4 THE TEN CLEARING PRINCIPLES

It is not anticipated that the clearing proposed within the NVCP application area will create any significant environmental or social impacts and is not considered to be at variance with the 10 Clearing Principles, as defined in Schedule 5 of the EP Act.

The following section is a statement against each of the 10 Clearing Principles, as defined in Schedule 5 of the EP Act.

4.1 PRINCIPLE 1

Native vegetation should not be cleared if it comprises a high level of biological diversity.

The area proposed for clearing is not considered to be of higher biodiversity than the surrounding areas and therefore is unlikely to be at variance with this principle. No features were found that consider the area particularly unique in terms of diversity both on a local and regional level.

The proposed clearing is comprised of approximately 1.6 ha of vegetation situated on disturbed agricultural land (e.g. isolated paddock trees). The remaining 2.9 ha of native vegetation, which is contained within the NVCP application area, is largely considered degraded (Keighery, 1994), with the vegetation structure significantly impacted by disturbance due to grazing, clearing and weed invasion (*ecologia,* 2010b). No priority flora or DRF will be impacted by the proposed clearing.

On a regional scale, the proposed clearing will not result in the remaining extent in the Geraldton Sandplains Bioregion falling into a more critical category of conservation significance (EPA, 2000) and potential impacts to *ecologia* (2010) associations are all less than 2% of their local extent.

On this basis, the proposed clearing of up to approximately 4.5 ha within a total area NVCP area of 455 ha is unlikely to have any significant impact on the biodiversity of the region.

4.1.1 Regional Vegetation Assessment

The NVCP area was plotted over the Beard and Burns (1976) regional vegetation assessment, which identified three regional vegetation units would be impacted by clearing activities, including:

- Jam scrub (*Acacia acuminata*) with York Gum (*Eucalyptus loxophleba*) (Vegetation Unit 35);
- *Banksia* woodland and Acacia scrub (Vegetation Unit 359); and
- *Acacia ligulata* open shrub (Vegetation Unit 440).

As stated previously in **Section 2.1.1**, endangered regional vegetation units are considered as having current extents less than 10% (EPA, 2000 and WAPC, 2010) with vulnerable vegetation units having current extents greater than 10% but less than 30% (EPA, 2000 and WAPC, 2010). The proposed disturbance to regional vegetation units has been determined by overlaying DAFWA (2006) mapping with *ecologia* (2010) mapped vegetation units, as outlined in **Table 2**.

Table 2 Area of Beard and Burns (1976) vegetation units to be cleared within the NVCP area compared against the extent within the Geraldton Sandplains Bioregion

Vegetation Unit (as per Beard and Burns, 1976)		Geraldton Sandplains (GS) Extent (DAFWA, 2006)					
No.	**Description**	**Pre-Euro Extent (ha)**	**Current Extent (ha)**	**% extent remaining in GS**	**Proposed Disturbance[1] (ha)**	**% Impact to Current Extent**	**Corresponding change to % extent in GS (total)**
35	Jam scrub (*Acacia acuminata*) with York Gum (*Eucalyptus loxophleba*)	184570.6	31410.5	17.0	1.7	0.005	0 (17.0)
359	*Banksia* woodland and *Acacia* scrub	44437.7	11087.6	25.0	2.3	0.02	0 (25.0)
440	*Acacia ligulata* open shrub	3753.3	2418.6	64.4	0.5	0.02	0.01 (64.4)

Key:

1 The proposed disturbance area has been determined by overlaying DAFWA (2006) mapping (as amended by Ecologia 2010a) with Ecologia (2010a) mapped vegetation sub-associations i.e. areas mapped as 15 (Bare Sand) and 16 (disturbed agricultural land) have not been included in these calculations (OPR, 2010).

Endangered vegetation units having current extents less than 10% (EPA, 2000a and WAPC, 2010)

Vulnerable vegetation units having current extents greater than 10% but less than 30% (EPA, 2000a and WAPC, 2010)

As identified in **Table 2** impacts at the Geraldton Sandplains Bioregion level are not greater than approximately 0.02% of the current extent of each Beard and Burns (1976) unit, nor do they reduce the current extent by greater than 0.01%. In all cases, the proposed impact does not result in the remaining extent in the Geraldton Sandplains Bioregion falling into a more critical category of conservation significance (EPA, 2000). It is considered that the small area of vegetation clearing proposed will not significantly reduce the current extent of Beard and Burns (1976) vegetation units 35, 359 and 440.

4.1.2 Local Vegetation Assessment

The NVCP application area was plotted over the top of *ecologia's* (2010) Terrestrial Port survey area to determine which native vegetation associations may be impacted. Approximately 4.5 ha will be cleared within a total NVCP application area of 455 ha, which equates to more than 99% of the NVCP application area being disturbed agricultural land. Four (4) vegetation associations and some paddock vegetation (e.g. isolated/scattered paddock trees, that have not been recorded as native vegetation) situated within cleared agricultural land (*ecologia* (2010) association 16), will be impacted by clearing within the NVCP application area (**Figure 3**). Vegetation condition was assessed using the scale produced by Keighery (1994).

Ecologia vegetation association 5: *Melaleuca cardiophylla*

The central section of the Port Services Road passes through Melaleuca (*Melaleuca cardiophylla*) and Grevillea (*Grevillea argyrophylla*) open scrub, corresponding to *ecologia* (2010) association 5. There is also a small area situated at the most southern point of the Port Services Road that intersects with the approved deepwater port (MS469) footprint, containing vegetation association 5. The total impact to *ecologia* (2010) association 5 is approximately 0.7 ha.

ecologia (2010) association 5 combined with vegetation association 3, 4, 11, 12 and 13 (as mapped by *ecologia,* 2010) correspond to either one or both of the GRFVS association 10 and 12. GRFVS association 10 occupies 2258.86 ha or 36.63% of the native vegetation of the GRFVS area, and is the most widespread of the GRFVS associations. GRFVS association 12 occupies 865.8 ha or 14.04% of the native vegetation of the GRFVS area, and is one of the more widespread GRFVS associations (DoP, 2010). That is, a total of 3124.66 ha of associations 10 and 12 are present within the GRFVS.

Although it is impossible to determine the proportion *ecologia* (2010) association 5 within GRFVS associations 10 and 12, it is probable that *ecologia* (2010) association 5 is represented well beyond the NVCP application area, that is, the clearing of *ecologia* (2010) association 5 will only result in an impact of 0.02% of the known extent of associations 10 and 12 within the GRFVS.

Furthermore, the condition of vegetation association 5 occurring within the proposed NVCP footprint, was described as 'good' being densest at the tops of the hills, becoming sparser downhill (*ecologia,* 2010b) with the vegetation structure significantly impacted by disturbance due to grazing, clearing and weed invasion (Keighery, 1994). Given the vegetation structure within this area is significantly impacted, it is unlikely the 0.7 ha of *ecologia* (2010) association 5, to be cleared as part of this NVCP application, supports a greater biodiversity than the vegetation within the wider Geraldton area.

Ecologia vegetation association 6: *Banksia prionotes*

This *ecologia* (2010) association is represented in the GRFVS as association 13. GRFVS association 13 occupies 754.39 ha or 12.23% of the native vegetation of the GRFVS area, and is one of the more widespread GRFVS associations (DoP, 2010). Approximately 0.03 ha of *ecologia* (2010) association 6 has been identified in the NVCP application area, which represents 0.004% of the area represented in the GRFVS.

The vegetation condition within this area is classed as 'degraded' as there are large grassed areas between shrubs and the vegetation structure is severely impacted by disturbance from grazing, clearing and weed invasion (*ecologia,* 2010b).

On this basis, the NVCP application area is considered unlikely to have a significant impact on the conservation status of vegetation association 6.

Ecologia vegetation association 7: *Eucalyptus camaldulensis*

This association is represented in the GRFVS as association 2, which occupies 388.36 ha or 6.3% of the native vegetation of the GRFVS area (DoP, 2010), and 106.4 ha within the wider Terrestrial Port survey area (*ecologia,* 2010). Approximately 1.1 ha of association 7 has been identified in the NVCP application area, which is 0.3% of the area represented in the GRFVS. Furthermore, *ecologia* (2010b) conducted an additional survey of the Port Services Road and river crossings and described the She Oak (*Casuarina obesa*) vegetation as 'degraded' and containing no understory (*ecologia,* 2010b).

Ecologia vegetation association 9: *Acacia acuminata*

This association is represented in the GRFVS as association 16, which 16 occupies 452.11 ha or 7.33% of the native vegetation of the GRFVS area, and is one of the more widespread GRFVS plant communities (DoP, 2010) and 203.6 ha within the wider Terrestrial Port survey area. The central section of the Port Services Road passes through 1.1 ha of vegetation association 9; however, there are large grassed areas between shrubs and the vegetation condition is classed as 'degraded', due to severe impacts from grazing, clearing and weed invasion (*ecologia,* 2010b).

The 1.1 ha of association 9 impacted by clearing within the NVCP application area, corresponds to 0.2% of the area represented in the GRFVS.

Ecologia vegetation association 16: Disturbed agricultural land

Although *ecologia* association 16 has been mapped as disturbed agricultural land, there are some pockets of vegetation, including paddock trees, which have been included in this NVCP application. Approximately 1.6 ha of vegetation and some paddock trees/vegetation are situated within the disturbed agricultural land and will be impacted by clearing within the NVCP application area. This vegetation is considered severely degraded (Keighery, 1994) and has not been mapped as 'native' vegetation on a local scale.

Table 3 outlines the proposed impact to vegetation associations, as mapped by *ecologia* (2010), in comparison with the area of each association contained within the GRFVS and the wider Terrestrial Port survey area. **Table 3** also described the vegetation condition of each *ecologia* (2010b) association.

Table 3 Proposed Impact to *ecologia* (2010) Vegetation Associations

Vegetation Association (*ecologia* 2010)		Corresponding GRFVS Vegetation Association		Vegetation Condition (*ecologia* 2010a)	Vegetation Condition Scale	Area present within the GRFVS (ha)	Area present within the Terrestrial Port Survey Area (ha)	Proposed Disturbance		
No#	Description	No#	Description					Area (ha)	% Impacted within the GRFVS	% Impacted within the Terrestrial Port Survey Area
5	*Melaleuca cardiophylla – Grevillea argyrophylla* scrub or heath (+/- *Eucalyptus dolichocera* mallee and *Diplolaena grandiflora* scrub).	10 12	Near Coastal; *Acacia rostellifera* shrubland (ncAr); and Limestone Ridge; *Melaleuca cardiophylla* (rMc)	Vegetation condition is 'good' however, vegetation structure significantly impacted (*ecologia,* 2010b).	Good (4)	3124.7	192.7	0.7	0.02	0.36
6	*Banksia prionotes (+/- Banksia menziesii*) open scrub.	6	Sandplain; *Banksia prionotes / Acacia rostellifera* (Bp/Ar)	Large grassed areas between shrubs, with the vegetation conditions classed as 'degraded' since the vegetation structure is severely impacted by disturbance from grazing, clearing and weed invasion (*ecologia,* 2010b).	Degraded (5)	754.4	174.6	0.03	0.004	0.02
7	*Eucalyptus camaldulensis - Casuarina obesa* low closed forest (+/- *Melaleuca rhaphiophylla* and *Cyperus gymnocaulos*).	2	Riparian; *Eucalyptus camaldulensis / Casuarina obesa / Melaleuca rhaphiophylla* (Ec/Co/Mr)	Vegetation condition is 'good' however, vegetation structure significantly impacted (*ecologia,* 2010b).	Good (4)	388.4	106.4	1.1	0.3	1.0
9	*Acacia acuminata* sparse low trees over *Acacia tetragonophylla* shrubs (+/- Eucalyptus spp. mallees, pasture grasses and weedy herbs).	16	Woodland; *Acacia acuminate / A. tetragonophylla / Hakea preissii* (Aa/At/Hp	Vegetation condition is 'degraded' and vegetation structure is severely impacted (*ecologia,* 2010b).	Degraded (5)	452.1	203.6	1.1	0.2	0.5
16	Disturbed Agricultural Land: Vegetation and paddock trees situated within disturbed agricultural land.	N/A	Not mapped.	Disturbed pockets of vegetation situated on cleared agricultural land (*ecologia,* 2010b).	N/A	N/A	N/A	1.6	N/A	N/A

4.1.3 Priority Flora

There are no DRF situated in the NVCP application area, therefore no DRF will be impacted by the proposed clearing activities.

There is one Priority 3 flora species, *Acanthocarpus parviflorus*, which occurs within the NVCP application area (**Figure 5**). *A. parviflorus* was accurately identified by *ecologia* (2010) using GPS coordinates and as such, a 5 x 5 m fenced buffer will be placed around the Priority 3 species, which is situated within the Port Services Road alignment (**Figure 5**). Refer to **Section 2.2** for a detailed location description of the Priority 3 species *A. parviflorus.*

OPR will ensure that areas of native vegetation in the vicinity of the Priority 3 flora species *A. parviflorus* will be avoided and an Environmental Advisor will inspect the site prior to clearing e.g. for the purpose of site demarcation.

Given no Priority flora or DRF will be impacted by the clearing associated with this NVCP application, the vegetation within the NVCP application area is not considered more biologically diverse than the surrounding areas.

4.2 PRINCIPLE 2

Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

OPR does not anticipate that the clearing associated with this NVCP application will impact core habitat for conservation significant fauna, result in the loss of ecological linkages or important vegetation buffers or result in the loss of large intact areas of native vegetation supporting breeding populations or species with limited dispersal. As such, the clearing associated with this NVCP application is unlikely to be at variance with this principle.

Note: Impacts to subterranean invertebrate fauna are not considered within this NVCP application, as the proposed clearing activities will not result in a significant change to subterranean habitat.

4.2.1 Significant Fauna Habitat

ecologia (2010a) conducted surveys for conservation significant fauna as part of the Terrestrial Port PER, which covered the area subject to this NVCP application. There are no conservation significant or short range endemic fauna species within the proposed footprint of the NVCP application and the proposed quarry area is predominantly cleared farmland and is therefore unlikely to have any significant faunal habitats.

Although it is likely that the vegetated areas subject to this NVCP application may support a range of reptile and invertebrate species, disturbance will not exceed 4.5 ha within the NVCP application area. The vegetation within the NVCP application area is unlikely to support larger mammals or a diverse bird population, given vegetation condition is considered 'good' to 'degraded' (Keighery, 1994), with vegetation structure being significantly degraded due to impacts from grazing and clearing (*ecologia*, 2010b). As outlined in **Table 3**, the proposed impact to vegetation at both a regional and sub-regional scale, is considered insignificant.

Furthermore, habitat present within the NVCP application area is well represented in the surroundings lands. As outlined in **Section 2.4** the habitat types and corresponding *ecologia* (2010) associations occurring within the NVCP application area include:

- Limestone Associations (corresponds to *ecologia* (2010) mapped association 5);
- Sandplain (corresponds to *ecologia* (2010) mapped associations 6 and 9);

- Riverine Vegetation (corresponds to *ecologia* (2010) mapped association 7); and
- Lateritic Hills and Breakaways (corresponds to *ecologia* (2010) mapped association 8).

Clearing associated with this NVCP application will only impact small areas of vegetation that support the habitat types listed above, with disturbance generally occurring on the outer edges of larger vegetation assemblages, therefore reducing fragmentation of habitat. For example, the limestone association habitat type, which is represented by *ecologia* (2010) association 5 within the NVCP application area, also occurs both north and south of the Oakajee River. This habitat type is also widely represented by *ecologia* (2010) vegetation associations 4, 11 and 12 that occur within the wider Terrestrial Port survey area. The proposed clearing activities will impact a small strip of *ecologia* (2010) association 5, that is connected to a larger assemblage of *ecologia* (2010) association 5 that extends north of the Oakajee River (**Figure 4**). An additional assemblage of association 5 also occurs to the south of the Oakajee River and will not be impacted by clearing associated with this NVCP application.

The remaining habitat types and corresponding *ecologia* (2010) associations, which occur within the NVCP application area, are also well represented beyond the NVCP application area. Like *ecologia* (2010) association 5, impacts to habitat types and corresponding *ecologia* (2010) vegetation associations are restricted to small areas, situated on the outer edge of larger groups of the same vegetation association. The clearing associated with this NVCP application is therefore unlikely to cause fragmentation to fauna habitat and it is likely that the surrounding vegetation will support the widespread fauna species expected to occur within the NVCP application area.

4.2.2 Ecological Linkages

The vegetation to be cleared within the NVCP application area is already considered highly fragmented, with vegetation occurring predominantly in small, isolated pockets, that is, not largely intact areas of dense vegetation.

OPR does not anticipate clearing associated with this NVCP application will impact ecological linkages within the Oakajee area. The vegetation to be cleared does not form part of an important ecological linkage or provide a buffer for other vegetation that may support important fauna habitat.

The proposed clearing will impact small pockets of vegetation, within a large NVCP application area, the majority of which is considered cleared agricultural land (*ecologia* (2010) association 16). Only 0.9 ha of riparian vegetation associated with the Oakajee River will be impacted by clearing associated with the two river crossings and as such, impacts to the Oakajee River corridor are considered insignificant.

Management measures, to minimise fragmentation of the ecological corridor provided by the Oakajee River, will be achieved through the installation of culverts, traffic controls and appropriate signage. Fauna egress areas will be adopted during detailed design to reduce impacts on fauna. No significant impacts to fauna populations are anticipated given that the tributary to the Oakajee River is ephemeral in nature, and that the clearing of native riparian vegetation will be minimal.

As part of the broader Terrestrial Port project, OPR will investigate, with LandCorp, the implementation of a revegetation program for the Oakajee River (and Buller River), which will assist in creating a corridor connecting coastal habitats with the Moresby Range.

4.2.3 Breeding Populations

As stated previously, it is likely that the vegetated areas situated within this NVCP application footprint support a range of reptile and invertebrate species, but unlikely to support larger mammals or a diverse bird population. No conservation significant fauna were found within the NVCP application area, however, the distribution of conservation species within the wider Terrestrial Port

survey area appear common and widespread and not restricted to the vegetation to be cleared within the NVCP application area (if present at all).

With regards to Carnaby's Black Cockatoos, it was determined that there is unlikely to be significant foraging and nesting habitat within the NVCP application area, which is considered critical for their survival or persistence in the area (Ecological Australia, 2010). Furthermore, there are no known Carnaby breeding populations situated in the broader Terrestrial Port survey area (Ecological Australia, 2010).

The clearing associated with this NVCP application is unlikely to create loss of large intact areas of native vegetation that are capable of supporting breeding populations of species with limited dispersal. It is not expected that any species will become more vulnerable as a result of potential habitat loss associated with the proposed clearing activities.

4.3 PRINCIPLE 3

Native vegetation should not be cleared if it includes, or is necessary for the continued existence for rare flora.

The proposed clearing is not at variance with this principle. The results of the wider Terrestrial Port survey indicates there are no rare flora (DRF) located within the NVCP application area or the wider Terrestrial Port survey area (*ecologia*, 2010).

4.4 PRINCIPLE 4

Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

The clearing is not at variance with this principle.

There are no TECs or PECs within or in the vicinity of the NVCP application area.

4.5 PRINCIPLE 5

Native vegetation should not be cleared if it is significant as a remnant vegetation that has been extensively cleared.

The NVCP application area is unlikely to be at variance with this principle as the area of vegetation to be cleared is fragmented/isolated and is not considered a significant remnant in the area.

Using detailed aerial photography (2010), OPR engineers have optimised the quarry site, associated laydown areas, supporting infrastructure and access roads to take advantage of previously cleared and disturbed land.

As discussed in Principle 1 and 2, vegetation and fauna habitats present in the proposed NVCP boundary are well represented in the surrounding area, and clearing shall not exceed 4.5 ha. The disturbance areas are not considered to be located in remnants of significant native vegetation, with similar habitat available elsewhere in the surrounding lands. The area has already been extensively cleared for agricultural activities and remnant vegetation areas have been avoided where possible (**Figure 2**).

As outlined in Principle 1 (**Table 2**), at a regional scale, although Beard and Burns (1976) vegetation units 35, 359 are considered vulnerable, the proposed impact from clearing within the NVCP application area equates to only 0.005 % and 0.02% of the current extent remaining within the Geraldton Sandplains, respectively. Furthermore, the proposed impact to Beard and Burns (1976) vegetation unit 440 is 0.02 % of the extent remaining in the Geraldton Sandplains and in all cases, the proposed impact of clearing within the NVCP application area does not result in the remaining

extent in the Geraldton Sandplains Bioregion falling into a more critical category of conservation significance (EPA, 2000), demonstrating clearing will not be at variance with the 10% and 30% thresholds (EPA, 2000 and WAPC, 2010).

On a local scale, the condition of vegetation associations 5, 7, 9 and 16, as mapped by *ecologia* (2010), which is contained within the boundary of Beard and Burns (1976) vegetation units 35, 359 and 440, ranges from 'good' to 'degraded'; however all vegetation structures are considered severely impacted by disturbance from grazing and clearing (*ecologia,* 2010b) (**Table 3**).

Given the small area of vegetation clearing proposed and the degraded condition of vegetation structures, OPR does not believe the vegetation within the NVCP application are is significant.

4.6 PRINCIPLE 6

Native vegetation should not be cleared if it is growing in, or association with, an environment associated with a watercourse or wetland.

The clearing is likely to be at variance with this principle; however, the area of riparian vegetation to be cleared is negligible in relation to the historical clearing that has been undertaken in the area.

A small portion of the proposed disturbance area will intersect a watercourse. The construction of the Port Services Road occurs predominantly on previously disturbed agriculture land; however, clearing of native vegetation and disturbance to the bed and banks of the Oakajee River, is required for the construction of the two river crossings/floodways. The Port Services Road crossings will require approximately 0.9 ha of riparian native vegetation to be cleared. None of the proposed disturbance areas will intersect or are associated with any wetland.

The river crossings will result in the clearing of the following vegetation types:

- River crossing 1 – At the eastern end, the corridor crosses 0.5 ha of low Casuarina (*Casuarina obesa)* forest along the river (**Photograph 1**). The vegetation is approximately 35m wide, with no understorey and cleared pasture on either side. The vegetation condition is classed as 'degraded' (Keighery, 1994), with the vegetation structure severely impacted by disturbance from grazing and clearing (*ecologia,* 2010b).
- River crossing 2 – at the western end, the Port Services Road crosses approximately 0.4 ha of low Eucalyptus (*Eucalyptus camaldulensis*) forest along the river with a dense shrub layer and significant weed invasion (**Photograph 2**). The vegetation is approximately 50 m wide with cleared grassland on either side. The vegetation condition is classed as 'good' (Keighery, 1994), with the vegetation structure significantly impacted by disturbance due to grazing, clearing and weed invasion (*ecologia,* 2010b).

Both areas of riparian vegetation correspond to association 7 (*ecologia* 2010a). **Photograph 1** and **Photograph 2** provide context as to the quality of vegetation experienced at the river crossings.

As discussed in Principle 2, as part of the larger Terrestrial Port Proposal, OPR will conduct revegetation along the Oakajee River, which includes the rehabilitation of degraded vegetation adjacent to areas of impact (e.g. river crossings) located within a 50 m buffer surrounding the Oakajee River. Furthermore, OPR is working with LandCorp and the Geraldton Port Authority (GPA) to identify appropriate areas of riparian vegetation and associated land that can be rehabilitated and protected for conservation purposes (Ecological Australia, 2010).

4.7 PRINCIPLE 7

Native vegetation should not be cleared if the clearing of vegetation is likely to cause appreciable land degradation.

The proposed clearing is not at variance with this principle.

The proposed NVCP application area occurs predominantly in pre-disturbed agricultural areas, that is approximately 99% of the land has been cleared for agricultural purposes (**Figure 2**) and the area of clearing proposed is negligible compared to historical clearing in the area. The maximum clearing of native vegetation will be 4.5 ha. Given that minimal clearing will occur within the NVCP application area, it is unlikely to result in an increased risk of land degradation via salinity or erosion.

Whilst the proposed quarry and Port Services Road are unlikely to impact on the quality of surface or groundwater resources within the area, some localised erosion may occur as a result of clearing within the NVCP application area.

The river crossings will be situated such that sedimentation of drainage lines and watercourses is unlikely to occur. Engineering design of the river crossings will incorporate site-specific surface water controls including erosion and sedimentation controls. Any areas of major erosion hazard will be identified and specific management measures will be implemented to reduce the erosion risk to acceptable levels.

All construction roads will be bunded to prevent water run-off, and stormwater run-off from roads will be directed to swales and retained in accordance with appropriate standards such that sediments are retained and water is infiltrated in situ. Minor localised erosion impacts will be minimised by the use of standard stormwater controls (culverts, sumps, bunds etc).

OPR will prepare and implement a Rehabilitation Management Plan. Cleared areas that are no longer required during the operation phase will be rehabilitated in accordance with this OPR Rehabilitation Management Plan, which will further minimise any land degradation in the form of wind or water erosion. OPR believes it is therefore unlikely that clearing will cause appreciable land degradation.

4.8 PRINCIPLE 8

Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

The proposed clearing is not at variance with this principle.

There are no conservation reserves adjacent to the NVCP application area (**Figure 6**). Oakajee Nature Reserve and Howatharra Nature Reserve are located approximately 1.5 km and 2.5 km respectively to the east and south east of the NVCP application area. Reserve 16200 is situated approximately 2 km to the south east of the NVCP application area.

4.9 PRINCIPLE 9

Native vegetation should not be cleared if the clearing of the vegetation is likely to cause the deterioration in the quality of surface or underground water.

The proposed clearing is unlikely to be at variance with this principle.

OPR will prepare and implement Surface Water and Groundwater Management Plans to ensure there is minimal impact to surface water and groundwater quality. Furthermore, as stated previously, river crossings will be situated such that sedimentation of drainage lines and watercourses is unlikely to occur. All construction roads will be bunded to prevent water run-off, and stormwater run-off from roads will be directed to swales and retained in accordance with appropriate standards. Minor localised erosion impacts will be minimised by the use of standard stormwater controls (culverts, sumps, bunds etc).

For the purposes of this NVCP, the clearing activities within the NVCP application area does not require dewatering, groundwater abstraction or significant excavation below the groundwater table. As outlined in **Section 2.5**, the underlying limestone and dune sands have a neutralising capacity, which means that in terms of ASS the NVCP application area may be regarded as low risk. On the basis of this information the NVCP application area is considered unlikely to disturb ASS. Nevertheless, OPR will prepare an ASS Management Plan to test for this material and then manage it in the instance it is recorded onsite.

Both the implementation of the Surface Water and Groundwater Management Plan and the ASS Management Plan, will ensure that the NVCP application area does not cause deterioration in the quality of surface or groundwater.

4.10 PRINCIPLE 10

Native vegetation should not be cleared if clearing the vegetation is likely to cause or exacerbate the incidence or intensity of flooding.

The proposed clearing is not at variance with this principle.

Approximately 99% of the area is currently cleared for agricultural purposes and it is not anticipated that the minimal amount of clearing, required for the purpose of this NVCP application area (up to 4.5 ha), will cause or exacerbate the intensity of flooding (i.e. the area of clearing proposed is negligible compared to historical clearing in the area).

To cater for flows at the river crossings, floodways will be constructed, which will include pipe culverts for low flow drainage and will be designed with associated floodway's to provide safe and serviceable access for heavy mining haul packs. Floodway's shall remain dry for up to a 5 year annual rainfall event (ARI) and passable for haul vehicles for a 20 year ARI rainfall event. Floodway's have been designed to survive a 50 year ARI rainfall event with minor damage. OPR propose to match existing stream bed and proposed culvert invert levels. Scour protection will be provided to minimise the effect of scour during severe events. Hydraulic calculations have been completed on these crossings appropriate to the current stage of design, to ensure that flood waters are not inappropriately diverted or retained. The proposed quarry and laydown areas will be set back from all watercourses by approximately 10 to 200 m and will be fenced appropriately.

5 ENVIRONMENTAL MANAGEMENT

The environmental management standards identified in this document will form the basis for environmental compliance that will be adopted by all personnel associated with this NVCP application.

Contractors shall work in accordance with the management strategies outlined below.

5.1 CLEARING STRATEGY

5.1.1 Objectives

- To limit the area of land cleared to 4.5 ha or less;
- To conserve and reuse cleared vegetation and topsoil (which contains seeds and nutrients, organic matter and micro-organisms) required for establishing vegetation on rehabilitated areas; and
- To prevent the spread of weeds into new areas.

5.1.2 Management Procedure

- Removal of native vegetation will be via a bull dozer/front end loader.
- Topsoil will be pushed to one side of the construction area and used for rehabilitation.
- Trees will be removed and used around the site for revegetation of unused areas, where possible.
- A qualified Environmental Advisor will inspect sites prior to and during clearing to ensure clearing is carried out in accordance with this NVCP application (e.g. to demarcate clearing boundaries).
- A map showing exclusion areas (e.g. registered aboriginal heritage sites, known locations of Priority Flora, and Fauna habitats) will be provided to contractors and exclusion areas will be demarcated in the field (where located in or adjacent to the clearing area).
- Vehicles will use designated tracks.
- Vegetation and soil from excavations will not be pushed into surrounding vegetation, but will be formed into dedicated topsoil stockpiles. Vegetation debris, logs and leaf litter will be retained for reuse.
- Weed control measures will be implemented to prevent the spread and introduction of pest species.

5.2 SURFACE WATER AND GROUNDWATER

5.2.1 Objectives

- To minimise impacts on quality of surface and groundwater;
- To contain any contaminated water on site; and
- To avoid unnecessary disturbance to natural surface water drainage.

5.2.2 Management Procedure

- River crossings will be constructed as a priority and during periods of no or low flow.
- All plant involved in the proposed clearing activities will have access to hydrocarbon spill response kits.
- Hydrocarbons, oily wastes and rags will be retained and transported offsite to an appropriate waste facility.
- Pre-existing access tracks will be used where possible to minimise interference to natural drainage.
- Cleared vegetation and topsoil will be stockpiled away from watercourses and in discrete stockpiles to avoid interference to surface flows.
- Rehabilitation works will be undertaken in unused areas, following the completion of the construction activities.
- Engineering design of the river crossings will incorporate site-specific surface water controls including erosion and sedimentation controls.
- Floodways will be constructed which will include pipe culverts for low flow drainage.
- Floodway's will be designed to survive a 50 year ARI rainfall event and scour protection will be provided to minimise the effect of scour during severe events.

5.3 FLORA AND VEGETATION

5.3.1 Objectives

- To limit the loss of native vegetation and plant habitats;
- To protect Priority Flora species; and
- To prevent, where possible, the introduction and spread of noxious weeds within the NVCP application area.

5.3.2 Management Procedures

- All clearing will be kept to a minimum.
- No clearing will be undertaken in areas containing Priority Flora. Priority 3 Flora species *Acanthocarpus parviflorus* (*ecologia,* 2010), situated within the Port Services Road alignment will be demarcated with a 5 x 5 m fence to ensure it is not impacted during clearing activities. An Environmental Advisor will be present on site prior to and during clearing activities, to ensure clearing complies with this management strategy (e.g. demarcation of clearing boundaries). Site locations will be adjusted accordingly.
- Where possible, vehicles will use designated tracks.
- Mobile plant and equipment will be cleaned of all vegetative, soil and rock material prior to mobilisation to the disturbance areas to avoid introducing weeds to the sites.
- Should weeds be introduced or spread via the construction activities, OPR will undertake appropriate control activities.

5.4 FAUNA

5.4.1 Objectives

- To ensure that native fauna species are not adversely affected by the proposed clearing activities.

5.4.2 Management Procedures

- All clearing operations will be kept to a minimum.
- Vehicles will use designated tracks and speed restrictions will be enforced on all access roads.
- Holes and excavations will be covered, where possible, to ensure that native fauna do not become trapped.
- Installation of culverts, traffic controls, appropriate signage and fauna egress areas will be adopted during detailed design.
- Rehabilitation works will be undertaken in unused areas, following the completion of the construction activities.
- Native fauna will not be captured, taken, fed or harmed without the appropriate permits.
- Domestic pets will not be allowed on site.
- Wastes will be contained and removed from site regularly, to be disposed of at an appropriate waste facility.
- Any death of conservation significant fauna will be reported to DEC and will be recorded in a fauna injury / death register, which will be used to determine long and short term trends.
- All tracks and excavations will be sloped to allow fauna to escape.
- OPR will investigate, with LandCorp, the implementation of a revegetation program for the Oakajee River.
- Consideration will be given to removing barriers to fauna movement such as fences and informal access tracks.

5.5 REHABILITATION

The Port Services Road and the quarry will remain in place following construction, for use by GPA to maintain the breakwater. All unused areas will be rehabilitated to reflect the previous landuse.

5.5.1 Objectives

- To ensure disturbed areas meet acceptable environmental standards; and
- To ensure the rehabilitated area is safe, non-erodible, and is integrated into the surrounding environment.

5.5.2 Management Procedures

- Rehabilitation will be conducted in accordance with OPR's Terrestrial Port Vegetation and Flora Management Plan.
- Rehabilitation will be undertaken using a tracked dozer or excavator or a grader with rubber tyres in order to close off the tracks and prevent public use resulting in 'new' tracks.
- Removal of all temporary infrastructure and materials from the NVCP application area.
- Removal of all waste and hydrocarbon contaminated soil.
- Backfill any investigation areas to the existing ground level.
- Replacement of topsoil and any vegetative materials and levelling to surrounding contours to allow for further natural regeneration.
- Mulched/flattened vegetation will prevent wind and water erosion along the tracks.

6 CONCLUSION

The proposed clearing will not be at variance with the following Principles as outlined in Schedule 5 of the EP Act:

- (a) Native vegetation should not be cleared if it comprises a high level of biological diversity.
- (b) Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.
- (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence for rare flora.
- (d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.
- (e) Native vegetation should not be cleared if it is significant as a remnant vegetation that has been extensively cleared.
- (g) Native vegetation should not be cleared if the clearing of vegetation is likely to cause appreciable land degradation.
- (h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.
- (i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause the deterioration in the quality of surface or underground water.
- (j) Native vegetation should not be cleared if clearing the vegetation is likely to cause or exacerbate the incidence or intensity of flooding.

The proposed clearing may be at variance with:

- (f) Native vegetation should not be cleared if it is growing in, or association with, an environment associated with a watercourse or wetland.

However, OPR does not believe the clearing associated with the Oakajee River (and NVCP application are) is significant due to the small amount of clearing proposed for the two river crossings, that is, 0.9 ha of riparian vegetation. Furthermore, the vegetation structure present at the proposed river crossing locations has been significantly impacted by disturbance due to grazing, clearing and weed invasion (*ecologia,* 2010b). OPR is committed to investigating, with LandCorp, the implementation of a revegetation program for the Oakajee River.

As discussed in **Section 4**, the condition of the vegetation that will be impacted by clearing within the NVCP application area is considered good to degraded; however, it represents a small, fragmented and isolated remnant that is severely impacted by disturbance from grazing and clearing (*ecologia,* 2010b) (**Table 3**). The area proposed to be cleared is negligible in relation to historical clearing in the region.

Despite the above, OPR is committed to best practice environmental management and will, as part of the greater OPR project, undertake conservation works in the area that aims to achieve long-term environmental benefits. The conservation works will retain and protect vegetation and habitat as well as undertake the rehabilitation and restoration of currently degraded land, with the aim to enhance local habitat values and ensure local and regional habitat connectivity is protected (Ecological Australia, 2010).

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