trees to strengthen groups of existing trees that are retained. ■ Mass planting of indigenous vegetation, including some species enrichment to enhance long term biodiversity.
Sector 2: Paraparaumu		
a) Wharemauku Basin landscape character area	<ul style="list-style-type: none"> ■ Expressway embankments elevated up to 8.0m above low lying ground – at Wharemauku Stream and on top of the dunes at Kāpiti Road. ■ Expressway bridge across Wharemauku Stream and walkway- 89m long and approximately 5.0m above 	<ul style="list-style-type: none"> ■ Retain lengths of mature shelterbelts of exotic trees where possible ■ Add to shelterbelt planting in places to strengthen visual connections to wider landscape ■ Large area of mass planting of indigenous vegetation in

Expressway Sectors	Key Landscape Change	Mitigation
	<p>ground (to underside of bridge).</p> <ul style="list-style-type: none"> ■ Full interchange at Kāpiti Road, including on/off ramps, retaining walls, split overbridge. ■ Two large flood storage areas on the south side of Wharemauku Stream. One planted with native vegetation and the other grassed with groups of trees. ■ Stormwater treatment wetland adjacent to Kāpiti Road interchange. ■ Shared cycleway/walkway on top of earth bunds –located on western side of Expressway. ■ An earth noise bund will be constructed between the dunes, at chainage 5670, to provide mitigation of the Expressway for Quadrant Height dwellings. ■ Three, 2.0m high timber noise fences along four property boundaries west of Expressway (Quadrant Heights, Observation Place, Milne Drive) ■ Concrete noise walls adjacent to the west side of Expressway and northbound off-ramp (3.0m) and Kāpiti Road bridge approach (2.0m). North of Kāpiti Road concrete noise walls (1.1m) on east side of Expressway and south bound off ramp. Overhead lighting of Expressway and on/off-ramps at Kāpiti Road interchange, 	<p>the flood storage area south of Wharemauku Stream; planting to comprise species that can tolerate occasional inundation.</p> <ul style="list-style-type: none"> ■ Mass planted indigenous vegetation either side of the Expressway and cycleway/walkway extends to the beginning of the Kāpiti Road interchange. ■ Mass planting of indigenous vegetation north of Wharemauku stream to also include enrichment planting of canopy tree species to enhance the long term biodiversity of the local area. ■ Restoration of the riparian margins of 160m length of Wharemauku Stream. ■ Specimen trees with massed underplanting at Kāpiti interchange to recognise proximity to Paraparaumu Town Centre zone.

Expressway Sectors	Key Landscape Change	Mitigation
<p>b) Kāpiti Road – Mazengarb Road</p>	<p>for approximately 1300m. Under-bridge lighting and inground uplighting of bridge piers.</p> <ul style="list-style-type: none"> ■ No lighting at Wharemauku Stream bridge. ■ Lighting on cycleway/walkway. ■ Substantial modification of remnant 10-13m dune landforms. ■ Expressway cut down into dune remnants and with construction of noise bunds between the low points in the dunes, a continuous 3.0m-7.0m high bund will be created either side of the Expressway providing visual screening and noise mitigation to the adjoining residential areas. ■ Expressway elevated either side of Mazengarb and Kāpiti Road bridges. ■ Concrete noise walls north of Kāpiti Road (1.1m) on east side of Expressway and south bound off ramp. ■ Concrete noise wall (2.0m) east side on top of bund chainage 7700-7900 just south of Mazengarb Road adjacent to St James Court & Chilton Drive dwellings, and between 7800 and Mazengarb Road. ■ Earth noise bund on west side, adjacent to Metlife Retirement Village (chainage 7150-7450) and 2.5m concrete noise wall on west side adjacent to Expressway 	<ul style="list-style-type: none"> ■ Utilise dune remnants and noise bunding for visual and noise mitigation. Mass planting of indigenous vegetation either side of the Expressway and cycleway/walkway. ■ Mass planting on bunds and interchange embankments to screen noise walls, traffic and roadway. (eg from Makarini Street Reserve, St James Court, Chilton Place)

Expressway Sectors	Key Landscape Change	Mitigation
	<p>near Metlife Retirement Village (chainage 7150-7680).</p> <ul style="list-style-type: none"> ■ Overbridge across Mazengarb Road bridge (not split). ■ 4.5m-5.0m high retaining walls either side of Mazengarb Road, east of the Expressway. ■ Shared cycleway/walkway on western side of Expressway. ■ Cycleway/walkway bridge across Expressway (location yet to be determined) ■ Stormwater swales either side of Expressway. ■ Stormwater treatment wetland near Mazengarb Road. ■ No significant vegetation to be removed. ■ Expressway, and on/off ramps at Kāpiti Road lit with overhead lighting, ■ Underbridge lighting and inground uplights at Kāpiti Road and at Mazengarb Road. ■ Cycleway/walkway lit (lighting ends at Mazengarb Road). 	
<p>Sector 3: Waikanae</p> <p>a) Otaihanga South landscape character area</p>	<ul style="list-style-type: none"> ■ Expressway cuts through dunes (up to 10.0m -12.0m cuts). ■ Loss of high value wetland areas 	<ul style="list-style-type: none"> ■ Retain mature pine trees between Expressway and properties to the west. ■ Retain as much of the Carex dominated wetlands and

Expressway Sectors	Key Landscape Change	Mitigation
	<ul style="list-style-type: none"> ■ New stormwater wetlands and flood storage areas. ■ Expressway bridge over Otaihanga Road (alignment of Otaihanga Road left as is). ■ Removal of some of the mature pine plantation in existing WLR designation –leaving parts of the stand adjacent to Killalea Place rural lifestyle area. ■ Shared cycleway/walkway on western side of Expressway crosses to east side at Otaihanga Road and continues on the eastern side north of Otaihanga Road. ■ Concrete noise wall (2.0m) on western side at southern end, (chainage 8000-8400), and shorter 2.0m high wall on eastern side near Mazengarb Road. A 1.1m high concrete noise wall at the northern end on the western side immediately south of Otaihanga Road. 	<p>regenerating kanuka as possible.</p> <ul style="list-style-type: none"> ■ Restore and enhance wetland areas and riparian margin of Mazengarb drain. ■ Mass planting of native species in Expressway corridor. ■ Off-set ecological mitigation- new wetland area near Mazengarb Road to offset loss of wetlands.
b) Otaihanga North landscape character area	<ul style="list-style-type: none"> ■ Expressway cut into dunes (up to 15.0m cuts) ■ 700m of new right-of-way on east side to link existing right-of-way to Otaihanga Road ■ New stormwater wetlands and flood storage areas ■ Shared cycleway/walkway on eastern side of Expressway ■ 1.1m high noise wall on the western side just north of the Otaihanga Road overbridge (chainage 9200-9420) 	<ul style="list-style-type: none"> ■ Retain several stands of mature trees within the existing WLR designation ■ Pasture and rural scale tree plantings proposed to retain the existing open character of the area. It is intended that grazed pasture (or mown grass) will extend as close as possible to Expressway. If visual screening is required from particular locations (such as dwellings) 'shelter belts' or strategically placed groups of trees

Expressway Sectors	Key Landscape Change	Mitigation
<p>c) Waikanae River landscape character area</p>	<ul style="list-style-type: none"> ■ 182m long bridge over river corridor 7.0m above the ground ■ Eight bridge piers in river corridor, four immediately adjacent to the river channel (two either side) ■ Riprap reinforcement of river on both sides of the channel and 30m wide strip of riprap extending across the floodplains to the bridge abutments, (100m north bank, 38m south bank covering approximately 4000m²) ■ Realignment of approximately 200m of river channel ■ Riprap in river channel to protect bridge piers ■ Realignment of Muaupoko Stream at its confluence with the Waikanae River, including, reinforcement with riprap. ■ Works in the river will require removal of riparian vegetation (both willow and native vegetation plantings) for approximately 200m up/down stream. Willow to be replanted to stabilise river channel banks. ■ Minor relocation of walkway on north bank to allow for bridge pier. ■ Shared cycleway/walkway crosses river on Expressway bridge and access to the river also provided on both sides 	<p>could be planted.</p> <ul style="list-style-type: none"> ■ Planting of native vegetation along Muaupoko Stream and Waikanae River to replace the existing vegetation in the river corridor that will be removed. ■ Replanting of willows for flood protection along realigned river edge with interplanting of local indigenous species. ■ Floodplain on northern bank needs to allow for flood flows and cannot be densely planted. ■

Expressway Sectors	Key Landscape Change	Mitigation
	<p>of the river to connect with paths that run along the river.</p> <ul style="list-style-type: none"> ■ Access road to El Rancho passes under bridge adjacent to the abutment on the north bank. ■ Concrete noise wall (1.1m) on west at El Rancho (chainage 10750-11000) and continues into next character area. 	
d) Te Moana landscape character area	<ul style="list-style-type: none"> ■ Expressway is on raised embankments through this character area (7.5m high at El Rancho, and 9.0m high ramps at Te Moana) and cuts the side off a high dune with a 13m cut just south of Te Moana interchange. ■ 215m long, 4.0m-5.0m high earth noise bund near Pururi Road (chainage 11100-11300) ■ 1.1m high concrete noise wall on the embankment just north of the Waikanae River bridge, adjacent to El Rancho (chainage 10720-11000) continued from Waikanae River character area. ■ Full interchange at Te Moana Road including on/off ramps, embankments, Expressway bridges over Te Moana Road and Waimeha Stream, two roundabouts and large areas of open space between the paved road areas for residual overland flood flow path. ■ New stormwater treatment wetlands near Pururi Road 	<ul style="list-style-type: none"> ■ Restoration of indigenous riparian margin of a 320m length of the Waimeha Stream ■ Retain areas of existing vegetation, wetlands, regenerating broadleaf scrub and areas of mature exotic trees. ■ Mass planting of indigenous species throughout the interchange, provides some visual screening.

Expressway Sectors	Key Landscape Change	Mitigation
	<p>and overland flow path east of Te Moana Road.</p> <ul style="list-style-type: none"> ■ Cycleway/walkway on eastern side of Expressway which diverges from the Expressway Alignment along Kauri Road. ■ New access road to Takemore Urupa - off Te Moana Road west of Expressway. ■ 1300m length of Expressway lit at Te Moana interchange; ■ Expressway and on/off ramps lit as well as both roundabouts and underbridge lighting and in-ground up-lighting under the Expressway 	

Expressway Sectors	Key Landscape Change	Mitigation
Sector 4: North	<ul style="list-style-type: none"> ■ Substantial earthworks required through series of large dunes between Te Moana and Ngarara Roads with the Expressway being cut down into the dunes resulting in many large cuts ranging from 13m-16m high. ■ Removal of small areas of regenerating broadleaf forest. ■ Inter-dunal areas modified and native vegetation removed. ■ Rural landscape and farming operation split by Expressway. ■ Shared cycleway/ walkway on eastern side of Expressway south of Ngarara Road, crosses to west north of Ngarara Road. ■ Ngarara Road bridged over the Expressway near Nga Manu access road, including 16m high cuts into dunes. ■ Smithfield Road realigned partly along Nga Manu access road, 1.2km of new road including approximately 500m on raised embankments to cross Expressway (up to 9.0m high embankments). ■ Construction of large stormwater treatment/storage wetlands, most to be planted with indigenous vegetation. ■ Restoration of drain to more naturalised stream and 	<ul style="list-style-type: none"> ■ Retain existing native and exotic vegetation/trees wherever possible and strengthen with additional plantings. ■ Construction design avoids heritage tree (pohutukawa near Smithfield Road, see Figure 49). ■ Mass planting of native vegetation including canopy species to contribute to key east-west ecological corridor. ■ Reshaping of cut faces to high dunes along this part of the route to integrate Expressway into the landscape. ■ Large area (approximately 9ha) of indigenous planting associated with the stormwater wetlands, flood storage riparian restoration of drain ('Smithfield Stream diversion') and riparian enhancement of Kakariki Stream will enhance the local biodiversity and enrich the ecological corridor.

Expressway Sectors	Key Landscape Change	Mitigation
<p>b) Peka Peka south landscape character area</p>	<p>riparian planting.</p> <ul style="list-style-type: none"> ■ Riparian planting along 520m of Kakariki Stream. ■ Expressway marginally higher than the existing ground level, embankments 2.0-3.0m high ■ Shared cycleway/walkway on western side of Expressway ■ Partial interchange at Peka Peka Road has an elongated footprint covering approximately 18ha. and extends into this character area at the northern end. ■ One roundabout, one bridge over the Expressway with embankments up to 9.0m and new local road ■ Construction of large flood storage area 	<ul style="list-style-type: none"> ■ Riparian planting 10m wide along 200m of Paetawa Drain ■ Planting along either side of the Expressway and cycleway/walk will reflect the current open/grazed pasture character with grazed pasture extending as close as possible to Expressway. Rural scale trees, in groups/as shelterbelts will be included in the grassed areas and can be strategically located to provide visual screening, if required.

Appendix T.D

Earthworks Mitigation – Principles for Reshaping Dunes (Figure 7
from Landscape and Visual Effects Assessment)

Refer to Technical Report Appendices, Report 7, Volume 5

Appendix T.E

Pre-Loading Areas (Figure 64 from Landscape and Visual Effects
Assessment)

Refer to Technical Report Appendices, Report 7, Volume 5