ENVIRONMENTAL STATEMENT
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A9.2 BASELINE ECOLOGY/ VEGETATION SURVEYS

The following section details the findings of the survey work. Surveys were undertaken according to the Guidelines for Baseline Ecological Assessment, (1995) published by the Institute of Environmental Assessment, now the Institute of Environmental Management and Assessment (IEMA) using the principles outlined by the UK Joint Nature Conservation Committee in A Handbook for Phase 1 Habitat Survey, (1990). Surveys were undertaken quartering the ground on foot in November 2005 and recording the details of habitats and plant species present. All terrestrial habitats under actual or potential impact from the airport and its contingent developments (e.g. the access road, quarry site, BFI, water abstraction and pipeline routes, remote navigation lighting locations, proposed wharf options at Prosperous Bay and Rupert's Bay) were visited, some on repeated occasions as revisions and more detailed design became available: (October 2006 (Lichen survey), November 2006 (Prosperous Bay access route, water pipeline, Great Stone Top and the Barn ROLs), Jan 2007 (Sharks water abstraction) and May 2007 (Gill Point salt water abstraction).

The method used for classifying the various habitats is based on the habitat classifications for PBP described by the Ashmoles in their study of the invertebrates of PBP (P & M Ashmole, 2004) and with reference to the vegetational zones described by Brown (1981), Cronk (1984) and P& M Ashmole (2000). Appendix 9.3 of Volume 4 of this ES summarises the past and present habitat classifications. Habitats upon which the airport and its contigent developments impact range from eroded semi-desert with steep rocky slopes and gullies and PBP saline semi-desert both with low floristic diversity and vegetation cover, to creeper and scrub zones made up almost entirely of introduced species (principally dominated by either prickly pear, wild mango, and wild coffee & poison peach), grading at higher elevations into planted woodland, often dominated by alien species, dry pasture and cultivated land, and the permanent stream valley of Sharks. The regeneration of more competitive introduced species in these degraded areas is changing the former characteristic composition of the semi-desert and scrub zone species

Species have been listed using their common names where known, or scientific name. Table 1 identifies the common and scientific names for all the species described in the ecology baseline and elsewhere.

The ecology baseline information is illustrated on Figure 9.3 Ecology Baseline. Figure 9.2 identifies the compartments or zones described below. Also refer to photos Presented on Figure 9.7 in Volume 3 of this ES.

Species composition and abundance will vary on a seasonal basis because of the presence or absence, depending on time of survey, of annuals growing within the semi-desert habitats.

Rupert's Bay and Lower Valley

The proposed development area for a new wharf at Rupert's Bay; a bulk fuel installation (BFI) in Rupert's Valley; and the haul road for construction and permanent access road link from Rupert's Bay to the airport on Prosperous Bay Plain were surveyed.

The vegetation of the floor of the lower valley is a combination of roadside screening, boundary and amenity planting, gardens and open unmanaged ground in between dwellings and industrial buildings. Weedy species grow on the roadside verges and open ground along side the indigenous samphire.

The vegetation of the lower slopes of lichen covered rocks and stable scree boulders with fine clayey soil in between rocks have a scrub species mix dominated by prickly pear and samphire with ground cover annuals fat hen, blue weed, purslane and summer grass seasonally abundant.

Rupert's Beach

Chainage: 00 Classification: urban shore

Photograph 1 on Figure 9.7 in Volume 3 of this ES.

Narrow coastal zone between beach and fortification wall.

Samphire is the dominant species on the terrace behind the beach, although it is only occasional and sparsely distributed. Saltbush, and fat hen are occasional occurring in small localised patches whilst grass sp *(Graminaceae)* and wild tomato are rare. These species are all more abundant on the southern side of the wall.

The growth of 3 samphire bushes established by self-seeding into the disturbed ground at the start of the rock armouring which was completed in June 2004 provides an indication of rates of colonization.

Leuceana is dominant in the drainage channel above the beach and samphire in the lower parts where the channel extends onto the beach.

Lines to Church

Chainage: 00-600 Classification: urban wasteland, and amenity planting

Samphire dominates the rocky margins of the Line and compacted soil and partially stone surfaced car park and extend along the roadside margins. Wild tomato and fat hen are also frequent in the disturbed and rocky margin immediately behind the Line. Boundary plantings of She-oak with samphire screen the Fisheries buildings.

A band of amenity planting has been established on the eastern side of the road, initially consisting of a thin roadside edge planting of *Crassula multicara* and money plant and then extending into a substantial band in front of the strip of houses from Haytown to the Church. Species composition includes: Flamboyant, seaside maho, sea grape, Indian

almond, Hibiscus *rosa-sinensis* Garden hibiscus, wild sicreviver. A ground cover of weedy species is present as an understorey which is dominated by *Leuceana*, with saltbush abundant. *Leuceana* remains the dominant 'weed' on the western roadside edge, with seasonally abundant blue weed, prickly pear, creeper. A scrubby dump slope exists just above the Church.

From Church to Power Station

Chainage: 600-850

Classification: samphire & leuceana dominated scrub

Roadside vegetation is dominated by Leuceana and samphire, with purslane, blue weed, saltbush and finger grass abundant

Basin below road – level terrace area with ephemeral water channel running through it. Compacted substrate of small stones, rock gravel and dust – bareground 80% dumped soil dirt, rock and tombstones 5-10 %,

Sparsely vegetated, species present include: samphire frequent but patchily distributed. *Leuceana* dominant in the water course and roadside margins. Saltbush, *Chenopodium sp*, fat hen, *Bryum argenteum* var. argenteum, soil crust and boulder lichens, guava, and wild mango, largely restricted to stream bed are occasional. Hibiscus, prickly pear, wild pepper tree, golden cup, and wild currant rare. English aloe planted for slope erosion control below road to power station, elephant grass, tallowvine, blue weed, finger grass and other grass species abundant, English aloe from planted terraces about fuel pipeline – rare.

Tombstones – move, evidence of rabbits.

From road at Power station to proposed mid-valley quarry site

Chainage: 850-1100
Rocky slopes

Classification: amenity planting samphire dominated scrub

Photograph 2 on Figure 9.7 in Volume 3 of this ES.

Amenity planting in Power station grounds: Lampranthus zeyehi, Fat hen, finger grass, samphire, saltbush, yellow boy, scrubwood, Leuceana, guava, wild pepper tree (on northern edge), yellow oleander, garden hibiscus, data palm, acalypha, bougainvillea, Eucalyptus sp, prickly pear and blue weed, 40-50% bare ground.

Lichen covered rocky boulder slopes with fine soil and soil encrusting lichens to north of power station. Samphire is dominant, with prickly pear abundant, English aloe, fat hen, finger grass, saltbush, leucaena, yellow pops are rare and Lampranthus rare. 40-50% bare ground and soil crusts

Rupert's mid-valley quarry

Classification: prickly pear dominated scrub

Photographs 3 and 4 on Figure 9.7 in Volume 3 of this ES.

This potential quarry site is at the lower part of the valley-side on the eastern side of Rupert's Valley between the Power station and the Quarantine station.

Rocky boulder and stable scree slope with fine clayey soil. Lichen rich boulders are frequent. Ground cover is >60% on the hillside. Prickly pear is dominant and samphire abundant. Wild mango, wild pepper tree, Wild currant, saltbush and Leucaena are rare. Blue weed and purslane are frequent on the track leading to the quarry area and lower slopes. Love grass is abundant on and alongside the track. Bryum argenteum var. argenteum is abundant in the damp sheltered areas amongst the rocks.

Confirmation of this site as a potential quarry site was not available at the time of lichen surveys.

Upper Rupert's quarry site

Classification: prickly pear and samphire dominated scrub

Photograph 5 on Figure 9.7 in Volume 3 of this ES.

The site occupies the lower part of a steep-sided west facing spur in the upper part of Rupert's valley.

Ground cover is 90% on the hillside. Intermittent, lichen rich, small rock boulders rest on the surface with smaller angular rocks and fine soil in between.

Samphire and prickly pear are the co-dominant vegetation types of the slope. Large shrubby black olive and wild mango grow as scattered individuals and are occasional. Wild pepper tree is rare.

In the moist valley floor, wild mango is dominant. Grass species are abundant, Wild currant is patchily distributed and where it occurs it can be abundant. Other species present include prickly pear, Chenopodium sp, lucky leaf, saltbush, wild tomato and blue weed.

A more detailed survey of the lichens in this area was carried out by Dr Andre Aptroot, see report (Aptroot, 2006 in Appendix 9.3 of this ES)

Valley floor Power station to confluence

(area of valley floor between 950-1150)
Classification: prickly pear & aloe dominated scrub

Photographs 6 & 7 on Figure 9.7 in Volume 3 of this ES.

Fly-tipped rubble, soil and plant material.

English aloe and prickly pear co dominant with samphire which is growing at the margins of the area, finger grass, blue weed, saltbush, fat hen, wild currant, bareground and dumped spoilage, Chenopodium sp, .Stream bed supports additional species and more luxuriant growth: wild mango, wild pepper tree, prickly pear.

Abundance of soil covering sheet web spiders and rabbits evident.

Soil and rock encrusting lichens evident.

Upper valley proposed Bulk Fuel Installation

Classification: Prickly pear & samphire dominated scrub slopes and wild mango dominated scrub in the valley floor

Photographs 8 & 9 on Figure 9.7 in Volume 3 of this ES.

Rabbits and large area of droppings observed. Purslane and grass species browsed.

Valley floor – compacted dirt track, ephemeral stream bed, large rock boulders >=1m, smaller boulders and rocks on valley sides up to 1m dispersed small boulders and cobble, highly eroded slope predominantly of fine clays. Prickly pear, wild currant co dominant in valley floor with wild mango and wild pepper tree frequent. English aloe, rare, samphire, wild currant, wild mango wild pepper tree, purslane, grass species, lichen covered rock boulders, blue weed, single gee, fat hen, chenopodium sp, lucky leaf, wild coffee – rare

Samphire dominant near the base of the slopes with prickly pear increasingly abundant as slope rises. Purslane frequent along the roadside and lucky leaf abundant in patches. Lichen crusts on valley floor and stable areas of rocky slope.

Bryum argentium in shaded damp areas beneath large boulders with a small Pottiaeceae sp. rocky boulders (20-50cm) and soil encrusting lichens
Retain rocky outcrops (mature landscape feature) and remove large surface boulders (note orientation) to replace after works.
More lichen covered rocky boulders on valley floor which could be moved and replaced after construction.

Upper Rupert's Valley

The prickly pear dominated scrub mix grades into a wild mango dominated scrub mix at higher elevations (>200m) before changing again near the crest of the hill (300-400m) where the slope is more gentle, lichens and rock boulders and outcrops become less prominent, gully erosion is significant, the vegetation is less dense, with more open ground, lichen soil crusts and lichen dominated small areas of weathered rock outcrops. Here a mixed scrub of wild mango, prickly pear, creeper and wild coffee is present with wild mango dominant in soil pockets with creeper in erosional gullies and prickly pear and wild coffee in rocky margins.

Haul/access route chainage section 1150-1925

Classification: prickly pear dominated scrub

Photographs 4, 10 & 11 on Figure 9.7 in Volume 3 of this ES.

This is the area through which the haul road runs passing above the proposed upper valley BFI. It is a west facing slope of >45o with lichen covered rocky boulder outcrops with fine clayey soils and small rocks and boulders. Small patches of moss (Pottiaeceae) inhabit the damp shaded areas beneath boulders.

Evidence that rabbits are present.

Prickly pear is the dominant vegetation type with purslane, wild currant abundant. Samphire is frequent and wild mango occasional. Black olive, wild pepper tree, saltbush, lucky leaf are rare.Annual species were not in evidence during survey in May 2007.

Haul/access route section 1925-2650

Classification: wild mango dominated scrub

Photograph 12 on Figure 9.7 in Volume 3 of this ES.

West facing slope >45o of fine clay soils with gravel, rocks, larger boulders and rocky outcrops.

The vegetation is dominated by wild mango with prickly pear and lucky leaf abundant (heavy infestations of coral spot scale were observed on both lucky leaf and prickly pear. Samphire and saltbush are occasional with black olive, wild pepper tree, sour thistle, cedar and wild currant rare. Wild currant and prickly pear become increasingly dominant in the western edge of this area with wild mango abundant.

Fern Phlebodium aureum grows among the crevices in rocky outcrops.

New growth of annuals were observed with single gee seedlings and young plants being frequent

Haul/access route section 2650-3750

Classification: wild mango dominated scrub

Photograph 13 on Figure 9.7 in Volume 3 of this ES.

At around 300m ASL the slope and aspect changes (to a more northerly orientation) with erosional gullies dominated by bare soil and the substrate becomes more soily of fine red clay with soil crust lichens, boulders and rocks.

Wild mango remains dominant in much of this area and creeper and saltbush are locally abundant in erosional gullies. Wild coffee and prickly pear are locally abundant on rocky areas. St Helena tuft-sedge was rare and patchily distributed on rocky areas.

Annuals not in evidence in May 2007 but observations further along Rupert's Hill in November 2005 at a similar altitude revealed blue weed – rare and grasses (Bromus sp, Digitaria sp) – locally frequent in damp patches.

Upper Rupert's Valley – Rupert's Hill – Bank Ridge

(Haul/access road)

Creeper dominates the scrub zone which grades into a planted woodland mix (Acacia & Eucalyptus species with English aloe) which is developing with little human intervention, with the exception of a small amount of cutting of wood (not strictly limited to deadwood) for fuel.

St Helena tuft-sedge is rare at elevations around 400m ASL and a patch of scrubwood of 20-30 individuals is growing to the north of the Rupert's Hill trig point on Bank's ridge. This is illustrated in Photograph 14 on Figure 9.7 in Volume 3 of this ES.

Haul/access route section 3750 – 5400m

Classification: Creeper dominated area grading to acacia dominated woodland

Photographs 15, 16, 17 & 18 on Figure 9.7 in Volume 3 of this ES.

Area prone to erosion. Rocky exposed. Plants concentrated in areas where soil collects.

Initially creeper – dominant in soil areas, prickly pear– dominant in rocky areas, wild coffee – occasional in rocky areas, wild currant– occasional in rocky areas, samphire – rare, *Acacia* – rare naturally regenerated plants becoming increasingly abundant towards forested areas on the Pipe Path (around 450m). black olive – rare and pimpernel – rare.

English aloe, *Acacia sp* and *Eucalyptus* sp. (*E. lehmenii*) - planted for soil erosion control are occasional - , together with occasional and patchily distributed wild mango, wild currant and wild coffee. *Conyza* and St Helena tuft-sedge are rare across the area. Silk cotton and pimpernel were found as only one or two plants.

On the ridge beside the Pipe Path the substrate is compacted weathered rock and outcrops dominated by soil crust lichens. Vegetation grows amongst the rockier margins with soil pockets.
Note: Aptroot (2006) describes the soil crust vegetation along the Pipe Path on Rupert's Hill as "unique in that it contains the largest known population of the endemic *Xanthoparmelia wildeae* and a beautiful (but probably fairly recent) population of the endemic *Xanthoparmelia beccae*. The first is situated just North-East off of the road track as it is currently proposed, the latter is bang on the track, 70 meter E. from the Trig point along the ridge. If the road were to follow the ridge, the localities of both species would become endangered." (locality 12 on map 2; the GPS coordinates of locality 12 in the appendix apply to this population)

Forestry planting to control soil erosion on northern edge of Deadwood Plain down Pipe Path includes *Eucalyptus* sp. (including Eucalyptus lehmenii), *Acacia sp* (including *A.*

longifolia) and English aloe. Everlasting flower grows in forest/Deadwood Plain margins together with blue weed and various grass and mosses (*Campylopus sp*)growing in the damp situations beneath trees.

Other species noted along Rupert's Hill from field excursions to consider alternative routes up to Deadwood from Rupert's:

> *Lycopersicon esculentum* – localised abundance where soil was damp, Fat hen – particularly abundant on the seaward facing slopes, Sida cordifolia – rare on lower slopes (0-50m) above Haytown, *Pelargonium inquinans* (Scarlet Geranium) – rare along Boer Road, Cotton – rare along Boer Road, *Psidium guajava* (Guava) – rare along Boer Road, *Tetragonia tetragonioides* (New Zealand spinach) – rare, Sonchus oleraceus (Sour thistle) – rare, *Leonotis nepetifolia*, Elephant grass (*Pennisetum purpureum*), *Paspalum scrobiculatum* (cow grass), *Cyperus* sp, *Phoenix dactylifera* (Date palm) – rare – single tree. *Euphorbia serpens* Kunth – rare, *Cluytia pulchella* (Wild Pepper), *Pittosporum viridiflorum* (Spore) and *Catharanthus roseus* Venus Rose – rare between 50-100m asl above Haytown..

Deadwood Plain

(Haul/access road)

The Deadwood Plain pasture marks the end of the Pipe path at around 520m ASL. The haul/access road follows the northern edge of the pasture resulting in some peripheral loss of forest planting and the loss of a strip of pasture land extending from Paddock 5/7 through paddock 4, 2 and 1adjacent to the existing road along the edge of Deadwood Plain. The haul/access road leaves the existing road and runs through paddocks 1 and 2 in front of Fox's Garage and down through paddock 15 and a narrow woodland planting before descending into Mulberry Gut a.

Haul/access route section 5400-7100 Deadwood Plain

Classification: kikuyu dominated dry pasture, acacia dominated woodland and properties

Exposed to south east prevailing winds.

Mixed grass sward pasture with varying encroachment of a variety of weedy species and varied sward height and density. Pasture for cattle grazing and wirebird habitat.
Species present: wild currant – patchy, rare to locally abundant; creeper – abundant on lee-side of slope on the northern edge of the pasture; wiregrass – abundant; Kikuyu – dominant, everlasting flower – patchy with local abundance, wild coffee – occasional, monkey ears, prickly pear – rare, pimpernel - rare, cedar – rare becoming increasingly abundant in the west towards paddock 2. Bull grass dominant in paddocks (1& 2) to the west; *Indigofera* sp. (Indigo) – patchy with localised abundance on the south facing slopes towards Mulberry Gut, Poison Peach – rare, Diddly Dight – rare, New Zealand Spinach – rare. Occasional regenerated Acacia seedlings from trees from planted windbreak.

Haul/access route section: pasture (7100 – 7400)

Classification: kikuyu dominated dry pasture

Photograph 19 on Figure 9.7 in Volume 3 of this ES.

Kikuyu dominant, bull grass frequent, furze rare, monkey ears abundant, Cape grass occasional, bilberry rare, wild currant rare, juniper, occasional, Conzya rare, everlasting flower, wild mango rare, bringal rare, prickly pear rare present along fenceline.

Haul/access route section: pasture scrub (7400 – 7600)

Classification: acacia dominated woodland

Photograph 20 on Figure 9.7 in Volume 3 of this ES.

Planted area, formerly managed for fodder supplementation

Port Jackson willow, English aloe, tallowvine, poison peach, black olive, grass sp, wild currant, English English aloe, Cape grass, everlasting flower, matt grass, finger grass, small fine clump grass with wiry stems like hair grass abundant with tallowvine in understorey. *Campylopus* frequent patches under trees. Lichens. English aloe increasingly dominant towards base of hill and black wattle abundant adjacent to the agricultural field.

Area between shrub planting of slope and vegetable growing area of mulberry gut
Grass species dominant – including Kikuyu.

Mulberry Gut and Middle Point

The land use between Mulberry Gut and Middle Point is predominantly agriculture (arable and pasture) with some properties. Vegetables are grown on leased land in the floor of Mulberry Gut. On the eastern side of the gut the haul/access road rises, following an existing track before crossing Coltshed Road and continuing along the northern edge of Longwood Farm. The haul/access road continues through the former ANRD nursery before skirting the edge of Bilberry Field Gut, running beneath the new properties currently being constructed before crossing adjacent to the waste stabilisation ponds and the open ground at Bottom Woods.

Haul/access route section: Mulberry Gut arable field (7600 – 7700)

Classification: arable

Photograph 21 on Figure 9.7 in Volume 3 of this ES.

Mixed vegetable growing and weeds of agricultural land including bilberry on the margins…

Haul/access route section: Mulberry rise (7700- 8050)

Classification: aloe dominated scrub

Photograph 22 on Figure 9.7 in Volume 3 of this ES.

Fenced hedgerows line the road as it rises out of Mulberry Gut towards the houses of Coltsheds.

English aloe dominates the hedge row on the lower part of the road closest to Mulberry Gut dispersed with woody species that includes: spore, black olive, poison peach, guava, loquat, wild mango, wild currant. The hedgerow becomes less dense towards the crest of the hill and other species including everlasting flower, creeper, kikuyu grass, wild coffee become more abundant.

Haul/access route section: Middle Point (8050- 8500)

Classification: arable

An uneven strip of land, dominated by kikuyu grass, between cultivated arable land to the west and cattle pasture to the east. English English aloes are frequent and a variety of non native species present are rare and include: wild coffee, conzya, bilberry, New Zealand spinach, indigo, wild currant, sour thistle, saltbush, black olive, Port Jackson willow, poison peach and elephant grass

Fish composting pits have been dug within the strip and there's also a small hut.

Haul/access route section: abandoned nursery (8500- 8650)

Classification: arable & Eucalyptus dominated woodland

This is a small triangular area of weedy field and former forestry nursery that is bounded by trees (Silky oak, blackwood, *Eucalyptus sp*) and scrub (frequently bilberry) on all sides. Potting sheds and raised terraced potting benches occupy some of the area with a wide range of agricultural weeds and abandoned fruit species growing abundantly amongst the dominant kikuyu grass and include: tallowvine, English aloe, spore, prickly pear, wild mango, blue weed wild coffee, black olive, shepherd's purse weed, Port Jackson willow, Acacia sp., wild currant, cape gooseberry, sour thistle, cedar, *Conzya, Aptenia* and poison peach are patchily distributed and varyingly abundant to frequent. Blackwood seedlings are regenerating in the central area and a single peach tree is growing. The area becomes more dense on the eastern edge. The area is under an annual lease for livestock fodder and fish waste composting.

Bilberry Field Gut

Haul/access route section: Head Bilberry Field gut (8650-9200)

Classification: acacia dominated woodland & properties

This is a wooded and scrub area, a forestry parcel with some annexation for house plots, at the head of Bilberry Field gut. This area has been planted with a variety of forestry species of these *Port Jackson willow* is dominant with Acacia sp (A. decurrens/mearnsii),

silky oak, *Port Jackson willow* abundant. A wide variety of scrub species makes up the understorey: English aloe and creeper are abundant and prickly pear and wild coffee occasional. Other species present include: poison peach, wild mango and fleabane.

Creeper, poison peach and wild coffee make up the dominant vegetation mix below the forested areas on the open valley sides

Bottom Woods – Bradleys Government Garage

(Haul/access road)

Haul/access route section: Bottom Woods (9200- 9450)

Classification: creeper dominated area to unimproved dry wiregrass grassland

Photographs 23 & 24 on Figure 9.7 in Volume 3 of this ES.

From the gut the land opens out rising slightly on to the more level and gently sloping plain of Bottom Woods. The composition and abundance of the vegetation varies across the site (from west to east). Creeper is initially dominant on the northern side below the waste stabilisation ponds and poison peach is abundant with wild mango rare.

An extensive area of earth has been tipped above the ponds within which colonisation of weedy species is occurring and harbours rocks and rubbish (tyres, plastic, tree trunks, metal and wood) this dominates the upper area with over 60% bare earth.

Thereafter a flat low grass sward dominated by wire grass (with bare patches covering 10-20% of the area) becomes the dominant vegetation type with saltbush, wild coffee, scattered creeper mats and wild currant occasional. New Zealand spinach, kikuyu grass, Cape grass, monkey ears and sour bells, Conzya, everlasting flower and blue weed are rare. A small moss (Pottiaceae) grows on the ground. Dirt tracks criss-cross the area and donkey droppings from one or more tethered animals are occasional. Closer to the houses other species are noted: Cape cudweed, cedar and bull grass.

Soils fine clay. Rabbits evident.

Donkeys are grazed on tethers in this area.

Haul/access route section: Bottom Woods to Millennium Forest (9450-10450)

Classification: poison peach and aloe dominated scrub grading to plantation gumwood woodland

Photographs 25 & 26 on Figure 9.7 in Volume 3 of this ES.

Mixed scrub, with boundary planting of *Eucalyptus sp* (about 200m strip) on the Bottom Woods field side and weeds line the sealed road from Bottom Woods. Just over half way down, at the turning to the weather station scrub has been cleared and gumwoods have been planted within the boundary of the Millennium Forest.

Poison peach is dominant with English aloe abundant to co-dominant in sections. Cedar is frequent on the eastern roadside and wild currant is frequent and wild mango occasional. Prickly pear, Cape grass, black olive, bull grass, sour thistle, plantain, shepherd's purse and kikuyu are rare and patchily distributed along the length of the verge.

Poison peach remains dominant with saltbush and wiregrass abundant and creeper frequent in the roadside verges along the stretch of road of the Millennium Forest

Haul/access route section: Millennium Forest to Bradley's (10450-11075)

Classification: erosion gullies, poison peach & wild coffee dominated scrub

Photographs 27 & 28 on Figure 9.7 in Volume 3 of this ES.

This is the area in between the two roads running east from the Millennium Forest towards Bradleys Government Garage and includes the strip of land running along the northern edge of the road.

The substrate is heavily eroded and comprises stretches of hard subrock with gullying and trenching and indispersed with raised soil mounds varying from strips to larger areas of flatly sloped ground running west to east. Soil crust lichens and ice plant are prominent on rocky outcrops and raised soil mounds. Wirebird observed on the largest level mound.

Bare ground covers over 50% of the area.

Wild mango is dominant in the lower portion of this section above and around the stone crushing site. Wild coffee is patchily abundant principally in the lower portion, creeper and poison peach are frequent and Port Jackson willow occasional. Wire grass, prickly pear, *Port Jackson willow*, greasy grass and black olive are rare.

On the northern side below the fenceline of the Millennium Forest the ground is mostly barren with a tracked vehicle track and soil crust lichens.

Dumped vehicles and other metal rubbish litter the area around the crusher.

Bradleys Government Garage – Prosperous Bay Plain

(Haul/access road/ Construction compounds/ Temporary airstrip

Contractor's Camp Bradleys Government Garage

Classification: barren eroded area

Photographs 29 & 30 on Figure 9.7 in Volume 3 of this ES.

A series of erosional gullies leading to Bradleys Government Garage. Highly eroded soils and heavily impacted/compacted by vehicular movements with tyre tracks criss-crossing the whole area.

The proposed contractor's camp extends to Bradley's erosion gullies to the north (close to proposed bulky waste site), with fine clayey bare ground sloping north east leading to further deeply incised erosional gullies.

The area is largely devoid of vegetation. Some amenity planting of small succulents (*Aptenia*, *Lampranthus* and *Crassula*) has been carried out beneath the fence in front of the dwellings and here saltbush is abundant.

Soil crust lichens are present on undisturbed bare ground and other species are growing in the margins and drainage ditches: New Zealand spinach, creeper, wild mango & Cape grass.

Bradleys Government Garage to Cook's Bridge (11075-11750)

Classification: erosion gullies with poison peach & wild coffee dominated scrub

Photograph 31 on Figure 9.7 in Volume 3 of this ES.

Deeply incised gully erosion continues parallel and on each side of the road from Bradleys Government Garage to Cook's Bridge running south west towards Fishers Valley.

Wild mango and prickly pear are dominant in the gullies with poison peach, wild coffee and black olive, frequent.

Along the eastern edge on the Bradley's side of the road lichen crusts, ice plant and creeper are abundant on the sloped level ground between gullies and wirebirds are seen here regularly..

Cooks Bridge to Terminal Access Road turn off (11750-12200)

Classification: prickly pear dominated scrub

Photographs 32 & 33 on Figure 9.7 in Volume 3 of this ES.

This is the area north of the road to Fisher's Valley and south to join terminal access road creeper. Sloped area with ridges and an ephemeral watercourse, with deep gully erosion in places.

An dryland area of mixed scrub extending east from Fisher's Valley. Vegetation cover varies across the area and bare ground broadly makes up ≥ 50%. In addition to the main vehicle track a motor cross track peals off the road just after Cook's Bridge towards the plateau on the western rim of the Central basin.

Prickly pear is the dominant vegetation type. English aloe is locally abundant in patches in the western edge of this area closest to Cook's Bridge. Creeper is also abundant on the rocky western ridge immediately to the east of Cook's Bridge. Poison peach, saltbush, Eragrostis are occasional, wild mango is frequent in the guts and close to Fishers valley becoming rare further east. Black olive, cedar, lantana, wild coffee, purslane, Ficus, cotton and mat grass are rare.

St Helena tuft-sedge is rare and limited to the ridge immediately to the east of Cook's Bridge.

Pheasant observed

Sheet web spider webs are abundant, particularly on the eroded compacted gullies north of the road.

Prosperous Bay Plain (Airfield site)

(Construction compound areas /Airfield)

The PBP area includes the central basin and surrounding ridges and connecting valley and the route of the haul road from Cook's Bridge to PBP. The area of PBP has a high variability of habitats influenced by substrate, wind, temperature and moisture levels. Many of the various habitats grade into one another resulting in a highly complex mosaic. Floristic diversity is low but invertebrate diversity is high. The method used for mapping the various habitats in and around Prosperous Bay Plain is based on the habitat classifications described by the Ashmoles in their study of the invertebrates of PBP.

The area was surveyed by zoning or compartmentalising similar vegetational assemblages/substrates and mapping with GPS to interpret the mosaic of habitats found throughout the area. This section is broken down to describe the compartments surveyed. Figure 9.2 identifies the compartments described below. See photographs 34 to 68 presented on Figure 9.7 of Volume 3 of this ES.

Compartment: Barren cinders and mesas

Area prone to erosion. Rocky exposed. Plants concentrated in areas where soil collects.

Classification: Barren cindery area & mesas

This is a highly eroded area in the north of PBP west of King and Queen Rocks below the height of the eastern plateau (around 300m) with 'mesas' of steep rocky 'scree' unstable slopes and flat tops. Eroded drainage channels feed into the area from the northern end of the central basin and the eastern ridge.

In between the mesas are predominantly flat areas of deep fine purple dust devoid of plants except babies' toes and soil crust lichens: notably *Dimelaena triseptata* and *Xanthoparmelia phaeophana* soil crusts.

On the more exposed flats before the cliffs to the north, and northwestern edge of this area the substrate is eroded highly weathered cinder, more compact that the deep fine cindery deposits found between the mesas further east, with rocky margins and small boulders and small dusty depressions. The area is more exposed and subject to dust devils. The area is sparsely vegetated, with >90% bare ground and soil crust and boulder field lichens being the dominant vegetation type: Saltbush is the dominant higher plant here with *Eragrostis* occasional and samphire, purslane, prickly pear, creeper and four leaved allseed rare.

Photograph 34 on Figure 9.7 in Volume 3 of this ES.

Mice and rabbits were evident.

Tea plants (@10) grow on and around a mesa immediately on the cliff edge north of strange rock plateau (2 large, 3 smalll – 05-1m in height flowering and seeding in May & 1 seedling 0.15m). This is an extremely exposed site. One young plant was found growing on a rocky mound approximately 20m west.

Photographs 35, 36 & 37 on Figure 9.7 in Volume 3 of this ES.

Beyond the tea plant 'mesa' on the rock and craggy eastern coastal edge north towards King and Queen Rocks boulder and cliff lichens are dominant, with creeper and samphire occassional. Here a small group of 5 scrubwoods are growing just before the old walled path. About 20 more are growing in and around a drainage channel on the cliff edge.

Photographs 38 & 39 on Figure 9.7 in Volume 3 of this ES.
(GPS ref: 021 6597 8234946 9 m acc & 021 6657 8234860 12m acc).

Oils drums and other metal and wood rubbish have been dumped (some time ago, 20+ years) in the drainage channel immediately north of strange rock plateau. Vehicle tracks criss-cross the dusty areas, a popular place to try out of road skills.

Fisher's valley tower

Photographs 40 & 41 on Figure 9.7 in Volume 3 of this ES.

On the northern edge of this area, below the airstrip is Fisher's valley tower and path. This area was also traversed. The vegetation is not exceptionally different from the surrounding area but of note was the finding of a small population of indigenous lily fern between the ruin and bounding wall on the very flat compact gritty rocky terrace of the tower which were just emerging. Six young shoots were observed in May 2007 covering an area of 1.5m. It is likely that more are present in the area. (GPS ref 0216158 8235472).

Samphire is dominant with grasses (Eragrostis and small prostrate hairy grass) occasional. Other species present are rare: purslane, saltbush, prickly pear, creeper, Cape grass, and lantana. Boulder field lichens are the prominent vegetation type.

Compartment: Strange Rock Plateau

Classification: Exposed gritty area

Photographs 42 & 43 on Figure 9.7 in Volume 3 of this ES.

This is a high stony plateau on the eastern rim of PBP, and includes part of the area described by the Ashmoles as Strange Rock Plateau (P & M Ashmole, 2004). It is a large flat area that is extremely exposed to prevailing winds.

This compartment consists of a shallow surface gravel substrate made of white rock and yellow ochre coloured dust overlaying harder bedrock. The hard gravely surface becomes increasingly stoney towards the southern edge of the compartment. Large amounts of vehicle movements are evident and the vegetation is largely absent from the central gravel area. Vegetative cover is sparse and mainly confined to the less compacted areas such as shallow water channels and the edges of the compartment. This has resulted in the vegetative cover being sparse with a patchy distribution.

The vegetation that is present is dominated by the annual grass *Eragrostis cilianensis*, with samphire an indigenous species, being more common (but still only occasional) than creeper a highly invasive introduced species which is located on the more rocky ground at the edges of the compartment. Other species that are present include babies' toes - rare, an endemic annual which the IUCN categorise as being Rare and is confined to the shallow water channels in this compartment, ice plant – rare an introduced species, pagoda plant – rare and 1 prickly pear an introduced species and 1 small wild coffee plant.

Lichens are confined to exposed rock outcrops and undisturbed boulders.

Compartments: Eastern plateau dust bowls

Classification: Dust

Shallow concave depressions and sheltered basins can be found scattered across the eastern plateau, surrounded by slightly higher ground or low ridges They are characterised by a substrate consisting of a stoney margin, central deep fine grit and or fine gravel and dust with vegetation largely confined to the ridge edges, shallow water channels and sheltered areas. The central area of the compartment being largely devoid of vegetation.

Bare ground and grit dominant making up ≥95% of the area. Vegetation covers about >1<4% and will vary seasonally. The vegetation that is present is dominated by samphire (frequent) or occasionally saltbush with *Eragrostis cilianensis* occasional to rare. Other species present include: creeper - rare, saltbush occasional to rare, ice plant – rare and babies' toes are mostly confined to water channels and are occasional to rare.

Brown widow webs were observed across abandoned rabbit hole and Australian bug on babies toes. It was noted that babies toes' were not predated upon as significantly as in the barren cindery areas.

Compartment: Small bowl

Classification: Gritty area

Photograph 44 on Figure 9.7 in Volume 3 of this ES.

South east facing bowled area below the surrounding ground on the far eastern edge of the plateau which drops down into gut leading to Gill Point. Substrate largely of small dark grey stone and gravel, less fine substrate compared to other gritty areas to the north of this compartment. Area mostly bare, vegetation largely confined to compartmental

margins and dominated by saltbush but still only frequent. Other species present: ice plant – occasional, creeper – rare, Eragrostis – rare and babies' toes – rare

A healthy patch of babies' toes is growing on the exposed rocky slope below the bowl together with ice plant, pagoda plant and *Eragrostis*. This is less typical habitat for this species. It is possible it is trapping water run off or condensing sea mists. Rocky areas elsewhere are more often dominated by creeper but its presence here indicates its ability to successfully colonise rocky ground. Predation on babies' toes evident, mice could be attracted to it as a moisture source.

Rockyslopebelowsmallbowl_20051101

Compartment: East plateau grit

Classification: Gritty Area

A sheltered depression on the eastern ridge where it extends into the central basin, culminating in Stone Hill. The substrate consists of small stones and gravel and the vegetation is largely confined to the compartment margins. The central area of the compartment is devoid of vegetation.

The vegetation that is present is dominated by Samphire (frequent) with Eragrostis cilianensis small (occasional) large (rare). Other species that are present are rare and include: Creeper, Saltbush, ice plants and babies' toes.

Compartment: Stony ground

Classification: Exposed Stony Area

Photograph 45 on Figure 9.7 in Volume 3 of this ES.

This compartment comprises rocky ridges and stony areas between gravel and dusty bowls. The stony substrate is at a slightly higher elevation to the gritty area of compartment 2 to its north. Stone collection and disturbance in this area has been extensive, so although a level area a pitted undulating effect has been created.

The vegetation that is present is dominated by the grass Eragrostis (frequent) with Saltbush (frequent). Other species that are present include: Creeper – occasional, Samphire – occasional, and pagoda plant - rare.

Brown widow webs evident.

Isolated disturbed areas caused by stone collection.

Area east of the upper eastern ridge is highly disturbed with large pot holes due to stone collection (and possibly mortar fire). Lichens, predominantly old man's beard are abundant, creeper – frequent, pagoda plant – occasional, saltbush - rare, *Eragrostis cilianensis* - rare, ice plant – rare, wild tobacco and wild currant - rare

Compartment Stone Hill

Classification: Rocky slope
Photograph 46 on Figure 9.7 in Volume 3 of this ES.

Stone Hill, including slopes to east, south and north. The west facing slope (leeward) is quite different: stony and extracted from compartment and almost completely devoid of vegetation. Larger dark (basaltic) rock substrate of the ridge grades into fine sands and white fine gravels of central basin.

Vegetation dominant on south/south eastern slope. Particularly lichens on exposed southern and south eastern slope (25% of vegetation cover). 50% bare rock and stone from 15cm +.

St Helena goosefoot approx 60 individuals on south facing slope and another 20 on top of Stone Hill.

Rocks of varied size over finer gravel dominant ground cover (>50%) with large communities of lichens, notably orange lichen on exposed southern slope. Creeper is the dominant plant species on Stone Hill with Samphire, *Eragrostis cilianensis* and Saltbush being occasional and Chenopodium rare.

Compartment: Rocky margin

Classification: Transition zone
Photograph 47 on Figure 9.7 in Volume 3 of this ES.

North western slope of Stone Hill. Rocky substrate, largely devoid of vegetation. Where rocky slope grades into central basin and rocks of varying size sit amongst finer gravel and dust: Samphire, Saltbush and *Eragrostis cilianensis* are co-dominant species (all frequent) with Creeper – occasional and Prickly pear rare (3 plants). Dark basaltic rocks of varied size covers approx 67% of the area.

Compartment Rocky ridge

Classification: Transition zone

Rocky ridge east of Stone Hill, extending to central basin on southern side. Waypoint 6 marks end of compartment on its most south eastern extent at watercourse into the adjacent gut next to area surface quarried for gypsum

Vegetation dominated by Creeper

Compartment North mixed scrub

Classification: creeper dominated exposed stony area with rocky margins with samphire dominant in finer substrate.

Photographs 48, 49, 50 & 51 on Figure 9.7 in Volume 3 of this ES.

Rocky north western edge of PBP central basin heading south following cliff edge. Rockier along the margins, finer substrate increasing towards centre of basin. Some localised disturbance: radio towers, stone collecting pits and vehicle tracks.

Vegetation cover varies across site from 10-15% to >25% with varying abundance of species dominated by creeper in the rocky margins and exposed stony areas and samphire and Eragrostis abundant in the finer dusty substrates in between. Babies' toes are rare together with prickly pear, wild mango and wild currant. Saltbush is also rare and present in localised patches predominantly the main vehicle track margins. Blue weed is also rare and present in localised and patchy areas alongside the main vehicle track.

The compartment includes the channel which is largely dominated by bare ground of a fine dust with more stoney substrate on its slopes. Samphire is most abundant but with Saltbush, Blue weed, creeper, tomato, ice plant and Eragostis forming a co-dominant group with patchy and often localised distribution throughout the channel. Also present but rare are wiregrass, prickly pear, babies toes and a deep red prostrate chenopodium. Goosefoot (*Chenopodium ambrosioides*?) – very red stems (rare) 30 plants and localised – confirm ident.

Compartment: South Basin samphire

Classification: gritty area

Photographs 52 & 53 on Figure 9.7 in Volume 3 of this ES.

Includes Site 22 described by the Ashmoles (P&M Ashmole, 2004)
Deep white grit and fine dust between Stone Hill and Samphire Plain and grass dominated area making up main compartment in central basin. Increasing scattering of small rocks closer to the ridge leading to Stone Hill and Widow Slope. Area largely devoid of vegetation with occasional patches of saltbush, samphire and Eragrostis. Creeper increasingly dominant closer to slopes on rockier substrate. Babies toes rare, St Helena goosefoot – rare (close to southern side of stone hill), prostrate red chenopod – rare.

Bare ground 99%. Samphire traps sand moving across the basin.

Vehicle tracks increasingly evident causing significant compacting – more since Ashmoles work of 2003.

The remains of a Wirebird were found which have been killed by a cat and then dragged into a dense area of samphire scrub.

Saltbush has colonised disturbed areas where car tracks have been abandoned. Old roads defined by Saltbush.

An excavated trench approximately 1m deep in places and over 100m in length, runs north south through Basin Yellow dust and South Basin Samphire ending west of Stone Hill. The substrate of the trench is fine dust and grit. 80% bare ground. Species present samphire, Eragrostis, samphire (rare), creeper rare primarily limited to area around lush area outwith the trench.

Comp: White grit saddle

Classification: exposed gritty area

Photograph 54 on Figure 9.7 in Volume 3 of this ES.

This is the saddle leading to the gully south east of the basin which leads into the main one running south east towards Gill Point.

Wind tunnel into basin.

This is the very fine white grit which is slightly larger than the fine dust and heavily compacted by exposure (like strange rock plateau) and by vehicle movements just beyond Ashmoles site South Basin Samphire SB22. Vegetation largely absent. Babies' toes – occasional, appearing in water channels, Saltbush – rare, samphire – rare, ice plant – rare. Condensation patches – dries hard like cement.

Compartment: Basin Yellow Dust

Classification: dust

Photograph 55 on Figure 9.7 in Volume 3 of this ES.

Fine dusty area in lowest part of central basin at southern edge before hybrid zone of the ridge. Includes site BYD24 as described in the Ashmoles report. Deep fine dust and sand make up about 90% of the ground cover. Samphire is the dominant vegetation type but is only occasional (5% of ground cover). Saltbush, babies toes and Eragrostis are all rare.

A small duned area is found within Basin Yellow Dust

Bare ground of very fine yellow dust makes up 85-90% of ground cover. Samphire is occasional (10%) and Saltbush and Eragrostis are rare.

Compartment: Transition zone

Classification: Transition zone

Photographs 56, 57 & 58 on Figure 9.7 in Volume 3 of this ES.
Taken of hybrid zone looking west by radio tower base and looking east.

Hybrid zone, includes the site described as PBP1 Central Plain West by Ashmoles in their report, between the very fine dust of compartment 5 and the lower part of the rim of the basin (below the main creeper slope). It is approximately a 20 m wide strip along the contour of the ridge. Fine dust and stoney substrate make up just over 50% of the ground cover. Small stones increase in frequency and size up the slope c. 10 degrees. Samphire is the dominant species in this compartment growing on the fine dust flat area below the slope and acts are a trap for dust movements across the Plain creating a low hillocky effect. Babies toes are frequent in the western end of the hybrid zone. They appear to enjoy the water run off from the ridge and frequent water channels. This is the most

abundant site for babies toes experienced. Eragrostis are occasional together with Saltbush, whilst creeper is rare.

Compartment: Southern ridge samphire

Classification: Samphire dominated area

Photograph 59 on Figure 9.7 in Volume 3 of this ES.

Sparsely vegetated area that runs from the sheltered depression on top of ridge running east/west on the southern end of PBP central basin below the rocky outcrop (creeper hill) close to the proposed terminal building round to higher fairly level elevations and more exposed terminal area then east to with ridges as elevation drops towards Earwig Gully and exposed rocky slopes leading into Dry Gut and towards Gill Point. Some disturbed areas from stone collection.

Exposed to the south easterly wind.

Substrate varies across compartment from transition zones at the base of the rocky out crop (creeper hill) and a basin of fine dust in the quarried area west of the hill to the more predominant substrate of a mix fine light deep grit in between darker angular broken stone substrate with no prominent large rocks.

Vegetation cover decreases eastwards as wind exposure increases , approximately 80% bare ground. Annual *Eragrostis* (during winter months) and Samphire are the co-dominant species in this area and are both abundant. Saltbush is occasional as is creeper which is predominantly in the more rockier areas and disturbed mounds. Babies' toes, ice plant, prickly pear, wild tobacco, pagoda plant and Fat Hen are all rare. Babies toes is locally abundant but occasional and predominantly restricted to the fine gravely area at the site of the terminal building, wild tomato, ice plant, and *Port Jackson willow* are rare. The lichen, old Man's Beard is common on larger boulders and the orange soil encrusting lichen rare. A small unidentified but introduced white flowered herb is very rare. Bare ground is dominant in the dusty depressions.

Evidence of donkeys and 2 wirebirds observed.

Ashmoles Plateau trig point (PTP17) above widow slope is within this compartment. The Ashmoles extended their survey in 2006 and carried out some investigation between Site 5 (PBP5, Bone Gully) and PTP17 (above widow slope) – Bencoolen view. They found the mole spider to be locally abundant and found evidence of its "considerable ecological interest, and since it lies along the proposed access route to the airport it is unfortunate that it was not sampled in 2003" (P. & M. Ashmole. The Invertebrates of Prosperous Bay Plain, St Helena September – December 2003. Update after visit in February – March 2006).

Widow Slope

Classification: rocky slope

This area also includes Widow Slope (WS12) of the Ashmoles. Widow Slope, north north west facing provides protection from wind exposure to the very fine dusts in the basin below (Basin Yellow Dust, BYD 24).

Compartment: Terminal dust bowl

Classification: dust

Photograph 60 on Figure 9.7 in Volume 3 of this ES.

Shallow depression of fine yellow sand and grit with some larger dark stones mostly confined to the edges. Largely devoid of vegetation which are also marginally confined with patchy distribution predominantly associated with rocky/dusty bluffs and water courses. Babies toes is locally abundant and the dominant species. Samphire, *Eragrostis*, portulaca and ice plant are rare.

Brown widow web observed in a pile of dumped stone.

Compartment: Slope into Central Basin from Southern Ridge

Classification: Rocky slope

Photograph 61 on Figure 9.7 in Volume 3 of this ES.
View west across west end of southern ridge slope, widow slope behind camera.

A stony slope, with deep light gritty and fine dusty areas in between rocky boulders, facing north and north north west. Widow Slope, north north west facing provides protection from wind exposure to the very fine dusts in the basin below (Basin Yellow Dust, BYD 24). At the eastern end of the slope large bushes of *Port Jackson willow* are occasional, with about 20 plants *of Chenopodium helenense* (?). Wild tobacco and *Solanum nigrum* (diddly dight) are rare. Heading west Eragrostis becomes increasingly abundant with other Chenopodium species present, before creeper becomes the dominant vegetation. Good colonies of lichens, old Man's Beard and Dirinaria triseptata sp.nov.

Compartment: dust bowl below exposed ridge east of terminal

Classification: dust

Typical transitional zone between ridge and central dusty area. Vegetation is present on the transition zone, the more gravely substrate, before the central fine grit area where there is no vegetation. Samphire is abundant and dominant, *Eragrostis* is occasional and babies' toes, ice plant, creeper, *Chenopodium murale* (?) are rare. Orange, green and white lichens present on larger prominent rocks on outer parts of compartment.

Compartment: Samphire Plain

Classification: Samphire Dominated area

Photograph 62 on Figure 9.7 in Volume 3 of this ES.

Includes site described by Ashmoles as Samphire Plain SP8.

Central southern end of central basin. A flat deep dusty plain in the middle of the central basin. No large surface rocks. Vegetation dominated by samphire and Eragrostis both abundant, with occasional Saltbush and creeper. Prickly pear, ice plant, wild currant and

prostrate (radiating) red chenopod are rare with localised patches along roadside margins of saltbush, blue weed and wild tomato.

Substrate 50% ground cover, yellow dust and coarser light grit and small rocks. Vegetation not uniform with some areas more vegetated than others

Vegetation structure changes at radio tower (Waymark 3) to become more samphire dominated with Eragrostis grass and open bare ground. Bare sandy ground between compartment and Stone Hill. Species present include samphire, Eragrostis, Saltbush and prickly pear

Windy as further away from the protection of the ridge.

This area, as the Ashmoles indicate “epitomises the desert Suaeda habitat”

Donkeys observed on several occasions within the central basin and this area.

Area between terminal post and central basin

Classification: samphire dominated area

From terminal post, described by track to central basin, down to old boundary wall in Fishers valley

Animal presence indicated: donkey & rabbits

Substrate: combination of fine dust, small stones and grit with a stoney substrate on the north western slope into Fisher’s Valley.

Vegetation cover and diversity in this area is low, with 25 % bare ground. White, Black and Orange lichen growing on undisturbed patches of bare ground.
White Tungy is patchily distributed in this area and is the dominant vegetation type. Prickly pear, the Red Tungy, is rare by comparison. Creeper, Samphire and *Eragrostis cilianensis* are similarly abundant. The latter three species are more prevalent in the dustier areas. Saltbush, black olive, wild mango, ice plant, wild currant, Diddly Dight, fat hen and the endemic babies’ toes are rare.

This area is included in the Samphire Plain compartment map.

Compartment: Oil Drum creeper

Classification: creeper dominated area

Includes site described by Ashmoles as Oil drum creeper (ODC14).

Slightly higher elevation than surrounding samphire dominated area. More exposed. Angular flat stoney, light grey rock of varying sizes and gritty stoney finer substrate in between – instead of contrasting dust in samphire dominated area.

Creeper dominant species occupying about 85% of ground cover area with Eragrostis and saltbush occasional.

Terminal access road creeper

Classification: creeper dominated area

Substrate fine gravel, light brown, dust with organic material and deep in places, scattered small rocks. Occasional larger lichen (*Usnea sp*, *Ramalia* sp and *Ramalina sp*) covered rocks.

Creeper is the dominant vegetation type, forming near complete ground cover with patchy distribution of Eragrostis occasional. Saltbush, samphire, prickly pear, purslane, ice plant, fat hen, diddly dight and St Helena goosefoot also present but rare. In three small areas (less than 50m wide) samphire with saltbush still remains, bounded by creeper, in isolated fine grit patches. These are notable and should be avoided.

Compartment : – Creeper dust bowl

Classification: dust

Dusty deep easterly facing surrounded by creeper just above proposed haul road. Fine yellow, brown dusty soil which graded into darker grey gravel. Soil trapped under samphire. Bare ground 75-80% of which 50% had encrusting black & grey soil lichens. Samphire 20%, creeper rare, ice plant rare.

Lichen dust bowl

Classification: dust
Photograph 63 on Figure 9.7 in Volume 3 of this ES.

Spider holes evident. Level area of fine clayey soil and dust, small black/grey gravel patches, soil encrusting lichens found covering soil in open dusty patches. Samphire dominant, babies toes rare – restricted to open areas (beside waypoint 11). Ice plant rare, creeper occasional limited to margins and small patches. Prickly pear – rare, White tungy frequently abundant. Saltbush occasional, Chenopodium murale/ambrosiodes and diddly dight rare observed nr waypoint 11.

Boundary of compartment not obvious in substrate terms – creeper defines boundary in vegetation terms. Possible that creeper is spreading into area. Take compartment to gully in northern end leading to Fisher's Valley. Take to creeper area in west @ 20m east of radio tower.
Eragrostis cilianensis patchy distribution, mostly eastern edge where more exposed.

Exposed to SE prevailing winds ridge plateau.

Rabbits and mice evident.

The Ashmoles did not survey this area in 2003, and agreed it was potentially interesting in 2006, however they did not have time to survey and focused their attention on the other area of identified interest which they call Bencoolen View which is the area south of Bone

Gully and part of the area described as Wirebird Alley. Area has soils, probably old mature soils from former forests, has potential for restoration ecology here.

Bone Gully

Classification: eroded water channel

Photograph 64 on Figure 9.7 in Volume 3 of this ES.
towards transition zone of central basin

Wirebird on eastern side of gully above plain.

Archaelogical value for bird bone deposits.

Depression separating the western extent of the plateau from the eastern. Deep erosion cut gullies at top of gut into PBP central basin. Leading into graded area from ridge with larger stones and fine dust. Species present: Samphire, prickly pear, creeper (dominant), soil encrusting black and orange lichen, ice plant, chenopodium murale (helenense?)-occasional, Eragrostis, babies' toes, Saltbush, grass large bent and diddly dight. Samphire and grass dominant in transitional zone, creeper increasing dominant to ridge.

Evidence of donkeys and rabbits.

Fine gravel soil deep getting rockier towards ridge.

Upper bone gully & Bencoolen view in Photographs 65 & 66 on Figure 9.7 in Volume 3 of this ES.

Wirebird Alley

Classification: Samphire dominated area

Photographs 67 & 68 on Figure 9.7 in Volume 3 of this ES.

Bounded by a creeper dominated vegetation all around with a prominent higher ridge to the west.

Aspect: south east facing, exposed to south easterly winds

Substrate: Primarily fine white dust, gritty in places and littered with small (10-30cm) surface stones in places. Central depression, devoid of vegetation, of larger gravely stones and dust in centre of compartment.

Animal presence indicated

Human presence: criss-crossed with vehicle tracks, with main vehicle track running through the centre of the compartment. Note propose access route should avoid dusty Samphire dominated area and stick to Carpobrotus dominated ridge.

Lichen communities: orange and black soil covering lichen

Samphire and *Eragrostis cilianensis* are abundant in this area and dominate the vegetation

Small patch of Shepherd's purse? - rare

Gill Point / Dry Gut

(Dry Gut embankment and earthworks / Dry Gut storage weir / Temporary sea water abstraction)

Photograph 69 on Figure 9.7 in Volume 3 of this ES.

South side of Dry Gut

Classification: steep rocky slope cliffs & crags

Photographs 70 & 71 on Figure 9.7 in Volume 3 of this ES.

North facing slope.

Sparsely vegetated hillside, predominantly brown rocky slopes with small (2-3cm) to large boulder slabs (1m) and some fine orange grit and dust in between. About 90% bare ground.

Saltbush dominant species but only occasional, creeper occasional largely restricted to the rocky skirt (could be due to water seepage from the underlying rock) and water channels, grass – water run off area below airstrip resa and in base of valley, tomato – rare, wild mango – rare, Portulaca – rare, Wild currant – rare, Chenopodium murale? – rare and Port Jackson willow – rare, boneseed – rare – in sheltered area below resa.

Cliffs - possible former nesting area for seabirds in cliffs.

Sheltered side of valley. Lichen communities less evident, but orange rock encrusting lichen very prominent.

Dry Gut Valley floor

Classification: rocky gully

Photograph 72 on Figure 9.7 in Volume 3 of this ES.

Bedrock of worn smooth large flat boulders in river bed with a fine silt sand in the stream bed.

Sparsely vegetated, samphire dominant in dusty depositions in dried out stream bed. Also present: Blueweed, Saltbush, wiregrass, creeper, Eragrostis, prickly pear, Port Jackson willow, wild coffee, weedy cudweed, Sour thistle.

Upper valley rocky slope – north side of Dry Gut (south facing slope)

Classification: lichen dominated steep rocky slope, cliffs and crags

Photographs 73 & 74 on Figure 9.7 in Volume 3 of this ES.

Sparsely vegetated (with higher plants) exposed rocky slope with good communities of lichens on cliff top crags. Lichens are the dominant vegetation type, refer to Aptroot (2006) report.

Cairned walk track from Woody Ridge passes along the contour.

Lower slope - north side of Dry Gut

Classification: steep rocky slope, cliffs and crags

Photograph 75 on Figure 9.7 in Volume 3 of this ES.

Exposed rocky south facing lower slope of Dry Gut.
Vegetation sparse – 90-99% bare ground. Species present: Saltbush, grass, creeper, prickly pear – rare, Wild tobacco – rare, Pagoda plant – rare, ice plant – rare, wild mango – rare,
Boneseed – rare (I plant – with mealy bug and 2 seedlings in water channel in rocky area), nut grass – rare, Chenopodium murale (fat hen) – rare, goatweed – rare, wild currant – rare and Port Jackson willow – rare.

Brown widows evident. Also cats.

Southern end of runway emergency strip (RESA)

Classification: exposed stony area

Photograph 76 on Figure 9.7 in Volume 3 of this ES.

Large boulders and small stones with fine orange dust between. Sparsely vegetated 90% bare ground.

Eragrostis – dominant species – abundant, creeper – occasional, Wild tobacco – rare, Saltbush – rare, Pagoda plant (eaten) – occasional, purslane – rare, sour thistle – rare.

North east facing slope – bone seed - seeding

Cynobacteria in shaded damp rock overhangs

Lichens on raised rocks exposed on the southerns side – green old man's beard.

Valley below RESA

Classification: rocky gully

Photographs 77 & 78 on Figure 9.7 in Volume 3 of this ES.

Rocky bedrock with horizontal stratification, large boulders and small stones with fine orange dust between. Sparsely vegetated 95-99% bare ground/rock
Cats and mice evident

Creeper – restricted largely to water channel – occasional, Pagoda plant (eaten) – rare, grass large – mostly on east facing slope little in valley floor – occasional, Saltbush occasional, sour thistle – rare, Nut grass – rare, brown/white lichen, babies toes – rare confined to sandy river bed, other grass – rare, ice plant – rare, , prickly pear – rare.

Dry Gut Storage weir

Classification: Samphire Dominated Area

Substrate across the floor of the valley is highly to moderately weathered basalt overlain with fine grained clayey alluvium.

Samphire is dominant in the deep fine alluvial deposits and flood plain terraces where it accretes wind blown soils. Saltbush is frequent and wild mango is rare but locally abundant in isolated patches along the gut. Babies' toes is occasional to locally abundant in fine soils on higher level flood plain terraces and could provide valuable source of local seed for restoration programme. Creeper and prickly pear are rare. *Eragrostis cilianensis* is also present.

Temporary sea water abstraction route

Observations were made of vegetation and habitat during a walk-over survey visit in May 2007

Coastal Zone

Photograph 79 on Figure 9.7 in Volume 3 of this ES.

Narrow incised base to valley culminating in the wave cut platform. Crabs, algae, limpets occupy the narrow tidal zone.

Beach hinterland to blowhole

Photograph 80 on Figure 9.7 in Volume 3 of this ES.

Soft fine soil, with rock and boulders. Wind blown flotsam and jetsam. Largely devoid of vegetation.

From blowhole to base of dry steep rocky gully

Photograph 81 on Figure 9.7 in Volume 3 of this ES.

Two ephemeral water channels have their confluence at the blowhole, one leading from Dry Gut and the other from Prosperous Bay Plain. The proposed water channel follows the valley below PBP.

From the blowhole the vegetation remains sparse in this area and is largely limited to ephemeral water channels and run off. Density of vegetation increases below and around the steep rocky gully where species can make use of occasional water availability.

Samphire grows predominantly in the gut and on the south facing slope. Creeper grows on rockier cliff margins, wild mango, saltbush, pagoda plant are occasional whilst Port Jackson willow, and wild tobacco, New Zealand spinach, *Conzya*, fat hen are rare.

Top of dry steep rocky gully to Ridge

The sheltered base of the first valley before the narrow gorge like gully which descends into the second valley level. The valley opens up and broadens at this point and through it runs a narrow meandering ephemeral stream with a series of small waterfalls (dry at time of survey and only likely to flow after substantial period of rain). The cliffs, steep rocky slopes and valley bottom (with larger boulders) are sparsely distributed with vegetation and the ground is predominantly bare (>90%). Lichens are the main biological group in this semi-desert environment.

Wild tobacco is occasional and mostly restricted to the streambed, as is prickly pear. Higher up creeper and samphire become the dominant species in the streambed.

Other species rarely present include: saltbush, Eragrostis, *Port Jackson willow* and wild currant. Purslane grows alongside the path.

Annuals were not in evidence at the time of the survey (May 2007) but salad plant, babies' toes, and ice plant are known to be present along the base of the valley sides from previous visits. Only the dried out stems were evident on this visit.

Lichen rich boulders are present in the upper parts of the valley and the south facing cliffs are lichen rich, in contrast to the sparser northern facing slopes.

Saltbush, purslane and creeper become increasingly abundant with altitude.

Ridge to 'car park' above Dry Gut

Photograph 82 on Figure 9.7 in Volume 3 of this ES.

The valley emerges onto a level plateau below the eastern plateau of the central basin with large brown/orange flat rock slabs and rocks (0.3-1m) and boulders with compact grit in between. The vegetation remains scattered and correspondingly compact. Pagoda plant is occasional, with wild currant, Conzya and wild tobacco rare.

The 'car park' (often used as a drop off point for walkers and fishermen going to Gill Point and other fishing rocks) is situated on the ridge above. The south facing rocky slopes of the ridge are rich in lichen growth.

Sharks Valley

(Intakes/break tank/pipeline – permanent supply)

Observations were made of vegetation and habitat during walk-over survey visits in January and May 2007.

The valley was 'divided' into a series of recognisable sections based on changes in topography and ecology.

Section 1: Cairn on access track to Hancock's hole, marking footpath down Sharks Valley to A1 & A2 water abstraction point

(GPS reference at cairn: 021 4265 8232712 16.1m acc)
Photographs 83, 84, 85 & 86 on Figure 9.7 in Volume 3 of this ES.

From the cairn the footpath turns seaward (east) along a narrow track along the edge of the valley and drops down to the valley floor. Lichens are present on weathered basalt outcrops and cobbles. Wild mango is frequent and saltbush and wild currant are occasional with black olive, prickly pear and sour thistle are rare on the dry gravelley talluvium. *Poa annua*, Cape grass and *Eragrostis*, creeper, Conzya are also present. As the footpath drops down into the valley floor the vegetation changes into dense wild mango thicket. The mango is so dense that the branches have been cut back to form a dark tunnel through which the footpath meanders across to the northern side of the valley, near abstraction point A1.

Wild mango remains the dominant vegetation type for most of the length of Sharks Valley.

Mosses (*Pottiaceae*) and the liverwort *Plagiochasma rupestre* grow in damp soil patches below rocky boulders on the upper side of the path (GPS Ref 0214375 823262). This species was known from a single 19th century collection from the island, locality unknown and was found more recently by Martin Wigginton in his 2005 survey of the bryophytes of the Peaks on rocks by the waterfall in Wash House Gut and by Rebecca Cairns-Wicks from Little Stone Top.

Cat scat was observed.

Section 2: Water abstraction point A1 & A2 to point where path crosses over stream through wild mango

(GPS ref 0214404 8232625 12.6m acc)

Photographs 87 & 88 on Figure 9.7 in Volume 3 of this ES.

This is the confluence of two springs in Sharks Valley. The spring is surrounded by wild mango which is the dominant vegetation type here. Also present is Black Yam which is rare at this site, heavily shaded under the wild mango and a small clump of Bananas have been introduced below the waterfall.

The vegetation is sparse on the rocky scree valley sides that climb steeply out from the valley floor which is damp and lush. Vegetation up to the footpath to Sharks Valley beach includes wild mango – dominant, salt bush – occasional, wild currant and purslane rare. Sour thistle, *Chenopodium sp*, fat hen, finger grass, Cape grass and Eragrostis abundant in small patches.

Section 3: From path across stream through wild mango to point where path rises back up onto south side of valley

(GPS ref 0215015 8232359 24.8 m acc)

Photographs 89 & 90 on Figure 9.7 in Volume 3 of this ES.

The footpath drops down into the valley and crosses over the stream just before the valley narrows and bends around interlocking spurs. Where the footpath crosses the stream the water level is similar to the surrounding fine clayey terrace and a few stepping stones are all that is needed to traverse the boggy ground. Within about 100m of this the level of the stream bed and water channel drop as the valley narrows. The stream is just 1 m wide at this point and about 0.2 m deep in the centre. Tadpoles were observed in the water.

The vegetation here remains dominated by wild mango, but also growing in this section of the stream are Back yam - frequent, English English aloe - rare, wild celery - occasional - introduced to the island by early settlers and which had escaped cultivations before 1771, it now grows wild in damp guts at lower levels – *Cyperus sp* (*polystachyos?*), Tallowvine or water grass (*Commelina diffusa*), saltbush and which are all rare.

Along the boulder scree valley sides salt bush is dominant with purslane and wild mango occasional and Chenopodium sp., creeper rare.

Section 4: From point where path rises back up onto south side of valley to Big Rock Waterfall

(GPS ref: 0215287 823238, 11.5m acc)

Photographs 91, 92 & 93 on Figure 9.7 in Volume 3 of this ES.

The footpath rises on the southern valley side above the watercourse up to a big rock which marks the point of crossing back over the stream to the north side just above the first of a series of visible waterfalls (there are several waterfalls along the watercourse but they are all obscured from view by the dense wild mango thicket up to this point). The path forms a narrow strip between the rock face and slope into valley bottom which in parts is completely covered with wild mango. Saltbush is dominant on the valley slopes, with purslane occasional and wild currant, creeper and annual grasses rare.

Whilst wild mango remains the dominant vegetation type in the valley. Black Yam is still present and frequent in a large clump together with possibly indigenous *Scirpus prolifer*

Scirpus sp, *Cyperus sp (C. esculentum?)*, wild celery, black yam and grass (*Polypogon monspleniensis*?) grow in increasing abundance around the waterfall. Where *Lemna minor* also grows luxuriantly on the damp rock and still water edges. Salt bush is occasional and limited to the dry dusty and rocky margins.

Section 5: From big rock waterfall to upper beach waterfall

(GPS ref 0215612 8232423, 14.5m acc)

Photographs 94, 95, 96 & 97 on Figure 9.7 in Volume 3 of this ES.
:
The valley opens out, wild mango becomes decreasingly dominant and black yam becomes increasingly dominant. In places where water flow is sluggish yam has filled the stream bed and it becomes a boggy wetland which flows in wet periods. Small stepped drops create faster flows and small waterfalls.

Valley floor: Black yam dominant, Cyperus esculentum and tallowvine frequent (abundant where they occurs but patchily distributed). Creeper, saltbush, wild celery (abundant in patches) are occasional and purslane and Scirpus rare.

Valley sides: margins sparsely vegetated. Saltbush occasional with purslane, creeper and wild mango rare.

Section 6: Upper beach waterfall terrace

Photographs 98 & 99 on Figure 9.7 in Volume 3 of this ES.

The stream drops down a waterfall and flows along a short flat terrace for about 25 m before plunging down another drop to the beach level.

Pagoda plant, wild celery, creeper, black yam and *Lemna minor* are all abundant around the waterfall and in and along the stream. Cyperus sp and Scirpus prolifer are rare at this site.

Section 7: Beach and waterfall – point water falls to beach from upper terrace

(GPS ref 0215692 8232416, 12.5m acc)
Photographs 100 & 101 on Figure 9.7 in Volume 3 of this ES.

The water plunges dramatically onto the beach over rocks.

Within the splash zone of the fall and along the stream where sediment has been caught before it reaches the cobble and boulder shoreline, yam is dominant, with *Lemna minor* and pagoda plant abundant and wild celery, grass and *Cyperus sp.*, rare. Creeper is rare on the flat margins with salt bush and wild mango.

Flotsam and jetsam are abundant on the shoreline.

Crabs are found up to the waterfall.

Raw Water pipeline from Sharks

Section 1: Water abstraction point A1 & A2

(GPS ref 0214404 8232625 12.6m acc)
Photographs 85 & 86 on Figure 9.7 in Volume 3 of this ES.
This is the confluence of two springs in Sharks Valley. The spring is surrounded by wild mango which is the dominant vegetation type here. Also present is Black Yam which is rare at this site, heavily shaded under the wild mango and a small clump of Bananas have been introduced below the waterfall.

The vegetation is sparse on the rocky scree valley sides that climb steeply out from the valley floor which is damp and lush. Vegetation up to the footpath to Sharks Valley beach includes wild mango – dominant, salt bush – occasional, wild currant and purslane rare. Sour thistle, *Chenopodium sp*, fat hen, finger grass, Cape grass and Eragrostis abundant in small patches.

Wild mango remains the dominant vegetation type for most of the length of Sharks Valley.

Mosses (*Pottiaceae*) and the liverwort *Plagiochasma rupestre* grow in damp soil patches below rocky boulders and old walls on the upper side of the path (GPS Ref 0214375 823262). Micro-siting of the pipeline will be needed on site to avoid sensitive sites.

Section 2: Ascent up valley side from path directly uphill of abstraction point A1&A2

Photograph 102 on Figure 9.7 in Volume 3 of this ES.

The valley continues to rise steeply above the footpath, with lichen covered rocky boulders and outcrops just above the footpath at the start of the ascent, and further outcrops of slightly weathered basalt and gravelly and cobbly talluvium up to near the crest of the slope.

The valley side is sparsely vegetated dominated by lichen covered boulders (*Ramalina* sp and *Rimelia* sp) and weathered outcrops and wild mango which is abundant at the base of the slope with creeper, salt bush being frequent, *Cyperus sp* and Cape grass are occasional and black olive, prickly pear and sour thistle rare. Half way up there are two young trees which mark the transition into the weathered basalt outcrop where lichens are abundant and include several endemic species (including *Ramelina sanctae-helenae*, *R. rigidella*, *R. geniculata*, *Leconora santae-helenae*, *Dermatiscum pusillum sp. nov*. and *Xanthoparmelia beccae* (GPS ref 0214391 8232820 11.2m acc). Moss (Pottiaceae) are found in damp places beneath rocky boulders and in crevices.

Sheet web spider webs were abundant over bare ground

Section 3: Crest of Hill above Sharks Valley

(E305150 N2000100 – David Shilston's recording)

Photographs 103 & 104 on Figure 9.7 in Volume 3 of this ES.

Just above the weathered rock outcrop the slope of the valley side changes becoming less steep up to the crest of the hill at the position of the break tank. Here there are less boulders and there is more soil, with bare ground about 40%. The vegetation is dominated by creeper which has significant die back (40% die back), wild mango is rare. (photograph: habitat type near crest of hill above Sharks valley).

Small surface rocks and boulders are covered in *Leconora santae-helenae* and *Ramelina* species on the southern and south eastern slopes to the crest of the hill but largely disappear on the northern slope.

There is lichen rich stone ruin to the east of the crest of the hill with a number of soil crust lichens including X. beccae (GPS ref 0214396 8232980). St Helena tuft-sedge is also occasional in this area.

A footpath extends towards Bencoolen across the contour of the hill (GPS ref 0214397 8232838, 8.1m accuracy).

Section 4: From crest of Hill descending into Dry Gut to the cairn at the end of the vehicle track along the spur.

(From E305150 N 2000100 to E0305800 N 2000650 – David Shilston's recordings)

Photographs 105 & 106 on Figure 9.7 in Volume 3 of this ES.

Substrate predominantly highly weathered and completely weathered basalt with some residual patches of clay soil and moderately weathered basalt.

Creeper is dominant with English English aloe locally frequent,large saltbush – locally frequent and *Port Jackson willow* – rare are present in the area below the crest of the hill (break tank) to the Col (E395030 N2000290 – David Shilston) spreading down towards the more heavily eroded badlands from former terraced plantings for erosion control. Also present are *Chenopodium sp* and saltbush which are locally abundant on the flat areas.

The vegetation remains sparse from the col and down the spur to the cairn at the base of the vehicle track. Soil crust lichens and creeper are dominant, wild mango, rare. *Xanthoparmelia beccae* and *X. subramigera* were found growing abundantly across a wide area (10 x 2m) amongst soil crusts and creeper below the track. Micro-siting of the pipeline will be needed on site to avoid the most sensitive species.

2 Wirebirds observed nearby.

Section 5: Upper Dry Gut valley floor

From cairn (E0305800 N2000650 – David Shilston) at end of vehicle track to base of ridge rising out of valley on northern side.

Photographs 107 & 108 on Figure 9.7 in Volume 3 of this ES.

Substrate across the floor of the valley is highly to moderately weathered basalt overlain with fine grained clayey alluvium.

Indigenous samphire is dominant in the deep fine alluvial deposits and flood plain terraces where it accretes wind blown soils. Saltbush is frequent and wild mango is rare but locally abundant in isolated patches along the gut. Endemic Babies toes (*Hydrodea cryptantha)* is occasional to locally abundant in fine soils on higher level flood plain terraces and could provide valuable source of local seed for restoration programme. Creeper and prickly pear are rare. *Eragrostis cilianensis* is also present.
Trenching across this area will need to be at a depth below the level of erosion. Terraces should be reformed. The removal of any Samphire bushes affected by digging and replanting could be considered. If this is attempted plants should be trimmed back hard. Babies toes should be seeded back into the area. Wild mango could be cut down and a systemic poison applied directly to the cut stumps to reduce their rate of spread along the valley bottom.

Section 6: Ascent from Dry Gut to top of ridge

Photograph 109 on Figure 9.7 in Volume 3 of this ES.

Steep scarp slope ascending from Dry Gut. Highly weathered basalt at base to slightly weathered rocky outcrops with gravelly soil as slope ascends.

Creeper becomes increasingly dominant as slope ascends from the finer substrate of the highly weathered to the slightly weathered basalt. Port Jackson willow are the large bushes which are obvious on the slope. *Chenopodium sp* and Saltbush are occasional and largely restricted to the lower parts of the slope. Introduced *Sonchus oleraceae*, Blue Weed (*Ageratum conyzoides*) and a small prostrate herb are also present and rare.

Section 7: Route across ridge to Creeper Hill.

(data reproduced from previous survey work for Prosperous Bay Plain. This length was not traversed with Nigel Kirby and David Shilston).

Photograph 110 on Figure 9.7 in Volume 3 of this ES.

Substrate varied from stoney and rocky to coarse grit - from transition zones at the base of Creeper hill and a basin of fine dust in the quarried area west of the hill to the more predominant substrate of a mix fine light deep grit in between darker angular broken stone substrate with no prominent large rocks to the rocky margins on the ridge above Dry Gut. There are some disturbed areas from stone collection on west facing slope of Creeper Hill.

Creeper is predominantly restricted to the rocky ridge and disturbed mounds were it is the dominant vegetation. Vegetation becomes increasingly sparse towards Creeper Hill. Samphire and Babies toes are locally abundant but occasional and predominantly restricted to the fine gravely area to west of Creeper Hill. Bare ground is dominant in the dusty depressions. Also present annual *Eragrostis* (during winter months). Saltbush is occasional, ice plant, prickly pear, tomato (*Lycopersicon esculentum)*, and fat hen are all rare.

Ancillary Components

(ROL cairn features)
Micro-siting of the ROL will be needed on site to avoid the most sensitive species at each of the sites, including establishment of clearly demarcated access points for Bradleys Government Garage and Horse Point Plain. Great Stone top access sites follow existing walk tracks.

Bradleys Government Garage

ROL site 5 (St Helena reference design C1-01-1002 Rev A)
Photograph 111 on Figure 9.7 in Volume 3 of this ES.
Classification: creeper dominated area
Substrate and vegetation very similar to terminal road creeper. Creeper dominated area with patches of fine dust dominated by samphire and Chenopodium species.

Lichens cover boulders and rocky outcrops and included *Ramalina geniculata, Lecanora sanctae helenae, Teloschistes flavicans, Ramalia sp.*

Moles spider burrows observed in fine dusty bowl with *Chenopodium sp* (goosefoot and st Helena goosefoot), samphire, ice plant and Eragrostis at the eastern edge of the flat

before drops down towards the ruin and Holdfast Tom. GPS ref S 15 56 661 W 005 39 575.

Navigational aid
Photographs 112 & 113 on Figure 9.7 in Volume 3 of this ES.

Area on the rocky margin on the crest of the ridge above Bradleys Government Garage Flat. Beyond the heavily eroded fine clayey and gullying the soil profile changes to one of many small rocks with deep grit and soil with some larger lichen encrusted boulders and rocky outcrops similar to the substrate on the creeper dominated western rim of the central basin (terminal road creeper.

Creeper is the dominant species here also, with small patches of samphire (which are being suppressed). Bare ground occupies about 25% of the area and die back of the creeper extends the bare patches. Wild currant (also with die back), prickly pear and wild coffee are rare here.

Annuals species were notably absent at the time of survey (May 2007) but observations from further north along the same ridge at another time of year during the lichen survey (October 2006) indicate that Chenopodium murale, Chenopodium helenense, babies toes' and Eragrostis may be present.

Horse Point ROL site (St Helena reference design C1-01-1002 Rev A)
Classification: creeper dominated area
Photographs 114 & 115 on Figure 9.7 in Volume 3 of this ES.

An extensive area of level ground extending from Horse Point to Bryan's Rock with a varied substrate of predominantly of small rocks (0.2-0.5m), stones and grit and compacted dust and small rocks extending to a rocky slope with weathered outcrops on the rounded coastal cliff edge where lichens are dominant. Creeper is the dominant vegetation type (50%) with lichens (10-25%), samphire abundant and saltbush occasional on the bare fine dusty ground. Prickly pear is rare. The area is criss-crossed with vehicle tracks. Bare ground 25-50%.

Refer to Aptroot (2006) report for lichen flora at Bryan's Rock site.

A single solitary scrubwood was found growing approx 50m of the eastern tip of the Millennium Forest.

1 wirebird observed

Great Stone Top ROL

Site 11 (St Helena reference design C1-01-1002 Rev A)
Photograph 116 on Figure 9.7 in Volume 3 of this ES.

The proposed cliff top ROL position is dominated by large rocks and boulders ranging from <0.5 m - > 2m which have a rich lichen flora of surface and overhang species. Lichens dominate the vegetation on the rocky boulder fields, vertical cliff tops and soil

crusts (see Aptroot, 2006). In between there are smaller rocks and grit. In the soil pockets creeper is occasional with Acacia sp, prickly pear, saltbush, wild tobacco, ice plant
Note: Aptroot (2006) "Great Stone Top is unique in that it harbours several non-endemic lichen species (e.g. *Dirinaria flava* and *Usnea exasperata*) for which this is the only known locality on St Helena. There is a remote lighting planned at its top, where these species occur. However, the species are occurring also on the nearly vertical seaward slope, which will not be affected".

Site 12 (St Helena reference design C1-01-1002 Rev A)
Photograph 117 on Figure 9.7 in Volume 3 of this ES.

This site is a lichen rich boulder field with soil crust lichens. Four individuals of Port Jackson willow grow at this site.

Salad plant, Cheilanthes multifida and St Helena goosefoot are rare growing on the rocky slope and amongst the boulders.

St Helena goosefoot (Single plant GPS ref 0215478 8231947 17.4m accuracy, larger clump of 13 plants GPS ref 0215267 8231764, 11.9m accuracy and clump 3 individuals 0215273 8231749 – not flowering May 2007), salad plant (2 plants, one flowering and seeding at time of survey in May 2007: GPS ref 0215275 8231750), blue weed and purslane are rare. *Cheilanthes multifida* is rare growing in sheltered crevices amongst the largest boulders (GPS ref 0215438 8231926 11.4m accuracy).

Refer to Lichens of St Helena

The Barn
Photograph 118 on Figure 9.7 in Volume 3 of this ES.

ROL no 1 (St Helena reference design C1-01-1002 Rev A)

Not visited

ROL no 2 (St Helena reference design C1-01-1002 Rev A)

The Haystack is a raise rocky outcrop that 'sits' on the Barn marking the highest point. Rock encrusting lichens are abundant on the boulders and rock face. Moisture loving and rare species more commonly associated with the peaks, ferns (lesser kidney fern, barn fern, plastic bottle fern) and *Carex dianae* (Diana's Peak grass) as well as rare bryophytes can be found in deep cracks and crevices of the south facing rock face.

Wild coffee, Port Jackson willow, lantana, cedar are occasional amongst the boulders and below the south facing cliff.

Lichens are the dominant vegetation type, refer to Aptroot (2006) report for lichen flora of the Barn.

ROL no 3 (St Helena reference design C1-01-1002 Rev A)

Not visited

King & Queen Rocks ROL

Old walled foot path leads to the abandoned signal station.

Predominantly barren highly eroded weathered rock and boulder field. Lichens are present on boulders, crags and overhangs. Samphire is the dominant vegetation type although it is only occasional. Skeltons of last years babies' toes and possibly ice plance were evident. A valuable source of seed for restoration. Eragrostis cilianensis was rare.

Presence of other annuals was not observed at time of visit in May.

Table 1: Species table

Latin name	Common Name	Family	Status
			+ endemic /- indigenous
Agave lurida	Fence aloe	Agavaceae	
Ageratum conyzoides	Blue weed	Compositae	
Aloe grandidentata	Wild Sicreviver	Liliaceae	
Alternanthera repens	Double Gee	Amaranthaceae	
Anagallis arvensis	Pimpernel	Primulaceae	
Apium graveolens	Wild celery	Umbelliferae	
Aptenia cordifolia	pink star shaped flowers	Aizoaceae	
Asclepias rotundifolia	Silk cotton	Asclepiadaceae	
Asplenium haughtonii	Barn fern	Aspleniaceae	+
Asplenium platybasis	Plastic bottle fern	Aspleniaceae	+
Atriplex nummularia	Large saltbush	Chenopodiaceae	
Atriplex semibaccata	Saltbush	Chenopodiaceae	
Bromus pectinatus	Bromus sp?	Gramineae	
Bryophyllum pinnata	Lucky leaf	Crassulaceae	
Bulbostylis lichtensteiniana	St Helena Tuft sedge	Cyperaceae	+
Carex dianae	Diana's Peak grass	Cyperaceae	+
Carpobrotus edulis	Creeper	Aizoaceae	
Casaurina equisetifolia	She-oak	Casuarinaceae	
Centella asiatica	Money ears	Umbelliferae	
Chenopodium ambrosioides	Goosefoot	Chenopodiaceae	
Chenopodium helenense	St Helena goosefoot	Chenopodiaceae	+
Chenopodium murale	Fat hen	Chenopodiaceae	
Chenopodium sp.,	*Unknown red prostrate chenopodium*	Chenopodiaceae	
Chrysanthemum monilifera	Wild coffee	Compositae	
Cluytia pulchella	Wild pepper	Euphorbiaceae	
Cocoloba uvifera	Sea grape		
Colcasia sp	Black Yam	Araceae	
Commelina diffusa	Tallowvine	Commelinaceae	
Commidendrum robustum	Gumwood	Compositae	+
Commidendrum rugosum	Scrubwood	Compositae	+
Conzya bonariensis	Conzya	Compositae	
Cordia alliodora			
Cotula coronopifolia	Pagoda plant	Compositae	
Crassula multicara		Crassulaceae	
Crassula ovata	Money plant	Crassulaceae	
Cynodon dactylon	Wire grass	Gramineae	
Cyperus rotundus	nut grass	Cyperaceae	

Latin name	Common Name	Family	Status
			+ endemic /- indigenous
Cyperus sp.,		Cyperaceae	
Delonix regia	Flamboyant		
Digitaria ciliaris	Finger grass	Gramineae	
Digitaria sp	Finger grass	Gramineae	
Diospyros dichrophylla	poison peach	Ebenaceae	
Dryopteris napoleonis	Lesser kidney fern	Dryopteridaceae	
Ehrharta erecta	Summer grass	Gramineae	
Elaeodendron capense	White olive	Celastraceae	
Eragrostis cillianensis		Gramineae	-
Eriobotrya japonica	Loquat	Rosaceae	
Erythrina caffra	Thorn tree	Leguminoseae	
Eucalyptus lehmannii	Dry land tree	Myrtaceae	
Eucalyptus sp.,	E. grandis?	Myrtaceae	
Euphorbia heleniana	French grass	Euphorbiaceae	+
Frankenia portulacifolia	Tea plant	Frankeniaceae	+
Furcraea gigantea	Aloe	Agavaceae	
Gnaphalium luteo-album	Weedy cudweed	Compositae	
Gnaphalium undulatum	Cape cudweed	Compositae	
Grevillea robusta	Silky oak	Proteaceae	
Helichrysum bractaeatum	Everlasting flower	Compositae	
Hibiscus rosa-sinensis	Hibiscus	Malvaceae	
Hydrodea cryptantha	Babies' toes	Aizoaceae	+
Hydrodea cryptantha	*Babies toes*	Aizoaceae	+
Hypertelis acida +	Salad plant	Aizoaceae	+
Juncus capilliaceus	Bull grass	Juncaceae	
Juniperus bermudiana	Cedar	Cupressaceae	
Lampranthus zeyehi			
Lantana camara	wild current	Verbenaceae	
Lemna minor	Commmon duckweed	Lemnaceae	
Leucaena leucocephala	Leucaena, seed work acacia	Leguminoseae	
Lycopersicon esculentum	Wild tomato	Solanaceae	
Mesembryanthemum crystallinum	Ice plant	Aizoaceae	
Musa sp.,	Banana	Musaceae	
Nicotiana glauca	Wild tobacco	Solanaceae	
Olea africana	Black olive	Oleaceae	
Ophioglossum polyphyllum	Lily fern	Ophioglossaceae	-
Opunita cochinillifera	English, white tungy	Cactaceae	
Opuntia vulgaris	Red tungy, prickly pear	Cactaceae	
Osteospermum sanctae-helenae	Boneseed	Compositae	+
Oxalis pes-caprae	Sour bells	Oxalidaceae	
Paspalum scrobiculatum	Cow grass	Gramineae	
Pelargonium cotyledonis	Old Father live-forever	Geraniaceae	+
Pennisetum clandestinum	Kikuyu grass	Gramineae	
Phlebodium aureum		Polypodiaceae	
Pittosporum viridiflorum	Spore	Pittosporaceae	
Poa annua		Gramineae	
Polycarpon tetraphyllum	Four-leaved allseed	Caryophyllaceae	
Polypogon monspeliensis		Gramineae	-?
Portulaca oleracea	Purslane	Portulacaceae	-

Latin name	Common Name	Family	Status
			+ endemic /- indigenous
Psidium guajava	Guava	Myrtaceae	
Romulea rosea	Wild pansy	Iridaceae	
Schinus molle	Wild pepper tree	Anacardiaceae	
Schinus terebinthifolius	Wild mango	Anacardiaceae	
Scirpus prolifer		Cyperaceae	-?
Setaria verticulata	Love grass	Gramineae	
Sida cordifolia		Malvaceae	
Solandra maxima	Cup of Gold	Solanaceae	
Solanum mauritianum	Bilberry	Solanaceae	
Solanum nigrum	Diddly Dight	Solanaceae	
Solanum sodomaeum	Wild brinjal	Solanaceae	
Sporobolus africanus	Cape grass	Gramineae	
Suaeda fruticosa	Samphire	Chenopodiaceae	-
Tecoma stans	Yellow pops	Bignoniaceae	
Tetragonia tetragonioides	New Zealand spinach	Aizoaceae	-
Ulex europaeus	Furze	Leguminoseae	
?	Single gee - erect annual herb	?	