WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (a) - Native vegetation should not be cleared if it comprises a high level of biological diversity.										
Removal of vegetation	Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora Habitat loss	3-Moderate	2- Unlikely	MEDIUM	5	Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora Proposed clearing is not in biodiversity hotspots for priority action High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion <10 hectares of vegetation to be removed with this project Ecosystems will be measured as per MCP and vegatation recolonisation monitoring Clearing permit controls	1-Insignificant	1 -Rare	LOW	2
Removal of priority ecological communities	Alteration in vegetation condition Removal of priority or significant flora Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora Habitat loss	4-Major	1-Rare	MEDIUM	5	Bioregion offers a much higher degree of ecological significance than the proposed clearing Preliminary desktop review for TEC occurrence Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora Proposed clearing is not in biodiversity hotspots for priority action High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion <10 hectares of vegetation to be removed with this project Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring Clearing permit controls	1-Insignificant	1-Rare	LOW	2
Natural disaster inc: Fire Flooding Cyclones Tidal waves	Alteration in vegetation condition Removal of priority or significant flora Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora Habitat loss	3-Moderate	2-Unlikely	MEDIUM	5	High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring Proposed clearing is not in biodiversity hotspots for priority action <10 hectares of vegetation to be removed with this project Bioregion offers a much higher degree of ecological significance than the proposed clearing Clearing permit controls	1-Insignificant	1-Rare	LOW	2
Ecological processes	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	<10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring Proposed clearing is not in biodiversity hotspots for priority action Bioregion offers a much higher degree of ecological significance than the proposed clearing	1-Insignificant	1-Rare	LOW	2
Altered landscape	Habitat loss Unstable landform Erosion Unsafe environment Polluted landscape	3-Moderate	2- Unlikely	MEDIUM	5	Post mining landscape will be safe, stable and non-polluting as per MCP Clearing permit controls NDVI Bi-annual survey Mobile dune system is targeted resource for extraction <10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion	2-Minor	1-Rare	LOW	3
Removing remnant vegetation (pre-European)	Removal of genetic diversity (fauna) Loss of biodiversity Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Lack of topsoil Pathogens Erosion	3-Moderate	2-Unlikely	MEDIUM	5	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species with limited dispersal Final landform and recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species No key habitat sites or TEC's found during desktop reviews No meta-populations identified during desktop review Vegtation recolonisation monitoring <10 hectares of vegetation to be removed with this project	2-Minor	2-Unlikely	LOW	4
Ecological linkages	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring <10 hectares of vegetation to be removed with this project	1-Insignificant	1-Rare	LOW	2
Weed occurrence	Reduction in biodiversity Loss of habitat Further spread of invasive species Homogenous species richness	3- Moderate	3-Possible	MEDIUM	6	Clearing permit controls Weed management as per MCP Mobile plant is cleaned prior to site entry Truck clean out bay maintained and any grain seeds to be buried or sprayed with approved pesticides NDVI Bi-annual survey	2-Minor	2-Unlikely	LOW	4

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (a) - Native vegetation should not be cleared if it comprises a high level of biological diversity.										
Ground water	Acid Sulphate Soils (ASS) Groundwater hydrocarbon contamination Altered infiltration rates Waterlogging Flooding Increased salinity Eutrophication Change of landform Pathogens Spills	4-Major	2- Unlikely	MEDIUM	6	Desktop review of DWER groundwater mapping and desktop reviews of scientific literature Final landform and vegetation recolonisation as per MCP No chemicals stored on site No bores onsite and no groundwater is abstracted from aquifer Target resource is calcium carbonate (CaCO3) and therefore ASS will not be disturbed during clearing Mining only to natural surface calcrete level not into Leeman aquifer No nearby watercourses or wetlands Groundwater discharge into ocean approximately 700m from tenement No excavating past calcrete layer Natural calcrete layer has high hydraulic transmissivity Flood Plain Mapping extent 1 in 100 (1%) Annual Exceedance Probability (AEP) for flooding Increased salinity not expected to increase given tidal zone is 700m from tenement western perimeter No fertilisers used onsite No organic waste sorted onsite Potential eutrophication minimised by proximity of tidal zone (tidal zone is 700m) Minimal operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested Emergency response planning and safe management systems onsite Spill kits on site & contractor training	2-Minor	1-Rrare	LOW	3
Pathogens	Loss of biodiversity Extinction of threatened plant and animal species Reduced richness of native plant diversity Loss of habitat and food sources Increased dominance of resistant plants	5-Catastrophic	5-Almost certain	EXTREME	10	Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested No operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) does not sustain phytophthora oomycetes (DPAW Jurien bay) Vehicles travel many km's on sealed highways before entering site Equipment is locally sourced to minimise contamination	1-Insignificant	1-Rare	LOW	2
Dust	Decreased flora recruitment Decreased fecundity rates Surface water contamination Spread of pathogens	3- Moderate	4-Likely	HIGH	7	Extant flora and fauna tolerant of dusty conditions due to mobile dune system Final landform and vegetation recolonisation as per MCP Mobile dune system is targeted resource for extraction No chemicals stored on site No fertilisers used onsite Compacted roads as per TMP Water carts onsite to supress dust as required Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested	1-Insignificant	2-Unlikely	LOW	3

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing Principle (b) - Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.										
Ecological processes	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	<10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring Proposed clearing is not in biodiversity hotspots for priority action Bioregion offers a much higher degree of ecological significance than the proposed clearing	1-Insignificant	1-Rare	LOW	2
Removing remnant vegetation (pre-European)	Removal of genetic diversity (fauna) Loss of biodiversity Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Lack of topsoil Pathogens Erosion	3-Moderate	2-Unlikely	MEDIUM	5	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and vegetation recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species with limited dispersal Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species No key habitat sites or TEC's found during desktop reviews No meta-populations identified during desktop review Vegtation recolonisation monitoring <10 hectares of vegetation to be removed with this project	2-Minor	2-Unlikely	LOW	4
Pathogens	Loss of biodiversity Extinction of threatened plant and animal species Reduced richness native plant diversity Loss of habitat and food sources for fauna Increased dominance of resistant plants such as grasses, rushes and sedges.	4-Major	1- Rare	MEDIUM	5	Minimal operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Target resource is Target resource, calcium carbonate (CaCO3) and therefore ASS will not be disturbed during clearing Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested	2-Minor	1-Rare	LOW	3
Ground water	Acid Sulphate Soils (ASS) Groundwater hydrocarbon contamination Altered infiltration rates Waterlogging Flooding Increased salinity Eutrophication Change of landform Pathogens Spills	4-Major	2- Unlikely	MEDIUM	6	Desktop review of DWER groundwater mapping and desktop reviews of scientific literature Final landform and vegetation recolonisation as per MCP No chemicals stored on site No bores onsite and no groundwater is abstracted from aquifer Target resource is calcium carbonate (CaCO3) and therefore ASS will not be disturbed during clearing Mining only to natural surface calcrete level not into Leeman aquifer No nearby watercourses or wetlands Groundwater discharge into ocean approximately 700m from tenement No excavating past calcrete layer Natural calcrete layer has high hydraulic transmissivity Flood Plain Mapping extent 1 in 100 (1%) Annual Exceedance Probability (AEP) for flooding Increased salinity not expected to increase given tidal zone is 700m from tenement western perimeter No fertilisers used onsite No organic waste sorted onsite Potential eutrophication minimised by proximity of tidal zone (tidal zone is 700m) Minimal operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested Emergency response planning and safe management systems onsite Spill kits on site & contractor training	2-Minor	1-Rare	LOW	3

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing Principle (b) - Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.										
Wild fire	Disruption to nutrient cycling Loss of biodiversity Reduced richness in native plant diversity Loss of habitat and food sources for fauna Increased dominance of resistant plants such as weeds Removal of genetic diversity Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Erosion	4-Major	2- Unlikely	MEDIUM	6	Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora & fauna Neighbouring area's not in biodiversity hotspots for priority action No key habitat sites or TEC's found during desktop reviews No meta-populations identified during desktop review Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring <10 hectares of vegetation to be removed with this project Emergency response planning and safe management systems onsite	1-Insignificant	1 -Rare	LOW	2
Synemon gratiosa (Graceful Sun Moth)	Removal of genetic diversity and/or taxon diversity Loss of significant or priority fauna Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Trophic cascade Extinction	4-Major	1-Rare	MEDIUM	5	No occurrence of required host plant species Lomandra sp present onsite(see Hart, Simpson & Associates survey, 1996a, NatureMap) Target resource, calcium carbonate (lime sand) non carrier of phytophthora No impacts to groundwater High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion	1-Insignificant	1-Rare	LOW	2
Calidris ferruginea (Curlew Sandpiper)	Removal of genetic diversity and/or taxon diversity Loss of significant or priority fauna Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Trophic cascade Extinction	4-Major	1-Rare	MEDIUM	5	Extant habitat not expected to host Curlew Sandpiper Target resource, calcium carbonate (lime sand) non carrier of phytophthora No impacts to groundwater High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion NRP	3-Moderate	1- Rare	LOW	4
Limosa lapponica menzbier (Northern Siberian Bar-tailed Godwit)	Removal of genetic diversity and/or taxon diversity Loss of significant or priority fauna Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Trophic cascade Extinction	4-Major	1-Rare	MEDIUM	5	Extant habitat not expected to host Bar-tailed Godwit Target resource, calcium carbonate (lime sand) non carrier of phytophthora No impacts to groundwater High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion NRP	3-Moderate	1- Rare	LOW	4
Dasyurus geoffroii (Chuditch, Quol)	Removal of genetic diversity and/or taxon diversity Loss of significant or priority fauna Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Trophic cascade Extinction	4-Major	1-Rare	MEDIUM	5	Extant habitat not expected to host Chuditch Target resource, calcium carbonate (lime sand) non carrier of phytophthora No impacts to groundwater High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion NRP	3-Moderate	1-Rare	LOW	4
Thalassarche steadi (White-capped Albatross)	Removal of genetic diversity and/or taxon diversity Loss of significant or priority fauna Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Trophic cascade Extinction	4-Major	1-Rare	MEDIUM	5	Extant habitat not expected to host White-capped Albatross Target resource, calcium carbonate (lime sand) non carrier of phytophthora No impacts to groundwater High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion NRP	3-Moderate	1-Rare	LOW	4
Leipoa ocellata (Malleefowl)	Removal of genetic diversity and/or taxon diversity Loss of significant or priority fauna Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Trophic cascade Extinction	4-Major	1-Rare	MEDIUM	5	Extant habitat not expected to host Malleefowl Target resource, calcium carbonate (lime sand) non carrier of phytophthora No impacts to groundwater High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion NRP	3-Moderate	1-Rare	LOW	4

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing Principle (b) - Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.										
Removal of priority ecological communities	Alteration in vegetation condition Removal of priority or significant flora Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora Habitat loss	4-Major	1-Rare	MEDIUM	5	Bioregion offers a much higher degree of ecological significance than the proposed clearing Preliminary desktop review for TEC occurrence Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora Proposed clearing is not in biodiversity hotspots for priority action High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion <10 hectares of vegetation to be removed with this project Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring Clearing permit controls	1-Insignificant	1-Rare	LOW	2
Calyptorhynchus latirostris (Carnaby's Cockatoo	Removal of genetic diversity and/or taxon diversity Loss of significant or priority fauna Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Trophic cascade Extinction	4-Major	1-Rare	MEDIUM	5	Extant habitat not expected to host Canaby's Cockatoo Target resource, calcium carbonate (lime sand) non carrier of phytophthora No impacts to groundwater High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion NRP	3-Moderate	1-Rare	LOW	4
Habitat removal for fauna	Removal of genetic diversity and/or taxon diversity Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range	3- Moderate	2- Unlikely	MEDIUM	5	Extant landscape is naturally severally fragmented and supports small patches of vegetation Final landform and vegetation recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species with limited dispersal Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species No key habitat sites or TEC's found during desktop reviews No meta-populations identified during desktop review <10 hectares of vegetation to be removed with this project Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora Proposed clearing is not in biodiversity hotspots for priority action High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion Ecosystems will be measured as per MCP and vegetation recolonisation monitoring Clearing permit controls	1-Insignificant	1 -Rare	LOW	2
Dust	Decreased flora recruitment Decreased fecundity rates Surface water contamination Spread of pathogens	3- Moderate	4-Likely	HIGH	7	Extant flora and fauna tolerant of dusty conditions due to mobile dune system Final landform and vegetation recolonisation as per MCP Mobile dune system is targeted resource for extraction No chemicals stored on site No fertilisers used onsite Compacted roads as per TMP Water carts onsite to supress dust as required Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested	1-Insignificant	2-Unlikely	LOW	3
Removal of buffering vegetation	Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Natural corridor loss Loss of significant or priority fauna Altered ecological processes	2 - Minor	2-Unlikely	LOW	4	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and vegetation recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species with limited dispersal Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species No key habitat sites or TEC's found during desktop reviews No meta-populations identified during desktop review Ecosystems will be measured as per MCP and vegetation recolonisation monitoring <10 hectares of vegetation to be removed with this project	1-Insignificant	1-Rare	LOW	2

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing Principle (b) - Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.										
Fauna meta-populations	Removal of genetic diversity and/or taxon diversity Loss of significant or priority fauna Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Trophic cascade Extinction	3- Moderate	2- Unlikely	MEDIUM	5	No meta-populations identified during desktop review Extant landscape is naturally severally fragmented and supports small patches of vegetation <10 hectares of vegetation to be removed with this project Ecosystems will be measured as per MCP and vegetation recolonisation monitoring Extant landscape does not have the spatial distribution of vegetation to support meta-populations	1-Insignificant	1-Rare	LOW	2
Ecological balance	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	< 10ha hectares of vegetation to be removed High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring Proposed clearing is not in biodiversity hotspots for priority action Bioregion offers a much higher degree of ecological significance than the proposed clearing	1-Insignificant	1-Rare	LOW	2
Weed occurrence	Reduction in biodiversity Loss of species richness Loss of habitat Further spread of invasive species Loss of species richness	3- Moderate	3-Possible	MEDIUM	6	Clearing permit controls Weed management as per MCP Mobile plant is cleaned prior to site entry Truck clean out bay maintained and any grain seeds to be buried or sprayed with approved pesticides NDVI Bi-annual survey	2-Minor	2-Unlikely	LOW	4
Ecological linkages	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring <10 hectares of vegetation to be removed with this project	1-Insignificant	1-Rare	LOW	2
Altered landscape	Habitat loss Unstable landform Erosion Unsafe environment Polluted landscape	3-Moderate	2- Unlikely	MEDIUM	5	Post mining landscape will be safe, stable and non-polluting as per MCP Clearing permit controls NDVI Bi-annual survey Mobile dune system is targeted resource for extraction <10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion	2-Minor	1-Rare	LOW	3

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (c) - Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.										
Removal of priority, significant or rare flora	Alteration in vegetation condition Removal of priority or significant flora Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora	4-Major	1-Rare	MEDIUM	5	Bioregion offers a much higher degree of ecological significance than the proposed clearing Preliminary desktop review for TEC occurrence Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora Proposed clearing is not in biodiversity hotspots for priority action High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion <10 hectares of vegetation to be removed with this project Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring	1-Insignificant	1-Rare	LOW	2
Removal of buffering vegetation	Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Natural corridor loss Loss of significant or priority fauna Altered ecological processes	2 - Minor	2-Unlikely	LOW	4	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and vegetation recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species with limited dispersal Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species No key habitat sites or TEC's found during desktop reviews No meta-populations identified during desktop review Ecosystems will be measured as per MCP and vegetation recolonisation monitoring <10 hectares of vegetation to be removed with this project	1-Insignificant	1-Rare	LOW	2
Ecological processes	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	<10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring Proposed clearing is not in biodiversity hotspots for priority action Bioregion offers a much higher degree of ecological significance than the proposed clearing	1-Insignificant	1-Rare	LOW	2
Dust	Decreased flora recruitment Decreased fecundity rates Surface water contamination Spread of pathogens	3- Moderate	4-Likely	HIGH	7	Extant flora and fauna tolerant of dusty conditions due to mobile dune system Final landform and vegetation recolonisation as per MCP Mobile dune system is targeted resource for extraction No chemicals stored on site No fertilisers used onsite Compacted roads as per TMP Water carts onsite to supress dust as required Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested	1-Insignificant	2-Unlikely	LOW	3
Removal of vegetation	Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora Habitat loss	3- Moderate	2- Unlikely	MEDIUM	5	Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora Proposed clearing is not in biodiversity hotspots for priority action High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion <10 hectares of vegetation to be removed with this project Ecosystems will be measured as per MCP and vegetation recolonisation monitoring Clearing permit controls	1-Insignificant	1 -Rare	LOW	2
Grevillea olivacea (Olive Grevillea)	Removal of genetic diversity and/or taxon diversity Loss of significant or priority flora Loss of habitat values for geographic range Extinction	3- Moderate	2- Unlikely	MEDIUM	5	No occurrence of plant on site (see Hart, Simpson & Associates survey, 1996a) Training provided to on-site operators pertaining to the phenotypical traits of this plant Extant habitat not expected to host Olive Grevillea Target resource, calcium carbonate (lime sand) non carrier of phytophthora No impacts to groundwater High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion	2-Minor	1-Rare	LOW	3

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (c) - Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.										
Pathogens	Loss of biodiversity Extinction of threatened plant and animal species Reduced richness native plant diversity Loss of habitat and food sources for fauna Increased dominance of resistant plants such as grasses, rushes and sedges.	4-Major	1- Rare	MEDIUM	5	Minimal operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested Target resource is Target resource, calcium carbonate (CaCO3) and therefore ASS will not be disturbed during clearing	2-Minor	1-Rare	LOW	3
Weed occurrence	Reduction in biodiversity Loss of species richness Loss of habitat Further spread of invasive species Loss of species richness	3- Moderate	3-Possible	MEDIUM	6	Clearing permit controls Weed management as per MCP Mobile plant is cleaned prior to site entry Truck clean out bay maintained and any grain seeds to be buried or sprayed with approved pesticides NDVI Bi-annual survey	2-Minor	2-Unlikely	LOW	4
Altered landscape	Habitat loss Unstable landform Erosion Unsafe environment Polluted landscape	3-Moderate	2- Unlikely	MEDIUM	5	Post mining landscape will be safe, stable and non-polluting as per MCP Clearing permit controls NDVI Bi-annual survey Mobile dune system is targeted resource for extraction <10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion	2-Minor	1-Rare	LOW	3

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (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										
Removal of vegetation	Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora Habitat loss	3- Moderate	2- Unlikely	MEDIUM	5	Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora Proposed clearing is not in biodiversity hotspots for priority action High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion <10 hectares of vegetation to be removed with this project Ecosystems will be measured as per MCP and vegatation recolonisation monitoring Clearing permit controls	1-Insignificant	1 -Rare	LOW	2
Threatened ecological communities (TEC)	Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora Extinction	3- Moderate	1-Rare	LOW	4	No TEC in vicinity of tenement, closest TEC is approximately 22km to the south-east of tenement <10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion	1-Insignificant	1-Rare	LOW	2
Removal of priority ecological communities	Alteration in vegetation condition Removal of priority or significant flora Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora Habitat loss	4-Major	1-Rare	MEDIUM	5	Bioregion offers a much higher degree of ecological significance than the proposed clearing Preliminary desktop review for TEC occurrence Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora Proposed clearing is not in biodiversity hotspots for priority action High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion <10 hectares of vegetation to be removed with this project Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring Clearing permit controls	1-Insignificant	1-Rare	LOW	2
Ecological linkages	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring <10 hectares of vegetation to be removed with this project	1-Insignificant	1-Rare	LOW	2
Ecological processes	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	<10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring Proposed clearing is not in biodiversity hotspots for priority action Bioregion offers a much higher degree of ecological significance than the proposed clearing	1-Insignificant	1-Rare	LOW	2
Removal of buffering vegetation	Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Natural corridor loss Loss of significant or priority fauna Altered ecological processes	2 - Minor	2-Unlikely	LOW	4	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and vegetation recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species with limited dispersal Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species No key habitat sites or TEC's found during desktop reviews No meta-populations identified during desktop review Ecosystems will be measured as per MCP and vegetation recolonisation monitoring <10 hectares of vegetation to be removed with this project	1-Insignificant	1-Rare	LOW	2
Removal of priority, significant or rare flora	Alteration in vegetation condition Removal of priority or significant flora Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora	4-Major	1-Rare	MEDIUM	5	Bioregion offers a much higher degree of ecological significance than the proposed clearing Preliminary desktop review for TEC occurrence Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora Proposed clearing is not in biodiversity hotspots for priority action High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion <10 hectares of vegetation to be removed with this project Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring	1-Insignificant	1-Rare	LOW	2

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (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										
Pathogens	Loss of biodiversity Extinction of threatened plant and animal species Reduced richness native plant diversity Loss of habitat and food sources for fauna Increased dominance of resistant plants such as grasses, rushes and sedges.	4-Major	1- Rare	MEDIUM	5	Minimal operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested Target resource is Target resource, calcium carbonate ($CaCO_3$) and therefore ASS will not be disturbed during clearing	2-Minor	1-Rare	LOW	3
Weed occurrence	Reduction in biodiversity Loss of species richness Loss of habitat Further spread of invasive species Loss of species richness	3- Moderate	3-Possible	MEDIUM	6	Clearing permit controls Weed management as per MCP Mobile plant is cleaned prior to site entry Truck clean out bay maintained and any grain seeds to be buried or sprayed with approved pesticides NDVI Bi-annual survey	2-Minor	2-Unlikely	LOW	4
Altered landscape	Habitat loss Unstable landform Erosion Unsafe environment Polluted landscape	3-Moderate	2- Unlikely	MEDIUM	5	Post mining landscape will be safe, stable and non-polluting as per MCP Clearing permit controls NDVI Bi-annual survey Mobile dune system is targeted resource for extraction <10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion	2-Minor	1-Rare	LOW	3

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (e)- Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.										
Removal of vegetation	Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora Habitat loss	3-Moderate	2- Unlikely	MEDIUM	5	Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora Proposed clearing is not in biodiversity hotspots for priority action High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion <10 hectares of vegetation to be removed with this project Ecosystems will be measured as per MCP and vegatation recolonisation monitoring Clearing permit controls	1-Insignificant	1 -Rare	LOW	2
Weed occurrence	Reduction in biodiversity Loss of species richness Loss of habitat Further spread of invasive species Loss of species richness	3- Moderate	3-Possible	MEDIUM	6	Clearing permit controls Weed management as per MCP Mobile plant is cleaned prior to site entry Truck clean out bay maintained and any grain seeds to be buried or sprayed with approved pesticides NDVI Bi-annual survey	2-Minor	2-Unlikely	LOW	4
Removing remnant vegetation (pre-European)	Removal of genetic diversity (fauna) Loss of biodiversity Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Lack of topsoil Pathogens Erosion	3-Moderate	2-Unlikely	MEDIUM	5	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and vegetation recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species with limited dispersal Final landform and recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species No key habitat sites or TEC's found during desktop reviews No meta-populations identified during desktop review Vegtation recolonisation monitoring <10 hectares of vegetation to be removed with this project	2-Minor	2-Unlikely	LOW	4
Removal of buffering vegetation	Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Natural corridor loss Loss of significant or priority fauna Altered ecological processes	2 - Minor	2-Unlikely	LOW	4	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and vegetation recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species with limited dispersal Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species No key habitat sites or TEC's found during desktop reviews No meta-populations identified during desktop review Ecosystems will be measured as per MCP and vegetation recolonisation monitoring <10 hectares of vegetation to be removed with this project	1-Insignificant	1-Rare	LOW	2
Altered landscape	Habitat loss Unstable landform Erosion Unsafe environment Polluted landscape	3-Moderate	2- Unlikely	MEDIUM	5	Post mining landscape will be safe, stable and non-polluting as per MCP Clearing permit controls NDVI Bi-annual survey Mobile dune system is targeted resource for extraction <10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion	2-Minor	1-Rare	LOW	3
Ecological processes	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	<10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring Proposed clearing is not in biodiversity hotspots for priority action Bioregion offers a much higher degree of ecological significance than the proposed clearing	1-Insignificant	1-Rare	LOW	2
Habitat isolation	Decreased fecundity rates Decreased pollination Loss of biodiversity Loss of genetic diversity and/or taxon diversity Reduction of supporting habitat for a diverse range of species	3-Moderate	2-Unlikely	MEDIUM	5	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and vegetation recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species	1-Insignificant	1-Rare	LOW	2

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (e)- Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.										
Ecological linkages	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring <10 hectares of vegetation to be removed with this project	1-Insignificant	1-Rare	LOW	2
Habitat fragmentation	Natural corridor loss Loss of ecological linkages Decreased biodiversity Decreased fecundity rates Loss of genetic diversity and/or taxon diversity	3-Moderate	2-Unlikely	MEDIUM	5	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and vegetation recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species	1-Insignificant	1-Rare	LOW	2
Pathogens	Loss of biodiversity Extinction of threatened plant and animal species Reduced richness of native plant diversity Loss of habitat and food sources Increased dominance of resistant plants	5-Catastrophic	5-Almost certain	EXTREME	10	Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested No operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) does not sustain phytophthora oomycetes (DPAW Jurien bay) Vehicles travel many km's on sealed highways before entering site Equipment is locally sourced to minimise contamination	1-Insignificant	1-Rare	LOW	2
Removal of priority, significant or rare flora	Alteration in vegetation condition Removal of priority or significant flora Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora	4-Major	1-Rare	MEDIUM	5	Bioregion offers a much higher degree of ecological significance than the proposed clearing Preliminary desktop review for TEC occurrence Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora Proposed clearing is not in biodiversity hotspots for priority action High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion <10 hectares of vegetation to be removed with this project Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring	1-Insignificant	1-Rare	LOW	2

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (f) - Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.										
Ground water	Acid Sulphate Soils (ASS) Groundwater hydrocarbon contamination Altered infiltration rates Waterlogging Flooding Increased salinity Eutrophication Change of landform Pathogens Spills	4-Major	2- Unlikely	MEDIUM	6	Desktop review of DWER groundwater mapping and desktop reviews of scientific literature Final landform and vegetation recolonisation as per MCP No chemicals stored on site No bores onsite and no groundwater is abstracted from aquifer Target resource is calcium carbonate (CaCO3) and therefore ASS will not be disturbed during clearing Mining only to natural surface calcrete level not into Leeman aquifer No nearby watercourses or wetlands Groundwater discharge into ocean approximately 700m from tenement No excavating past calcrete layer Natural calcrete layer has high hydraulic transmissivity Flood Plain Mapping extent 1 in 100 (1%) Annual Exceedance Probability (AEP) for flooding Increased salinity not expected to increase given tidal zone is 700m from tenement western perimeter No fertilisers used onsite No organic waste sorted onsite Potential eutrophication minimised by proximity of tidal zone (tidal zone is 700m) Minimal operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested Emergency response planning and safe management systems onsite Spill kits on site & contractor training	2-Minor	1-Rrare	LOW	3
Removing remnant vegetation (pre-European)	Removal of genetic diversity (fauna) Loss of biodiversity Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Lack of topsoil Pathogens Erosion	3-Moderate	2-Unlikely	MEDIUM	5	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species with limited dispersal Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species No key habitat sites or TEC's found during desktop reviews No meta-populations identified during desktop review Vegtation recolonisation monitoring <10 hectares of vegetation to be removed with this project	2-Minor	2-Unlikely	LOW	4
Land degradation	Increased flooding Increased soil salinity Increased erosion Decreased land capability Habitat loss Changed landform Altered hydrological regimes Nutrient export Soil acidification Groundwater deterioration	3-Moderate	2- Unlikely	MEDIUM	5	Target resource and calcrete layer highly permeable Vegetation recolonisation to reduce nutrient export Tenement approximately 700m from ocean Final landform design includes heaped mounds Clearing permit controls NDVI Bi-annual survey MCP Naturally mobile dune system is targeted resource for extraction Target resource (CaCO3) primarily used for neutralising soil acidification Mining only to natural surface calcrete level not into Leeman aquifer	3-Moderate	3-Possible	MEDIUM	6
Weed occurrence	Reduction in biodiversity Loss of species richness Loss of habitat Further spread of invasive species Loss of species richness	3- Moderate	3-Possible	MEDIUM	6	Clearing permit controls Weed management as per MCP Mobile plant is cleaned prior to site entry Truck clean out bay maintained and any grain seeds to be buried or sprayed with approved pesticides NDVI Bi-annual survey	2-Minor	2-Unlikely	LOW	4
Sand extraction	Altered hydrological regime Water logging Ground water recharge	3-Moderate	3-Possible	MEDIUM	6	Mining to natural calcrete lay only. Target resource and calcrete layer highly permeable with high hydraulic conductivity Vegetation resulting from natural recolonisation suitable for near shore environments Flood Plain Mapping (FPM) extent 1 in 100 (1%) Annual Exceedance Probability (AEP) for flooding	2-Minor	1-Rare	LOW	3

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (f) - Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.										
Ecological processes	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	<10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring Proposed clearing is not in biodiversity hotspots for priority action Bioregion offers a much higher degree of ecological significance than the proposed clearing	1-Insignificant	1-Rare	LOW	2
Dust	Decreased flora recruitment Decreased fecundity rates Surface water contamination Spread of pathogens	3- Moderate	4-Likely	HIGH	7	Extant flora and fauna tolerant of dusty conditions due to mobile dune system Final landform and vegetation recolonisation as per MCP Mobile dune system is targeted resource for extraction No chemicals stored on site No fertilisers used onsite Compacted roads as per TMP Water carts onsite to supress dust as required Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested	1-Insignificant	2-Unlikely	LOW	3
Wetlands and watercourses	Loss of significant habitat Loss of biodiversity	4-Major	2- Unlikely	MEDIUM	6	No watercourses or water reserves within vicinity of tenement Closest watercourse 15km east of tenement Water table >2m below calcrete layer No water abstracted for mining activities	1-Insignificant	1-Rare	LOW	2
Removal of buffering vegetation	Habitat loss Natural corridor loss Erosion	3-Moderate	2-Unlikely	MEDIUM	5	Clearing permit controls On site monitoring MRF AER MCP <10 hectares of vegetation to be removed with this project	1-Insignificant	1-Rare	LOW	2

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (g) - Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.										
Altered landscape	Habitat loss Unstable landform Erosion Unsafe environment Polluted landscape	3-Moderate	2- Unlikely	MEDIUM	5	Post mining landscape will be safe, stable and non-polluting as per MCP Clearing permit controls NDVI Bi-annual survey Mobile dune system is targeted resource for extraction <10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion	2-Minor	1-Rare	LOW	3
Land degradation	Increased flooding Increased soil salinity Increased erosion Decreased land capability Habitat loss Changed landform Altered hydrological regimes Nutrient export Soil acidification Groundwater deterioration	3-Moderate	2- Unlikely	MEDIUM	5	Target resource and calcrete layer highly permeable vegetation recolonisation to reduce nutrient export Tenement approximately 700m from ocean Final landform design includes heaped mounds Clearing permit controls NDVI Bi-annual survey MCP Naturally mobile dune system is targeted resource for extraction Target resource (CaCO3) primarily used for neutralising soil acidification Mining only to natural surface calcrete level not into Leeman aquifer	3-Moderate	3-Possible	MEDIUM	6
Weed occurrence	Reduction in biodiversity Loss of species richness Loss of habitat Further spread of invasive species Loss of species richness	3- Moderate	3-Possible	MEDIUM	6	Clearing permit controls Weed management as per MCP Mobile plant is cleaned prior to site entry Truck clean out bay maintained and any grain seeds to be buried or sprayed with approved pesticides NDVI Bi-annual survey	2-Minor	2-Unlikely	LOW	4
Ecological linkages	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring <10 hectares of vegetation to be removed with this project	1-Insignificant	1-Rare	LOW	2
Removing remnant vegetation (pre-European)	Removal of genetic diversity (fauna) Loss of biodiversity Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Lack of topsoil Pathogens Erosion	3-Moderate	2-Unlikely	MEDIUM	5	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species with limited dispersal Final landform and recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species No key habitat sites or TEC's found during desktop reviews No meta-populations identified during desktop review Vegtation recolonisation monitoring <10 hectares of vegetation to be removed with this project	2-Minor	2-Unlikely	LOW	4

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (g) - Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.										
Ground water	Acid Sulphate Soils (ASS) Groundwater hydrocarbon contamination Altered infiltration rates Waterlogging Flooding Increased salinity Eutrophication Change of landform Pathogens Spills	4-Major	2- Unlikely	MEDIUM	6	Desktop review of DWER groundwater mapping and desktop reviews of scientific literature Final landform and vegetation recolonisation as per MCP No chemicals stored on site No bores onsite and no groundwater is abstracted from aquifer Target resource is calcium carbonate (CaCO3) and therefore ASS will not be disturbed during clearing Mining only to natural surface calcrete level not into Leeman aquifer No nearby watercourses or wetlands Groundwater discharge into ocean approximately 700m from tenement No excavating past calcrete layer Natural calcrete layer has high hydraulic transmissivity Flood Plain Mapping extent 1 in 100 (1%) Annual Exceedance Probability (AEP) for flooding Increased salinity not expected to increase given tidal zone is 700m from tenement western perimeter No fertilisers used onsite No organic waste sorted onsite Potential eutrophication minimised by proximity of tidal zone (tidal zone is 700m) Minimal operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested Emergency response planning and safe management systems onsite Spill kits on site & contractor training	2-Minor	1-Rrare	LOW	3
Sand extraction	Altered hydrological regime Water logging Ground water recharge	3-Moderate	3-Possible	MEDIUM	6	Mining to natural calcrete lay only. Target resource and calcrete layer highly permeable with high hydraulic conductivity Vegetation resulting from natural recolonisation suitable for near shore environments Flood Plain Mapping (FPM) extent 1 in 100 (1%) Annual Exceedance Probability (AEP) for flooding	2-Minor	1-Rare	LOW	3
Ecological processes	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	<10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring Proposed clearing is not in biodiversity hotspots for priority action Bioregion offers a much higher degree of ecological significance than the proposed clearing	1-Insignificant	1-Rare	LOW	2
Pathogens	Loss of biodiversity Extinction of threatened plant and animal species Reduced richness of native plant diversity Loss of habitat and food sources Increased dominance of resistant plants	5-Catastrophic	5-Almost certain	EXTREME	10	Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested No operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) does not sustain phytophthora oomycetes (DPAW Jurien bay) Vehicles travel many km's on sealed highways before entering site Equipment is locally sourced to minimise contamination	1-Insignificant	1-Rare	LOW	2
Dust	Decreased flora recruitment Decreased fecundity rates Surface water contamination Spread of pathogens	3-Moderate	4-Likely	HIGH	7	Extant flora and fauna tolerant of dusty conditions due to mobile dune system Final landform and vegetation recolonisation as per MCP Mobile dune system is targeted resource for extraction No chemicals stored on site No fertilisers used onsite Compacted roads as per TMP Water carts onsite to supress dust as required Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested	1-Insignificant	2-Unlikely	LOW	3

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (g) - Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.										
Removal of vegetation	Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora Habitat loss	3-Moderate	2- Unlikely	MEDIUM	5	Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora Proposed clearing is not in biodiversity hotspots for priority action High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion <10 hectares of vegetation to be removed with this project Ecosystems will be measured as per MCP and vegatation recolonisation monitoring Clearing permit controls	1-Insignificant	1 -Rare	LOW	2

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (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.										
DRF occurrence	Flora destruction Habitat loss	3- Moderate	2-Unlikely	MEDIUM	5	Preliminary desktop review for DRF occurrence Clearing permit controls On site monitoring Low vegetation disturbance due to nature of operations MCP	1-Insignificant	1-Rare	LOW	2
Ground water	Acid Sulphate Soils (ASS) Groundwater hydrocarbon contamination Altered infiltration rates Waterlogging Flooding Increased salinity Eutrophication Change of landform Pathogens Spills	4-Major	2- Unlikely	MEDIUM	6	Desktop review of DWER groundwater mapping and desktop reviews of scientific literature Final landform and vegetation recolonisation as per MCP No chemicals stored on site No bores onsite and no groundwater is abstracted from aquifer Target resource is calcium carbonate (CaCO3) and therefore ASS will not be disturbed during clearing Mining only to natural surface calcrete level not into Leeman aquifer No nearby watercourses or wetlands Groundwater discharge into ocean approximately 700m from tenement No excavating past calcrete layer Natural calcrete layer has high hydraulic transmissivity Flood Plain Mapping extent 1 in 100 (1%) Annual Exceedance Probability (AEP) for flooding Increased salinity not expected to increase given tidal zone is 700m from tenement western perimeter No fertilisers used onsite No organic waste sorted onsite Potential eutrophication minimised by proximity of tidal zone (tidal zone is 700m) Minimal operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested Emergency response planning and safe management systems onsite Spill kits on site & contractor training	2-Minor	1-Rrare	LOW	3
Removing remnant vegetation (pre-European)	Removal of genetic diversity (fauna) Loss of biodiversity Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Lack of topsoil Pathogens Erosion	3-Moderate	2-Unlikely	MEDIUM	5	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species with limited dispersal Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species No key habitat sites or TEC's found during desktop reviews No meta-populations identified during desktop review Vegtation recolonisation monitoring <10 hectares of vegetation to be removed with this project	2-Minor	2-Unlikely	LOW	4
Habitat isolation	Decreased fecundity rates Decreased pollination Loss of biodiversity Loss of genetic diversity and/or taxon diversity Reduction of supporting habitat for a diverse range of species	3-Moderate	2-Unlikely	MEDIUM	5	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and vegetation recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species	1-Insignificant	1-Rare	LOW	2
Removal of buffering vegetation	Habitat loss Natural corridor loss Erosion	3-Moderate	2-Unlikely	MEDIUM	5	Clearing permit controls On site monitoring MRF AER MCP <10 hectares of vegetation to be removed with this project	1-Insignificant	1-Rare	LOW	2

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (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.										
Removal of vegetation	Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora Habitat loss	3-Moderate	2- Unlikely	MEDIUM	5	Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora Proposed clearing is not in biodiversity hotspots for priority action High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion <10 hectares of vegetation to be removed with this project Ecosystems will be measured as per MCP and vegatation recolonisation monitoring Clearing permit controls	1-Insignificant	1 -Rare	LOW	2
Habitat fragmentation	Loss of natural corridors Loss of ecological linkages Loss of fauna	3-Moderate	2-Unlikely	MEDIUM	5	Extant landscape is naturally severely fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and vegetation recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species	2-Minor	2-Unlikely	LOW	4
Ecological processes	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	<10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring Proposed clearing is not in biodiversity hotspots for priority action Bioregion offers a much higher degree of ecological significance than the proposed clearing	1-Insignificant	1-Rare	LOW	2
Ecological linkages	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring <10 hectares of vegetation to be removed with this project	1-Insignificant	1-Rare	LOW	2
Habitat removal for fauna	Habitat loss	3- Moderate	2- Unlikely	MEDIUM	5	Clearing permit controls On site monitoring MRF AER MCP	1-Insignificant	1 -Rare	LOW	2
Weed occurrence	Reduction in biodiversity Loss of species richness Loss of habitat Further spread of invasive species Loss of species richness	3- Moderate	3-Possible	MEDIUM	6	Clearing permit controls Weed management as per MCP Mobile plant is cleaned prior to site entry Truck clean out bay maintained and any grain seeds to be buried or sprayed with approved pesticides NDVI Bi-annual survey	2-Minor	2-Unlikely	LOW	4
Pathogens	Loss of biodiversity Extinction of threatened plant and animal species Reduced richness of native plant diversity Loss of habitat and food sources Increased dominance of resistant plants	5-Catastrophic	5-Almost certain	EXTREME	10	Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested No operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) does not sustain phytophthora oomycetes (DPAW Jurien bay) Vehicles travel many km's on sealed highways before entering site Equipment is locally sourced to minimise contamination	1-Insignificant	1-Rare	LOW	2
Dust	Decreased flora recruitment Decreased fecundity rates Surface water contamination Spread of pathogens	3- Moderate	4-Likely	HIGH	7	Extant flora and fauna tolerant of dusty conditions due to mobile dune system Final landform and vegetation recolonisation as per MCP Mobile dune system is targeted resource for extraction No chemicals stored on site No fertilisers used onsite Compacted roads as per TMP Water carts onsite to supress dust as required Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested	1-Insignificant	2-Unlikely	LOW	3

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (i) - Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.										
Ground water	Acid Sulphate Soils (ASS) Groundwater hydrocarbon contamination Altered infiltration rates Waterlogging Flooding Increased salinity Eutrophication Change of landform Pathogens Spills	4-Major	2- Unlikely	MEDIUM	6	Desktop review of DWER groundwater mapping and desktop reviews of scientific literature Final landform and vegetation recolonisation as per MCP No chemicals stored on site No bores onsite and no groundwater is abstracted from aquifer Target resource is calcium carbonate (CaCO3) and therefore ASS will not be disturbed during clearing Mining only to natural surface calcrete level not into Leeman aquifer No nearby watercourses or wetlands Groundwater discharge into ocean approximately 700m from tenement No excavating past calcrete layer Natural calcrete layer has high hydraulic transmissivity Flood Plain Mapping extent 1 in 100 (1%) Annual Exceedance Probability (AEP) for flooding Increased salinity not expected to increase given tidal zone is 700m from tenement western perimeter No fertilisers used onsite No organic waste sorted onsite Potential eutrophication minimised by proximity of tidal zone (tidal zone is 700m) Minimal operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested Emergency response planning and safe management systems onsite Spill kits on site & contractor training	2-Minor	1-Rrare	LOW	3
Removing remnant vegetation (pre-European)	Removal of genetic diversity (fauna) Loss of biodiversity Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Lack of topsoil Pathogens Erosion	3-Moderate	2-Unlikely	MEDIUM	5	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and vegetation recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species with limited dispersal Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species No key habitat sites or TEC's found during desktop reviews No meta-populations identified during desktop review Vegtation recolonisation monitoring <10 hectares of vegetation to be removed with this project	2-Minor	2-Unlikely	LOW	4
Potential Acid sulphate soils (PASS)	Soil disturbance Deleterious leachates Groundwater contamination	1-Insignificant	1-Rrare	LOW	2	ASS risk mapping indicates low risk area No watering or groundwater bore abstraction associated with clearing No excavating past calcrete layer Natural calcrete layer has high hydraulic transmissivity Mining only to natural surface calcrete level not into Leeman aquifer Groundwater discharge into ocean approximately 700m from tenement Target resource is calcium carbonate (CaCO3) and therefore ASS will not be disturbed during clearing	1-Insignificant	1-Rrare	LOW	2
Surface water	Surface water contamination Sedimentation Eutrophication Altered hydrological regime Increased salinity Hydrocarbon contamination	3-Moderate	2-Unlikely	MEDIUM	5	Desktop review of GIS databases showing no nearby water reserves, water courses or water bodies Closest watercourse 15km east of tenement No chemicals stored on site No fertilisers used onsite Mining only to natural surface calcrete level not into Leeman aquifer No organic waste sorted onsite No bores onsite and no groundwater is abstracted from aquifer Increased salinity not expected to increase given tidal zone is 700m from tenement western perimeter Spill kits on site & contractor training Final landform and vegetation recolonisation as per MCP	1-Insignificant	1-Rrare	LOW	2

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (i) - Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.										
Dust	Decreased flora recruitment Decreased fecundity rates Surface water contamination Spread of pathogens	3-Moderate	4-Likely	HIGH	7	Extant flora and fauna tolerant of dusty conditions due to mobile dune system Final landform and vegetation recolonisation as per MCP Mobile dune system is targeted resource for extraction No chemicals stored on site No fertilisers used onsite Compacted roads as per TMP Water carts onsite to supress dust as required Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested	1-Insignificant	2-Unlikely	LOW	3
Pathogens	Loss of biodiversity Extinction of threatened plant and animal species Reduced richness of native plant diversity Loss of habitat and food sources Increased dominance of resistant plants	5-Catastrophic	5-Almost certain	EXTREME	10	Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested No operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) does not sustain phytophthora oomycetes (DPAW Jurien bay) Vehicles travel many km's on sealed highways before entering site Equipment is locally sourced to minimise contamination	1-Insignificant	1-Rare	LOW	2
Sand extraction	Altered hydrological regime Water logging Ground water recharge	3-Moderate	3-Possible	MEDIUM	6	Mining to natural calcrete lay only. Target resource and calcrete layer highly permeable with high hydraulic conductivity Vegetation resulting from natural recolonisation suitable for near shore environments Flood Plain Mapping (FPM) extent 1 in 100 (1%) Annual Exceedance Probability (AEP) for flooding	2-Minor	1-Rare	LOW	3

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (j) - Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.										
Altered landscape	Habitat loss Unstable landform Erosion Unsafe environment Polluted landscape	3-Moderate	2- Unlikely	MEDIUM	5	Post mining landscape will be safe, stable and non-polluting as per MCP Clearing permit controls NDVI Bi-annual survey Mobile dune system is targeted resource for extraction <10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion	2-Minor	1-Rare	LOW	3
Removing remnant vegetation (pre-European)	Removal of genetic diversity (fauna) Loss of biodiversity Reduction in foraging habitat Increased risk of predation Loss of habitat values for geographic range Lack of topsoil Pathogens Erosion	3-Moderate	2-Unlikely	MEDIUM	5	Extant landscape is naturally severally fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species with limited dispersal Final landform and recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species No key habitat sites or TEC's found during desktop reviews No meta-populations identified during desktop review Vegtation recolonisation monitoring <10 hectares of vegetation to be removed with this project	2-Minor	2-Unlikely	LOW	4
Removal of vegetation	Removal of genetic diversity and/or taxon diversity Loss of biodiversity Loss of significant or priority flora Habitat loss	3- Moderate	2- Unlikely	MEDIUM	5	Preliminary Desktop review of NatureMap and EPBC 1-5km buffers for potential impacts to priority of significant flora Proposed clearing is not in biodiversity hotspots for priority action High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion <10 hectares of vegetation to be removed with this project Ecosystems will be measured as per MCP and vegatation recolonisation monitoring Clearing permit controls	1-Insignificant	1 -Rare	LOW	2
Sand extraction	Altered hydrological regime Water logging Ground water recharge	3-Moderate	3-Possible	MEDIUM	6	Mining to natural calcrete lay only. Target resource and calcrete layer highly permeable with high hydraulic conductivity Vegetation resulting from natural recolonisation suitable for near shore environments Flood Plain Mapping (FPM) extent 1 in 100 (1%) Annual Exceedance Probability (AEP) for flooding	2-Minor	1-Rare	LOW	3
Ground water	Acid Sulphate Soils (ASS) Groundwater hydrocarbon contamination Altered infiltration rates Waterlogging Flooding Increased salinity Eutrophication Change of landform Pathogens Spills	4-Major	2- Unlikely	MEDIUM	6	Desktop review of DWER groundwater mapping and desktop reviews of scientific literature Final landform and vegetation recolonisation as per MCP No chemicals stored on site No bores onsite and no groundwater is abstracted from aquifer Target resource is calcium carbonate (CaCO3) and therefore ASS will not be disturbed during clearing Mining only to natural surface calcrete level not into Leeman aquifer No nearby watercourses or wetlands Groundwater discharge into ocean approximately 700m from tenement No excavating past calcrete layer Natural calcrete layer has high hydraulic transmissivity Flood Plain Mapping extent 1 in 100 (1%) Annual Exceedance Probability (AEP) for flooding Increased salinity not expected to increase given tidal zone is 700m from tenement western perimeter No fertilisers used onsite No organic waste sorted onsite Potential eutrophication minimised by proximity of tidal zone (tidal zone is 700m) Minimal operating during wet periods, transportation restricted to warmer and drier months (October to April) Target resource, calcium carbonate (lime sand) non carrier of phytophthora (DPAW Jurien Bay) Equipment is locally sourced to minimise contamination Desktop review of DIDMS shows no susceptible vegetation within 20kms, no priority protection areas and moderate confidence in the mapped area being uninfested Emergency response planning and safe management systems onsite Spill kits on site & contractor training	2-Minor	1-Rrare	LOW	3

WDH risk assessment relevant to Clearing Permit Application M70/932 & L70/75 WDH-CP-RA

RISK ASSESSMENT RECORD		Inherent Risk					Residual Risk			
Aspect	**Impact**	**Consequence**	**Likelihood**	**Level**	**Rank**	**Management/controls**	**Consequence**	**Likelihood**	**Level**	**Rank**
Clearing principle (j) - Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.										
Waterlogging	Flooding Altered hydrological regimes Increased salinity Water body sedimentation Eutrophication	3-Moderate	2-Unlikely	MEDIUM	5	Desktop review of GIS databases showing no nearby water reserves, water courses or water bodies Mining to natural calcrete lay only. Natural calcrete layer has high hydraulic transmissivity No excavating past calcrete layer No nearby watercourses or wetlands Vegetation resulting from natural recolonisation suitable for near shore environments Groundwater discharge into ocean approximately 700m from tenement Flood Plain Mapping (FPM) extent 1 in 100 (1%) Annual Exceedance Probability (AEP) for flooding Increased salinity not expected to increase given tidal zone is 700m from tenement western perimeter No fertilisers used onsite No organic waste sorted onsite Potential eutrophication minimised by proximity of tidal zone (tidal zone is 700m)	1-Insignificant	1-Rare	LOW	2
Habitat fragmentation	Loss of natural corridors Loss of ecological linkages Loss of fauna	3-Moderate	2-Unlikely	MEDIUM	5	Extant landscape is naturally severely fragmented and supports small patches of vegetation Desktop review of EPBC 1-5km buffers Final landform and vegetation recolonisation as per MCP will result in more native vegetation capable of supporting breeding populations of potential species	2-Minor	2-Unlikely	LOW	4
Ecological processes	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	<10 hectares of vegetation to be removed with this project High percentage of remaining remnant vegetation 1026.3 & 129 remaining in bioregion Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring Proposed clearing is not in biodiversity hotspots for priority action Bioregion offers a much higher degree of ecological significance than the proposed clearing	1-Insignificant	1-Rare	LOW	2
Ecological linkages	Disruption to nutrient cycling Trophic cascade Reduced bioturbation Reduced carbon sequestration Altered hydrological regimes	4-Major	1- Rare	MEDIUM	5	Final landform and vegetation recolonisation as per MCP will provide ecological linkages and buffering vegetation for faunal species Overall vegetation condition will be improved through MCP practices and vegetation recolonisation monitoring <10 hectares of vegetation to be removed with this project	1-Insignificant	1-Rare	LOW	2
Wetlands and watercourses	Loss of significant habitat Loss of biodiversity	4-Major	2- Unlikely	MEDIUM	6	Desktop review of GIS databases showing no nearby water reserves, water courses or water bodies Closest watercourse 15km east of tenement Water table >2m below calcrete layer No water abstracted for mining activities	1-Insignificant	1-Rare	LOW	2
Surface water	Surface water contamination Sedimentation Eutrophication Altered hydrological regimes Increased salinity Hydrocarbon contamination	3-Moderate	2-Unlikely	MEDIUM	5	Desktop review of GIS databases showing no nearby water reserves, water courses or water bodies Closest watercourse 15km east of tenement No chemicals stored on site No fertilisers used onsite Mining only to natural surface calcrete level not into Leeman aquifer No organic waste sorted onsite No bores onsite and no groundwater is abstracted from aquifer Increased salinity not expected to increase given tidal zone is 700m from tenement western perimeter Spill kits on site & contractor training Final landform and vegetation recolonisation as per MCP	1-Insignificant	1-Rrare	LOW	2