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ALKIMOS WATER ALLIANCE FAUNA MANAGEMENT PLAN

NOVEMBER 2007



ALKIMOS WATER ALLIANCE

ALKIMOS WASTEWATER TREATMENT SCHEME

FAUNA MANAGEMENT PLAN

MANP002

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EXECUTIVE SUMMARY

In December 2006, the Water Corporation announced Alkimos Water Alliance (AWA) as the successful Alliance partner to undertake design and construction works associated with the Alkimos Wastewater Scheme on behalf of the Water Corporation. It comprises Alliance partners Multiplex, Züblin and Macmahon and sub-contractor partners Worley Parsons, Connell Wagner, Land and Marine and Cardno BSD.

AWA was formed specifically to progress the design and construction of:

- Earthworks for the wastewater treatment plant (WWTP) to be located at Site B;
- The ocean outfall, including the launch site at Site 1B;
- A land based connection between the WWTP site and the launch site/ocean outfall; and
- The section of the Quinns Main Sewer to connect established residential areas to the WWTP site.

This Fauna Management Plan (FMP) has been prepared by AWA for works associated with the Alkimos Wastewater Scheme. This FMP details how AWA will manage the environmental aspects (specifically in relation to terrestrial fauna) for construction activities associated with the Alkimos Wastewater Scheme. The FMP has been prepared to satisfy Ministerial Condition 10-1 associated with Ministerial Statement 755, which was issued in accordance with the provisions of Part IV of the *Environmental Protection Act 1986*. The proposal was assessed at the level of Public Environmental Review (PER).

AWA has developed a more detailed and refined design to that presented in the PER. The extent of the design presented in the PER for the terrestrial components of the proposal is shown in **Figure 2**. The existing detailed proposal design is described in detail in **Section 4**, and is materially consistent with that presented in the PER.

A fauna assessment, in accordance with EPA Guidance Statement No.56 (EPA 2004), was carried out for the area as part of preparation for the PER. The assessment consisted of a site inspection conducted in January 2005 by Dr Mike Bamford and Dr Robert Davis of Bamford Consulting Ecologists (as contained in **Appendix C**).

On the basis of the site inspection from the fauna assessment, five fauna habitats were recognised and are described in **Table 2.3** and mapped in **Figure 3**. The majority of the fauna species observed or likely to be present in the Alkimos project area no longer occur in suburban Perth, so the area represents the southern limit of the distribution of many species in the region. The Alkimos site possibly supports up to 51 reptile species, 102 bird species, 22 species of mammals and 5 species of amphibian (Bamford, 2004). Of these species, a number have conservation significance such as Carnaby's Cockatoo and the Carpet Python.

Potential impacts on terrestrial fauna have been identified for each aspect of the project. A management framework was developed and is outlined in **Section 6**. Management controls will be adopted for the management of fauna during the Alkimos Wastewater Scheme construction works and these controls are essential for the successful implementation of the FMP. The management controls are summarised below in **Table ES1**.

Table ES1: Summary of management controls and responsibilities

COMPONENT	MANAGEMENT	RESPONSIBILITY	REFERENCE
Design	Design has been undertaken with the objective of reducing the amount of ground disturbing activity.	Design Manager / Alliance Manager	Section 6.1
	Tunnelling using trenchless techniques and geotechnical investigations to minimise the need for earthworks and associated clearing between WWTP and launch site.	Design Manager / Construction Manager	Section 6.1
	Areas of conservation significance are to be conserved and retained (Area 9, Area 10b and Area 10a) within the buffer zone.	Alliance Manager / Water Corporation	Section 6.1
	All trench batters have been designed at a gradient to allow for safe entry into the trench and an escape route for fauna. If the batter gradient does not allow for safe entry ramps are to be installed.	Design Manager	Section 6.1
Personal Training and Induction	All construction personnel are to be inducted to the site operating procedures and will undertake training with regard to fauna management during operations and prior to being involved in construction works.	Site Supervisor / Site Environmental Coordinator, Environmental / Communications Manager	Section 6.2
	Specific induction for all Site Supervisors and Package Managers.	Site Supervisor / Site Environmental Coordinator, Environmental / Communications Manager	Section 6.2
	A current version of the FMP is to be available on site at all times.	Site Supervisor	Section 6.2
	Contact details for a local veterinarian and/or animal carer are to be available on site at all times.	Site Supervisor	Section 6.2
	Contact details of a trained reptile handler are to be available on site at all times (alternatively a qualified reptile handler is to be situated on site).	Site Supervisor	Section 6.2
	Construction should be undertaken in a manner to avoid fauna fatalities at all times.	All on site personnel	Section 6.2
	Fauna Incident Forms are to be completed and lodged with the Environmental and Community Relations Manager if any fauna management issues occur on site, (fatalities or injuries to fauna).	All on site personnel	Section 6.5, Appendix E
	Deliberate killing / injuring of any fauna is strictly prohibited at all times.	All on site personnel	Section 6.2
Clearing	Domestic pets are not to be bought onto or kept on site.	All on site personnel	Section 6.2
	A Ground Disturbing Works Permit (GDWP) must be completed and signed off prior to any ground disturbing activities being undertaken.	Alliance Manager / Environmental and Communications Manager / Site Supervisor.	Section 6.3, Appendix D
	A reconnaissance fauna survey is to be completed prior to major ground disturbing activities.	Site Environmental Coordinator	Section 6.3
	Clearing is to be carried out in a step-wise fashion and over a period of time to enable fauna to disperse	Site Supervisor	Section 6.3
Large woody debris is to be collected for redistribution in rehabilitated areas.	Site Supervisor	Section 6.3	

COMPONENT	MANAGEMENT	RESPONSIBILITY	REFERENCE
Construction	Construction activities are to be confined to designated haul / access roads and marked out areas at all times.	All on site personnel	Section 6.4
	Haul and access road speed limits are to be obeyed at all times.	All on site personnel	Section 6.4
	Road kill is to be removed from the roads as soon as a fauna incident arises or as discovered.	Site Supervisor / Site Environmental Coordinator	Section 6.4
	Critically injured fauna are to be assessed by a veterinarian and if necessary humanely destroyed by a qualified animal handler.	Site Supervisor / Site Environmental Coordinator	Section 6.4
	Site operational areas (fenced compounds and open trenches) are to be inspected for trapped fauna prior to works commencing each day.	Site Supervisor	Section 6.4
	Where batters are too steep ramps are to be placed at open trenched areas (Quinns Main Sewer) to enable an escape route for fauna.	Site Supervisor / Site Environmental Coordinator	Section 6.4
	Any existing boreholes and test pits are to be capped and/or maintained in a way which will restrict fauna entry.	Site Supervisor / Site Environmental Coordinator	Section 6.4
	The WWTP will be fenced after clearing has been completed to discourage fauna re-entering the site.	Construction Manager	Section 6.4
Rehabilitation	Site rehabilitation is to be undertaken in a manner which maximises fauna habitat potential	Construction Manager / Site Environmental Coordinator	Section 6.6
	Rehabilitated areas will be systematically monitored throughout the life of the project and two years thereafter, all fauna observed within rehabilitation areas will be recorded as part of rehabilitation monitoring program.	Site Environmental Coordinator	Section 6.6
Monitoring and Reporting	Monitor open trenches and areas inside fencing to identify and release trapped fauna. This will form part of the daily works procedure for construction personnel	Site Supervisors/Site Engineers	Section 6.7.1
	Monitoring the project site daily during clearing and liaise with the works personnel to ensure that the requirements of the FMP are being implemented.	Site Environmental Coordinator	Section 6.7.1
	Conduct weekly progress meetings to discuss monitoring of the projects environmental performance, document findings and prepare a report to be made available to the Alliance Manager and the Water Corporation.	Environment and Community Relations Manager/Site Environmental Coordinator	Section 6.7.1
	Conduct monthly Environmental Audit on the project. The audit will ensure compliance with the FMP and will be kept and incorporated within quarterly environmental compliance reports to be made available to the Water Corporation and annual compliance reports to be submitted to the DEC.	Environment and Community Relations Manager/Site Environmental Coordinator	Section 6.7.1, Section 6.7.2

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ABBREVIATIONS

AHD	Australian Height Datum
AWA	Alkimos Water Alliance
DEC	Department of Environment and Conservation
DEH	Department of Environment and Heritage
EPA	Environmental Protection Authority
EPBC	Environment Protection and Biodiversity Conservation
EIA	Environmental Impact Assessment
FMP	Fauna Management Plan
MRS	Metropolitan Regional Scheme
PER	Public Environmental Review
RL	Reduced Level
TBM	Tunnel Boring Machine
WA	Western Australia
WWTP	Wastewater Treatment Plant

INTRODUCTION

1.1 BACKGROUND

This Fauna Management Plan (FMP) has been prepared by the Alkimos Water Alliance (AWA) for works associated with the Alkimos Wastewater Scheme. The Alkimos Wastewater Scheme is proposed to be implemented approximately 40km north-west of Perth's CBD within the future suburb of Alkimos as shown in **Figure 1**. The scheme lies within portions of Lots 101 and 102 Romeo Road.

The Water Corporation commenced planning for the Alkimos Wastewater Scheme in the 1970s to provide for the continued residential growth in Perth's metropolitan north-west corridor. The Water Corporation is the proponent for the Alkimos Wastewater Scheme and the project/proposal has been subject to the Western Australian (WA) Environment Impact Assessment (EIA) process.

In December 2006, the Water Corporation announced AWA as the successful Alliance partner to undertake design and construction works associated with the Alkimos Wastewater Scheme on behalf of the Water Corporation. It comprises Alliance partners Multiplex, Züblin and Macmahon and sub-contractor partners Worley Parsons, Connell Wagner, Land and Marine and Cardno BSD.

AWA was formed specifically to progress the design and construction of:

- Earthworks for the wastewater treatment plant (WWTP) to be located at Site B;
- The ocean outfall including the launch site at Site 1B;
- A land based connection between the WWTP site and the launch site/ocean outfall; and
- The section of the Quinns Main Sewer to connect established residential areas to the WWTP site.

It is also envisaged that AWA will integrate the design and construction of the WWTP itself once the earthworks have been completed, however it will not be responsible for the ongoing operation of the scheme.

The Alkimos Wastewater Scheme components, listed above (except for the Quinns Main Sewer), received Ministerial approval on the 12 November 2007 (see **Appendix A**). The Quinns Main Sewer (from the suburb of Butler to the edge of the WWTP buffer zone) falls under the jurisdiction of *Water Agencies (Powers) Act 1984* as general works and therefore did not require environmental approval pursuant to Part IV of the *Environmental Protection Act 1986*. A Purpose Clearing Permit was approved for the Quinns Main Sewer (CPS 1064/1) on the 24 November 2006 and fauna management has been addressed in conditions associated with the clearing permit and therefore will not be addressed in this FMP.

Since the formation of the AWA, the project design has progressed and been refined from what was presented in the PER. The changes to the original proposal due to the advancement of design will be assessed pursuant to *Section 45C of the Environmental Protection Act 1986 (Part IV)*.

The construction and operation of the Alkimos Wastewater Treatment Plant has been considered pursuant to *Section 75 of the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. On the 26 February 2007 it was deemed to not constitute a 'Controlled Action' and, as such, did not require further assessment by the Australian Government (EPBC 2007/3259), (see **Appendix B**).

Since the submission of the PER a number areas within the buffer zone were identified as regionally significant and were incorporated into the Metropolitan Regional Scheme (MRS) as conservation estate. The Alkimos – Eglinton Metropolitan Regional Scheme Amendment No. 1029/33 was formally reviewed by the EPA and through this process Area 9 to the north of the WWTP was identified as having high east-west ecological linkage values. To assist in the finalisation of the MRS assessment the Water Corporation proposed two areas within the buffer zone to be protected and managed for conservation purposes as an offset to taking a portion of Area 9 for the location of the WWTP site, Area 10b which is located to the south of the WWTP site and Area 10a which is the portion of land north of Area 9 as shown in **Figure 3**.

1.2 PURPOSE OF THIS DOCUMENT

Following assessment of the Alkimos Wastewater Treatment Plant Site B proposal (Assessment 1529), the Environmental Protection Authority (EPA) published Bulletin 1239, which provided the advice and recommendations of the EPA to the Minister for the Environment on the environmental factors and principles relevant to the proposal by the Water Corporation. These recommendations formed the basis for conditions associated with Ministerial Statement 755 which was issued in accordance with the provisions of Part IV of the *Environmental Protection Act 1986*.

This FMP details how the AWA will manage the environmental aspects (specifically in relation to terrestrial fauna) for construction activities associated with the Alkimos Wastewater Scheme. The FMP has been prepared to satisfy Ministerial Condition 10-1 associated with Ministerial Statement 755.

The objective of the FMP is to ensure the management of potential impacts to fauna values within the Alkimos project area during construction of the Alkimos Wastewater Scheme. Condition 10-2 of Ministerial Statement 755 specifically requires the FMP to address the items listed in **Table 1.2**.

Table 1.2 EPA issues and relevant section references

Issue	Reference
Clearing of the construction area in a step-wise fashion as the WWTP plant expands, to reduce impacts on fauna	Section 6.3
Avoidance of clearing land when Carnaby Cockatoos are actively breeding or foraging in the area	Section 6.3
Presence of terrestrial fauna and their translocation	Section 6.4

1.3 DOCUMENT FORMAT

The remainder of this report is comprised of the following:

- Section 2 – Existing environment and potential impacts;
- Section 3 – Management objectives, standards and performance criteria;
- Section 4 – Design and construction of the Alkimos Wastewater Scheme;
- Section 5 – Potential impacts
- Section 6 – Proposed management framework;
- Section 7 – Roles and responsibilities;
- Section 8 – Summary; and
- Section 9 – References.

EXISTING ENVIRONMENT AND POTENTIAL IMPACTS

1.4 EXISTING ENVIRONMENT

A fauna assessment in accordance with EPA Guidance Statement No.56 (EPA 2004) was carried out for the area as part of the preparation of the PER. The assessment consisted of a site inspection (conducted in January 2005 by Dr Mike Bamford and Dr Robert Davis of Bamford Consulting Ecologist) and included a desktop review of available data including publications and databases (CALM, EPBC, WA Museum, Birds Australia). A copy of the Fauna Assessment Report is attached as **Appendix C**.

The existing environment of the Alkimos project area includes coastal and near coastal environments that have not been cleared but have been subject to a variety of impacts since European settlement, including, grazing, damage from recreational vehicles, altered fire regimes and introduced species.

The environment and fauna habitats of the project area are strongly influenced by dunal systems. The vegetation of the project area is broadly described by Bamford 2005 as coastal heathlands and woodlands overlying Quindalup and Spearwood dune systems. Near coastal localities were dominated by heath with gullies of *Acacia* and *Scaevola*, with interior localities supporting climax *Banksia* and *Eucalyptus tottiana* woodland with dense heaths of *Dryandra sessilis*.

The conservation significance of fauna species is generally assessed in accordance with Commonwealth and State Acts such as the *Commonwealth Environmental Protection and Biodiversity Conservation Act* (EPBC Act) 1999 and the *Western Australian Wildlife Conservation Act* 1950. Three levels of significance are generally identified during environmental impact assessment and these are:

- *Conservation Significance (CS) 1*: Species listed under State or Commonwealth Acts.
- *Conservation Significance (CS) 2*: Species not listed under State or Commonwealth Acts, but listed in publications on threatened fauna.
- *Conservation Significance (CS) 3*: Species not listed under Acts or in publications, but considered of at least local significance because of their pattern of distribution.

The Alkimos site possibly supports up to 51 reptile species, 102 bird species, 22 species of mammals and 5 species of amphibian (Bamford, 2004). Of these species, a number have conservation significance and these are summarized below.

Reptiles include:

- The Carpet Python (Level 1);
- The Black Striped Snake (Level 2); and
- Seven other reptiles (Level 3).

Birds include:

- Carnarby's Black Cockatoo (Level 1); and
- Peregrine Falcon (Level 1).

Mammals include:

- Possibility of the Chuditch being present as a vagrant (Level 1);
- Western Bush Wallaby (Level 2); and
- Quenda (Level 2).

1.5 SUMMARY OF CONSERVATION SIGNIFICANT SPECIES (LEVEL 1)

2.2.1 Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*)

Carnaby's Cockatoo is a large black cockatoo with a white patch on its cheek, white bands on its tail, and it has a strong curved bill. Carnaby's Cockatoo is endemic to the south-west of Western Australia. The breeding habitat consists of uncleared or remnant areas of eucalypt woodland in the wheatbelt where they migrate to during the spring time for breeding season.

Carnaby's Black Cockatoo migrates after breeding to higher rainfall coastal areas which support *Banksia* woodland and/or *Pinus* plantations and accessible water. Carnaby's remain in this habitat from late December to early July, feeding on seeds and insect larvae from a variety of native and introduced plant species including *Banksias*, *Dryandras*, *Grevilleas*, *Hakeas*, *Eucalyptus*, *Lambertia* and *Callistemon*. Over the last 20 years this species has disappeared from over one third of its former range (Nature Base, 2007).

2.2.2 Peregrine Falcon (*Falco peregrinus*)

The Peregrine Falcon can be found throughout all of Australia (and on most continents) and is known for its speed, it is known for being the fastest bird on earth. Both male and female birds are similar in appearance with a wingspan between 85 and 100cm. Generally the Falcon has deep blue-grey above with dark cross bars, outer flight feathers dusky with hidden grey-white bars, underwing coverts buff barred with black, barred tail tipped grey-white, black head and nape.

The neck and breast area are a pale cream-buff marked with black spots or streaks. The Peregrine Falcon may be a visitor to the Alkimos area to forage over all habitats. The Falcon is known to nest in horizontally aligned tree hollows, however there is no evidence of suitable nesting sites in Tuarts at the Alkimos site (Bamford, 2004).

2.2.3 Carpet Python (*Morelia spilota*)

The Carpet Python has been recorded from semi arid coastal and inland habitats, *Banksia* woodland, *eucalypt* woodlands and grasslands. It is known as a Schedule, Other specifically Protected Fauna in accordance with the *Wildlife Conservation Act 1950*. Its colour varies from pale to dark brown, with blackish blotches or variations. Its belly is white, cream or yellow, unmarked or with bold black blotches. In summer months, the Carpet Python is active either at night or at dawn and dusk, in cooler months it can be active during the day time. It is arboreal, terrestrial and rock dwelling. The Carpet Python is likely to be widespread in the area but mostly abundant in Habitat 4 where there is heath and limestone (Bamford, 2004).

2.2.4 Chuditch (*Dasyurus geoffroii*)

The Chuditch is the largest carnivorous marsupial which is distinguishable from other mammals by its white spotted brown pelage, large rounded ears, pointed muzzle, large dark eyes and a non-hopping gait. The Chuditch formerly ranged over nearly 70 percent of the continent, occurring in every mainland state and territory.

Currently, Chuditch are present in about 5% of their former range and are now restricted to the south-west of Western Australia. The former range of the Chuditch suggests that they utilised a wide variety of habitats including woodland associations, dry sclerophyll forests, beaches and deserts (DEH Website, 2007). There is a remote possibility of the Chuditch being present as a vagrant at the Alkimos Site (Bamford, 2004).

1.6 HABITAT ASSESSMENT

The majority of the fauna species present in the Alkimos project area no longer occur in suburban Perth, so the area represents the southern limit of the distribution of many species in the region.

On the basis of the site inspection from the Fauna Assessment five fauna habitats were recognised and are described in **Table 2.3** and the extent of these is shown in **Figure 3**. A more comprehensive description can be found in the Fauna Assessment Report attached in **Appendix C**.

Table 2.3: Habitats of Significant Fauna (Bamford, 2004)

Habitat No.	Habitat Description	Reptiles	Birds	Mammals
Habitat 1	Sandy beach	Few reptile species although the bobtail is known to forage along the strand line.	Some seabirds and shorebirds are likely to utilise the adjacent beach, and an Osprey was observed foraging over the shallows during the site inspection. Some of the shorebirds, forage amongst seaweed accumulated on beaches	The White-striped Bat has been recorded foraging over seaweed piled along beaches, presumably hunting for insects, but other mammals are probably only vagrants on the beach
Habitat 2	Foredunes restricted mainly to the outlet launch site but some foredunes are mobile secondary dunes.	A moderately rich reptile fauna, including generalist species and species specialised for existence in loose sand.	Few birds regularly use this habitat, but <i>Acacia</i> thickets in dune valleys will be used by white-browed Scrubwren, fairy wrens and some honeyeaters. The Rock Parrot forages on foredunes and even onto the upper beach zone.	Grey Kangaroos have been observed in this habitat, and there were tracks of Foxes and Rabbits. Most other mammals probably make limited use of this habitat, although could be expected as occasional visitors.
Habitat 3	Stabilised tertiary dune systems with low heath of <i>Lamandra</i> , <i>Melaleuca acerosa</i> and <i>Acacia Cyclops</i> in sheltered locations. Seen in majority of the areas to be cleared.	A rich reptile fauna with probably all the species present in Habitat 2, but with the addition of species associated with low bushes such as in the <i>Acacia</i> shrublands and species that require the continuous vegetation of low heath.	Probably a depauperate avifauna as the low heaths support few species. Australian Magpies and Stubble Quails have been observed in the broad, degraded valleys. These are species typical of disturbed ecosystems. The isolated stands of Tuart trees may attract occasional eucalypt specialists and may contain hollows used for nest and roosting by owls.	Grey Kangaroos and all introduced species were recorded in this habitat. Most of the bat species forage within woodland but the White-striped Bat forages high over open ground. <i>Acacia</i> shrubland in valleys may provide shelter for mammals, including the Quenda, and Tuart trees may provide roosting sites for bats and even the Brush-tailed Possum.
Habitat 4	Heath with outcropping limestone	A moderately rich reptile fauna that may lack some species dependent upon loose sand. The <i>Dryandra sessilis</i> thickets and exposed limestone may support species with locally restricted distributions on the coastal plain. The Carpet Python also seems to favour rocky areas. Areas of grasstrees provide shelter for a lot of reptiles.	The <i>Dryandra sessilis</i> thickets are likely to support resident White-browed Scrubwrens, possibly all three species of fairy-wrens and will be seasonally utilized by honeyeaters and Carnaby's Cockatoo.	The <i>Dryandra sessilis</i> thickets are likely to provide shelter for a range of mammal species and are probably seasonally utilized as food by Honey Possums.
Habitat 5	<i>Banksia</i> woodland on undulating deep grey sands	Probably the richest reptiles fauna because this woodland provides the greatest range of habitats, from loose sand to dense heath vegetation, grasstrees and eucalypts with loose bark. However, some of the limestone dependent and loose sand dependent species may be absent or at very low densities.	Probably the richest avifauna because of the diversity of micro-habitats available. Dense <i>Acacia</i> thickets in valleys within the <i>Banksia</i> woodland may support the White-breasted Robin, and such birds would be at the southern extremity of the northern, coastal population of the species including Carnaby's Cockatoo	Probably the richest mammal fauna because of the diversity of micro-habitats available. Virtually all listed species could be present.

MANAGEMENT OBJECTIVES, STANDARDS AND PERFORMANCE CRITERIA

1.7 MANAGEMENT OBJECTIVES

In general terms the objectives of the FMP are as follows:

- Provide additional information and detail to that contained within the PER pertaining to the AWA design development process for areas relevant to impacts on and the management of terrestrial fauna;
- Provide detail as to how AWA proposes to manage impacts on fauna in accordance with the key objectives outlined in the PER, which include:
 - Protecting threatened fauna species that may occur;
 - Minimising possible impacts of development upon fauna species and their habitats;
 - Minimising impacts and preserving regional biodiversity; and
- Provide a framework for the FMP in line with the recommendations detailed by the EPA and contained within the EPA Bulletin 1239, and also to satisfy Ministerial Condition 10-1 of Ministerial Statement 755.

1.8 RELEVANT LEGISLATION, POLICIES AND STANDARDS

The relevant legislation, policies and standards in relation to managing the impacts on fauna are outlined below in **Table 3.2**.

Table 3.2: Relevant Legislation/Policies/Standards in relation to managing the impacts of the Alkimos WWTP on fauna

Legislation / Policy / Standard	Purpose	Key Agency / DMA
Environmental Protection Act 1986 Environmental Protection Regulations 1987	Provides the statutory framework for environmental impact assessment and the placement of statutory conditions on approvals.	EPA, DEC
Wildlife Conservation Act 1950 Wildlife Conservation Regulations 1970	Provides protection for fauna and identifies fauna with conservation significance.	DEC
Environment Protection and Biodiversity Conservation Act 1999	Provides protection for matters of National Environmental Significance including fauna species	DEH
EPA Position Statement No. 3 (Terrestrial Biological Surveys as an Element of Biodiversity Protection in Western Australia, 2002)	The Position Statement discusses the principles which the EPA will use when assessing proposals which may impact on biodiversity values.	EPA

DESIGN AND CONSTRUCTION OF THE ALKIMOS WASTEWATER SCHEME

As part of the environmental approval assessment process for the Alkimos Wastewater Scheme, the Water Corporation prepared a PER pursuant to Part IV of the *Environmental Protection Act 1986*. The PER outlined components of the proposal, some of which are shown **Figure 2**, including:

- Two WWTP Site options, known as, Site A and Site B and associated buffer boundaries;
- A preliminary concept design for an ocean outfall, approximately 3.5km in length and with a diameter of 1200mm;
- Three launch site options were proposed (Site 2, Site 1A and Site 1B) with a preference for Launch Site 1B to minimise impact on significant vegetation identified in the area;
- A land outlet pipeline connection between the WWTP and the ocean outlet; and
- Associated ancillary works including access/haul roads, work shop and office areas and amenities were proposed but no details or design specifications were provided.

Since that time AWA has been developing a more detailed design and refinement of what was presented in the PER, including:

- Detailed design of the WWTP at Site B and at Launch Site 1B footprints;
- Refined design of the ocean outfall with a new length of 3.7km (as requested by the EPA);
- Detailed design of the connection from the WWTP to the ocean outfall
- Detailed design of the trench through Bush Forever Site 397;
- Detailed design of all ancillary works including, access roads, haul roads and lay out areas for offices and associated infrastructure such as fencing;
- Detailed design of the Quinn's Main Sewer from the WWTP to the boundary of the buffer zone; and
- Rehabilitation plans for all temporarily disturbed areas.

Based on discussions between the Water Corporation and the EPA Service Unit it has been agreed that any changes outside of the scope of the original proposal will be amended through a *Section 45 c* process, and that the proposed changes are considered “non substantial”.

The Quinns Main Sewer alignment from the suburb of Butler to the edge of the buffer boundary was not assessed in the PER and was approved through the “Preliminaries to Works” process established under the *Water Agencies (Powers) Act 1984* and a Development Approval process as part of the *Planning and Development Act 2005*. A purpose Clearing Permit (1064/1) was secured for the full alignment of the Quinns Main Sewer, inclusive of the section within the WWTP buffer zone in November 2006.

The trenched crossing through Bush Forever Site 397 and the infrastructure including the access track a portion of the launch site and pipeline located in between the two Metropolitan Region Scheme (MRS) ‘Public Purposes’ Reserves in land zoned ‘Urban’ under the MRS is also being assessed through a Development Approval process. Similarly, the excavated fill site area and all associated haul/access roads outside of the WWTP buffer

boundary was approved through a separate Development Approval process coordinated by LandCorp (DA 07/0219).

1.9 WWTP SITE

The ultimate capacity of the WWTP is proposed to be 160ML/d, however this capacity is not expected to be required until beyond 2050 depending on demand. Initially a 20ML/d WWTP will be installed at the site which will utilise a footprint approximately one quarter of the size of that required for a 160ML/d plant. Due to geotechnical conditions, terrestrial drill and blast is required as part of the earthworks program. On this basis a step-wise excavation of the WWTP site in line with plant expansion requirements would not be feasible as future blasting may affect the plants structural integrity. Since the WWTP earthworks cannot be undertaken progressively, the WWTP site will be prepared for the ultimate capacity, requiring the excavation and removal of approximately 3 million cubic meters of spoil that will be fully cleared of vegetation. This will provide for holistic planning of the rehabilitation of the WWTP site batters and avoid putting the constructed WWTP plant at risk through blasting in close proximity in the future.

The site excavation works will require a fleet of earthmoving equipment including excavators, dozers, graders, dump trucks and water carts. Portions of the footprint will be initially excavated to floor levels founded at Reduced Level (RL) 4m and RL5m Australian Height Datum (AHD), then back filled to a floor level of RL7m AHD so that the area is prepared for future removal by free digging when the plant requires expansion.

The site will be cleared of all vegetation and topsoil in a step-wise fashion. An approximate area of 29.5 ha will be cleared over a period of approximately 25 days from the beginning of January 2008 through to February 2008, which will enable highly mobile fauna to relocate into adjacent bush-land areas. The vegetation will not be mulched, rather it will be pushed into stockpiles remaining in “brush” form. Topsoil will be stripped within the WWTP site and used for the rehabilitation of the batters. Where sequencing will allow, topsoil will be stripped from one location and immediately placed where rehabilitation works are active. In all other instances where immediate re-use is not possible, topsoil will be stockpiled for later re-spreading as required or incorporated in the fill. Approximately 10ha of the WWTP footprint will be rehabilitated.

A 1.2 metre tall, ring lock fence will be erected around the project area. Excavated material from the WWTP site will be trucked via haul roads and disposed of as fill within LandCorp’s development fill site to the south of the WWTP, haul roads are shown in **Figure 3**. Ground water production bores will be located within the area to assist with compaction and dust suppression.

The WWTP site final levels will be battered back to natural grade at a slope of 1 metre vertical to three metres horizontal (1V:3H) which will provide a high degree of geotechnical stability and provide a sound basis for rehabilitation. These batters will comprise both loose course sand and consolidated limestone at depth.

Rehabilitation of the WWTP sand batters will be undertaken progressively as excavation proceeds. This will involve respreading topsoil and cleared vegetation in “brush” form, planting tube stock and direct seeding using provenance seed collected through out the area in 2006 and 2007. Revegetating the sand batters will ensure long-term stability and prevent wind and water erosion onsite and into Area 9. The proposed rehabilitation/revegetation procedures are detailed further in **Section 6.6**.

1.10 OCEAN OUTFALL LAUNCH SITE

The launch site and onshore outfall trench (from the launch site through the primary dune to the beach) are required to facilitate the fabrication and pull out of the outfall pipeline strings. Launch Site 1B was selected as the preferred site for launch site design and construction as it incurs a lesser impact on significant vegetation identified in the area (Water Corporation, 2005) compared to the other launch site options.

The launch site requires the clearing of approximately 6.7 ha of vegetation (including the outfall trench section through Bush Forever Site 397). Once the ocean outfall has been installed the entire area will be rehabilitated. Clearing will be completed in a step-wise fashion, and vegetation will be cleared so that it remains in “brush” form and topsoil will be removed and stockpiled within the launch site footprint for rehabilitation purposes. The launch site will be levelled with the material cut to fill the lower lying areas as the site will need to form a suitable working platform.

The trenched section required for the pipeline will be excavated from the launch site down to the ultimate pipe invert level of the Ocean Outfall, through Bush Forever Site 397. The area to be cleared through Bush Forever Site 397 is approximately 1.7ha and the alignment was adjusted 10 metres to the north of that presented in the PER, to be located through an existing dune blow-out and to minimise impacts on limestone cliffs to the south of the alignment. The launch site trench sidewall batter grade will be 1V to 2H, in order to ensure stability of the trench but also to minimise horizontal intrusion into existing remnant vegetation.

Material excavated from the launch site trench (through the primary dune) will be stockpiled within the launch site footprint (in areas previously cleared) and will be used for the reinstatement of the primary dune once the pipe launch is complete. Rehabilitation will take place using the cleared vegetation, topsoil, tubestock and provenance seed collected through out the area in 2006 and 2007. It is the intent of the AWA to reinstate and revegetate the area to an improved condition then currently existing at the site. In particular, the Bush Forever component will undergo full ecological restoration which will focus on restoring the previously existing flora characteristics and values of the area.

1.11 LAND BASED WWTP – LAUNCH SITE CONNECTION

The WWTP will be connected to the launch site (the start of the ocean outfall) by a 990m section of pipe. The connection extends from the WWTP outlet flume to a chamber at the launch site.

In order to avoid surface disturbance associated with cut and cover techniques, the AWA proposes to use a Dual Mode Tunnel Boring Machine (TBM) that caters for the diverse nature of the geotechnical conditions that are expected to be encountered.

The distance between the WWTP and the launch site will necessitate an intermediate shaft to be installed at a point between the two sites as the pipe jacking TBM cannot continuously tunnel for longer than 700 metres. The necessary jacking forces beyond 700 metres exceed the maximum force that can be delivered by a hydraulic jacking system and therefore the total connection distance of 990 metres cannot be jacked directly. Therefore there will be some ground disturbance along the alignment of this section of pipeline to construct and access a retrieval/jacking shaft. This disturbance will be significantly less than that incurred if the connection was installed through cut and cover (open trench) construction methods.

1.12 ACCESS AND HAUL ROAD WORKS

During the construction period, haul and access roads, work sheds, storage yards, office facilities, amenities and car park facilities will need to be constructed.

An access road will be required for general use and site access (to both the WWTP site and the launch site). Initial entry into the works area will be along Romeo Road from Wanneroo Road, following the existing Romeo Road reserve through the future Marmion Avenue extension and then linking up with future road reserves.

Haul Roads will be required to transport excavated material from the WWTP and the launch site to the LandCorp fill site to the south of the WWTP site. The haul roads have been designed for 85 tonne haul trucks. For safety and efficiency, haul roads need to be separated from general site traffic on the access roads. The haul roads consist of twin 8.5 metre unsealed individual lanes separated by an earth bund. The design speed for the haul road will be 40km/hr for loaded trucks and 60km/hr for unloaded trucks.

An area of 7.5 ha will be cleared for haul road and access roads within the WWTP buffer zone. A access road connecting the WWTP and the launch site will also be constructed and will consist of twin 3.5 metre unsealed individual lanes.

The haul and access roads were designed to avoid areas that support significant environmental values. In particular, the haul road alignments through Area 10b were designed to minimise the need for earthworks and consequential clearing of vegetation. As such, the permanent access road was designed to align to the west of Area 10b which further reduced the width of the corridor through Area 10b. The temporary nature of the haul road works allow for the full restoration of the area via re-contouring and rehabilitation to pre-disturbed levels once earthworks are complete.

Clearing of the haul and access roads will be completed in a step-wise fashion. As the majority of the roads are only for temporary use, stockpiling of cleared material and topsoil will be undertaken and rehabilitation will occur once the construction phase has been completed.

The main site office is located along Romeo Road outside of the WWTP buffer zone. It serves as the primary access point for the Alkimos site. An earthworks site office will be located at the south west corner of the WWTP along with a 100m x 100m workshop/fuel store, and a site office facility will be located at the launch site. The locations for these facilities are shown in **Figure 3**. Office areas will be graded and levelled and will be constructed to provide appropriate drainage. On completion of works the offices will be removed and the areas rehabilitated.

1.13 QUINNS MAIN SEWER

The section of the Quinn's Main Sewer situated within the WWTP buffer zone will be constructed using both open cut trenching (cut and cover) and tunnelling techniques. Where clearing is required vegetation in "brush" form and topsoil will be cleared and stockpiled. Spoil will be excavated and placed on both sides of the trench. The sides of the trench will be battered and ramps will be installed at a gradient suitable for vehicles and personnel to enter the trench. These ramps will also act as an escape route for any fauna that could become trapped in the open trenches.

A shaft (AC11) and lay-down area for pipe work will be installed at the conclusion of the trenched section for insertion of the TBM which will facilitate tunnelling the remaining section to the WWTP. The total area of disturbance within the WWTP buffer zone will be no more than 6 ha, including the cut and cover trench and a lay down area required for the shaft construction and operation. Once the sewer is constructed the trench will be backfilled and the areas within the WWTP buffer zone will be rehabilitated.

POTENTIAL IMPACTS

The construction of the Alkimos Wastewater Scheme has the potential to impact local fauna, in certain circumstances mortality of local fauna will be inevitable, the potential impacts identified have been summarised in **Table 5**. It is the objective of this FMP to implement management measures to minimise and mitigate any impacts to fauna within the project area, management measures addressing the below impacts are discussed below and within the management framework as outlined in **Section 6**.

Table 5 Summary table of the potential impacts to fauna

Construction Activity	Potential Impacts
Clearing	Loss of fauna habitat, in particular, a portion of Carnaby's Black Cockatoo foraging habitat
	Loss of vertebrates too small immobile to relocate
	Stranding of fauna during clearing operations
Vehicle movements	Roadside fatalities and injuries to fauna from collisions with construction vehicles
Trench/fencing	Trapping of fauna in trenches and within fenced areas

1.14 WWTP SITE

The WWTP Site will require clearing of 29.5 ha of vegetation, and the site supports mostly Habitat 3 (degraded heaths with *Acacia* shrubland). A small portion within the east of the WWTP footprint supports portions of Habitat 5 (*Banksia* woodlands) and Habitat 4 (Heath with outcropping limestone supporting *Dryandra* and grasstrees).

The *Banksia* woodlands are known to provide the richest environment for most species but areas of heath with exposed limestone, *Dryandra sessilis* thickets and *Acacia* shrublands are potentially utilized for particular species or groups of species, in particular:

- Areas of heath with exposed limestone potentially support restricted populations of several reptile species and the Carpet Python;
- *Dryandra sessilis* thickets are foraging habitat for Carnarby's Cockatoo and a range of nectarivorous species, and *Acacia* shrublands potentially provide shelter for a number of locally significant species such as Quenda; and
- Grass trees almost certainly provide shelter for reptiles and some mammals.

The primary impact will be the loss of vertebrate fauna habitat caused by the clearing of vegetation, which is expected to result in the localised loss of vertebrates that are too small or immobile to relocate to unaffected areas. Most of the bird species, larger mammals and reptiles will be able to relocate and avoid the impact of clearing and construction within the site.

Carnaby's Cockatoo's predominantly breed in the in the Western Australian Wheatbelt. Migration to the Alkimos region during summer through to autumn is likely to be for foraging purposes . Therefore due to the timing and location of the project, disruption to breeding cycles is expected to be negligible, and direct impacts to foraging birds is also likely to be minimal due to the small areas of foraging habitat within the clearing footprints. Within the buffer zone significant amounts of Cockatoo foraging habitat will be retained, particularly within Area 9 and Area 10a as shown in **Figure 3**.

1.15 OCEAN OUTFALL LAUNCH SITE

The Launch Site will require the clearing of 7.3ha of vegetation. This clearing will require the removal of majority Habitat 3 (stabilised tertiary dunes) with a small area of Habitat 4 (heath with outcropping limestone).

Habitats 1 and 2 will be disturbed during the construction of the outfall dune crossing and pipeline installation through Bush Forever Site 397.

Dryandra sessilis thickets and exposed limestone may support species with locally restricted distributions on the coastal plain, including *Diplodactylus polyopthalmus* (a gecko) and the Barking Gecko. The Carpet Python also seems to favour rocky areas.

Grass Trees that are a component of Habitat 4 almost certainly provide shelter for reptiles and some mammals however the presence of this species in the area is minimal.

The main impact of clearing will be the loss of vertebrate fauna habitat caused by the clearing of vegetation, which is expected to result in the localized loss of vertebrates that are too small or immobile to relocate to unaffected areas. It is unlikely that the excavation and trenching through the primary dune will result in any trapping of fauna as the dune area will be excavated down to grade levels at the eastern and western sides of the dune, providing a corridor through to the beach in preparation for the pipe pull.

1.16 LAND BASED WWTP – LAUNCH SITE CONNECTION

The pipeline from the WWTP to the launch site will be tunnelled with the insertion and recovery portals located within existing excavated footprints. The distance between the WWTP and the launch site will necessitate a recovery shaft to be installed at a point between the two sites, as discussed previously.

Due to the small scale clearing required for the shaft, impacts will be minimal and most likely result in localized loss of vertebrates that are too small or immobile to relocate to unaffected areas.

1.17 ACCESS AND HAUL ROAD WORKS

All haul roads, temporary access roads and earthworks office structures lie within Habitat 3. The main impact will be the loss of vertebrate fauna habitat caused by the clearing of vegetation, which is expected to result in the localised loss of vertebrates that are too small or immobile to relocate to unaffected areas.

A fleet of earthmoving machinery and work vehicles will be operational along designated haul roads and access roads, it is expected that some localised fauna fatalities and injuries could potentially occur during the construction period arising from vehicle movement.

1.18 QUINNS MAIN SEWER

The construction of the Quinns Main Sewer within the WWTP buffer zone necessitates the clearing of 6ha for trench construction, preparation of a shaft laydown area and associated access tracks. Majority of this vegetation is representative of Habitat 3.

The main impact of clearing will be the loss of vertebrate fauna habitat caused by the clearing of vegetation, which is expected to result in the localised loss of vertebrates that are too small or immobile to relocate to unaffected areas. The open trench areas may trap fauna; however this occurrence is likely to be minimised due to temporary mounds of spoil being located on either side of the trench which will act as a barrier to the movement of fauna. The sides of the trench will be battered with a stable gradient (to avoid slumping and trench collapse) and ramps will be installed at each end of the trench at gradient suitable for vehicles and personnel to enter the trench. These ramps/batters will inevitably provide an escape route for any fauna should they become trapped in the open trenched areas, however the open trenches will need to be inspected daily prior to works commencing.

Heavy machinery and work vehicles will be operational along the access track and within the shaft laydown area, it is expected that local fauna fatalities and injuries could potentially occur during the construction period.

PROPOSED MANAGEMENT FRAMEWORK

In general, the following broad scale management principles will be adopted with the overarching objective of minimising impacts to terrestrial fauna and to satisfy the objectives specified in the Ministerial Statement 755 during the construction of the Alkimos Wastewater Scheme as specified in **Section 1.2:**

- All site personnel will be inducted and provided training with regard to the fauna management requirements prior to being involved in any construction works;
- Before clearing commences a internal Ground Disturbing Works Permit must be checked and signed off by the Alliance Manager and the Environment and Community Relations Manager;
- Immediately prior to clearing commencing, a reconnaissance fauna survey will be undertaken by a qualified and suitably experienced zoologist to ensure that there are no significant fauna species situated within the clearing areas that could be injured by clearing operations and therefore requiring local relocation;
- Clearing will be undertaken in a progressive manner and over a period of time that will allow mobile fauna to relocate from the works area, and will not create “islands” of vegetation in which fauna could become stranded;
- Fencing will not be installed until all clearing within the site area is complete, allowing free movement of fauna away from clearing activities;
- The WWTP site works area will be fenced to discourage fauna from re-entering cleared areas;
- Operation personnel will be required to contact a local Veterinarian or appropriate local fauna carer should injured fauna be encountered during works;
- Site personnel will be clearly instructed that no native fauna (including venomous snakes) are to be deliberately injured or killed;
- There will be a qualified reptile handler either within the workforce or based nearby;
- Any fauna management issues encountered will be recorded with a ‘Fauna Incident Form’ as shown in **Appendix E**, and the Site Supervisors will be required to lodge these forms with the Site Environmental Coordinator;
- Ensure that areas of the works where fauna could be trapped (i.e. open sewer trenches) are inspected daily for the duration that these are open to ensure that trapped fauna are identified and released in a suitable manner;
- Ensure any boreholes and test pits are capped and/or maintained in a way which will restrict fauna entry; and
- Ensure that site rehabilitation is undertaken to maximise fauna habitat potential (i.e. the placement of intact large woody debris, revegetation with locally occurring plant species etc).

1.19 DESIGN MANAGEMENT

Design has focused on minimising the need for vegetation clearing and maximising rehabilitation. Approximately 49.2 Ha of vegetation will be cleared and disturbance of fauna habitat will therefore be inevitable.

State-of-the-art technology has been procured by AWA which will assist in the minimisation of ground disturbance, for example, the section of pipeline from the WWTP to the launch site will be tunnelled using a TBM, with two out of the three insertion and recovery portals constructed within the respective footprints of those sites. This will preclude the need for open cut trenching and hence avoid any clearing and associated impacts with clearing activities for this portion of the project.

The AWA has minimised disruption of Carnaby's Cockatoo foraging habitats as far as possible. Portions of the buffer zone surrounding the WWTP Site offer the opportunity for the long term conservation of foraging habitat for Carnaby's Cockatoo. In addition, a further ~43 Ha (Area 10a) of *Banksia* woodland immediately north of Area 9 has been put forward by the Water Corporation as land to be protected and managed for conservation purposes, this area has been documented in the Alkimos-Eglington MRS amendment, the location of the areas is shown in **Figure 3**.

1.20 PERSONNEL TRAINING AND INDUCTION

Prior to works commencing all personnel will be inducted to a level that will enable understanding and compliance with the requirements of the FMP. The induction will ensure that:

- Site supervisors know the location of the most current version of this FMP and the requirements specified within it;
- All site personnel are aware and know the location of contact details for the local Veterinarian or appropriate local carer should injured fauna be encountered;
- All site personnel are aware and know the location of contact details of a trained reptile handler should any reptiles be trapped or are located within the construction areas;
- Procedures are in place which ensure that operations are undertaken to avoid fauna fatalities;
- Site personnel are aware of who to contact when fauna management issues arise;
- Site personnel complete Fauna Incident Forms when any fauna management issues occur during construction activities;
- Deliberate killing of any fauna is strictly prohibited at all times; and
- No domestic pets are allowed on site.

1.21 CLEARING MANAGEMENT

A formal internal Ground Disturbing Works Permit (GDWP) procedure has been established which requires approval from both the Alliance Manager and the Environment and Community Relations Manager before any clearing of vegetation can be undertaken on any area of the overall project. This procedure will ensure that the set out areas marked for clearing comply with the design specifications, management plans and permits/approvals and therefore no excess or unauthorised clearing eventuates. A copy of the GDWP application form is contained in **Appendix D**.

Package Managers and Site Supervisors will undertake an intensive environmental induction and will be responsible for ensuring all site personnel have undertaken an environmental induction and are aware of the FMP requirements prior to operations as outlined in **Section 6.2**.

Immediately prior to ground disturbing works a reconnaissance survey will be undertaken by a qualified and suitably experienced zoologist to ensure that there are no significant fauna species situated within the areas marked out for clearing that could potentially be injured by clearing operations. In particular, areas of Banksia woodlands (Habitat 5) where Carnaby's Cockatoos are likely to reside and within Habitat 4 which is favoured by the Carpet Python. If significant fauna is discovered, translocation to adjacent bushland areas may be necessary. The Site Environmental Coordinator will also be present onsite when clearing is being undertaken.

The bulk clearing for the WWTP area will take place in the beginning of February 2008 through to March 2008. Carnaby's Cockatoos may be present in the area for foraging purposes however minimal disturbance to breeding cycles is envisaged as the Cockatoo's migrate to the Wheatbelt for breeding season. The habitat being cleared has minimal foraging habitat for the Cockatoos as the footprints to be cleared fall mainly in Habitat 3 which represents stabilised tertiary dune systems with low heath of *Lomandra Melaleuca acerosa* and *Acacia Cyclops* in sheltered locations.

Clearing will be carried out in a step-wise fashion (although all during the same process) and areas will be cleared so that fauna can be displaced and easily relocate into adjacent bushland areas. The clearing will be undertaken over a period of time that will allow mobile fauna to relocate from the works area, and not create "islands" of vegetation in which fauna could become stranded.

Large woody debris and standing dead timber will be collected for redistribution in rehabilitation and surrounding conservation areas. Clearing will be undertaken by "windrowing" the vegetation so that it remains in "brush" form and this brush vegetation will be stockpiled to the side of the works. At the completion of clearing the site will be inspected and then fenced off with a 1.2m ringlock mesh fence in an attempt to keep fauna out of the work areas.

1.22 CONSTRUCTION MANAGEMENT

Construction activities will be restricted to designated haul and temporary access roads and no off-road driving is to occur. All vehicles will be required to comply with site speed limits and road kill will be removed from the road surface to prevent other animals from being attracted to corpses, and, in turn being struck by vehicles.

Any boreholes and/or testpits within the site area that have been installed for geotechnical investigations or for other purposes associated with the construction of the Alkimos Wastewater Scheme are to be appropriately capped or covered to restrict entry and prevent the trapping of fauna.

Work sites will be inspected prior to works commencing each day by the various Site Supervisors to ensure there are no trapped fauna within open trenches/shafts and fences for the duration of works. Any trapped fauna that is unable to be safely freed from the site will require a qualified animal handler to assist in relocation to adjacent bush land areas and any venomous reptiles will require a trained reptile handler.

The open trenched sections of the Quinns Main Sewer will have mounds of spoil located on either side of the trench which will act as a temporary barrier to fauna movement. The batters of the trench will have a gradient that would prevent trench slumping or collapse, and access ramps will be located at each end of the trench for vehicles and personnel to enter the trench floor. These ramps are to be in place at all times and will also enable trapped mobile fauna to easily escape from the trench without risk of injury.

1.23 FAUNA INCIDENT REPORTING

Fauna Incident Forms as shown in **Appendix E** will be made available at all site office locations and will require completion should any Fauna Management issues occur during works.

By definition, fauna management issues include;

- Any fauna deaths of vertebrates (except for reptiles but including any pythons) that occur on-site.
- Any incidents on site which result in fauna being injured and requiring assistance from a veterinarian or qualified animal handler.
- Any trapped fauna located on-site that are required to be removed / relocated.

All forms are to be completed by the personnel involved/responsible for the incident and returned to the Site Supervisor for submission to the Site Environmental Coordinator. Fauna Incident Forms will be filed, periodically reviewed (on a weekly basis) and any reoccurring incidents may invoke the implementation of procedures which aim to minimise harm to fauna.

1.24 REHABILITATION

All ground disturbed by construction activities that do not form part of the permanent works will be rehabilitated. All areas other than the sand batters of the WWTP will essentially be rehabilitated when that area of works is completed and no longer required for ongoing works. Rehabilitation of disturbed areas will promote the relocation of native fauna back into environment and assist in restoring the biodiversity of the area.

Rehabilitation of the WWTP Site sand batters will be undertaken progressively as the WWTP excavation proceeds. Treatments will involve respreading topsoil and stockpiled vegetation in “brush” form which will provide some surface protection and also potentially provide a native seed bank. Large trees cleared during earthworks will also be placed on the batters to increase surface roughness and provide ground dwelling fauna opportunities.

Once sufficient autumn/winter rain has been received, direct seeding using provenance correct seed collected through out the area in 2006 and 2007 will be undertaken and tube-stock will be planted. Re-planting of native seed will also assist in restoring the habitats of native fauna and promote relocation and restoration of biodiversity.

Rehabilitated areas will be monitored to ensure the success of the rehabilitation programme in terms of re-establishing appropriately diverse vegetation cover. Should monitoring reveal that the rehabilitation performance does not meet the pre-established completion criteria as specified by the AWA, responsive action will be undertaken to counteract any shortfalls. This will include the reapplication of seed and tube stock or weed control programs as specified by the AWA.

6.7 MONITORING AND REPORTING

6.7.1 MONITORING

6.7.1.1 Operational Monitoring

Site Supervisors/Site Engineers will monitor open trenches and areas inside fencing to identify and release trapped fauna. This will form part of the daily works procedure for construction personnel.

The Site Environmental Coordinator will monitor the project site daily during clearing and liaise with the works personnel to ensure that the requirements of the FMP are being implemented.

Weekly progress meetings monitoring the projects environmental performance will be held between the Environment and Community Relations Manager and the Site Environmental Coordinator, with findings from these being directly reported back to the Alliance Manager.

6.7.1.2 Environmental Compliance Monitoring

During the course of the project, monthly Environmental Audits will be undertaken internally by the Environment and Community Relations Manager and the Site Environmental Coordinator. The audit will ensure compliance with the FMP is being achieved with a view to immediately rectifying any shortcomings that are identified. All audit findings will be reported directly to the Alliance Manager.

Quarterly Environmental Audits will be conducted by the Water Corporation Environment Branch to ensure compliance with the FMP with findings being reported directly back to the Environment and Community Relations Manager and the Alliance Manager.

The AWA in conjunction with the Water Corporation will undertake annual Compliance Audits to ensure compliance with all the conditions outlined in the Ministerial Statement 755, these reports will be provided to the DEC Audit and Compliance branch.

6.7.1.3 Rehabilitation Monitoring

Systematic rehabilitation monitoring will occur throughout the duration of the rehabilitation works, and for two years thereafter to ensure that rehabilitation meets pre-determined completion criteria. As part of this process, sightings of fauna within the rehabilitation areas will be documented.

6.7.2 REPORTING

6.7.2.1 Internal Reporting

Weekly reports will be available following weekly meetings between the Site Environmental Coordinator and the Environmental and Community Relations Manager.

Reporting will include;

- Induction procedures review and records of inducted personnel;
- Area of clearing; and
- Issues/incidents with operations and actions/resolutions for these.

All findings will be reported back to the Alliance Manager and made available to the Water Corporation.

6.7.2.2 External Reporting

The Water Corporation will be provided with quarterly environmental update reports. Included in the report will be information pertaining to the FMP which will outline:

- Induction procedures and records of inducted personnel;
- Area of clearing to date; and
- Issues/incidents with operations and actions/resolutions for these.

An environmental compliance report will be submitted to the DEC annually on behalf of the Water Corporation as the proponent for the project. The report will document the process of compliance with all the environmental conditions outlined in the Ministerial Statement 755.

ROLES AND RESPONSIBILITIES

In order to ensure that AWA adequately resources and complies with the FMP throughout the life of the project various responsibilities have been delegated to personnel within the AWA team. **Table 7.1** outlines the roles and responsibilities for all AWA personnel, staff contact details are contained in **Appendix G**.

Table 7.1: Roles and Responsibilities for Site Based Staff

ROLE	RESPONSIBILITY
Alliance Manager	The Alliance Manager is responsible for the approval and implementation of this FMP. The Alliance Manager shall: <ul style="list-style-type: none"> - Actively promote sound environmental management and ensure that all project personnel are fully conversant with this FMP and any incumbent responsibilities. - Be aware of meetings, audits and reviews pertaining to environmental matters resulting from the FMP. - Ensure that the FMP is adopted into the construction management system and procedures. - Review marked out clearing areas and sign a Ground Disturbing Activity Permit prior to any ground disturbing activities being undertaken.
Environment and Community Relations Manager	The Environment and Community Relations Manager reports to the Alliance Manager and is responsible for ensuring the AWA is adequately resourced to comply with and implement the FMP. The Environment and Community Relations Manager shall: <ul style="list-style-type: none"> - Advise on environmental requirements and ensure compliance with all current statutory obligations - Ensure potential subcontractors have suitable experience and knowledge to conduct any potential work in compliance with the FMP. - Ensure performance is monitored, documented and reported to senior management. - Review marked out clearing areas and sign a Ground Disturbing Activity Permit prior to any clearing. In conjunction with the Environmental Coordinator, review the document every 3 months and install system improvements
Construction Manager	The Construction Manager is accountable to the Alliance Manager. The Construction Manager has the authority to assess the environmental implications of installation methodology/design on fauna habitat and make changes as appropriate in consultation with the Manager of Environment and Community Relations. The Construction Manger shall: <ul style="list-style-type: none"> - Develop a construction methodology compliant with the FMP. - Liaise with the Environment and Communications Manager and the Site Environmental Coordinator with respect to fauna issues which may occur on site. - Ensure that a Ground Disturbing Activity Permit has been signed off by the Alliance Manager and the Environment and Community Relations Manager prior to any ground disturbing activities being undertaken.
Site Environmental Coordinator	The Site Environmental Coordinator reports to the Environment and Community Relations Manager. This position provides daily site environmental management, advice of the environment issues to site construction personnel and assists them in managing environmental issues. The Site Environmental Coordinator shall: <ul style="list-style-type: none"> - Coordinate site reconnaissance survey for significant fauna prior to construction. - Monitor environmental performance of construction activities on a daily basis. - Distribute information in relation to Fauna and have the FMP readily available. - Be available to consult with subcontractors should there be any queries in relation to the FMP. - Facilitate training of personnel on site. - Report back to the Environment and Communications Manager on a weekly basis regarding any issues associated with the FMP. - Collect and log all Ground Disturbing Activity Permits and Fauna Incident Forms from the various Site Supervisors.

ROLE	RESPONSIBILITY
Supervisors & Site Engineers	<p>Supervisors shall be responsible for determining the course of actions to be taken, to ensure minimal impact to fauna and fauna habitat.</p> <p>Supervisors shall:</p> <ul style="list-style-type: none"> - Be aware of the FMP and have a copy of it on site at all times. - Provide leadership which encourages a consultative interaction with team members. - Be responsible for ensuring that sufficient resources are available for the implementation of the FMP. - Comply with and adhere to the requirements of the FMP, instruction and procedures - Ensure that the personnel under their supervision have an understanding of the FMP and are provided with the necessary instructions and support to perform their tasks in a manner which minimises impacts on the environment.
Personnel and Subcontractors	<p>All personnel, including subcontractors, are responsible for the environment, in so far as they have some control, either direct or indirectly.</p> <p>Each person shall:</p> <ul style="list-style-type: none"> - Participate in environmental meetings and awareness training through an induction process prior to entering site. - Be responsible for keeping the workplace in a clean and tidy condition. - Immediately report all incidents/accidents involving fauna by filling in a Fauna Incident Form and passing it on to the Site Supervisor. - Comply with and adhere to the requirements of the FMP, instruction and procedures.

SUMMARY

The FMP details how the AWA will manage potential impacts fauna during the construction of the Alkimos Wastewater Scheme. The design and construction works associated with the Alkimos Wastewater Scheme, undertaken by the AWA on behalf of the Water Corporation will be in accordance with the guiding principle of minimising impacts to the existing environment.

The management measures detailed in this FMP are considered to be the most appropriate manner in which to achieve the objectives stated throughout the document, given the environment in which construction is to occur. Furthermore, the FMP has been prepared in a manner to comply with Ministerial Condition 10-1 associated with Ministerial Statement 755, which was issued in accordance with the provisions of Part IV of the *Environmental Protection Act 1986*. This FMP is a live document which may require revision and modification throughout the life of the project.

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