

**Perth Desalination Integration  
Desalination DN 1200 Pipeline**

Draft Flora and Fauna Management Plan

February 2005



## PERTH DESALINATION INTEGRATION

### DRAFT FLORA AND FAUNA MANAGEMENT PLAN

#### REVISION STATUS

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**PERTH DESALINATION INTEGRATION**  
**DRAFT FLORA AND FAUNA MANAGEMENT PLAN**

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# 1. Introduction

## 1.1 Project Background

The Water Corporation is undertaking design and construction planning associated with the Perth Seawater Desalination Integration Project. The Premier announced the project on July 29<sup>th</sup>, 2004 and studies and design works are underway in order to meet the requirement of commissioning the works in late 2006. The Perth Seawater Desalination Plant (PSDP) and the pipeline to Thomsons Reservoir (DN 1200) received environmental approval on July 9<sup>th</sup>, 2004 (EPA Bulletin 1137, 2004).

Perth's Seawater Desalination Plant (PSDP) will be built adjacent to Cockburn Sound in Kwinana. It is planned that the plant will provide 45 gegalitres (GL) per annum to the IWSS. Essential to its integration with the present supply system are upgrades to Thomsons Reservoir, design and construction of a new pump station to pump water into the IWSS, and connecting pipelines and associated regulation valves.

## 1.2 Purpose and Scope

This plan provides management and mitigation measures for impacts on flora and fauna on the Kwinana to Thomsons Reservoir (DN 1200) pipeline. A map of the pipeline route is attached at Figure 1. In particular the plan includes:

- Details of clearing requirements;
- Dieback management and weed control
- Fauna protection and management;
- General pipeline route restoration.

### *Pipeline Details*

The pipeline will be laid underground, primarily along roadsides, between the Perth Seawater Desalination Plant at Barter Road, Kwinana and the Thomsons Reservoir on Henderson Road in Henderson.

The pipeline will extend for a distance of 10.2 km, with 51% of its length within road reserves, which are generally degraded. In the most part, the pipeline will be constructed by open trench excavation, with backfilling after the pipe is laid and subsequent restoration of the surface to its original condition. The estimated trench requirements for construction will be 6 to 8m wide at ground level and from 2.5 to 4.5m deep. It is anticipated that small sections of the pipeline, where it crosses busy roads, will be constructed using trenchless techniques such as thrust boring.

### 1.3 Legally Binding Commitments

The approval for the project, given in EPA Bulletin 1137, gave the following commitments from the proponent with regard to flora and fauna:

- ▶ Prepare and implement a Flora and Fauna Management Plan, that will include the following :
  - Locating the plant and pipelines to minimise clearing and effects on conservation values.
  - Mitigating impacts on Priority Flora.
  - Dieback management measures.
  - Weed control measures.
- ▶ Implement the Flora and Fauna Management Plan described above.

### 1.4 Objectives of the Plan

This plan has been developed to ensure that the construction of the project is carried out in a manner so as to cause the minimum practicable disturbance to the existing vegetation, fauna and natural landform, particularly:

- ▶ Minimising the disturbance of native flora;
- ▶ Minimising disturbance to native fauna; and
- ▶ Weed and dieback control.

### 1.5 Legal Requirements

The construction of the pipeline will comply with the relevant environmental legislation, regulations and Australian Standards and codes of practice administered by relevant State and Federal Government agencies. The Acts, standards and codes of practice, their applications to the project works and the responsible Government department are listed below.

**Table 2 Legislation Relevant to Flora and Fauna Management on the Project**

| <b>Legislation</b>  | <b>Application</b>   | <b>Responsible Department</b>                   |
|---|--|---|
| <i>Environmental Protection and Biodiversity Conservation Act 1999.</i> | Rare flora and fauna protection.<br>Pollution prevention licences. | Department of Environment and Heritage.         |
| <i>Wildlife Conservation Act 1950.</i>                                  | Flora and fauna protection.  | Department of Conservation and Land Management. |

| <b>Legislation</b>   | <b>Application</b>             | <b>Responsible Department</b>          |
|--|--------------------------------|--|
| <i>Environmental Protection Act 1986, Clearing Permit Regulations (2004)</i>     | Clearing of native vegetation. | Department of Environment              |
| <i>Bush Fires Act 1954</i>   | Management of fire safety.     | Fire and Emergency Services            |
| <i>Agriculture and Related Resources Protection Act 1976</i>                     | Declared weed control.         | Department of Agriculture              |
| SPP No. 2.8: Draft Bushland Policy for the Perth metropolitan Region (July 2004) | Protection of bushland.        | Western Australian Planning Commission |

## 2. Summary of Flora and Fauna Impacts

The following summarises the environmental impacts as discussed in the Environmental Impact Assessment report (GHD, 2004).

### 2.1 Vegetation Clearing

- ▶ Approximately 4.29 ha of native vegetation in varying condition will be removed for the works.
- ▶ Up to 4 plants of a Priority 4 species (*Dodonaea hackettiana*) will be removed.
- ▶ Some large native and planted trees will be removed.

### 2.2 Weeds and Dieback

The area is generally not highly susceptible to dieback, except at the Thomsons Reservoir site. Much of the land is uninterpretable for dieback due to previous disturbance or lack of indicator species. The Banksia woodland at Thomsons Reservoir is susceptible to dieback infestation but does not show any signs of infection.

General weed infestation occurs along much of the route, including within the existing gas pipeline corridor in the Thompons Reservoir land. A Declared weed, *Datura ferox* (Thornapple) occurs at some points along the route.

Although there are no specific management requirements for this plant within the Shire of Cockburn, efforts will be made to prevent its spread.

### 2.3 Risks to Fauna

Vegetation clearing will result in disturbance of some fauna habitats, however in this regard the impact on fauna is expected to be minimal as most fauna will have the opportunity to move from disturbed sites to adjoining areas.

Construction of the pipeline itself will cause some impact on local fauna, the main faunal impacts of the pipeline being:

- ▶ Excavation of the trench may trap small terrestrial fauna, that are unable to extract themselves out of the trench, causing injury and rendering them susceptible to predation;
- ▶ Soil disturbance – and potential refuge destruction for ground dwelling, or cryptic fauna species;
- ▶ Clearing of vegetation, which is used by fauna species for shelter and linkages between areas of habitat. Removal of vegetation may increase their susceptibility to predation;
- ▶ Changes to understorey and floristics will alter the habitat used by particular fauna species. For example, weed introduction/establishment is likely to occur

along the pipeline route, even with weed management measures in place. Weed species may provide a resource to fauna species not previously occurring within the easement;

- ▶ With an increase in weedy species within the alignment, a change in fire regime may occur, potentially impacting on resident terrestrial fauna species and habitat; and
- ▶ During construction, waste, including food scraps, may assist undesirable fauna species increase by providing a resource.

### 3. Management Measures

To ensure the objectives of flora and fauna management are met the Water Corporation will ensure the following:

#### Prior to Construction

| <b>Water Corporation Responsibilities</b>  | <b>Output</b>                                      | <b>Compliance Criteria</b>  |
|--|--|---|
| Prepare and implement Flora and Fauna Management Plan, as shown in Table 1               | Flora and Fauna Management Plan within the CEMS    | Submission of Management Plan to DoE  |
| Require contractor to prepare Flora and Fauna Management procedures                      | Contractor's flora and fauna management procedures | In accordance with approved Water Corporation Flora and Fauna Management Plan |
| Discuss options for seed collection and re-establishment of Priority 4 species with CALM |  | Advice from CALM  |

#### Construction Phase

| <b>Water Corporation Responsibility</b>   | <b>Compliance Criteria</b>   |
|---|--|
| Implement Flora and Fauna Management Plan and contractors Flora and Fauna Management Procedures | Water Corporation audit  |
| Implement rehabilitation monitoring for no less than two years                                  | Rehabilitation criteria, as specified in Flora and Fauna Management Plan (Table 1), demonstrated to be met |

#### 3.1 Flora and Fauna Management Plan

This management plan (Table 2) relates to clearing, trenching, backfilling and restoration activities of the Kwinana to Thomsons Reservoir (DN1200) pipeline. All Water Corporation personnel and Contractors will comply with the measures outlined, as a minimum, to alleviate impacts on native flora and fauna and to provide satisfactory restoration and rehabilitation works.

**Table 3 Flora and Fauna Management Plan – Kwinana to Thomsons Reservoir Pipeline (DN 1200)**

| Management  | Responsibility/Compliance Criteria  |
|---|---|
| <b>General Objective</b>  |   |
| <ul style="list-style-type: none"> <li>▶ To minimise the impact on the surrounding environment, the entire operation of clearing, trenching, pipe laying and rehabilitation will occur in the shortest practicable time.</li> </ul>   | Water Corporation and Contractor  |
| <b>VEGETATION CLEARING AND TOPSOIL REMOVAL</b>  |   |
| <b>Areas Required to be Cleared</b>   |   |
| <p>The total area of bushland clearing equates to approximately 4.29 ha, with clearing occurring at the following sites:</p>  | <p>Clearing zones to be checked by Water Corporation or representative prior to disturbance</p>                   |
| 1. Thomsons Reservoir (~760 m in length)  |   |
| 2. Gas pipeline corridor between Wattleup and Postans Road (~650 m)   |   |
| 3. Immediately south of Wester Power Peron Quarry Site (~850 m)   |   |
| 4. Western side of railway corridor (located immediately adjacent to western boundary of the railway corridor) (~220 m).  |   |
| <b><i>Pre – construction</i></b>  |   |
| <ul style="list-style-type: none"> <li>▶ Prior to any disturbance clearing zones will be marked by pegs or flagging and on construction plans.</li> <li>▶ The Contractor will develop a detailed construction procedures and clearing checklist to minimise clearing of native vegetation. The checklist will include hold points that require Superintendent Approval.</li> <li>▶ Approved Water Corporation personnel to mark tree trunks that are to be retained for future rehabilitation.</li> </ul> | <p>The contractor will ensure that construction and clearing procedures are approved by the Water Corporation</p> |

## Management

## Responsibility/Compliance Criteria

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### *Clearing*

- ▶ The Contractor will not destroy, remove or clear trees, timber, or scrub to any extent greater than that approved. The Contractor will not carry out any activity outside the areas defined for clearing, unless otherwise approved by the Superintendent.
- ▶ Cleared native vegetation will be chipped and retained on site for rehabilitation.
- ▶ No cleared vegetation will be burnt.

Water Corporation to mark and approve stockpiling zones.  
Advice from City of Cockburn.

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### **Management measures for Declared Rare and Priority Flora**

- ▶ Discuss options for seed collection and re-establishment of plants of *Dodonaea hackettiana* in secure areas with CALM.

Water Corporation. Advice from CALM

## Management

## Responsibility/Compliance Criteria

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### Removal and Storage of Topsoil and Overburden

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#### *Topsoil Removal*

- ▶ Where topsoil exists, topsoil will be stripped to a depth of 150 mm and temporarily stockpiled in a windrow adjoining its area of origin. If present, a second layer of topsoil will be removed to a depth of 200 mm and stockpiled separately in a windrow adjacent to the first windrow.
- ▶ Overburden will be removed and placed in a separate windrow.
- ▶ Where necessary, to avoid damage to adjoining vegetation, stripped topsoil or overburden will be temporarily removed from the construction site and will be stored as close as possible to its place of origin.
- ▶ Areas of native vegetation with weed free understorey will be identified and the boundary marked so that topsoil stripping operations are kept separate. Stripping operations will not continue across the boundary from pastured or weedy areas into native vegetation. Likewise, stripping operations will not continue across the boundary between dieback infested and dieback free topsoil.
- ▶ Machines used for pushing and heaping operations will be fitted with root rakes or similar equipment and operated in a manner such that as little topsoil as possible is removed and heaped with the cleared vegetation material.

The contractor will ensure that construction and clearing procedures are approved by the Water Corporation

## Management

## Responsibility/Compliance Criteria

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### *Stockpiling*

- ▶ Topsoil that has been removed and cannot immediately be used will be stockpiled in locations approved by the Superintendent. These stockpiles will be located as close as possible to the site of origin in areas that will not restrict or interfere with existing site drainage or vegetation
- ▶ Compaction of the topsoil during stockpiling will be avoided. Topsoil will be left in the stockpiles for a maximum period of four months. As far as is practicable, stockpiles will be kept to a maximum height of 1.2m.
- ▶ The quality of topsoil in stockpiles will be maintained by measures including protection against contamination from other materials, minimising stockpiling periods and prevention of erosion by surface runoff or wind.
- ▶ Monitoring for erosion and erosion risk will be undertaken regularly to ensure that any erosion that does occur is promptly mitigated.
- ▶ Any spoil will be replaced in the area from which it was removed. Any excess spoil will be removed from site and taken to a site agreed by the City of Cockburn.

The Water Corporation will undertake periodic site inspections to monitor adherence to management requirements.

## Management

## Responsibility/Compliance Criteria

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### *Topsoil Return*

- ▶ Following installation of the pipeline and backfilling of the trench, stockpiled topsoil will be returned and evenly respread without delay.
  - ▶ Stripped topsoil will be replaced in the reverse order in which it was removed. The windrows of topsoil will not be mixed but will be placed back in layers as required.
  - ▶ Topsoil replacement will to ensure that the surface is reinstated to original levels and that isolated high or low points do not remain.
  - ▶ The depth of topsoil placed will be not less than 150 mm.
  - ▶ The filled trench line will be “topped up” with soil where settlement has resulted in ponding or poor drainage. “Top up” soil will be sourced locally and will be from an area of similar vegetation type and will be of similar dieback status (in dieback free areas “top up soils” will be from dieback free areas only).
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## Management

## Responsibility/Compliance Criteria

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### Weed and Dieback Management

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- ▶ The Contractor will ensure that all vehicles and machinery are cleaned prior to entry to the site and prior to leaving the site. Clean down will aim to remove all soil, mud, dust and vegetable matter. Particular attention needs to be paid to wheels or tracks, cab floors and underneath the chassis. Clean down will consist of either brushing, gouging and/or scraping to remove any compacted soil or plant material, accompanied and followed by jetting with compressed air/water such that all soil and plant residue is removed.
- ▶ Locations for clean down will be in an area where any runoff water is contained in a shallow sump and allowed to infiltrate.
- ▶ The locations of *Datura ferox* (Thornapple) will be marked and all plants will be removed prior to construction.
- ▶ Soil from the areas where Thornapple occurs will be isolated and will remain at the source location.
- ▶ Any imported soil will be shown to be from a weed and dieback free source.
- ▶ Soils from the trench will be replaced as close as possible to their source area. No soil should be transported along the route, especially from degraded areas in vegetation in good condition, except where onsite storage would damage adjacent vegetation.

Satisfy periodic inspections by the Water Corporation or its representative.

Soil from areas of Thornapple will be specially marked and isolated.

**Management**

**Responsibility/Compliance  
Criteria**

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**FAUNA PROTECTION**

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- ▶ Construction staff will be educated in relation to the risks of fauna deaths and how to manage animals which are injured or displaced;
- ▶ The pipeline trench will be kept open for the minimal period required to undertake works;
- ▶ Temporary fencing or barriers will be placed along the trench in areas which are likely to be used as fauna corridors, e.g. possible linkages between bushland, and will be used to direct animals around the excavation;
- ▶ Post construction fire-risk along the pipeline will be managed through monitoring and weed control as required; and
- ▶ Rehabilitation of native vegetation will be undertaken where possible along the corridor.

The Contractor's Environmental Management Plan will include education of personnel on fauna protection and handling.

**Management**

**Responsibility/Compliance  
Criteria**

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**REHABILITATION**

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**Rehabilitation Objective**

- ▶ Rehabilitation and restoration works will aim to reinstate a stable landform that supports a plant community that is self – sustaining and that approaches density, diversity and species richness of the pre-existing community
- 

**Runoff Management**

- ▶ Drainage lines are especially vulnerable to scour and subsequent vegetation loss or damage, and will be carefully rehabilitated so that they form a stable landform, as close as possible to the pre-existing shape.
  - ▶ The Contractor will ensure that runoff from cleared areas is managed to ensure that no sediment or accidental spills enters drainage lines or wetlands. The detailed aspects of runoff management will be contained in the contractor’s Environmental Management Plan.
- 

Work will be carried out to the satisfaction of the Water Corporation or its representative.

**Bushland Rehabilitation**

- ▶ Following overburden and topsoil respreading, land along the alignment will be re-shaped to fit the previously existing natural ground levels by removing any ridges, depressions or pits;
- ▶ Compacted areas will be ripped or tyned to a nominal depth of 200 mm, except over the backfilled trench and retained access tracks, and will follow close to natural contours wherever possible.
- ▶ Chipped vegetation will be respread over areas to be rehabilitated as evenly as possible. Vegetation mulch will be respread within the same vegetation community type that it came from.
- ▶ Logs and rocks will be respread in their source areas.

Work will be carried out to the satisfaction of the Water Corporation or its representative.

## Management

## Responsibility/Compliance Criteria

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### *Seeding*

- ▶ The clearing zone and any disturbance zones not required for access tracks will be hand seeded immediately after ripping. Seed composition will comprise local native species and will incorporate species listed in Appendix A.
- ▶ Seeds will be pre-tested for germination percentage and relevant germination techniques (such as smoke treatment) will be implemented where required.

Seed will be hand spread at a rate of 2 kg/ha using a bulking agent.

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### **Rehabilitation of non-bushland Areas**

- ▶ Agreements with individual landowners will determine the type and methodology of restoration works in those areas. Negotiate with Landowners
- ▶ Restoration should aim to leave land as close as possible to, or better than, its pre-disturbance condition.

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### **Monitoring of Rehabilitation**

- ▶ Implement follow up monitoring of rehabilitation for not less than 3 years after initial rehabilitation.
  - ▶ Rehabilitation considered successful once density of one plant per m<sup>2</sup> with a richness of five species per 10 m<sup>2</sup>.
  - ▶ The project area will be monitored for the presence of new weed species and weed control measures undertaken where required for a three-year period post construction.
  - ▶ If at the end of three years after initial rehabilitation planting has not reached success criteria re-seeding or in-fill planting will occur.
- Water Corporation or its representative to ensure that the ground surface remains stable and not subject to erosion, and that density and richness requirements have been met.
- There will be no spread of Thornapple along the pipeline.

## Management

## Responsibility/Compliance Criteria

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### Acceptance of restoration works

- ▶ Restoration works will be ongoing at each property or road reserve until the owners/occupiers have formally accepted the outcome and confirmed in writing.
  - ▶ In the event that the owners are not available, the signature of a bonafide agent of the owner would be obtained on the acceptance form.
  - ▶ In the event that a disagreement between the Contractor and the owner regarding disturbed services, plant or property, the standard of restoration works for the purpose of acceptance will be determined by the Superintendent.
  - ▶ Inspection of road verge restoration by the local authority will be arranged before acceptance.
- 

The Contractor will continue restoration works until owners or land managers are satisfied.

Appendix A  
Bushland Rehabilitation Species List

The following species were observed along the pipeline route and within the Thomsons Reservoir site and are the recommended species for rehabilitation of the pipeline alignment. All are potentially suitable for seed germination *in situ*.

| <b>Genus</b>         | <b>Species</b>         |
|----------------------|------------------------|
| <i>Acacia</i>        | <i>pulchella</i>       |
| <i>Acacia</i>        | <i>rostellifera</i>    |
| <i>Acacia</i>        | <i>saligna</i>         |
| <i>Allocasuarina</i> | <i>fraseriana</i>      |
| <i>Allocasuarina</i> | <i>humilis</i>         |
| <i>Agonis</i>        | <i>flexuosa</i>        |
| <i>Anigozanthos</i>  | <i>humilis</i>         |
| <i>Anigozanthos</i>  | <i>manglesii</i>       |
| <i>Baeckea</i>       | <i>camphorosmae</i>    |
| <i>Banksia</i>       | <i>attenuata</i>       |
| <i>Banksia</i>       | <i>grandis</i>         |
| <i>Banksia</i>       | <i>menziesii</i>       |
| <i>Banksia</i>       | <i>ilicifolia</i>      |
| <i>Boronia</i>       | <i>crenulata</i>       |
| <i>Bossiaea</i>      | <i>eriocarpa</i>       |
| <i>Conostylis</i>    | <i>aculeata</i>        |
| <i>Corymbia</i>      | <i>calophylla</i>      |
| <i>Dasypogon</i>     | <i>bromeliaefolius</i> |
| <i>Dodonaea</i>      | <i>hackettiana</i>     |
| <i>Dryandra</i>      | <i>sessilis</i>        |
| <i>Eremaea</i>       | <i>pauciflora</i>      |
| <i>Eucalyptus</i>    | <i>marginata</i>       |
| <i>Eucalyptus</i>    | <i>gomphocephala</i>   |
| <i>Gompholobium</i>  | <i>tomentosum</i>      |
| <i>Grevillea</i>     | <i>vestita</i>         |
| <i>Hakea</i>         | <i>lissocarpha</i>     |
| <i>Hakea</i>         | <i>prostrata</i>       |
| <i>Hakea</i>         | <i>varia</i>           |
| <i>Hardenbergia</i>  | <i>comptoniana</i>     |
| <i>Hovea</i>         | <i>trisperma</i>       |
| <i>Hovea</i>         | <i>pungens</i>         |
| <i>Hybanthus</i>     | <i>calycinus</i>       |
| <i>Hypocalymma</i>   | <i>angustifolium</i>   |
| <i>Hypocalymma</i>   | <i>robustum</i>        |
| <i>Isopogon</i>      | <i>sphaeranthoides</i> |
| <i>Jacksonia</i>     | <i>sternbergiana</i>   |

| <b>Genus</b>        | <b>Species</b>       |
|---------------------|----------------------|
| <i>Jacksonia</i>    | <i>sericea</i>       |
| <i>Kennedia</i>     | <i>coccinea</i>      |
| <i>Kennedia</i>     | <i>prostrata</i>     |
| <i>Kunzea</i>       | <i>glabrescens</i>   |
| <i>Lepidosperma</i> | <i>species</i>       |
| <i>Macrozamia</i>   | <i>reidleyi</i>      |
| <i>Melaleuca</i>    | <i>rhapsiophylla</i> |
| <i>Melaleuca</i>    | <i>thymoides</i>     |
| <i>Olearia</i>      | <i>axillaris</i>     |
| <i>Patersonia</i>   | <i>occidentalis</i>  |
| <i>Persoonia</i>    | <i>saccata</i>       |
| <i>Spyridium</i>    | <i>globulosum</i>    |
| <i>Templetonia</i>  | <i>retusa</i>        |
| <i>Waitzia</i>      | <i>sauveolens</i>    |

Figure

**1200mm Diameter Main Route From the  
Perth Seawater Desalination Plant to  
Thomsons Reservoir.**

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