ECOLOGICAL ASSESSMENT OF STATE HIGHWAY 1 REALIGNMENT OPTIONS

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Prepared for:

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1. INTRODUCTION

The Government has made improving roading links through and within the Kapiti Coast a top transport priority. The Levin to Wellington Airport corridor has been identified as a Road of National Significance. A quality link is needed to provide proper service to Wellington, the Kapiti Coast, Levin, Palmerston North, and the lower North Island (NZTA 2009b).

The existing highway through the district is regularly congested and has a very poor safety record. It limits the movement of people and goods through and around the district, restricting economic growth and causing frustration for residents, commuters, and travellers. A number of options have been identified over many years to try and improve the highway, including diverting local traffic on to the proposed Western Link Road (WLR). The new priority is to provide a high standard four-lane expressway through the whole corridor, to the benefit of all road users (NZTA 2009b).

The options are under consideration

Option A: Eastern Option: SH1 Expressway following the rail corridor with local supporting roads.

Option B: Western Option: SH1 Expressway avoiding Waikanae town centre with local supporting roads.

Option C: Western Link Road (WLR) Option: SH1 Expressway following the Western Link Road corridor

Option D: SH1 Expressway Peka Peka to Otaki - the 2002 Transit Board approved plan.

At this stage the NZTA is seeking feedback from the community on the options A, B, C and D outlined in Section 2 below. The preferred option and its detail will be refined to include relevant community suggestions following consultation (NZTA 2009a, 2009b).

Kapiti Coast District Council is preparing a submission on the proposed options but would like further clarification of ecological values that could be impacted by the proposed roading options, especially those areas identified in the Kapiti Coast District Council Plan Heritage Register as Ecological Sites (being remnant forests or wetlands).

2. REALIGNMENT OPTIONS

To enable the comparison of the different roading alignments the options have been assigned a letter, and the descriptions of the routes are outlined below. At this stage the options are concepts only with detail to be refined following consultation. Options A, B and C deal with the area between MacKays Crossing to Peka Peka, and Option D is the previously approved alignment from Peka Peka to Otaki. The descriptions of the route are as per the October 2009 consultation brochure (NZTA 2009a).

2.1 Option A - Eastern Option: SH1 Expressway following the rail corridor with local supporting roads.

This option would follow the current State Highway west of the railway line as far as the Paraparaumu Railway Overbridge. Instead of having a bridge across the line as the current highway does, the expressway would continue to follow the western side of the railway line past Lindale and on to Waikanae township. There it would join up with the current State Highway to Peka Peka.

A new expressway bridge would be constructed over the Waikanae River to the west of the current bridge. The current State Highway from Paraparaumu Railway Overbridge would become a local arterial road and would use the existing Waikanae River Bridge. This option allows for the construction of two new sections of road.

Interchanges would be provided at either Poplar Avenue or 200 Main Road and at Peka Peka. Further consideration may also be given to providing interchanges at Ihakara Street, Kapiti Road, Otaihanga Road and/or the junction of Te Moana Road, State Highway and Elizabeth Street. This option may require a re-alignment of the rail lines near the junction of the State Highway with Poplar Avenue and near the Paraparaumu Domain. Underpasses could be provided for Kapiti Road, Otaihanga Road and Te Moana Road. A final decision on the location and number of interchanges would be determined as the project progressed.

2.2 Option B - Western Option: SH1 Expressway avoiding Waikanae town centre with local supporting roads.

This option would follow the current State Highway west of the railway line as far as the Paraparaumu Railway Overbridge. Instead of having a bridge across the line, as the current highway does, the expressway would continue to follow the western side of the railway line until Lindale where it would veer northwest through Otaihanga.

It would use part of the Western Link Road designation to cross the Waikanae River on a new bridge, continuing through Waikanae's western suburbs and farmland to an interchange at Peka Peka. The current State Highway from Paraparauma Railway Overbridge to Peka Peka would become a local arterial road. This option allows for construction of one new section of local road.

Interchanges would be provided at either Poplar Avenue or 200 Main Road South and at Peka Peka. Further consideration may also be given to providing interchanges at Ihakara Street, Kapiti Road, Otaihanga Road and/or Te Moana Road. This option may require a re-alignment of the rail lines near the junction of the State Highway with Poplar Avenue and near the Paraparaumu Domain. An underpass could be provided for Kapiti Road. The expressway way would pass closer to an Urupa and Nga Manu Wildlife Sanctuary then it currently does. A final decision on the location and number of interchanges would be determined as the project progressed.

2.3 Option C - WLR Option: SH1 Expressway following the Western Link Road Corridor.

This option would follow the Western Link Road Corridor, which is currently designated for a local link road, and would completely bypass the existing State Highway from either south of Poplar Road (cutting through a corner of Queen Elizabeth II Park) or 200 Main Road South to Peka Peka. This route would be a new road crossing, following the designated Western Link Road route, through Raumati and Paraparaumu and between Waikanae and Waikanae Beach. The current State Highway would become a local arterial road.

Interchanges would be provided at the start of the new route, either at Poplar Avenue or 200 Main Road South and at Peka Peka. Further consideration may also be given to providing interchanges at Ihakara Street Extension, Kapiti Road, Otaihanga Road west of the landfill and/or western Te Moana Road. The expressway way would pass closer to an Urupa and Nga Manu Wildlife Sanctuary then it currently does. A final decision on the location and number of interchanges would be determined as the project progressed.

Road bridges across the expressway would be provided at the following locations: Poplar Avenue (unless the expressway begins at 200 Main Road South), Raumati Road, Ihakara Street extension, Kapiti Road, Mazengarb Road, Otaihanga Road and Te Moana Road. It is likely the expressway would pass outside the existing Western Link Road designation at three locations to maintain the expressway's 100km/h speed limit: at the southern end near Poplar Avenue (or 200 Main Road South); immediately north of the new Waikanae River Bridge; and south of Peka Peka Road.

2.4 Option D - SH1 Expressway Peka Peka to Otaki – the 2002 Transit Board-approved plan.

This option is the route approved by the Transit NZ Board (now NZ Transport Agency) in 2002 for the highway from Peka Peka to Otaki. It is presented here for completeness. From Peka Peka the expressway would follow the current State Highway on the western side of the railway line to cross a railway over-bridge just north of Sutton Road. The expressway would then run along the eastern side of the railway line.

A bridge over the expressway at Te Horo Beach Road and an underpass at Otaki Gorge Road would link eastern and western Te Horo. Local roads would link to each other via the old State Highway and new or upgraded local roads. Local roads would connect to the expressway at Peka Peka interchange and an on-ramp north of Otaki roundabout. An off-ramp from the expressway near Otaki Gorge Road would take highway traffic into Otaki.

The expressway would cross the Otaki River on a new bridge to the east of the railway bridge. North of the river the expressway would continue east of the railway lines, bypassing the Otaki Retail Village and current roundabout. The railway line would be realigned so the expressway could pass under the current State Highway north of the roundabout and cut across rural land with a new bridge over the Waitohu

Stream, bypassing the wide bend that leads into Otaki. The expressway would connect with the current State Highway north of Otaki, before Taylors Road.

3. ECOLOGICAL CONTEXT

3.1 Geology

The majority of State Highway 1 (SH1), from two kilometeres north of MacKays Crossing to just north of Otaki, lies within the Foxton Ecological District. This Ecological District contains the most extensive sand-dune system in the country, although the vegetation on this dune system is severely modified. Essentially the area is a long belt of Holocene sand-dune country extending from Paekakariki to Patea and includes several estuaries, wetlands and lagoons. Soils in the area are sandy soils of various ages depending on the age of the sand dunes and the height of the water table (McEwen 1987a).

The area 2 km either side of MacKays Crossing falls within the toe-slopes of the Tararua Ecological District, and the geology here comprises mostly Triassic-Jurassic greywacke, argillite, and bedded, alternating greywacke and argillite. The soil of the lower altitude foothills comprises less-leached podzolised (than the upper ranges, which are subject to higher rainfall) and more fertile farmed steepland soils. The upper ranges are predominantly covered in indigenous vegetation, but lower hill slopes include induced scrub and gorse, pine plantations, and farmland. The Tararua ED runs roughly parallel to the current SH1 alignment (often within half a kilometre of SH1) until just north of Greenhill Road where the Tararua Ranges veer east and the Ecological District changes to the Manawatu Plains ED (McEwen 1987a).

The Manawatu Plains Ecological District is characterised by low altitude, predominantly undissected, loess covered plains and terraces of Holocene alluvium. Large swamps existed in the very low-lying areas, hence the soil in the areas of interested generally consists of peaty soils with admixed alluvium. The natural fertility of the soils is high but in their natural state river flooding and poor drainage delayed development of some areas (McEwen 1987a).

There are a number of geological sites of significance on, or near, the proposed realignment options. The value of these geological sites, and the degree of impact by the final alignment, will also need to be considered in making decisions about the preferred alignment.

3.2 Climate

Westerly to north-westerly winds prevail with relatively frequent gales. Rainfall is about 800-1200mm per annum in these lower-lying areas and tends to be reliable and evenly distributed. The area generally enjoys warm summers and mild winters (McEwen 1987a).

3.3 Vegetation and habitats

Vegetation in the Foxton Ecological District included extensive dune-stabilising vegetation (spinifex and pingao), dune scrub (tauhinau, sand coprosma, possibly matagouri), interdune wetlands, and rushfields. Forests, including species such as akeake, rewarewa, titoki, ngaio, mahoe, kohekohe, and wharangi, would have existed within 1 km from the sea. Further inland, deeper soils would have supported an extensive array of shrubs and trees.

Because of its easy accessibility, mild climate, and gentle contours the Foxton Ecological District has been greatly modified. Since the arrival of humans, the dune vegetation has been greatly modified by vegetation clearance, planting of pine forests, introduction of marram grass, and spread of weed species, particularly tree lupin, boxthorn, and pampas grass. *Spartina* x *townsendii* is invading some tidal rivers and streams. There are still isolated patches of the native sand sedge pingao (*Desmoschoenus spiralis*); *Pimelea arenaria* and *Coprosma acerosa* occur throughout dunes. The scrub and forest in the southern portion of Foxton Ecological District has been nearly completely cleared. However, there are some remnant wetlands and dune lagoons, and a few coastal swamp forest remnants containing nikau, pukatea, and kahikatea (McEwen 1987a; Ravine 1992). The area is largely farmed or used for other agricultural purposes (McEwen 1987a). Less than 5% of the surface area of the Foxton Ecological District now has predominantly indigenous vegetation (Ravine 1992).

The foothills of the western Tararua Ecological District were dominated by rata/kamahi forest with podocarps such as rimu, Hall's totara, and miro found throughout, and occasional hard beech (McEwen 1987b). The majority of this Ecological District is protected as Public Conservation Land, but the on privately-owned lowland area, forest have been extensively modified or completely removed.

Former vegetation in the western Manawatu Plains Ecological District included large areas of flax swamp surrounding the lower Manawatu, and large areas of open land including grassland and shrubland. There was also semi-swamp forest dominated by kahikatea and pukatea on low-lying land near rivers, totara forest on free-draining soils and low-rainfall areas, and mixed podocarp forest (rimu, matai, totara, and kahikatea) on parts of the plains. Small, isolated, important areas of flax swamp and forest remain, including locally characteristic totara forest. Less than 2% of indigenous vegetation remains in the Manawatu Plains Ecological District (McEwen 1987b; Ravine 1995).

3.4 Fauna

New Zealand dabchicks (*Poliocephalus rufopectus*) can be abundant, especially on dune lagoons, and the Foxton Ecological District holds the largest New Zealand population. Brown teal (pateke; *Anas chlorotis*) has been introduced, New Zealand scaup (*Aythya novaeseelandiae*) occurs on some lakes, and grey teal (*Anas gracilis*), Australasian shoveler (*Anas rhynchotis*), and grey duck (*Anas superciliosa superciliosa*) are widespread. In wetlands, Australasian bittern (*Botaurus poiciloptilus*) is abundant, and spotless crake (*Porzana tabuensis plumbea*) is widespread. The Tararua Ranges are known to support populations of

yellow-crowned parakeet, red-crowned parakeet, the southernmost distribution of whitehead, N.Z. Falcon (widespread), and North Island kaka.

Brown skink (*Oligosoma zelandicum*) is widespread in the district. Ornate skink (*Cyclodina ornata*) is known from bush remnants near Levin. Fish species include giant kokopu (*Galaxias argenteus*) and short jawed kokopu (*Galaxias postvectis*). Brown mudfish (*Neochanna apoda*) were formerly present. Notable insects include coastal cicada (*Rhodopsalta leptomera*) on the seaward side of the dunes. There are relict *Paryphanta* populations in lowland bush remnants near Otaki and Levin, and Wainuia (Rhytida) snails are found throughout the Tararua Ranges (McEwen 1987a, 1987b; Ravine 1992; Ravine 1995).

4. SITES OF ECOLOGICAL SIGNIFICANCE

The majority of ecological sites included in the Heritage Register in the Kapiti Coast District Plan were nominated by the Department of Conservation and were identified from the Protected Natural Areas Programme surveys (Ravine 1992; Ravine 1995).

The District Plan has been operative since 1999 and the Ecological Sites identified in Heritage Register were surveyed and ranked by Wildland Consultants Ltd (Wildland Consultants 2003a, 2003b, 2007). The Plan includes rules that prevent modification to any ecological site without resource consent. However, the Plan also identifies the need to provide non-regulatory incentives to assist landowners to effectively manage ecological sites on their property. Council has set aside funds towards the management of the Ecological Sites.

Not all identified sites of ecological significant have been included in the KCDC Heritage Register. Proposed District Plan Change 55B seeks to include additional sites and amend the shape of some sites. This report includes all sites of ecological significance, including those that have not yet been included in the KCDC District Plan Heritage Register.

During the surveys and assessments of sites (Wildland Consultants 2003a, 2003b, 2007) key ecological features for each site were identified and each site was ranked on a range of ecological aspects. Each Ecological Site was then ranked as being of International, National, Regional or Local Significance using accepted ecological ranking criteria (see Appendix 2). Alongside this, all sites (proposed and current) were assessed to identify whether they qualified for inclusion in the Heritage Register. Existing survey data and site information was evaluated alongside data gathered during the course of field survey in considering ecological rank for each site.

There are no Ecological Sites of International Significance within Kapiti District. Three sites were of National Significance but these are not affected by proposed State Highway realignments. Within close proximity of the road realignments there are 33 sites of Regional Significance (18 of which are potentially affected by proposed works), and 18 sites of Local Significance (12 of which are potentially affected by proposed works). Sites of local significance fulfil at least one criterion in the District Plan to be listed as a Heritage site (Kapiti Coast District Council 1993).

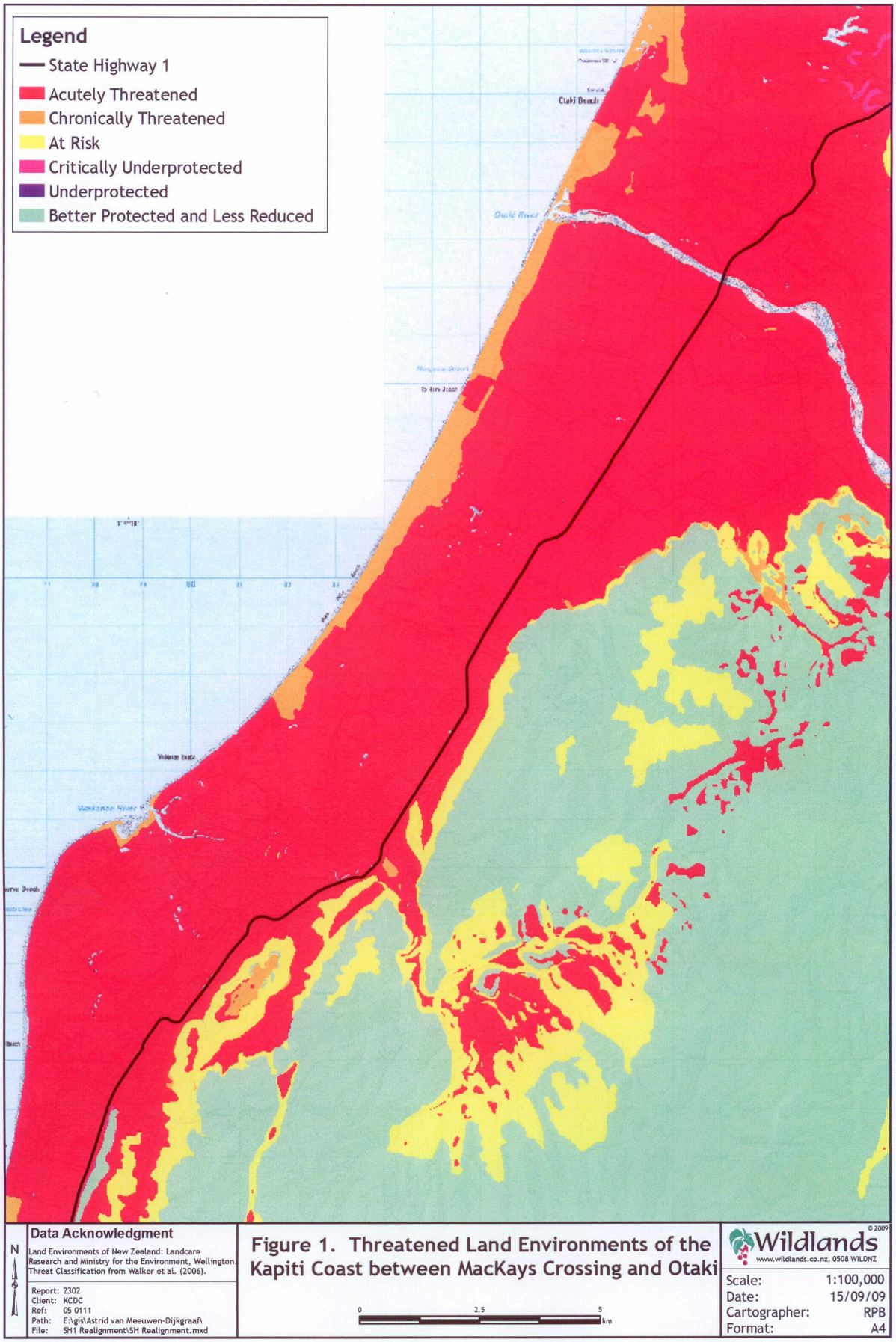

Figure 1. Threatened Land Environments of the Kapiti Coast between MacKays Crossing and Otaki

Nearly all of the Foxton and Manawatu Plain Ecological Districts are considered to be Acutely Threatened Land Environments because there is less than 10% of indigenous cover remaining within the Land Environments (LENZ) that occur in these Ecological Districts (Leathwick *et al.* 2003a; Leathwick *et al.* 2003b; Walker *et al.* 2005). It means that very little native biodiversity remains in these environments. There are only a few relicts of former native habitats and ecosystems left, and what little does remain can be highly modified and degraded. Species threatened by habitat loss are concentrated in these remnants. Further habitat loss may be expected to result in extinction or accelerated decline of many of the remaining native species, and to severely compromise the viability of other habitat patches remaining nearby in similar environments (Walker *et al.* 2005).

In other words, any indigenous vegetation left is considered to be highly valuable, almost regardless of how modified it is, or how small it is.

4.1 Overview of effect on Ecological sites

All sites that have been incorporated into the Kapiti Coast District Council Heritage Register, or are protected as Queen Elizabeth II Covenants and certain Department of Conservation reserves (Ecological Area, Forest Sanctuary, National Parks, Nature Reserve, Scientific Reserve, Wildlife Management Reserve, Wildlife Refuge, Scenic Reserve, Nga Whenua Rahui Kawenata, or for any conservation purpose under the Conservation Act such as a Conservation Area or Conservation Park) can be considered to be Ecological sites. This desktop review of Ecological sites may well have missed some sites that are or could potentially be affected. Additional survey work will be required along the proposed route to ensure that all natural areas have been identified.

Furthermore, the actual alignment of the various options has not been finalized yet, and in places it is not entirely clear how much area would be affected by works. For instance, will the train track be realigned opposite Poplar Avenue, Raumati, or where will the off-ramps actually be at Te Waka Road junction near Otaki, and will it affect Cottle Bush as well as Te Waka Road Bush?

Table 1: Summary of effects of the different routes on Ecological Sites.

Route	# Regional	# Local	Habitats affected	Scale of impact (- R = Regionally significant site)
Option A Eastern Route	9	4	4 wetlands, 8 forests, 1 both wetland and forest Sizes range from 11.09 ha to 0.83 ha wetlands and 72.74 ha to 0.55 ha forest One is a council reserve, 3 are DOC reserves and 6 are QEII Covenants (in part or full)	**Definitely affected** • ***4 sites; 2 wetlands and 2 forest areas.*** • Poplar Avenue, Raumati South (K184 - R), Raumati South Peatlands (K131), Paetawa Bush (K064), King Arthur Drive forest (K191). • The extent to which the first two sites are affected is highly dependent on the final road alignment. Poplar Avenue, Raumati South (K184) is a regionally significant wetland within Queen Elizabeth II Park. • The complete destruction of 0.5 ha forest King Arthur Drive forest (K191). • The other sites will suffer vegetation clearance, likely changes to hydrology, and possible invasion of weeds. Loss of habitat could also reduce populations of threatened species. **Likely to be affected** • ***3 sites; 1 wetland and 2 forest areas.*** • Paraparaumu Coastal Scarp (K095 - R), Muaupoko Swamp Forest (K089- R), QEII 5/07/50. • Paraparaumu Coastal Scarp (K095 - R) will likely be affected if the railway is realigned to create space for the Poplar Avenue interchange. • Muaupoko Swamp Forest (K089- R) could be affected by vegetation clearance and changes to hydrology. • Impacts such as vegetation removal, increased impacts of wind (especially on western edges), changes in hydrology, introduction of weed species, possible loss of threatened species and removal of vegetation buffers **Possibly be affected** • ***6 sites; 1 wetland, 1 wetland and forest area and 4 forest areas.*** • Nikau Reserve (K091 - R), Waikanae Scenic Reserve/Waikanae Bush (K061 - R), Harris Bush (K071 - R), Tini Bush (K085 - R), Otaihanga Road Bush (K088 - R), SH1 - Octavius Road wetland (K196 - R). • Impacts include possible modification of scarps, with possible loss of associated buffering scarp vegetation and possibly changes in hydrology
Option B Western Route	8	2	7 wetlands, 3 forests Sizes range from 122.7 ha to 0.83 ha wetlands and 72.74 ha to 0.64 ha forest Three are DOC reserves	**Definitely affected** • ***5 sites; 5 wetland areas.*** • Te Harakeke Swamp (K066 - R), El Rancho (K170 - R), Poplar Avenue, Raumati South (K184 - R), Osbornes Swamp (K068 - R), Raumati South Peatlands (K131) • The extent to which the Poplar Avenue, Raumati South (K184 - R) and Raumati South Peatlands (K131) sites are affected is highly dependent on the final road, railway and interchange alignments. Poplar Avenue, Raumati South (K184 - R) is a regionally

Route	# Regional	# Local	Habitats affected	Scale of impact (- R = Regionally significant site)
			and 4 are QEII Covenants (in part or full)	significant wetland within Queen Elizabeth II Park. • 3 of the other wetland sites will be affected, with large parts of the wetland destroyed (all three are also QEII Covenants), Te Harakeke Swamp (K066 - R), El Rancho (K170 - R), and Osbornes Swamp (K068 - R). All three are regionally important sites. • All sites will suffer changes in hydrology, introduction of weeds, removal of buffering edge vegetation. Loss of habitat could also reduce populations of threatened species. **Likely to be affected** • ***1 site; 1 forest area.*** • Paraparaumu Coastal Scarp (K095 - R). • Impacts such as vegetation removal, increased impacts of wind (especially on western edges), introduction of weed species. **Possibly be affected** • ***4 sites; 2 wetlands and 2 forest areas.*** • Ngarara Bush (K132 - R), SH1 - Octavius Road wetland (K196 - R), Waimeha Conservation Area (R26020), Waimeha Stream reserve (R26063). • Impacts include possible changes to hydrology, removal of vegetation, introduction of weeds.
Option C Western Link Road	10	4	9 wetlands, 4 forests, 1 dune land Sizes range from 122.7 ha to 0.55 ha wetlands and 72.74 ha to 0.64 ha forest Five are DOC reserves and 5 are QEII Covenants (in part or full)	**Definitely affected** • ***5 sites; 5 wetland areas.*** • Te Harakeke Swamp (K066 - R), El Rancho (K170 - R), Poplar Avenue, Raumati South (K184 - R), Osbornes Swamp (K068 - R), Raumati South Peatlands (K131) and Queen Elizabeth II Park • The extent to which the Poplar Avenue, Raumati South (K184 - R) and Raumati South Peatlands (K131) sites are affected, and the impact on Queen Elizabeth II Park, is highly dependent on the final road alignment. Poplar Avenue, Raumati South (K184 - R) is a regionally significant wetland within Queen Elizabeth II Park that could be completely destroyed if the route traverses through Queen Elizabeth II Park. • 3 of the wetland sites will be affected with large parts of the wetland destroyed (all three are also QEII Covenants), Te Harakeke Swamp (K066 - R), El Rancho (K170 - R), and Osbornes Swamp (K068 - R). • All sites will suffer changes in hydrology, introduction of weeds, removal of buffering edge vegetation. Loss of habitat could also reduce populations of threatened species. **Likely to be affected** • ***1 site; 1 forest area.*** • Paraparaumu Coastal Scarp (K095 - R). • Impacts such as vegetation removal, increased impacts of wind (especially on western edges), introduction of weed species.

Route	# Regional	# Local	Habitats affected	Scale of impact (- R = Regionally significant site)
				Possibly be affected • ***8 sites; 1 dune land, 4 wetlands and 3 forest areas.*** • Waikanae Scenic Reserve/Waikanae Bush (K061 - R), Ngarara Bush (K132 - R), SH1 - Octavius Road wetland (K196 - R), Waimeha Conservation Area (R26020), Andrews Pond (K093), between Crown Hill and Retirement Village (K183), Waimeha Stream reserve (R26063), Te Harakeke Swamp (K066-R), Queen Elizabeth II Park Dunes (K109 - R) • Impacts include possible changes to hydrology, removal of vegetation, introduction of weeds.
Option D Peka Peka to Otaki	5	5	2 wetlands, 8 forests Sizes range from 0.42 ha to 0.83 ha wetlands and 7.47 ha to 0.82 ha forest Two are QEII Covenants (in part or full)	**Definitely affected** • ***4 sites; 1 wetland and 3 forest area.*** • Hautere Bush F (K038), Oriwa Crescent escarpment forest (K212), Cottle's Bush (K037), Otaki Railway Wetland (K134), • Otaki Railway Wetland (K134) (0.42 ha) will be completely destroyed. • Hautere Bush F (K038), Cottle's Bush (K037) damaged by vegetation clearance. • Oriwa Crescent escarpment forest (K212) will be affected by rerouting of County Road, removal of vegetation and possible affects on hydrology. Loss of habitat could also reduce populations of threatened species. **Possibly be affected** • ***6 sites; 1 wetland and 5 forest areas.*** • Awatea Bush (K058 - R), Hautere Bush E (K039 - R), Te Waka Road Bush (K036 - R), SH1 - Octavius Road wetland (K196 - R), Hautere Bush C (K035 - R), Awatea Scarp Bush Remnant (K059), • Impacts include possible removal of vegetation, wind effects, introduction of weeds, modification of scarp and possibly loss of threatened species.

Table 1 summarizes the number and types of sites that definitely will, are likely, or could possibly be affected by works associated with the four different roading options. These options are;

Option A: Eastern Option: SH1 Expressway following the rail corridor with local supporting roads.

Option B: Western Option: SH1 Expressway avoiding Waikanae town centre with local supporting roads.

Option C: Western Link Road (WLR) Option: SH1 Expressway following the Western Link Road corridor.

Option D: SH1 Expressway Peka Peka to Otaki – the 2002 Transit Board approved plan.

Sites that are potentially impacted by a number of Expressway alignments occur in each relevant option, for instance the Poplar Avenue, Raumati South (K184 - R) wetland is potentially affected by Options A, B, and C but not Option D.

Table 2 provides more detail on each of the sites that will be, are likely, or could possibly be affected. They are grouped by the proposed alignment route, with a sub-table for each alignment. Within each Expressway option the sites that will definitely be affected are at the top followed by those likely to be affected, and then those that could possibly be affected. Within each level of effect (definitely, likely, or possibly) the sites are sorted by relative value (Regional more important than local, bigger better than smaller). Sites that are potentially impacted by a number of Expressway alignments occur in each relevant sub-table.

Table 3 lists all the numbers of all ecological sites shown in Figure 2, in numerical order, and indicates which of the tables in this report to refer to for additional information, and which expressway alignment option (as per October 2009) may affect that particular site.

Appendix 1 is a more comprehensive list that includes all Ecological Sites that are near to the proposed works (whether or not they are currently thought to be, or will potentially be affected) to assist with the assessment of potential future changes to the proposed alignment. The sites are sorted by relative value (with sites of regional significance being more important than local significance, and larger sites being more important than smaller).

Table 2a: Ecological sites that could be affected by proposed works associated with Option A: Eastern Option: SH1 Expressway following the rail corridor with local supporting roads.

Site Name, KCDC number, Ecological District	Type, Dominant habitat(s) or vegetation type, (Area ha)	Ranking	Description	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Affected	Option[1]
Poplar Avenue, Raumati South (K184), Foxton	Wetland, Site Description: Manuka scrub dominated wetland (Unit 01) and open rushland with Isolepis prolifer dominant wetland (Unit 02). (2.8 ha)	Regional	Small but the vegetative cover within this wetland is surprisingly intact The wetland is threatened because the surrounding land is highly modified. Two distinct ecotypes and linkages to adjacent wetland. Manuka is more sparse in south end of site. Dense blackberry is present in the north end of the site. Wetland is fringed by crack willow. Prunus sp. and broom are also present on the edge of the site. A small patch of raupo is present with few harakeke around outlet drain adjacent to road. Weedy here with pampas, bindweed, willow and poplar. Wetland was dry at time of survey. Bird species noted: paradise shelduck, pukeko	Wetland, Acutely Threatened Land Environment	Yes Damp sand plains and Dune slacks	Two ecotypes, wetland, linkages to other wetlands, much reduced in former extend	Queen Elizabeth II Park, Recreation Reserve managed by Greater Wellington Regional Council	Changes in hydrology, removal of edge vegetation through road widening, introduction of weeds. This depends on whether the alignment goes through QE Park, remains on Poplar Ave or goes through 200 Main Road South.	Definitely	ABC
Raumati South Peatlands (K131), Foxton	Wetland, Kanuka-gorse scrub, manuka scrub wetland, (11.09 ha)	Local	Small area of nationally under-represented habitat type. Relatively large area of kanuka-gorse scrub although it is highly fragmented and exotic species are common.	Wetland, Acutely Threatened Land Environment	Wetland - Damp sand plains and Dune slacks and peatland	Relatively large, wetland habitat	No	Destruction of part of the site, changes in hydrology, removal of edge vegetation through road widening, introduction of weeds	Definitely	ABC
Paetawa Bush (K064), Foxton	Forest, Titoki forest, tawa-kohekohe forest, (1.87 ha)	Local	A very small example of a forest type that is under-represented within the ecological district.	Acutely Threatened Land Environment	Much reduced in extend in ED	Under-represented in ED	No	Vegetation clearance, changes to hydrology, weed incursion	Definitely	A
King Arthur Drive forest (K191), Foxton	Forest, Tawa-pukatea-kohekohe forest, constructed pond, (0.5 ha)	Local	Under-represented habitat type within the ecological district; acutely threatened land environment. Occasional habitat for kereru (chronically threatened - gradual decline). In very close proximity to Tini Bush Tiny natural area but compact shape with good regeneration.	Habitat for rare species, Acutely Threatened Land Environment	Uncommon in Foxton ED	Under-represented habitat type, Linkages, Ecological restoration	No	Completely destroyed	Definitely	A
Paraparaumu Coastal Scarp (K095), Foxton	Forest, Kanuka-mahoe-gorse scrub, kohekohe-titoki forest, (72.74 ha)	Regional	Coastal forest is nationally under-represented. Small fragments of kohekohe dominated coastal forest with relatively large area of kanuka scrub. Part of a series of fragments that provide links between Kapiti Island and the Tararua Ranges.	Acutely Threatened Land Environment	No	Large area, coastal forest, linkage between fragments and to Tararua Ranges and Kapiti Island	No	Removal of edge vegetation through road widening and realignment of railway, introduction of weeds	Likely	ABC
Muaupoko Swamp Forest (K089), Foxton	Wetland, Kohekohe forest, mahoe forest, pukatea-maire tawake swamp forest, wetland, (7.63 ha)	Regional	Nationally under-represented habitat. An example of ecological sequence between wetland, swamp forest and dry forest. Kohekohe forest and mahoe forest is uncommon in the Foxton Ecological District. Provides habitat for brown mudfish (Department of Conservation 1996) and kereru. This site contains a relatively large area of mahoe forest.	Wetland, habitat for rare species, Acutely Threatened Land Environment	Dune swamp forest	Wetland habitat is nationally under-represented, much reduced from previous extent, habitat for rare species, linkages to other areas	Partly protected by Scenic Reserve (Paraparaumu SR).	Changes in hydrology, removal of edge vegetation through road widening, introduction of weeds	Likely	A
QEII 5/07/501, Foxton	Forest, Old kahikatea grove over revegetated understorey, (2.06 ha)	Local	Under-represented habitat type within the ecological district; acutely threatened land environment. Occasional habitat for kereru (chronically threatened - gradual decline). In very close proximity to Tini Bus.h	Habitat for rare species, Acutely Threatened Land Environment	Much reduced in extend in ED	Under-represented habitat type in Foxton ED, Linkages, Ecological restoration	QEII Covenant	Changes to hydrology and possible removal of vegetation buffers	Likely	A
Nikau Reserve (K091), Tararua	Forest, Kohekohe-nikau forest, (13.62 ha)	Regional	Relatively large, representative area of semi-coastal forest with considerable area of nikau grove. This habitat type was formally characteristic of this area and is now uncommon within Tararua Ecological District. Protected as Council Reserve.	No	Now uncommon forest type, much reduced from previous extent	Uncommon forest type, linkages to other forest fragments and Tararua Range	Council reserve	Changes in hydrology	Possibly	A

[1] Each site can be affected by one or more expressway alignment option. If more than one letter is listed here, then the site could be affected by a number of the proposed alignments. The degree of impact can vary between alignments and will also depend on the final approved expressway alignment.

Site Name, KCDC number, Ecological District	Type, Dominant habitat(s) or vegetation type, (Area ha)	Ranking	Description	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Affected	Option[1]
Waikanae Scenic Reserve/Waikanae Bush (K061), Foxton	Forest, Kohekohe forest, kohekohe-tawa forest, titoki-mahoe treeland, (7.59 ha)	Regional	Kohekohe forest at low altitude is uncommon within Tararua Ecological District. Provides habitat for kereru. Protected as Scenic Reserve.	Habitat for threatened species, Acutely Threatened Land Environment	Uncommon within ED	Uncommon within ED, linkages, restoration, habitat for threatened species	Waikanae Scenic Reserve (DOC) and QEII covenant protects nearly all of the area	Modification railway alignment could affect scarp and cause vegetation clearance	Possibly	AC
Harris Bush (K071), Tararua	Forest, Kohekohe-titoki-tawa forest, kamahi forest, kanuka scrub, (6.68 ha)	Regional	A small representative example of kohekohe forest – uncommon on lowland within Tararua Ecological District. Very small area of kamahi forest and scrub successional to kohekohe forest. Provides habitat for kereru. Protected in part under QEII Covenant with a further area in the process of becoming protected.	Habitat for threatened species, Acutely Threatened Land Environment	Much reduced from former extend	Small representative sample of previous forest cover, successional processes, linkages	Mostly by protected QEII covenant	modification of scarp, vegetation clearance	Possibly	A
Tini Bush (K085), Foxton	Wetland & Forest, Kohekohe-pukatea forest, kohekohe forest, kohekohe-titoki forest, semi-swamp forest, (6.28 ha)	Regional	These fragments represent the only example of kohekohe-pukatea associations within Foxton Ecological District. Borders both Foxton and Manawatu Plains Ecological District. Good example of the gradation between wetland and dryland forest with small nikau grove. Representative of the former forest diversity likely to have occurred within the District. Part of a series of fragments providing connection between Kapiti Island and the Tararua Ranges. Provides habitat for kereru.	Wetland, Habitat for rare species, Acutely Threatened Land Environment	Much reduced from former extend	Only example of forest in ED, several ecotypes, gradation between ecotypes, representative of former extensive forest, linkages, habitat for threatened species	Protected by DOC Covenant.	Removal of edge vegetation through road widening	Possibly	A
Otaihanga Road Bush (K088), Foxton	Forest, Kohekohe-nikau forest, (1.41 ha)	Regional	Kohekohe-nikau forest is uncommon in the Foxton Ecological District. Protected under QEII Covenant.	Acutely Threatened Land Environment	Much reduced from former extend	Kohekohe-nikau forest is uncommon, linkages to other areas	Partly protected by QEII covenant	Changes in hydrology	Possibly	A
SH1 - Octavius Road wetland (K196), Foxton	Wetland, Wetland, pukatea-swamp maire swamp forest, (0.83 ha)	Regional	Nationally under-represented habitat type; acutely threatened land environment. Most of site is protected by QE II covenant. New planting on margins will create a protective buffer.	Wetland, Acutely Threatened Land Environment	Much reduced in extend in ED	Nationally under-represented habitat type, Ecological restoration, Sustainability	QEII covenant	If railway realigned, vegetation clearance	Possibly	ABCD

Table 2b: Ecological sites that could be affected by proposed works associated with Option B: Western Option: SH1 Expressway avoiding Waikanae town centre with local supporting roads.

Site Name, KCDC number, Ecological District	Type, Dominant habitat(s) or vegetation type, (Area ha)	Ranking	Description	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Affected	Option
Te Harakeke Swamp (K066), Foxton	Wetland, Dune wetland, (122.7 ha)	Regional	Wetland habitat is nationally under-represented. A moderately sized area of harakeke flaxland and raupo reedland - the second largest of its type in the Kapiti District. An important representation of habitat formally common in the area. Protected under QEII Covenant.	Wetland, likely to be habitat for threatened species, Acutely Threatened Land Environment	Wetland - Damp sand plains and Dune slacks and peatland	Nationally under-represented habitat type, second largest of its type in KCDC, linkages	QEII covenant	Destroy part of swamp, changes to hydrology, open swamp up to weeds	Definitely	BC
El Rancho (K170), Foxton	Wetland, Manuka wetland, (8.77 ha)	Regional	Nationally under-represented habitat type. Relative large area of manuka dominated wetland with some open water. Buffered by considerable infestation of gorse and blackberry.	Wetland, Acutely Threatened Land Environment	Damp sand plains and Dune slacks	Wetland habitat is nationally under-represented, large size, linkages to other wetlands	Not protected	Large part of swamp would be destroyed including part of QEII covenant	Definitely	BC

Site Name, KCDC number, Ecological District	Type, Dominant habitat(s) or vegetation type, (Area ha)	Ranking	Description	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Affected	Option
Poplar Avenue, Raumati South (K184), Foxton	Wetland, Site Description: Manuka scrub dominated wetland (Unit 01) and open rushland with Isolepis prolifer dominant wetland (Unit 02). (2.8 ha)	Regional	Small but the vegetative cover within this wetland is surprisingly intact The wetland is threatened because the surrounding land is highly modified. Two distinct ecotypes and linkages to adjacent wetland. Manuka is more sparse in south end of site. Dense blackberry is present in the north end of the site. Wetland is fringed by crack willow. Prunus sp. and broom are also present on the edge of the site. A small patch of raupo is present with few harakeke around outlet drain adjacent to road. Weedy here with pampas, bindweed, willow and poplar. Wetland was dry at time of survey. Bird species noted: paradise shelduck, pukeko	Wetland, Acutely Threatened Land Environment	Yes Damp sand plains and Dune slacks	Two ecotypes, wetland, linkages to other wetlands, much reduced in former extend	Queen Elizabeth II Park, Recreation Reserve managed by Greater Wellington Regional Council	Changes in hydrology, removal of edge vegetation through road widening, introduction of weeds. This depends on whether the alignment goes through QE Park, remains on Poplar Ave or goes through 200 Main Road South.	Definitely	ABC
Osbornes Swamp (K068), Foxton	Wetland, Raupo-harakeke wetland, (0.95 ha)	Regional	DOC (729) Te Moana Rd, Waikanae R26 811/355 - 0.95ha. Wetland is small and modified. Wetland habitat is nationally under-represented. Protected under QEII Covenant. Recommended by DOC	Wetland, Acutely Threatened Land Environment	Currently rare	Nationally under-represented, wetland	Partially protected QEII covenant	Destruction of part of the site, severe changes in hydrology, removal of edge vegetation through road widening, introduction of weeds	Definitely	BC
Raumati South Peatlands (K131), Foxton	Wetland, Kanuka-gorse scrub, manuka scrub wetland, (11.09 ha)	Local	Small area of nationally under-represented habitat type. Relatively large area of kanuka-gorse scrub although it is highly fragmented and exotic species are common.	Wetland, Acutely Threatened Land Environment	Wetland - Damp sand plains and Dune slacks and peatland	Relatively large, wetland habitat	No	Destruction of part of the site, changes in hydrology, removal of edge vegetation through road widening, introduction of weeds	Definitely	ABC
Paraparaumu Coastal Scarp (K095), Foxton	Forest, Kanuka-mahoe-gorse scrub, kohekohe-titoki forest, (72.74 ha)	Regional	Coastal forest is nationally under-represented. Small fragments of kohekohe dominated coastal forest with relatively large area of kanuka scrub. Part of a series of fragments that provide links between Kapiti Island and the Tararua Ranges.	Acutely Threatened Land Environment	No	Large area, coastal forest, linkage between fragments and to Tararua Ranges and Kapiti Island	No	Removal of edge vegetation through road widening and realignment of railway, introduction of weeds	Likely	ABC
Ngarara Bush (K132), Foxton	Wetland, Kohekohe forest, kahikatea-pukatea forest, (2.59 ha)	Regional	Small fragment of kohekohe forest and a very small area of swamp forest. Protected under QEII covenant.	Wetland, Acutely Threatened Land Environment	Much reduced in extend in ED	Two ecotypes, wetland, linkages to other wetlands, much reduced in former extend	QEII covenant	Changes to hydrology	Possibly	BC
SH1 - Octavius Road wetland (K196), Foxton	Wetland, Wetland, pukatea-swamp maire swamp forest, (0.83 ha)	Regional	Nationally under-represented habitat type; acutely threatened land environment. Most of site is protected by QE II covenant. New planting on margins will create a protective buffer.	Wetland, Acutely Threatened Land Environment	Much reduced in extend in ED	Nationally under-represented habitat type, Ecological restoration, Sustainability	QEII covenant	If railway realigned, vegetation clearance	Possibly	ABCD
Waimeha Conservation Area (R26020), Foxton	Forest, (0.64 ha)	Regional		Acutely Threatened Land Environment			DOC	Changes to hydrology, removal of vegetation, introduction of weeds	Possibly	BC
Waimeha Stream reserve (R26063), Foxton	Forest, (0.69 ha)	Local		Acutely Threatened Land Environment			DOC	Changes to hydrology, removal of vegetation, introduction of weeds	Possibly	BC

Table 2c: Ecological sites that could be affected by proposed works associated with Option C: Western Link Road (WLR) Option: SH1 Expressway following the Western Link Road corridor.

Site Name, KCDC number, Ecological District	Type, Dominant habitat(s) or vegetation type, (Area ha)	Ranking	Description	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Affected	Option
Te Harakeke Swamp (K066), Foxton	Wetland, Dune wetland, (122.7 ha)	Regional	Wetland habitat is nationally under-represented. A moderately sized area of harakeke flaxland and raupo reedland - the second largest of its type in the Kapiti District. An important representation of habitat formally common in the area. Protected under QEII Covenant.	Wetland, likely to be habitat for threatened species, Acutely Threatened Land Environment	Wetland - Damp sand plains and Dune slacks and peatland	Nationally under-represented habitat type, second largest of its type in KCDC, linkages	QEII covenant	Destroy part of swamp, changes to hydrology, open swamp up to weeds	Definitely	BC
El Rancho (K170), Foxton	Wetland, Manuka wetland, (8.77 ha)	Regional	Nationally under-represented habitat type. Relative large area of manuka dominated wetland with some open water. Buffered by considerable infestation of gorse and blackberry.	Wetland, Acutely Threatened Land Environment	Damp sand plains and Dune slacks	Wetland habitat is nationally under-represented, large size, linkages to other wetlands	Not protected	Large part of swamp would be destroyed including part of QEII covenant	Definitely	BC
Poplar Avenue, Raumati South (K184), Foxton	Wetland, Site Description: Manuka scrub dominated wetland (Unit 01) and open rushland with Isolepis prolifer dominant wetland (Unit 02). (2.8 ha)	Regional	Small but the vegetative cover within this wetland is surprisingly intact The wetland is threatened because the surrounding land is highly modified. Two distinct ecotypes and linkages to adjacent wetland. Manuka is more sparse in south end of site. Dense blackberry is present in the north end of the site. Wetland is fringed by crack willow. Prunus sp. and broom are also present on the edge of the site. A small patch of raupo is present with few harakeke around outlet drain adjacent to road. Weedy here with pampas, bindweed, willow and poplar. Wetland was dry at time of survey. Bird species noted: paradise shelduck, pukeko	Wetland, Acutely Threatened Land Environment	Yes Damp sand plains and Dune slacks	Two ecotypes, wetland, linkages to other wetlands, much reduced in former extend	Queen Elizabeth II Park, Recreation Reserve managed by Wellington Regional Council	Changes in hydrology, removal of edge vegetation through road widening, introduction of weeds. This depends on whether the alignment goes through QE Park, remains on Poplar Ave or goes through 200 Main Road South.	Definitely	ABC
Osbornes Swamp (K068), Foxton	Wetland, Raupo-harakeke wetland , (0.95 ha)	Regional	DOC (729) Te Moana Rd, Waikanae R26 811/355 - 0.95ha. Wetland is small and modified. Wetland habitat is nationally under-represented. Protected under QEII Covenant. Recommended by DOC	Wetland, Acutely Threatened Land Environment	Currently rare	Nationally under-represented, wetland	Partially protected QEII covenant	Destruction of part of the site, severe changes in hydrology, removal of edge vegetation through road widening, introduction of weeds	Definitely	BC
Raumati South Peatlands (K131), Foxton	Wetland, Kanuka-gorse scrub, manuka scrub wetland, (11.09 ha)	Local	Small area of nationally under-represented habitat type. Relatively large area of kanuka-gorse scrub although it is highly fragmented and exotic species are common.	Wetland, Acutely Threatened Land Environment	Wetland - Damp sand plains and Dune slacks and peatland	Relatively large, wetland habitat	No	Destruction of part of the site, changes in hydrology, removal of edge vegetation through road widening, introduction of weeds	Definitely	ABC
Paraparaumu Coastal Scarp (K095), Foxton	Forest, Kanuka-mahoe-gorse scrub, kohekohe-titoki forest, (72.74 ha)	Regional	Coastal forest is nationally under-represented. Small fragments of kohekohe dominated coastal forest with relatively large area of kanuka scrub. Part of a series of fragments that provide links between Kapiti Island and the Tararua Ranges.	Acutely Threatened Land Environment	No	Large area, coastal forest, linkage between fragments and to Tararua Ranges and Kapiti Island	No	Removal of edge vegetation through road widening and realignment of railway, introduction of weeds	Likely	ABC
Queen Elizabeth II Park Dunes (K109), Foxton	Dune land, Sand dune, (109.52 ha)	Regional	Best representative example of sand dune habitat type in Foxton Ecological District. Good example of nationally under-represented habitat type. Provides habitat for pingao and Coprosma acerosa (Milne & Sawyer 2002). Protected as Regional Park.	Nationally significant dune land, habitat for threatened species, Acutely Threatened Land Environment	Dune land and sand plain, much reduded from original extend	Nationally under-represented habitat type, best representative example in KCDC, linkages, foreshore protection	Recreation Reserve, managed as Regional Park by Greater Wellington Regional Council	Possibly not affected unless hydrology is significantly altered as consequence of works	Possibly	C
Waikanae Scenic Reserve/Waikanae Bush (K061), Foxton	Forest, Kohekohe forest, kohekohe-tawa forest, titoki-mahoe treeland, (7.59 ha)	Regional	Kohekohe forest at low altitude is uncommon within Tararua Ecological District. Provides habitat for kereru. Protected as Scenic Reserve.	Habitat for threatened species, Acutely Threatened Land Environment	Uncommon within ED	Uncommon within ED, linkages, restoration, habitat for threatened species	Waikanae Scenic Reserve (DOC) and QEII covenant protects nearly all of the area	Modification railway alignment could affect scarp and cause vegetation clearance	Possibly	AC

Site Name, KCDC number, Ecological District	Type, Dominant habitat(s) or vegetation type, (Area ha)	Ranking	Description	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Affected	Option
Ngarara Bush (K132), Foxton	Wetland, Kohekohe forest, kahikatea-pukatea forest, (2.59 ha)	Regional	Small fragment of kohekohe forest and a very small area of swamp forest. Protected under QEII covenant.	Wetland, Acutely Threatened Land Environment	Much reduced in extend in ED	Two ecotypes, wetland, linkages to other wetlands, much reduced in former extend	QEII covenant	Changes to hydrology	Possibly	BC
SH1 - Octavius Road wetland (K196), Foxton	Wetland, Wetland, pukatea-swamp maire swamp forest, (0.83 ha)	Regional	Nationally under-represented habitat type; acutely threatened land environment. Most of site is protected by QE II covenant. New planting on margins will create a protective buffer.	Wetland, Acutely Threatened Land Environment	Much reduced in extend in ED	Nationally under-represented habitat type, Ecological restoration, Sustainability	QEII covenant	If railway realigned, vegetation clearance	Possibly	ABCD
Waimeha Conservation Area (R26020), Foxton	Forest, Forest, (0.64 ha)	Regional	0	Acutely Threatened Land Environment	0	0	DOC	Changes to hydrology, removal of vegetation, introduction of weeds	Possibly	BC
Andrews Pond (K093), Foxton	Wetland, Manuka Wetland, (1.27 ha)	Local	Manuka scrub wetland. Kapiti Rd / Milne Drive, Paraparaumu. A small wetland amongst residential and commercial land-use. Nationally under represented habitat type. Provides habitat for kapungawha.	Wetland, Acutely Threatened Land Environment	Wetlands - Damp sand plains and Dune slacks	Scientific Reserve. Nationally under represented habitat type. Provides habitat for kapungawha.	DOC reserve	Changes in hydrology	Possibly	C
Waimeha Stream reserve (R26063), Foxton	Forest, Forest, (0.69 ha)	Local	0	Acutely Threatened Land Environment	0	0	DOC	Changes to hydrology, removal of vegetation, introduction of weeds	Possibly	BC
between Crown Hill and Retirement Village (K183), Foxton	Wetland, Manuka scrub wetland, (0.55 ha)	Local	Wetland habitat is nationally under-represented. Very small area of unprotected wetland dominated by manuka scrub.	Wetland, Acutely Threatened Land Environment	Damp sand plains and Dune slacks	Wetland habitat is nationally under-represented	No	Changes in hydrology, removal of edge vegetation	Possibly	C

Table 2d: Ecological sites that could be affected by proposed works associated with Option D: SH1 Expressway Peka Peka to Otaki – the 2002 Transit Board approved plan.

Site Name, KCDC number, Ecological District	Type, Dominant habitat(s) or vegetation type, (Area ha)	Ranking	Description	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Affected	Option
Hautere Bush F (K038), Manawatu Plains	Forest, Totara-titoki-matai forest, (3.61 ha)	Local	Indigenous vegetation on alluvial plain is nationally under-represented. Convoluted, unfenced and lacking an understorey. Part of a series of fragments across the plains providing links between Kapiti Island and the Tararua Ranges.	Acutely Threatened Land Environment	Indigenous vegetation on alluvial plain is nationally under-represented	Nationally under-represented, linkages	No	Vegetation clearance	Definitely	D
Oriwa Crescent escarpment forest, Manawatu Plains	Forest, Tawa-titoki-kohekohe forest, Pukatea-kohekohe forest, Totara forest, (3.1 ha)	Local	Under-represented habitat type within the ecological district; acutely threatened land environment. Occasional habitat for kereru (chronically threatened - gradual decline). Adjoins KO18 (see 1999 District Plan). Although long and narrow, the site is a steep terrace riser with good regeneration. Part of the area (2.19 ha) should be considered an Ecological site	Habitat for threatened species, Acutely Threatened Land Environment	Much reduced in extend in ED	Under-represented habitat within ED, Linkages, sustainability	No	Affected by rerouting of County Road, removal of vegetation and possible affects on hydrology	Definitely	D
Cottle's Bush (K037), Manawatu Plains	Forest, Totara-matai forest, (1.46 ha)	Local	Indigenous vegetation on alluvial plain is nationally under-represented. Recovering from grazing, weed infestation, currently low quality but recovering. Part of a series of fragments across the plains providing links between Kapiti Island to the Tararua Ranges.	Acutely Threatened Land Environment	Indigenous vegetation on alluvial plain is nationally under-represented	Nationally under-represented, linkages	No	Realignment of local road and SH1 switches to east side of rails, vegetation clearance changes to hydrology	Definitely	D

Site Name, KCDC number, Ecological District	Type, Dominant habitat(s) or vegetation type, (Area ha)	Ranking	Description	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Affected	Option
Otaki Railway Wetland (K134), Foxton	Wetland, Predominantly raupo dominated (0.42 ha)	Local	Wetland habitat is nationally under-represented. Provides habitat for kapungawha. Small wetland, grazed in part with a considerable threat from pest plant species.	Wetland, habitat for threatened species, Acutely Threatened Land Environment	Much reduced in extend in ED	Wetland, nationally under-represented	No	Completely destroyed	Definitely	D
Awatea Bush (K058), Manawatu Plains	Forest, Kohekohe-tawa-titoki forest, (7.47 ha)	Regional	Indigenous vegetation on alluvial plain is nationally under-represented. Part of a series of fragments across the plains that provide links between Kapiti Island and the Tararua Ranges. Below main block of forest is a population of Streblus banksii. Provides habitat for kereru. In process of protection under QEII Covenant.	Habitat for threatened species, Acutely Threatened Land Environment	alluvial plain is nationally under-represented	Nationally under-represented, linkages, threatened species	Partially protected QEII covenant	Loss of threatened species, modification of scarp, vegetation clearance	Possibly	D
Hautere Bush E (K039), Manawatu Plains	forest, Totara-matai-titoki forest, (2.8 ha)	Regional	Indigenous vegetation on alluvial plain is nationally under-represented. Convoluted but one of largest fragments of its type in the area with relatively good regeneration.	Acutely Threatened Land Environment	Indigenous vegetation on alluvial plain is nationally under-represented	Nationally under-represented, linkages	No	Vegetation clearance, wind effects, introduction of weeds	Possibly	D
Te Waka Road Bush (K036), Manawatu Plains	Forest, Totara-kohekohe forest, (1.61 ha)	Regional	Indigenous vegetation on alluvial plain is nationally under-represented. Provides habitat for Korthalsella lindsayi and Nestegis montana (KCDC files).	Habitat for threatened species, Acutely Threatened Land Environment	Indigenous vegetation on alluvial plain is nationally under-represented	Nationally under-represented, threatened species, linkages	No	Vegetation clearance, wind effects, introduction of weeds, possibly loss of threatened species	Possibly	D
SH1 - Octavius Road wetland (K196), Foxton	Wetland, Wetland, pukatea-swamp maire swamp forest, (0.83 ha)	Regional	Nationally under-represented habitat type; acutely threatened land environment. Most of site is protected by QE II covenant. New planting on margins will create a protective buffer.	Wetland, Acutely Threatened Land Environment	Much reduced in extend in ED	Nationally under-represented habitat type, Ecological restoration, Sustainability	QEII covenant	If railway realigned, vegetation clearance	Possibly	ABCD
Hautere Bush C (K035), Manawatu Plains	Forest, Titoki-totara forest, (0.82 ha)	Regional	Indigenous vegetation on alluvial plain is nationally under-represented. Provides habitat for Streblus banksii, Ileostylis micranthus, and DOC historic records list Korthalsella lindsayi	Habitat for threatened species, Acutely Threatened Land Environment	Indigenous vegetation on alluvial plain is nationally under-represented	Nationally under-represented, threatened species, linkages	No	Vegetation clearance, wind effects, introduction of weeds, possibly loss of threatened species	Possibly	D
Awatea Scarp Bush Remnant (K059), Manawatu Plains	Forest, Kohekohe-tawa forest, induced wetland, (2.16 ha)	Local	Indigenous vegetation on alluvial plain is nationally under-represented. Fragment is very small and narrow. Area of wetland is small and induced.	Acutely Threatened Land Environment	alluvial plain is nationally under-represented	Nationally under-represented, small induced wetland	No	Modification of scarp and vegetation clearance	Possibly	D

Figure 2a to 2e: Indicative State Highway 1 expressway realignment options (October 2009) in relation to Ecological Sites and other Heritage features

Option A: Eastern Option: SH1 Expressway following the rail corridor with local supporting roads.
Pink coloured indicative south to north alignment on Figures 2e, 2d, and 2c. Alignment then continues as green coloured indicative Peka Peka to Otaki (Option D) alignment.

Option B: Western Option: SH1 Expressway avoiding Waikanae town centre with local supporting roads.
Purple coloured indicative south to north alignment on Figures 2d, and 2c. Alignment then continues as green coloured indicative Peka Peka to Otaki (Option D) alignment.

Option C: Western Link Road (WLR) Option: SH1 Expressway following the Western Link Road corridor.
Purple coloured indicative south to north alignment on Figures 2e, and 2d. Alignment then continues as purple coloured indicative Western Option (Option B) on Figures 2d and 2c and further south the green coloured indicative Peka Peka to Otaki (Option D) alignment.

Option D: SH1 Expressway Peka Peka to Otaki - the 2002 Transit Board approved plan.
Green coloured indicative south to north alignment on Figures 2c, 2b and 2a.

This key to Figure 2 also refers the reader to other tables that contain information about a particular site, indicates which expressway alignment options may affect the site, and the likelihood of effects on the site.

Table 3: Key to Ecological Sites numbers assessed in this report[2] and shown in Figure 2.

				Expressway option[3]		
Ecological site number	**QEII number**	**Site Name**	**Included in Tables**	**Definite effect**	**Likely effect**	**Possible effect**
K015		Haruatai Park forest	Appendix 1			
K035		Hautere Bush C	1, 2d, Appendix 1			D
K036		Te Waka Road Bush	1, 2d, Appendix 1			D
K037		Cottle's Bush	1, 2d, Appendix 1	D		
K038		Hautere Bush F	1, 2d, Appendix 1	D		
K039		Hautere Bush E	1, 2d, Appendix 1			D
K040		Kiripiti Bush	Appendix 1			
K041		Hautere Bush D	Appendix 1			
K051		Hautere Bush A	Appendix 1			
K052		Hautere Bush B	Appendix 1			
K054		Te Horo Bush	Appendix 1			
K058	5/07/382	Awatea Bush	1, 2d, Appendix 1			D
K059		Awatea Scarp Bush Remnant	1, 2d, Appendix 1			D
K060	5/07/544	Pekapeka Road Swamp	Appendix 1			
K061	5/07/383	Waikanae Scenic Reserve/Waikanae Bush	1, 2a, 2c, Appendix 1			AC
K064		Paetawa Bush	1, 2a, Appendix 1	A		
K065		Waikanae North Shrubland	Appendix 1			
K066	5/07/240A, 5/07/240B & 5/07/321	Te Harakeke Swamp	1, 2b, 2c, Appendix 1	BC		
K068	5/07/243	Osbornes Swamp	1, 2b, 2c, Appendix 1	BC		
K071	5/07/020 & 5/07/394	Harris Bush	1, 2a, Appendix 1			A
K082	5/07/144	Lion Downs Bush (Charman Covenant)	Appendix 1			
K082	5/07/541	Turf Farm Bush B	Appendix 1			
K084	5/07/540	Turf Farm Bush Forest A	Appendix 1			
K085		Tini Bush	1, 2a, Appendix 1			A
K087		Muaupoko Bush	Appendix 1			
K088	5/07/224	Otaihanga Road Bush	1, 2a, Appendix 1			A
K089		Muaupoko Swamp Forest	1, 2a, Appendix 1		A	
K091		Nikau Reserve	1, 2a, Appendix 1			A
K093		Andrews Pond	1, 2c, Appendix 1			C
K095		Paraparaumu Coastal Scarp	1, 2a, 2b, 2c, Appendix 1		ABC	

[2] Note that any numbers not listed here were not assessed as they were not thought to be at risk from currently proposed expressway alignments.

[3] The letters refer to expressway alignment Options A, B, C and/or D as explained elsewhere in the text.

				Expressway option[3]		
Ecological site number	**QEII number**	**Site Name**	**Included in Tables**	**Definite effect**	**Likely effect**	**Possible effect**
K108		Queen Elizabeth II Park Bush and wetlands	Appendix 1			
K109		Queen Elizabeth II Park Dunes	1, 2c, Appendix 1			C
K124		Karn Reserve	Appendix 1			
K131		Raumati South Peatlands	1, 2a, 2b, 2c, Appendix 1	ABC		
K132	5/07/241	Ngarara Bush	1, 2b, 2c, Appendix 1			BC
K133	5/07/380, 5/07/490, 5/07/491, 5/07/492, 5/07/493, 5/07/494, 5/07/495 & 5/07/533	Nga Manu Nature Reserve	Appendix 1			
K134		Otaki Railway Wetland	1, 2d, Appendix 1	D		
K153		Simon Brown Bush	Appendix 1			
K155		Woodleigh Stud, Bush C	Appendix 1			
K170		El Rancho	1, 2b, 2c, Appendix 1	BC		
K178		Kiripiti Scientific Reserve	Appendix 1			
K183		between Crown Hill and Retirement Village	1, 2c, Appendix 1			C
K184		Poplar Avenue, Raumati South	1, 2a, 2b, 2c, Appendix 1	ABC		
K185		Nimmo Ave East forest	Appendix 1			
K189		Park Avenue kanuka treeland and wetland	Appendix 1			
K191		King Arthur Drive forest	1, 2a, Appendix 1	A		
K196	5/07/402	SH1 - Octavius Road wetland	1, 2a, 2b, 2c, 2d, Appendix 1			ABCD
K211		Hariata Street - SH1 wetland	Appendix 1			
K212		Oriwa Crescent escarpment forest	1, 2d, Appendix 1	D		
K213		Tararua Crescent forest	Appendix 1			
5/07/501	5/07/501	QEII 5/07/501	1, 2a, Appendix 1		A	
R26020		Waimeha Conservation Area	1, 2b, 2c, Appendix 1			BC
R26063		Waimeha Stream reserve	1, 2b, 2c, Appendix 1			BC

4.2 Importance of specific sites

The ranking undertaken here is based purely on ecological criteria and will have missed aspects such as the amount of resources that have been committed to restoring sites, the level of community use of the site, the level of public participation in the maintenance of the site, and any visual or recreational aspects. In terms of ecological criteria, and the level of uncertainty around the precise alignment, it is probably more useful at this stage to provide some guidance as to what aspects should receive greater emphasis in considerations (also refer to Appendix 2).

Four national priorities for biodiversity protection have been set. They are based on the latest and best scientific research available (Ministry for the Environment 2007a, 2007b).

National Priority 1: To protect indigenous vegetation associated with land environments, (defined by Land Environments of New Zealand at Level IV), that have 20 percent or less remaining in indigenous cover.

This priority may not assist much, as most of Foxton and Manawatu Plains Ecological Districts are in the highest threat category (Acutely Threatened) as are the low foothills of the Tararua Range, within the Tararua Ecological District

National Priority 2: To protect indigenous vegetation associated with sand dunes and wetlands; ecosystem types that have become uncommon due to human activity.

Thus wetland areas in Foxton Ecological District will have a high priority for protection.

National Priority 3: To protect indigenous vegetation associated with 'originally rare' terrestrial ecosystem types not already covered by priorities 1 and 2.

The areas identified here again tend to be the wetlands on sand dunes within the Foxton Ecological District (Williams *et al.* 2007).

National Priority 4: To protect habitats of threatened and at risk indigenous species (Townsend *et al.* 2008).

This criterion may currently be of limited assistance given the brief descriptions for most sites. However, further information could be gathered from other sources (e.g. Department of Conservation, Ornithological Society of New Zealand, botanical groups etc) or through additional surveys.

Other general principles for evaluating natural areas are as follows:

- Larger sites are more valuable than smaller sites.
- Sites that have undergone fewer modifications (e.g. felling of trees, changes to hydrology, number and density of weeds) will be more valuable than more modified areas of equivalent size.
- Sites which are in close proximity to other natural areas, or which are partially linked (e.g. the same stream runs through them) or which provide a "stepping

stone" between extensive habitat areas, are often of higher value, and of greater viability, than small, isolated areas.

- Areas that form part of an ecological sequence or have a gradation of indigenous vegetation types, often harbour significant biodiversity values.
- Areas that have had significant input of resources (e.g. fencing, restoration planting, weed removal, pest control, restoration of hydrology) will be more valuable.
- Areas that provide buffers to riparian areas, including streams, wetlands, and estuaries, or to high value terrestrial sites, can contribute significantly to the value of adjacent sites and the value of aquatic environments downstream.

5. CONNECTIVITY OF AQUATIC ENVIRONMENTS

The location of the proposed expressway, broadly parallel with the coast and along the narrow coastal plain, means that any route will cross multiple watercourses. Some of these watercourses will be of low ecological value, either due to intermittent flow, or their location within highly modified catchments. However watercourses with permanent flow and which have their source in headwater catchments that are primarily forested, will support aquatic environments of high ecological value. Watercourses with these characteristics, even if of small size, typically support populations of indigenous freshwater fish.

Most freshwater fish species in New Zealand are migratory and require unimpeded migration in both upstream and downstream directions in order to maintain viable populations (McDowall 1990). Correct design and installation of culverts is critical to ensure that the proposed expressway does not result in the loss of indigenous freshwater fish populations.

When installing culverts in watercourses, adverse effects on freshwater fish populations can be avoided by applying the following guidelines: (1) culverts are positioned so that the gradient and alignment are the same as the existing watercourse, (2) the width of the culvert is equal or greater to the average width of the watercourse at the point where the culvert intersects the watercourse, (3) the culvert invert should be set well below the current bed of the watercourse, and (4) if average barrel velocity exceeds 0.3 metres per second, the flow within the culvert should be broken by rocks cemented onto barrel floor, spoilers, or baffles (Auckland Regional Council 2000; Greater Wellington Regional Council 2003).

6. EROSION AND SEDIMENT CONTROL

Some of the receiving environments of the proposed expressway, such as Waikanae River and Waitohu Stream, Otaki River are of high ecological value, with the two last mentioned waterways included in the Wellington Regional Council "Streams alive" programme. Furthermore, there are a number of community restoration groups actively working to restore river of beach habitat including, Paraparaumu Beach, Greendale Reserve, Kaitawa Reserve, Nga Uruora, Otaki North Beach, Otaki River, Queen Elizabeth II Park, Waikanae Estuary, Waikanae River, Waimeha Wetland,

Waitohu Stream. Therefore, all earthworks along the route need to be undertaken with sediment control measures of the highest standard.

7. CONCLUSIONS

The scale of the ecological impact, and whether or not this can be mitigated, will depend on the final proposed routing and realignment of State Highway 1 expressway, the extent of the associated works (e.g. realigning the rail lines, location of on and off-ramps, extent of cut and fill required), and the construction methods used (especially silt and sediment control measures). This report summarises a desk top review of areas in proximity to the proposed alignment (October 2009) that have already been identified as Ecological Sites. It also identifies which areas will, are likely to be, or could possibly be impacted by the proposed alignment, and the ecological issues that may result. Further consideration also needs to be given to adverse ecological effects that can occur beyond the road corridor, such as potential barriers to fish passage between the coastal and inland side of the corridor, and increased sediment inputs to aquatic environments of high ecological value.

Ecologically, the current (October 2009) indicative Eastern Route (Option A) has the least adverse effects as it will only destroy a small (0.5 ha) tawa-pukatea- kohekohe forest remnant and a constructed pond (King Arthur Drive forest K191 W8). This route could affect (through being adjacent to ecological sites) up to 12 other ecological areas, including three regionally important wetlands, six regionally important forest areas, and locally significant forest and wetland remnants.

The Peka Peka to Otaki (Option D) indicative alignment would destroy the 0.42 ha, locally significant Otaki Railway Wetland (K134), and would clear part of totara-titoki-matai forest within Hautere Bush F (K038), totara-matai forest in Cottle's Bush (K037) and a small area of mixed tawa-titoki-kohekohe-totara forest near Oriwa Cresent (K212). These forest sites are of local significance. A further 6 sites, all regionally significant forests or wetlands, could possibly be affected.

The ecological impacts of the indicative Western Route (Option B) and the Western Link Road (Option C) are the most severe, and differ only in that the Western Link Road (Option C) would also destroy part of the Raumati Peatlands (K131) and could affect the regionally significant Poplar Ave wetland (K184) and the locally significant Andrew's Pond (K093) which is also a DOC reserve.

The Western Route (Option B) would significantly impact on and partially destroy four regionally significant wetlands, including the very significant Te Harakeke Swamp (K066) and El Rancho (K170) wetland complexes, as well as Osbornes Swamp (K068) and wetland areas in Queen Elizabeth II Park. The two swamp complexes (Te Harakeke Swamp (K066) and El Rancho (K170)) are in part protected by Queen Elizabeth II Covenants, and these would be affected by the current indicative road alignment. In addition to the wetlands above another regionally important wetland (Octavius Road Wetland K196), two regionally important forested areas (Ngarara Bush K132, and Paraparaumu Coastal Escarpment K095), and two areas of DOC managed lands (Waimeha Conservation area and Waimeha Stream

Reserve) could also be affected. These areas would also all be affected by the Western Link Road option.

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APPENDIX 1

LIST OF ALL ECOLOGICAL SITES IN PROXIMITY TO STATE HIGHWAY ROAD REALIGNMENTS

Listed in order from regionally significant, to significant locally, and within each significance ranking by size in hectares from largest to smallest.
Nationally significant refers to significance criteria as per the national priorities for protecting rare and threatened native biodiversity on private land (Ministry for the Environment 2007a, 2007b)
Information on ecological sites sourced from previous Wildlands reports (Wildland Consultants 2003a, 2003b, 2007) and from the Heritage register of the Kapiti Coast District Plan (Kapiti Coast District Council 1993).

Site Name	KCDC number	Ecological District	Dominant habitats) or vegetation type	Area (ha)	Ranking	Description	Type	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Option [4]	Affected
Te Harakeke Swamp	K066	Foxton	Dune wetland	122.7	Regional	Wetland habitat is nationally under-represented. A moderately sized area of harakeke flaxland and raupo reedland - the second largest of its type in the Kapiti District. An important representation of habitat formally common in the area. Protected under QEII Covenant.	Wetland	Wetland, likely to be habitat for threatened species, Acutely Threatened Land Environment	Wetland - Damp sand plains and Dune slacks and peatland	Nationally under-represented habitat type, second largest of its type in KCDC, linkages	QEII covenant	Destroy part of swamp, changes to hydrology, open swamp up to weeds	BC	Definitely
Queen Elizabeth II Park Dunes	K109	Foxton	Sand dune	109.52	Regional	Best representative example of sand dune habitat type in Foxton Ecological District. Good example of nationally under-represented habitat type. Provides habitat for pingao and Coprosma acerosa (Milne & Sawyer 2002). Protected as Regional Park.	Dune land	Nationally significant dune land, habitat for threatened species, Acutely Threatened Land Environment	Dune land and sand plain, much reduded from original extend	Nationally under-represented habitat type, best representative example in KCDC, linkages, foreshore protection	Recreation Reserve, managed as Regional Park by Greater Wellington Regional Council	Possibly not affected unless hydrology is significantly altered as consequence of works	C	Possibly
Muaupoko Bush	K087	Tararua	Kohekohe-tawa forest, tawa forest, kohekohe forest, kanuka forest, wetland	100.24	Regional	One of the largest forest fragments in the area containing good representative examples of the forest types present. Provides habitat for Mazus novaezeelandiae subsp. novaezeelandiae (Townsend et al. 1998), Adelopetalum tuberculatum (Forest & Bird Society), Northern rata and kereru.	Wetland	Wetland, Habitat for rare species	Much reduced from former extend	Large area, rare species, linkages to other areas	Protected in part by Scenic Reserve (Paraparaumu SR), DOC Covenant, and Forest and Bird Reserve.	With current alignment		Unlikely
Paraparaumu Coastal Scarp	K095	Foxton	Kanuka-mahoe-gorse scrub, kohekohe-titoki forest	72.74	Regional	Coastal forest is nationally under-represented. Small fragments of kohekohe dominated coastal forest with relatively large area of kanuka scrub. Part of a series of fragments that provide links between Kapiti Island and the Tararua Ranges.	Forest	Acutely Threatened Land Environment	No	Large area, coastal forest, linkage between fragments and to Tararua Ranges and Kapiti Island	No	Removal of edge vegetation through road widening and realignment of railway, introduction of weeds	ABC	Likely
Nga Manu Nature Reserve	K133	Foxton	Wetland, swamp forest, kohekohe forest, tawa forest	43.92	Regional	Wetland habitat is nationally under-represented. One of largest and best examples of swamp forest within Foxton Ecological District. Good example of sequences between wetland, swamp forest and dry forest. Provides habitat for brown mudfish and kereru. Nga Manu Nature Reserve protected under Private Trust. Protected in part by QEII Covenant, with further area in the process of becoming protected.	Wetland	Wetland, habitat for threatened species, Acutely Threatened Land Environment	Wetland - Damp sand plains and Dune slacks and peatland, swamp forest sequences	One of largest and best example of swamp forest within ED, transitional sequences, huge restoration effort, threatened species recovery	Partially protected QEII covenant	Unless major changes to hydrology		Unlikely

[4] Refers to the proposed alignment options A, B, C and D as described elsewhere in this report.

Site Name	KCDC number	Ecological District	Dominant habitats) or vegetation type	Area (ha)	Ranking	Description	Type	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Option [4]	Affected
Nikau Reserve	K091	Tararua	Kohekohe-nikau forest	13.62	Regional	Relatively large, representative area of semi-coastal forest with considerable area of nikau grove. This habitat type was formally characteristic of this area and is now uncommon within Tararua Ecological District. Protected as Council Reserve.	Forest	No	Now uncommon forest type, much reduced from previous extent	Uncommon forest type, linkages to other forest fragments and Tararua Range	Council reserve	Changes in hydrology	A	Possibly
El Rancho	K170	Foxton	Manuka wetland	8.77	Regional	Nationally under-represented habitat type. Relative large area of manuka dominated wetland with some open water. Buffered by considerable infestation of gorse and blackberry.	Wetland	Wetland, Acutely Threatened Land Environment	Damp sand plains and Dune slacks	Wetland habitat is nationally under-represented, large size, linkages to other wetlands	Not protected	Large part of swamp would be destroyed including part of QEII covenant	BC	Definitely
Waikanae North Shrubland	K065	Foxton	Kanuka-manuka scrub	7.68	Regional	A relatively large area of kanuka-manuka scrub. Habitat of this type is uncommon within Foxton Ecological District.	Shrubland	Acutely Threatened Land Environment	Much reduced in extend in ED	Uncommon within ED, linkages, large area	No			Unlikely
Muaupoko Swamp Forest	K089	Foxton	Kohekohe forest, mahoe forest, pukatea-maire tawake swamp forest, wetland	7.63	Regional	Nationally under-represented habitat. An example of ecological sequence between wetland, swamp forest and dry forest. Kohekohe forest and mahoe forest is uncommon in the Foxton Ecological District. Provides habitat for brown mudfish (Department of Conservation 1996) and kereru. This site contains a relatively large area of mahoe forest.	Wetland	Wetland, habitat for rare species, Acutely Threatened Land Environment	Dune swamp forest,	Wetland habitat is nationally under-represented, much reduced from previous extent, habitat for rare species, linkages to other areas	Partly protected by Scenic Reserve (Paraparaumu SR).	Changes in hydrology, removal of edge vegetation through road widening, introduction of weeds	A	Likely
Waikanae Scenic Reserve/Waikanae Bush	K061	Foxton	Kohekohe forest, kohekohe-tawa forest, titoki-mahoe treeland	7.59	Regional	Kohekohe forest at low altitude is uncommon within Tararua Ecological District. Provides habitat for kereru. Protected as Scenic Reserve.	Forest	Habitat for threatened species, Acutely Threatened Land Environment	Uncommon within ED	Uncommon within ED, linkages, restoration, habitat for threatened species	Waikanae Scenic Reserve (DOC) and QEII covenant protects nearly all of the area	Modification railway alignment could affect scarp and cause vegetation clearance	AC	Possibly
Awatea Bush	K058	Manawatu Plains	Kohekohe-tawa-titoki forest	7.47	Regional	Indigenous vegetation on alluvial plain is nationally under-represented. Part of a series of fragments across the plains that provide links between Kapiti Island and the Tararua Ranges. Below main block of forest is a population of Streblus banksii. Provides habitat for kereru. In process of protection under QEII Covenant.	Forest	Habitat for threatened species, Acutely Threatened Land Environment	alluvial plain is nationally under-represented	Nationally under-represented, linkages, threatened species	Partially protected QEII covenant	Loss of threatened species, modification of scarp, vegetation clearance	D	Possibly
Harris Bush	K071	Tararua	Kohekohe-titoki-tawa forest, kamahi forest, kanuka scrub	6.68	Regional	A small representative example of kohekohe forest – uncommon on lowland within Tararua Ecological District. Very small area of kamahi forest and scrub successional to kohekohe forest. Provides habitat for kereru. Protected in part under QEII Covenant with a further area in the process of becoming protected.	Forest	Habitat for threatened species, Acutely Threatened Land Environment	Much reduced from former extend	Small representative sample of previous forest cover, successional processes, linkages	Mostly by protected QEII covenant	modification of scarp, vegetation clearance	A	Possibly
Narn's Bush (Harris Bush)	K071	Foxton	Kohekohe-titoki-tawa forest, kamahi forest, kanuka scrub	6.68	Regional	A small representative example of kohekohe forest – uncommon on lowland within Tararua Ecological District. Very small area of kamahi forest and scrub successional to kohekohe forest. Provides habitat for kereru.	Forest	Habitat for threatened species, Acutely Threatened Land Environment	Much reduced in extend in ED	Under-represented habitat type, Linkages, Ecological restoration	Majority under QEII Covenant	Removal of edge vegetation through road widening	A	Possibly

Site Name	KCDC number	Ecological District	Dominant habitats) or vegetation type	Area (ha)	Ranking	Description	Type	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Option [4]	Affected
Tini Bush	K085	Foxton	Kohekohe-pukatea forest, kohekohe forest, kohekohe-titoki forest, semi-swamp forest	6.28	Regional	These fragments represent the only example of kohekohe-pukatea associations within Foxton Ecological District. Borders both Foxton and Manawatu Plains Ecological District. Good example of the gradation between wetland and dryland forest with small nikau grove. Representative of the former forest diversity likely to have occurred within the District. Part of a series of fragments providing connection between Kapiti Island and the Tararua Ranges. Provides habitat for kereru.	Wetland & Forest	Wetland, Habitat for rare species, Acutely Threatened Land Environment	Much reduced from former extend	Only example of forest in ED, several ecotypes, gradation between ecotypes, representative of former extensive forest, linkages, habitat for threatened species	Protected by DOC Covenant.	Removal of edge vegetation through road widening	A	Possibly
Haruatai Park forest	K015	Foxton	Pukatea-kahikatea swamp forest, wetland	5.78	Regional	This site is fragmented and under considerable threat from pest plant species. However, swamp forest is very uncommon in Foxton Ecological District. Wetland habitat is nationally underrepresented. Provides habitat for kapungawha and kereru.	Wetland	Wetland, Habitat for threatened species, Acutely Threatened Land Environment	Wetlands - Damp sand plains and Dune slacks	Much reduced in former extend, habitat for threatened species, linkages	No			Unlikely
Pekapeka Road Swamp	K060	Foxton	Harakeke wetland	4.27	Regional	Wetland habitat is nationally under-represented. Moderately sized wetland with small area of open water and harakeke flaxland-Juncus rushland-coprosma scrub associations.	Wetland	Wetland, Acutely Threatened Land Environment	Wetland - Damp sand plains and Dune slacks and peatland	Wetland, nationally under-represented, variety of habitats	Protected under DOC Covenant, partially under QEII covenant			Unlikely
Nimmo Ave East forest (K185 W2)	K185	Foxton	Kohekohe-karaka-titoki-walnut forest	3	Regional	Under-represented habitat type within the ecological district; acutely threatened land environment. Streblus banksii present (at risk - sparse) Occasional habitat for kereru (chronically threatened - gradual decline) Removal of walnuts, eucalyptus and other exotics would enhance the site. With management, including ongoing plant and animal pest control, main part of site is sustainable, but western narrow end has no undergrowth and should be excluded from ecological site.	Forest	Habitat for threatened species, Acutely Threatened Land Environment	Much reduced from former extend	Under-represented habitat within ED, Ecological restoration, Sustainability	No			Unlikely
Poplar Avenue, Raumati South	K184	Foxton	Site Description: Manuka scrub dominated wetland (Unit 01) and open rushland with Isolepis prolifer dominant wetland (Unit 02).	2.8	Regional	Small but the vegetative cover within this wetland is surprisingly intact The wetland is threatened because the surrounding land is highly modified. Two distinct ecotypes and linkages to adjacent wetland. Manuka is more sparse in south end of site. Dense blackberry is present in the north end of the site. Wetland is fringed by crack willow. Prunus sp. and broom are also present on the edge of the site. A small patch of raupo is present with few harakeke around outlet drain adjacent to road. Weedy here with pampas, bindweed, willow and poplar. Wetland was dry at time of survey. Bird species noted: paradise shelduck, pukeko	Wetland	Wetland, Acutely Threatened Land Environment	Yes Damp sand plains and Dune slacks	Two ecotypes, wetland, linkages to other wetlands, much reduced in former extend	Queen Elizabeth II Park, Recreation Reserve managed by Wellington Regional Council	Changes in hydrology, removal of edge vegetation through road widening, introduction of weeds. This depends on whether the alignment goes through QE Park, remains on Poplar Ave or goes through 200 Main Road South.	ABC	Definitely

Site Name	KCDC number	Ecological District	Dominant habitats) or vegetation type	Area (ha)	Ranking	Description	Type	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Option [4]	Affected
Hautere Bush E	K039	Manawatu Plains	Totara-matai-titoki forest	2.8	Regional	Indigenous vegetation on alluvial plain is nationally under-represented. Convoluted but one of largest fragments of its type in the area with relatively good regeneration.	forest	Acutely Threatened Land Environment	Indigenous vegetation on alluvial plain is nationally under-represented	Nationally under-represented, linkages	No	Vegetation clearance, wind effects, introduction of weeds	D	Possibly
Hariata Street - SH1 wetland (K211 O3)	K211	Foxton	Isolepis prolifer sedgeland, pukatea-swamp maire forest	2.64	Regional	Wetlands are a national priority for protection. This site, while modified, is dominated by indigenous species. Water catchment protection. Removal of willows should be carried out following which the site is likely to regenerate naturally. (NB: Grey willow control will need to be ongoing until indigenous species are well established.) Good size and compact shape.	Wetland	Wetland, Acutely Threatened Land Environment	Much reduced in extend in ED	national priority for protection, Cultural values, Ecological restoration, Sustainability, linkages	No			Unlikely
Ngarara Bush	K132	Foxton	Kohekohe forest, kahikatea-pukatea forest	2.59	Regional	Small fragment of kohekohe forest and a very small area of swamp forest. Protected under QEII covenant.	Wetland	Wetland, Acutely Threatened Land Environment	Much reduced in extend in ED	Two ecotypes, wetland, linkages to other wetlands, much reduced in former extend	QEII covenant	Changes to hydrology	BC	Possibly
Te Horo Bush	K054	Manawatu Plains	Tawa-karaka-kohekohe forest	2.22	Regional	Site borders both Foxton and Manawatu Plains Ecological Districts and shows influences of both Districts. There are few remaining fragments on the boundary of the two Ecological Districts. The understorey is sparse and the site is under threat from pest plant species, mostly on the edges. Provides habitat for kereru.		Habitat for threatened species, Acutely Threatened Land Environment	No	Straddles two Ends, habitat for threatened species, very little forest left in either ED	No			Unlikely
Kiripiti Scientific Reserve	K178	Manawatu Plains	Totara-matai-titoki forest	1.98	Regional	Indigenous vegetation on alluvial plains is nationally under-represented. Site is one of the best examples of this habitat type within Manawatu Plains. Part of a series of fragments across the plains that provide links between Kapiti Island and the Tararua Ranges. Protected as Scientific Reserve.	Forest	Acutely Threatened Land Environment	Much reduced in extend in ED	Nationally under-represented, one of best examples in Manawatu Plains, linkages	DOC scientific reserve	With current alignment		Unlikely
Kiripiti Bush	K040	Manawatu Plains	Totara-matai-titoki forest	1.74	Regional	Indigenous vegetation on alluvial plain is nationally under-represented. This site is compact with good understorey and natural regeneration. One of the best examples of habitat of its type in the area. Part of a series of fragments across the plains that provide links between Kapiti Island and the Tararua Ranges.		Acutely Threatened Land Environment	Indigenous vegetation on alluvial plain is nationally under-represented	Nationally under-represented, linkages	No	With current alignment		Unlikely
Lion Downs Bush (Charman Covenant)	K082	Foxton	Kahikatea-pukatea swamp forest	1.68	Regional	Part of a series of fragments that jointly illustrate the diversity of habitat formally common in the area. Small area of nationally underrepresented habitat type. Canopy fragmented and exotic species common in the ground layer.	Wetland	Wetland, Acutely Threatened Land Environment	Much reduced in extend in ED	Diversity of habitat, nationally under-represented, linkages	QEII Covenant			Unlikely

Site Name	KCDC number	Ecological District	Dominant habitats) or vegetation type	Area (ha)	Ranking	Description	Type	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Option [4]	Affected
Te Waka Road Bush	K036	Manawatu Plains	Totara-kohekohe forest	1.61	Regional	Indigenous vegetation on alluvial plain is nationally under-represented. Provides habitat for Korthalsella lindsayi and Nestegis montana (KCDC files).	Forest	Habitat for threatened species, Acutely Threatened Land Environment	Indigenous vegetation on alluvial plain is nationally under-represented	Nationally under-represented, threatened species, linkages	No	Vegetation clearance, wind effects, introduction of weeds, possibly loss of threatened species	D	Possibly
Hautere Bush B	K052	Manawatu Plains	Tawa-kohekohe-titoki forest	1.49	Regional	Nationally under-represented habitat type. Good regenerating example of its type. Part of a series of fragments across the plains that provide links between Kapiti Island and the Tararua Ranges.		Acutely Threatened Land Environment	Indigenous vegetation on alluvial plain is nationally under-represented	Nationally under-represented, linkages	No	With current alignment		Unlikely
Otaihanga Road Bush	K088	Foxton	Kohekohe-nikau forest	1.41	Regional	Kohekohe-nikau forest is uncommon in the Foxton Ecological District. Protected under QEII Covenant.	Forest	Acutely Threatened Land Environment	Much reduced from former extend	Kohekohe-nikau forest is uncommon, linkages to other areas	Partly protected by QEII covenant	Changes in hydrology	A	Possibly
Turf Farm Bush B	K082	Foxton	Kohekohe-titoki-mahoe forest	1.11	Regional	Habitat type is uncommon in Foxton Ecological District. A representative example of forest type formally common in the area. Part of a series of fragments that jointly illustrate the diversity of habitat formally common in the area. Vulnerable to effects of expansion of quarry and sub-division.	Forest	Acutely Threatened Land Environment	Much reduced from former extend	uncommon in Foxton Ecological District	QEII covenant			Unlikely
Osbornes Swamp	K068	Foxton	Raupo-harakeke wetland	0.95	Regional	DOC (729) Te Moana Rd, Waikanae R26 811/355 - 0.95ha. Wetland is small and modified. Wetland habitat is nationally under-represented. Protected under QEII Covenant. Recommended by DOC	Wetland	Wetland, Acutely Threatened Land Environment	Currently rare	Nationally under-represented, wetland	Partially protected QEII covenant	Destruction of part of the site, severe changes in hydrology, removal of edge vegetation through road widening, introduction of weeds	BC	Definitely
Hautere Bush D	K041	Manawatu Plains	Totara-matai-titoki forest	0.9	Regional	Indigenous vegetation on alluvial plain is nationally under-represented. These fragments are a continuation of Kiripiti Scenic Reserve and provide one of the best examples of this habitat type in the area. Provides habitat for Korthalsella lindsayi (KCDC files). Part of a series of fragments across the plains that provide links between Kapiti Island and the Tararua Ranges.		Acutely Threatened Land Environment	Indigenous vegetation on alluvial plain is nationally under-represented	Nationally under-represented, linkages	No	With current alignment		Unlikely
SH1 - Octavius Road wetland (K196 TH5)	K196	Foxton	Wetland, pukatea-swamp maire swamp forest	0.83	Regional	Nationally under-represented habitat type; acutely threatened land environment. Most of site is protected by QE II covenant. New planting on margins will create a protective buffer.	Wetland	Wetland, Acutely Threatened Land Environment	Much reduced in extend in ED	Nationally under-represented habitat type, Ecological restoration, Sustainability	QEII covenant	If railway realigned, vegetation clearance	ABCD	Possibly
Hautere Bush C	K035	Manawatu Plains	Titoki-totara forest	0.82	Regional	Indigenous vegetation on alluvial plain is nationally under-represented. Provides habitat for Streblus banksii, Ileostylis micranthus, and DOC historic records list Korthalsella lindsayi	Forest	Habitat for threatened species, Acutely Threatened Land Environment	Indigenous vegetation on alluvial plain is nationally under-represented	Nationally under-represented, threatened species, linkages	No	Vegetation clearance, wind effects, introduction of weeds, possibly loss of threatened species	D	Possibly

Site Name	KCDC number	Ecological District	Dominant habitats) or vegetation type	Area (ha)	Ranking	Description	Type	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Option [4]	Affected
Hautere Bush A	K051	Manawatu Plains	Tawa-kohekohe forest	0.82	Regional	Indigenous vegetation on alluvial plain is nationally under-represented. Fenced with good understorey although severe Tradescantia infestation. Part of a series of fragments across the plains that provide links between Kapiti Island and the Tararua Ranges. Provides habitat for kereru.		Acutely Threatened Land Environment	Indigenous vegetation on alluvial plain is nationally under-represented	Nationally under-represented, linkages	No	With current alignment		Unlikely
Waimeha Conservation Area	R26020	Foxton	Forest	0.64	Regional		Forest	Acutely Threatened Land Environment			DOC	Changes to hydrology, removal of vegetation, introduction of weeds	BC	Possibly
Queen Elizabeth II Park Bush and wetlands	K108	Foxton	Kahikatea swamp forest, ephemeral wetland	16.81	Local	Wetland habitat is nationally under-represented. Kahikatea fragment very small, fragmented and lacking regeneration with area of macrocarpa canopy. Some restoration plantings. The wetland is highly degraded. Historic records of Amphibromus fluitans (Townsend et al. 1998) but hasn't been recorded from this site in recent years	Forest and wetland	Acutely Threatened Land Environment, habitat for threatened species	Wetland - Damp sand plains and Dune slacks, kahikatea forest, both much reduced from former extend	Wetland habitat is nationally under-represented, much reduced from previous extent, habitat for rare species, linkages to other areas, restoration efforts	Recreation Reserve, managed as Regional Park by Greater Wellington Regional Council	Changes to hydrology		Unlikely
Raumati South Peatlands	K131	Foxton	Kanuka-gorse scrub, manuka scrub wetland	11.09	Local	Small area of nationally under-represented habitat type. Relatively large area of kanuka-gorse scrub although it is highly fragmented and exotic species are common.	Wetland	Wetland, Acutely Threatened Land Environment	Wetland - Damp sand plains and Dune slacks and peatland	Relatively large, wetland habitat	No	Destruction of part of the site, changes in hydrology, removal of edge vegetation through road widening, introduction of weeds	ABC	Definitely
Park Avenue kanuka treeland and wetland (K189 W6)	K189*	Foxton	Kanuka treeland, wetland	5.1	local	Regenerating early successional forest type induced to treeland due to clearance and grazing, wetland is dominated by exotics; 1 kahikatea and 1 rimu in canopy; acutely threatened land environment. Potential for restoration given moderate size but would require major effort - removal of grazing, gaps in canopy planted, animal and plant pests controlled. Eastern part (4.27 ha) should be considered an Ecological site	Forest	Acutely Threatened Land Environment	No	Rarity Ecological restoration	No			Unlikely
Hautere Bush F	K038	Manawatu Plains	Totara-titoki-matai forest	3.61	Local	Indigenous vegetation on alluvial plain is nationally under-represented. Convoluted, unfenced and lacking an understorey. Part of a series of fragments across the plains providing links between Kapiti Island and the Tararua Ranges.	Forest	Acutely Threatened Land Environment	Indigenous vegetation on alluvial plain is nationally under-represented	Nationally under-represented, linkages	No	Vegetation clearance	D	Definitely

* K189 Park Avenue kanuka treeland and wetland has included in Wildland Consultants 2007 however does not appear in KCDC reports.

Site Name	KCDC number	Ecological District	Dominant habitats) or vegetation type	Area (ha)	Ranking	Description	Type	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Option [4]	Affected
Oriwa Crescent escarpment forest (K212 O4)	K212	Manawatu Plains	Tawa-titoki-kohekohe forest, Pukatea-kohekohe forest, Totara forest	3.1	Local	Under-represented habitat type within the ecological district; acutely threatened land environment. Occasional habitat for kereru (chronically threatened - gradual decline). Adjoins KO18 (see 1999 District Plan). Although long and narrow, the site is a steep terrace riser with good regeneration. Part of the area (2.19 ha) should be considered an Ecological site	Forest	Habitat for threatened species, Acutely Threatened Land Environment	Much reduced in extend in ED	Under-represented habitat within ED, Linkages, sustainability	No	Affected by rerouting of County Road, removal of vegetation and possible affects on hydrology	D	Definitely
Awatea Scarp Bush Remnant	K059	Manawatu Plains	Kohekohe-tawa forest, induced wetland	2.16	Local	Indigenous vegetation on alluvial plain is nationally under-represented. Fragment is very small and narrow. Area of wetland is small and induced.	Forest	Acutely Threatened Land Environment	alluvial plain is nationally under-represented	Nationally under-represented, small induced wetland	No	Modification of scarp and vegetation clearance	D	Possibly
QEII 5/07/501		Foxton	Old kahikatea grove over revegetated understorey	2.06	Local	Under-represented habitat type within the ecological district; acutely threatened land environment. Occasional habitat for kereru (chronically threatened - gradual decline). In very close proximity to Tini Bush	Forest	Habitat for rare species, Acutely Threatened Land Environment	Much reduced in extend in ED	Under-represented habitat type in Foxton ED, Linkages, Ecological restoration	QEII Covenant	Changes to hydrology and possible removal of vegetation buffers	A	Likely
Paetawa Bush	K064	Foxton	Titoki forest, tawa-kohekohe forest	1.87	Local	A very small example of a forest type that is under-represented within the ecological district.	Forest	Acutely Threatened Land Environment	Much reduced in extend in ED	Under-represented in ED	No	Vegetation clearance, changes to hydrology, weed incursion	A	Definitely
Simon Brown Bush	K153	Tararua	Kohekohe coastal forest	1.73	Local	Proposed site. Examples of coastal forest and kanuka forest successional to kohekohe, both forest types are uncommon within Tararua Ecological District. The fragment is small and unfenced.	Forest	Acutely Threatened Land Environment	Uncommon in Tararua ED	Coastal forest, successional processes, rare in ED	No			Unlikely
Cottle's Bush	K037	Manawatu Plains	Totara-matai forest	1.46	Local	Indigenous vegetation on alluvial plain is nationally under-represented. Recovering from grazing, weed infestation, currently low quality but recovering. Part of a series of fragments across the plains providing links between Kapiti Island to the Tararua Ranges.	Forest	Acutely Threatened Land Environment	Indigenous vegetation on alluvial plain is nationally under-represented	Nationally under-represented, linkages	No	Realignment of local road and SH1 switches to east side of rails, vegetation clearance changes to hydrology	D	Definitely
Woodleigh Stud, Bush C (K184 W1)	K155	Foxton	Kohekohe-karaka-tawa-titoki forest	1.37	Local	Under-represented habitat type within the ecological district; acutely threatened land environment. Occasional habitat for kereru (chronically threatened - gradual decline). Management of plant and animal pests currently carried out. Site is very small and vulnerable to wind/edge effects but has compact shape and good regeneration	Forest	Habitat for rare species, Acutely Threatened Land Environment	Much reduced in extend in ED	Rarity, ecological restoration, sustainability	No			Unlikely
Andrews Pond	K093	Foxton	Manuka Wetland	1.27	Local	Manuka scrub wetland. Kapiti Rd / Milne Drive, Paraparaumu. A small wetland amongst residential and commercial land-use. Nationally under represented habitat type. Provides habitat for kapungawha.	Wetland	Wetland, Acutely Threatened Land Environment	Wetlands - Damp sand plains and Dune slacks	Scientific Reserve. Nationally under represented habitat type. Provides habitat for kapungawha.	DOC reserve	Changes in hydrology	C	Possibly

Site Name	KCDC number	Ecological District	Dominant habitats) or vegetation type	Area (ha)	Ranking	Description	Type	Nationally significant	Currently or originally rare	Important criteria	Protected	Possible effects	Option [4]	Affected
Turf Farm Bush Forest A	K084	Foxton	Kahikatea swamp forest, manuka scrub	0.96	Local	Very small area of nationally under-represented habitat type. Lacking understorey. Narrow area of manuka scrub. Both habitat types are under-represented in the Foxton Ecological District. Part of a series of fragments that jointly indicate the diversity of habitat formally common in the area.	Wetland	Wetland, Acutely Threatened Land Environment	nationally under-represented habitat type, much reduced from former extend	nationally under-represented habitat type, linkages	Partially protected QEII covenant			Unlikely
Karn Reserve	K124	Foxton	Kohekohe-karaka forest	0.7	Local	Small area of kohekohe forest. Kohekohe forest is uncommon in Foxton Ecological District. Provides habitat for kereru.	Forest	Acutely Threatened Land Environment	Much reduced from former extend	Uncommon in Foxton Ecological District, linkages	Protected under Council Reserve.			Unlikely
Waimeha Stream reserve	R26063	Foxton	Forest	0.69	Local		Forest	Acutely Threatened Land Environment			DOC	Changes to hydrology, removal of vegetation, introduction of weeds	BC	Possibly
between Crown Hill and Retirement Village	K183	Foxton	Manuka scrub wetland	0.55	Local	Wetland habitat is nationally under-represented. Very small area of unprotected wetland dominated by manuka scrub.	Wetland	Wetland, Acutely Threatened Land Environment	Damp sand plains and Dune slacks	Wetland habitat is nationally under-represented	No	Changes in hydrology, removal of edge vegetation	C	Possibly
King Arthur Drive forest (K191 W8)	K191	Foxton	Tawa-pukatea-kohekohe forest, constructed pond	0.5	Local	Under-represented habitat type within the ecological district; acutely threatened land environment. Occasional habitat for kereru (chronically threatened - gradual decline). In very close proximity to Tini Bush Tiny natural area but compact shape with good regeneration.	Forest	Habitat for rare species, Acutely Threatened Land Environment	Uncommon in Foxton ED	Under-represented habitat type, Linkages, Ecological restoration	No	Completely destroyed	A	Definitely
Otaki Railway Wetland	K134	Foxton	Predominantly raupo dominated -	0.42	Local	Wetland habitat is nationally under-represented. Provides habitat for kapungawha. Small wetland, grazed in part with a considerable threat from pest plant species.	Wetland	Wetland, habitat for threatened species, Acutely Threatened Land Environment	Much reduced in extend in ED	Wetland, nationally under-represented	No	Completely destroyed	D	Definitely
Tararua Crescent forest (K213 O5)	K213	Manawatu Plains	Kohekohe-tawa-titoki forest	0.36	Local	Tiny area of indigenous forest in acutely threatened land environment. Occasional habitat for kereru (chronically threatened - gradual decline). Too small to be sustainable, but worthy of retention and restoration.	Forest	Habitat for threatened species, Acutely Threatened Land Environment	Much reduced in extend in ED	Under-represented habitat within ED, Linkages, Ecological restoration	No			Unlikely

ECOLOGICAL RANKING CRITERIA

Table 1: Ecological Sites - Key Ecological Features

Criteria[5]	Site Features/Evaluation	Significant Site	Justification/Notes
1. It is indigenous vegetation or habitat for indigenous fauna that has either been set aside by statute or covenant for protection, or has been recommended for protection by a committee of the Nature Heritage Fund or Nga Whenua Rahui or by the Queen Elizabeth II Trust Board of Directors.	Specify type of legal protection: _____ _____ _____	Y / N	
2. It is vegetation or habitat that is currently habitat for an indigenous species or a community that is threatened or naturally uncommon or endemic to the Wellington Region.	Identify species present (include threat category): _____ _____ _____	Y / N	
3. It is indigenous vegetation or habitat type that is under-represented (10% or less of its known or likely original extent remaining) in an Ecological District, or Ecological Region, or nationally.	List under-represented vegetation/ habitat type(s) and state whether rare at the national, regional, or ecological district scale? _____ _____ _____	Y / N	

[5] Criteria are adapted from the Draft National Policy Statement on Indigenous Biodiversity, and Appendix 3 of Waikato Regional Policy Statement - Criteria for Determining Significant Indigenous Vegetation and Significant Habitats of Indigenous Fauna.

Criteria[5]	Site Features/Evaluation	Significant Site	Justification/Notes
4. It is an area of indigenous vegetation or naturally occurring habitat that is large relative to other examples in the Wellington Region of similar habitat types, and which contains all or almost all indigenous species typical of that habitat type.	Broad habitat types present: _____ _____ Area (ha): Notable flora or fauna: _____ _____ How does the size compare with other similar habitat types in the Region? *e.g. the site is part of one of the largest examples of similar habitat types in the Region.* _____ _____	Y / N	
5. It is important aquatic habitat that is critical to the self-sustainability of an indigenous species within a catchment and which contains healthy representative populations of that species.	Catchment: _____ Breeding species present: _____ _____	Y / N	
6. It is an area of indigenous vegetation or habitat that forms part of an indigenous ecological sequence that is either uncommon in the Wellington Region or an ecological district, or is a good representative example of its type.	Does the site include or is it part of one of the best or only examples of this type of ecological sequence nationally (Y/N), regionally (Y/N), or in a particular ecological region/district (Y/N)? Location: _____	Y / N	

Criteria[5]	Site Features/Evaluation	Significant Site	Justification/Notes
7. It is an area of indigenous vegetation or habitat that is a healthy, representative example of its type because: (i) its structure, composition, and ecological processes are largely intact, and (ii) if protected from the adverse effects of plant and animal pests and of adjacent land use (e.g. stock, discharges, erosion), can maintain its ecological sustainability over time.	Rank the following factors High (H), Medium (M) or Low (L): ___ structural intactness ___ ratio of indigenous:exotic species ___ connectivity to other natural areas ___ size of the area in the context of the relevant ecological district ___ degree of protection from likely threats (e.g. fenced, buffered) ___ species diversity List number of responses to the above questions: _____ H _____ M _____ L Indicate overall ecological quality of the site: _____ Would you consider this to be among the best examples of its type nationally (Y/N), regionally (Y/N), or in a particular ecological region/district (Y/N)? Provide justification: _____ _____ _____	Y / N / NS	

Criteria[5]	Site Features/Evaluation	Significant Site	Justification/Notes
8. It is an area of indigenous vegetation or habitat for indigenous species (which is either naturally occurring or has been established as a mitigation measure) that forms, either on its own or in combination with other areas, an ecological buffer, linkage or corridor to other areas or habitats identified as significant under criteria (1)-(7).		Y / N / NS	

Table 2: Ranking of Ecological Sites
(Adapted from the Environment Waikato Guide for Applying Significance Criteria.)

Criterion (See Table 1)	INTERNATIONALLY SIGNIFICANT	RESPONSE	NOTES
	Internationally significant natural areas have usually been identified in previous assessments. These sites are so important that some of them are already protected by international conventions. Other natural areas may be internationally significant if they contain high quality vegetation or habitat that is unique in the world (e.g. Fiordland National Park). Internationally significant sites attract the interest of scientists and tourists from other countries.		
?	Has it been recognised under international legislation or convention as an internationally significant area (e.g. as a World Heritage Site or a RAMSAR site)?	Y / N / NS	
1	Has it been recommended for protection as a World Heritage Site or Wetland of International Importance (RAMSAR site) by QEII or NWH, or NHF?	Y / N / NS	
2	Is it currently habitat for an indigenous species which is threatened with extinction (in the categories Nationally Critical, or Nationally Endangered or Nationally Vulnerable) and endemic to the Wellington Region?	Y / N / NS	
?	Is it a key habitat for the completion of the life cycle of species that migrate internationally and that would be threatened if these habitats weren't sustained?	Y / N / NS	
3,7	Is the site the best or only remaining large representative example in New Zealand of a suite of relatively intact indigenous ecosystems and ecological sequences (wetlands may be included).	Y / N / NS	

Criterion (See Table 1)	NATIONALLY SIGNIFICANT	RESPONSE	NOTES
	Nationally significant natural areas include sites that contain healthy populations of threatened species or are very good examples of nationally rare habitat or vegetation (e.g. Lake Wairarapa) They also include sites that are the only location where certain species occur (e.g. Chatham Islands) Nationally significant sites tend to attract the interest of scientists, technical specialists, and eco-tourists from other parts of New Zealand. The site is **at least** Nationally Significant if the answer to any of the following criteria is 'Yes'.		
	Is it protected, or recommended for protection, under the Conservation Act 1987 (Ecological Area, Forest Sanctuary), National Parks Act 1980, Marine Reserves Act 1971, or Reserves Act 1977 (Nature Reserve, Scientific Reserve).	Y / N / NS	
	Is it habitat for an indigenous species which is under serious threat in the categories Nationally Critical, Nationally Endangered, Nationally Vulnerable, Serious Decline, or Gradual Decline?	Y / N / NS	
	Is it indigenous vegetation or habitat for indigenous species that is under-represented nationally (10% or less remains), or nationally uncommon (including wetland) that is a good quality example that is representative of its type? *Good quality examples would receive mostly highs or mediums for Criterion 7 in Table 1 (taking into account size, presence of plant and animal pests, stock damage, other damaging effects).* *For the definition of vegetation types refer to Criterion 4 in Table 1 above - Column B, Definitions and Further Information.*	Y / N / NS	List no. of responses to criterion 7 in Table 1: H _____ M _____ L _____

Criterion (See Table 1)	REGIONALLY SIGNIFICANT	RESPONSE	NOTES
	Regionally significant *natural areas include the best examples in the Wellington Region of habitats that may be common elsewhere in New Zealand - for example, our best dune systems, or the large areas of more common vegetation types. They may also include examples of nationally rare features that are not in good condition.* The site is **at least** Regionally Significant if you can respond 'Yes' to any of the following criteria.		
1	Is it protected under the Reserves Act 1977, as a Wildlife Management Reserve, Wildlife Refuge, Scenic Reserve, Nga Whenua Rahui Kawenata, or for any conservation purpose under the Conservation Act such as a Conservation Area or Conservation Park, with significant fauna and/or flora values.	Y / N / NS Status: _____ Recommended Status: _____	
1	Is it protected under the Queen Elizabeth the Second National Trust Act 1977 as an Open Space Covenant?	Y / N / NS	
1	Is it a site that has been recommended for protection by NHF, NWR, or QEII?	Y / N / NS	
2	Is it currently habitat for an indigenous species that is threatened, in the categories Sparse or Range Restricted, or endemic to the Wellington Region?	Y / N / NS Species: _____ Threat Status: _____	
3, 7	Is it indigenous vegetation or habitat for indigenous species that is under-represented regionally (i.e. within relevant ecological regions and districts) and which is a good quality example that is representative of its type (taking into account size, plant and animal pests, stock damage, other damaging effects)? *Good quality examples would receive highs or mediums for Criterion 7 in Table 1.* *Assessment must be justified by a well qualified and experienced ecologist.*	List no. of responses to question 7 in Table 1: H _____ M _____ L _____ Y / N / NS	

Criterion (See Table 1)	**REGIONALLY SIGNIFICANT**	**RESPONSE**	**NOTES**
3	Is it a relatively large example of indigenous vegetation or habitat for indigenous species that is under-represented nationally, or nationally uncommon (including wetlands), but which is degraded in quality (taking into account presence of plant and animal pests, stock damage, other damaging effects)? *Assessment must be justified by a well qualified and experienced ecologist. Use the results from Criterion 7 in Table 1 to determine the relative quality of the site.*	Y / N / NS	
3	Is it the Regions' only remaining representative example (irrespective of its size) of a particular indigenous vegetation type or indigenous species habitat that is degraded in quality? *Representative areas are the best examples of indigenous vegetation and habitats that comprise a network covering the full range of landforms, soil sequences, vegetation and fauna communities within an ecological district (c.f. Shaw 1994). The reality for many landscapes, particularly throughout much of Wellington, is that a 'representative example' will be the largest and most diverse remaining examples of indigenous vegetation and habitats.* *Degraded sites would receive mostly Low scores for the factors listed in Criterion 7.*	List no. of responses to question 7 in Table 1: H _____ M _____ L _____ Y / N / NS	
6, 7	Is it one of the best representative examples in the Wellington Region of indigenous vegetation or habitat for indigenous fauna or an ecological sequence? *Assessment must be justified by a well qualified and experienced ecologist.*	Y / N / NS	

Criterion (See Table 1)	REGIONALLY SIGNIFICANT	RESPONSE	NOTES
4, 7	Is it a good quality example of indigenous vegetation or habitat for indigenous species representative of the ecological character typical of the Wellington Region? *This may include examples of indigenous vegetation that are large or moderately large relative to other similar habitats in the region or within the relevant ecological district. They should be relatively intact and retain the main elements of their original composition structure. Examples would include relatively large tracts of indigenous forest and habitats on the ??.*	Y / N / NS	
8	Is it a buffer (or a key part of a buffer) to a site that is of international or national significance? *The site buffered must have first been shown to be of national or international significance using relevant sections above in Table 2.*	Y / N / NS	

LOCALLY SIGNIFICANT	RESPONSE	NOTES
Locally significant natural areas are healthy examples of relatively common vegetation and habitat types. They are often small areas, but large enough to enable key ecological processes to occur, such as regeneration of seedlings or reproduction of indigenous fauna. These sites may not be particularly significant in their own right, but nevertheless play an important part in a network of natural areas. For example, a locally significant site might be important as a seasonal feeding or breeding area. It might also act as a stepping stone between other natural areas, allowing indigenous fauna to move in search of food or mates. Such sites are likely to provide representative examples of common or typical vegetation types or habitat for common indigenous species. They will not be among the best examples in the Region but will meet criterion 7 as healthy, functioning, and ecologically viable sites.		
Did the site receive a 'Yes' response to **any** of the criteria in the plan?	Y / N / NS	

RELATIVE ECOLOGICAL RANK? Circle the highest level for which you allocated at least one 'Yes' response in Table 2. This indicates the rank of the site.	INTERNATIONAL, NATIONAL, REGIONAL, LOCAL