Excavation and Rehabilitation Management Plan

Renewal of Limestone Quarry Lots 103 – 104, McLennan and Godel Road, Nowergup

City of Wanneroo

Italia Stone Group

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Landform Research

Lindsay Stephens BSc (Geology), MSc (Plant Ecology) U1 49 Birdwood Avenue, Como WA 6152
Mem Aus Geomechanics Soc – MEIANZ – FIQA Tel 08 9474 3978, landform@iinet.net.au

SUMMARY

Italia Stone Group seeks Approval to renew Planning Consent and Extractive Industries Licence to enable the continued extraction of limestone from Lots 103 to 104 Godel Road and McLennan Drive Nowergup to maintain the supply of dimension stone and construction materials and an extension of the operations to Lot 101 and 102 Godel Road and McLennan Drive Nowergup.

Italia Stone Group have operated on Lots 103 and 104 since the 1980's and limestone extraction has taken place in the local area for many years prior to that time.

Italia Stone Group, has, over the years, built up a significant Perth based business providing limestone for the community and is a valuable contributor to the local community. It therefore requested that approval is granted for extension of these activities to lots 101 and 102.

The proposal includes rehabilitation plan that involves the restoration of the land surface to the same vegetation as currently occurs on site; parkland pasture and local native species. Landform restoration and rehabilitation is to progressively follow excavation.

Currently there is approximately 17.0 hectares that has been opened over many years for a variety of uses such as dimension stone, armour rock for coastal work, road base and sand. That area has vegetation in Completely Degraded Condition.

Having a large area opened will enable rehabilitation to be commenced and be progressively completed which will reduce the area of open ground over the life of the next approval period.

A flora and vegetation survey was completed by Arthur Weston and is attached to this Management Plan.

It is anticipated that an average of 0.5 - 1 hectare will require clearing per year. A Clearing Permit will be applied for.

The resource will enable a continued supply of strategic limestone resources to the north of Perth and the Perth Metropolitan Area.

The site lies in an important area of limestone that is strategic to the development of the Perth Metropolitan Area. The site is identified in Planning Policies such as State Planning Policy 2.4, Basic Raw Materials as a Priority Limestone Resource and a Regionally Significant Limestone Resource on Western Australian Geological Survey mapping.

The final land surface is to be compatible with the surrounding landform at a minimum elevation of 30 metres AHD rising gently to match the surrounding landform.

No change to the current access from Godel Road is proposed apart from sealing the first 50 metres.

The closest external dwelling is 400 metres to the south west adjacent and behind a poultry operation with other dwellings over 500 metres away. The operations have been designed to continue to minimise visual impact, noise and dust impacts. There is also a dwelling located on Lot 101. Lot 101 is held by the current landholders of Lots 101 – 104 and is rented out. The use of the site for sand and limestone extraction is highlighted to the tenant who lives in the dwelling on Lot 101.

The dwelling on Lot 101 is to be used as a caretaker's residence but not for excavation at this stage. There are no proposed changes to the dwelling. Rather as it is a rental property the only change may be a change in tenant at some future time when the existing tenant withdraws from the role of caretaker.

Hours of operation will continue to be 6.30 am to 5.00 pm Monday to Saturday inclusive, excluding public holidays. This is similar to the operations of nearby quarries in the local area.

Continued training of Italia personnel are proposed, using the existing mobile plant on site. Additional mobile plant may be used for training but with such a small site will normally be limited to one haul truck, one to 2 loaders, one excavator and one bulldozer in addition to other smaller plant normally used on quarries.

Perimeter fences, trenches, log and rock barriers, and locked gates, will be maintained to prevent illegal entry. Warning signs will be maintained as required by the Department of Mines and Petroleum and the City of Wanneroo.

The access will continue from Godel Road with the entrance being sealed for a distance of 50 metres.

APPROVAL SOUGHT

Approval is sought to remove the usable limestone from Lots 101, 102, 103 and 104 over a period of 20 to enable staged extraction and satisfy long term community needs and enable the continued training of quarry operators. In addition approval is sought to utilize the sand from the limestone extraction process in reconstituted block manufacturing on site and to on sell excess sand, to what is required to rehabilitate the site, to the market.

PROJECT SUMMARY

ASPECT	PROPOSAL CHARACTERISTIC
EXCAVATION	
Total area of excavation	41.2 hectares
Total disturbance area	17.0 ha cleared partially excavated 15.0 ha vegetation in Excellent condition 9.2 ha in Degraded to Very Good Condition
Total area of mining footprint	
Limestone and sand extraction	50 000 – 100 000 tonnes per year with the possibility of a larger contract in a particular year.
Total estimated resource	> 2.5 million BCM
Life of project	> 20 years
Area cleared per year	Average 1 ha
Area mined per year	Average 1 ha
Dewatering requirements	None
Maximum depth of excavations	3 - 20 metres
Native vegetation to be cleared	A Clearing Permit was provided for the existing area and a new permit will be applied for any new vegetated ground to be cleared.
PROCESSING	
Limestone and sand	See excavation rate above. Processing will include manufacture of reconstituted stone blocks
Water requirements	Supplied and controlled by Licensed Bore
Water supply source	Licensed bore 5 000 kl per year (GWL48200 (2)).
INFRASTRUCTURE	
Total area of plant and stock	Located within existing excavated area. No changes; approximately 0.5 ha needed.
Area of settling ponds	Not required
Fuel storage	Proposed to be mobile refuelling brought to site as necessary.
TRANSPORT	
Truck movements	Variable but approximately 2 per hour.
Access	Limestone internal road to McLennan Drive.
WORKFORCE	
Construction	Existing operation.
Operation	20 years
Hours of operation	Hours of operation will not change, and will be 6.30 am to 5.00 pm Monday to Saturday inclusive, excluding public holidays for bulldozing and processing.

MANAGEMENT OF THE OPERATIONS

The excavation, proessing and environmental management proposed has been designed to reflect best practice and utilises Commonwealth and State Guidelines.

Safety Management

All quarries operate under the provisions of the *Mines Safety and Inspection Act 1994 and Regulations 1995*. These are administered by the Department of Mines and Petroleum/Department of Mines and Industry Regulation Safety.

The regulation is achieved through the DMIRS Safety Regulations and Reporting Systems (SRS).

All quarries on commencement are required to register with the SRS system. As part of the registration a Project Management Plan is required to be produced and lodged online after all planning approvals are in place and prior to commencement.

The Project Management Plan will use some material from this Management Plan and concentrate on the onsite operations as they relate to health and safety.

Officers from the Safety Division of the DMIRS will regularly inspect the operations in relation to health and safety.

Environmental Management

Environmental Management is normally controlled through conditions imposed by Planning Approval under the Local Authority Town Planning Scheme, approval under a Local Authority Local Law, WAPC approval under a Regional Planning Scheme and any other conditions imposed by other approvals such as a Clearing Permit or Licensing through the Department of Enviroment Regulation or Water Licence through the Department of Water.

Management is also achieved through the design and site procedures relating to the operations and commitments made by the proponent which are reflected in this Management Plan.

The environmental management is designed to reflect best practise, outlined in particular in;

> Department of Resources, Energy and Tourism (Commonwealth), 2011, *A Guide to Leading Practice Sustainable Development in Mining*, and guidelines produced by Environmental Protection Authority, Department of Environment Regulation, Department of Water, Department of Mines and Petroleum, Western Australia Planning Commission and the Local Authority.

An Environmental Risk Assessment has been developed based on the EPA Environmental Factors which have been identified by the EPA as the factors to be considered when reviewing environmental impact and outcomes in Western Australia.

The EPA Factors have been used and added to in the following table which provides for the environmental risk if not mitigated or managed and the assessed environmental risk when the proposed design and management procedures are effectively implemented.

All the EPA environmental factors, together with the other factors, are provided in the Environmental Risk Table to show that some are not relevant to this proposal. Leaving them out may lead to some uncertainty in a reviewer's mind.

The Environmental Risk Matrix was developed to the principles of AS/NZS ISO 140001:2004 (Environmental Management Systems) and AS/NZS ISO 19011:2014 (Guidelines for auditing Management Systems). The principles of AS/NZS 31000:2009 (Risk Management Guidelines) are also used when considering any risks.

The Risk Table includes references to the various part of the document to enable easy review and provides a summary of the project and its management.

The risk assessment table also forms the basis of an auditable matrix.

Environmental Factor	Environmental Objective	Identified Issues and Commitments	Proposed Management	References	Environment Risk	
					Innate Risk - Unmanaged	Risk when Managed
LAND						
FLORA and VEGETATION	To maintain representation, diversity, viability and ecological function at the species, population and community level.	Vegetation communities and/or biodiversity may be significantly impacted by clearing, and degradation by weeds and dieback.	The site is partially cleared and excavated. Other parts are parkland pasture with some regrowth. There is also 9.0 ha that will require clearing. This is mainly limestone heathland vegetation. A Flora study has been completed by Arthur Weston and that found that there were no definitive areas of FCT26a, but one area might be FCT26a. That area has been excluded from disturbance and retained with wide vegetative buffers. An area of limestone ridge contains vegetation that might be FCT24 a Priority 3 Community. That vegetation is isolated from the FCT 26a with the surrounding vegetation not being a Priority or Threatened community. No Threatened or Priority species or taxa were recorded. A Clearing Permit CPS 3003/3 applied to part of the site but has now expired. A new Clearing Permit will be applied for. Offsets will be negotiated as part of the Clearing Permit.	3.1 Flora 8.0 Biodiversity Management Appendix 1 Biodiversity Management Figure 4	High	Low
		Threatened or Priority Communities may be impacted by inadvertent impacts.	A Flora study has been completed by Arthur Weston and that found that there were no definitive areas of FCT26a, but one area might be FCT26a. That area has been excluded from disturbance and retained with wide vegetative buffers. An area of limestone ridge contains vegetation that might be FCT24 a Priority 3 Community. That vegetation is isolated from the FCT 26a with the surrounding vegetation not being a Priority or Threatened community. No Threatened or Priority species or taxa were recorded. A Clearing Permit CPS 3003/3 applied to part of the site but has now expired.	3.1 Flora 8.0 Biodiversity Management Appendix 1 Biodiversity Management	High	Low

			A new Clearing Permit will be applied for.			
		Priority species may be affected by clearing, disturbance, weeds, dieback and other impacts.	No Threatened or Priority species or taxa were recorded.	3.1 Flora 8.0 Biodiversity Management Appendix 1 Biodiversity Management	Low	Low
		Threatened Species may be impacted by inadvertent impacts.	No Threatened or Priority species or taxa were recorded.	3.1 Flora 8.0 Biodiversity Management Appendix 1 Biodiversity Management	Low	Low
		Weeds may become established and impact on the local and on site biodiversity	A weed management program is in place.	Appendix 1 Biodiversity Management	Low	Low
		Dieback disease may be present and impact on the local and onsite vegetation.	Dieback management procedures are in place.	Appendix 1 Biodiversity Management	Low	Low
		The developments may fragment communities, biodiversity and ecological linkages.	Some fragmentation will occur but will be restored through rehabilitation. The land to the east is market garden so linkages are limited but will be formed by rehabilitation.	Figures 2, 3, 4 and 5	Low	Low
Landforms	To maintain the variety, integrity, ecological functions and environmental values of landforms and soils.	The local landform may be altered to a form that is not compatible with the surrounding geomorphology.	The site is an operational limestone pit that has been worked for many years. The surface will be lowered to the same extent as the existing excavation and an undulating final land surface produced. The surface will be compatible with the local geomorphology.	8.3.1 Visual Management	Low	Low
		The final land surface should be fit for its required end use.	Then end use is to pasture and native vegetation.	9.0 Mine Closure Plan	Low to Moderate	Low
		The development and final landform will not lead to significant visual impacts,	The surface will be lowered and revegetated with trees, native vegetation and pasture. There is no significant ridge to daylight out and the perimeter vegetation will provide screening from local roads.	8.3.1 Visual Management Appendix 1	Low	Low
		The final landform and soils may be subject to erosion by wind, water or other processes.	The excavation operations are designed to minimize erosion and dust. The land is being lowered closer to the water table which will increase soil moisture and reduce erosion potential.	9.0 Mine Closure Plan Attached Dust Management Plan (Appendix 1)	Low	Low

		The project has been assessed for karst features and has been designed to mitigate impacts on known and features that may potentially be present.	The site lies outside the main karst risk area. The water table is deep with a separation to the water table of over 10 meters from the final floor elevation. Locally no karst features are know from this far east of the lake system because the groundwater is travelling through sufficient distance of limestone to lose its erosive power.	2.2 Geology and Geomorphology	Low	Low
Subterranean Fauna	To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.	The development may have an impact on an isolated population of subterranean fauna.	The site lies outside the main karst risk area. The water table is deep with a separation to the water table of over 10 meters from the final floor elevation. Locally no karst features are known from this far east of the lake system because the groundwater is travelling through sufficient distance of limestone to lose its erosive power, even though the western sandy part of the sites is overlaid on indicated limestone.	3.4 Stygofauna and Troglofauna Appendix 1	Low	Low
		The development may fragment subterranean communities.	The proposed excavation takes a relatively smallportion of the limestone in an area of limestone ridges to the north and particularly to the east. The ridge limestone immediately east of the existing pit is not proposed to be excavated.	3.4 Stygofauna and Troglofauna Appendix 1	Low	Low
		The diversity of subterranean fauna may be reduced at a population or assemblage level.	See above	3.4 Stygofauna and Troglofauna Appendix 1	Low	Low
		The final formed structures may not support continued subterranean fauna and their ecological functions.	There will be many small cavities, rocks and fissures provided by the excavation activities because the floor will be fractured and deep ripped. The will also be small rock and stone left in the reconstructed profiles on the batter slopes.	3.4 Stygofauna and Troglofauna Appendix 1	Low	Low
Terrestrial Environment Quality	To maintain the quality of land and soils so that the environment values, both ecological and social, are protected.	At the end of excavation the created soils should be deep enough or of sufficient quality to be sustainable to meet the long term end use or ecological values.	Then end use will flat to gently undulating pasture with native vegetation on the batter slopes. Soils will be reformed to a sustainable structure.	5.0 Mining Operations 9.0 Mine Closure Plan	Moderate to High	Low
		The area of potential impacts will not impact on essential or desirable land uses.	Then end use will sloping pasture and native vegetation. Soils will be reformed to a sustainable structure that can support pasture,	5.0 Mining Operations 9.0 Mine Closure Plan	Low	Low

			livestock, rural activities and or another landuse such as rural living if the land was ever rezoned. The mix of pasture and native vegetation will be similar to the pre-excavation situation.			
		The development will not adversely impact an area identified as having high agricultural or community values.	The agricultural values currently on site are low due to steeper slopes.		Low	Low
		Acid soils are not exposed or are managed to ensure that there are no long term adverse effects.	There is no evidence of acid sulfate conditions. The site is elevated in oxidized sand.	2.6 Soil Attached Water Management Plan Appendix 3.	NA	
Terrestrial Fauna	To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.	Communities and fauna and/or biodiversity may be significantly impacted by clearing, and degradation by weeds and dieback.	The site is an operating limestone quarry that will be to be returned to pasture and native vegetation. Excavation and land clearing will be gradual followed by rehabilitation.	8.1.3 Fauna and Biodiversity in Appendix 1. Figures 4, 5	Low	Low
		Threatened Faunal Communities may be impacted by inadvertent impacts.	There are no Threatened Communities	Biodiversity in Appendix 1.	NA	
		Priority Fauna species may be affected by clearing, disturbance, weeds	A weed and dieback management plan is in place. Even though pasture grasses are present across the previously cleared areas, weed management is used. The only significant weed identified during the botanical studies is two small populations of Bridal Creeper. These will be dealt with through normal weed management.	Appendix 1.	Moderate	Low
		Threatened Fauna Species may be impacted by inadvertent impacts.	The main potential impact is potentially on Black Cockatoos. Known tree species that are used for feeding and roosting are excluded from the proposed excavation. Nine hectares of Proteaceous feeding habitat will potentially be temporarily lost. This will be considered by the DER through the Clearing Permit process and by the Commonwealth through the *EPBC Act 1999*	Biodiversity in Appendix 1.	High	Low

			and potential offsets. A Clearing Permit will be sought from DER and the clearing application will be sent to the Commonwealth for review. Offsets will be negotiated between the company and State and Commonwealth. Any Clearing Permit will have conditions imposed on it by the DER and if the clearing is determined to be a Controlled Action by the Commonwealth, additional conditions will be placed on any such approval by the Commonwealth.			
WATER						
Hydrological Processes	To maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected.	The ecological functions of watercourses are to be maintained.	There are no watercourses due to the deep limestone and sand.	Attached Water Management Plan	NA	
		Groundwater may be impacted by changes to recharge, over-pumping, alterations to flow paths or lead to significant evaporation and water loss.	No adverse impacts on water are recorded from the existing operations and none are likely. With a return of the site to pasture and native vegetation the water recharge based on the percentage of grass and deeper rooted plants will not change significantly and therefore there will be no impacts on Lake Nowergup from recharge changes. Compared to the large changes in recharge as a result of the planting and removal of the pine plantations the proposed on site activities are insignificant to water balance The project complies with the DWER Guidelines for Extractive Industries. The site has a separation of 10 meters between the final land surface and the water table. Extensive fuel and fluid management is used and will be continued.	8.2 Water Management Attached Water Management Plan Appendix 3.	Low	Low
		Wetlands may be altered by draining or flooding, potentially changing their ecological functions and biodiversity.	There are no wetlands or wetland vegetation on or near Lots 101 – 104. The only wetland is Lake Nowergup 700 meters to the west. The excavation will move further east away from the lake as it progresses. Rural land uses such as poultry/egg production	8.2 Water Management Attached Water Management Plan Appendix 3. Section 8.5 Recharge in Appendix 3	Low	Low

			lie between the quarry and the lake			
Inland Waters Environmental Quality	To maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social, are protected.	Hydrocarbons, fuels and other chemicals are stored in a manner that they pose no risk to the environment.	Extensive fuel and hydrocarbon management programs are proposed. There are no proposed changes to the methods of operation. See above	8.2 Water Management Attached Water Management Plan Appendix 3.	Low to moderate	Low
		Runoff from operations is contained and all water is either retained or treated to removed sediment and any deleterious materials.	All water is retained on site in the base of the pit or the dam on site prior to release. The volume of the dam is large compared to the water from disturbed areas and provides for effective sediment settlement.	8.2 Water Management Attached Water Management Plan. Appendix 3	Low to moderate	Low
		Water quality during and after development and operations is not adversely affected or altered.	See above	8.2 Water Management Attached Water Management Plan. Appendix 3	Low	Low
AIR						
Air Quality	To maintain air quality for the protection of the environment and human health and amenity.	Dust emissions are minimized or controlled to ensure that the local amenity is protected.	This is an existing limestone excavation using the same procedures as in the past. The operations comply with the EPA generic buffers. A Dust Management Plan is proposed.	8.3.3 Dust Management Attached Dust Management Plan. Appendix 2	Low	
		Dust emissions will not significantly impact on local and on site personnel health or quality of life.	Sand and limestone quarrying must comply with the *Mines Safety and Inspection Act* for Health and Safety. Officers from the DMIRS will regularly inspect the site and the site must be registered under the DMIRS SRS system.	8.3.3 Dust Management Attached Dust Management Appendix 2	Moderate to high for worker impact. Low for local amenity impact.	Low
		Noise levels will comply with the *Environmental Protection (Noise) Regulations 1997.*	Noise levels will comply with *Environmental Protection (Noise) Regulations 1997.*	8.2.3 Noise Management Appendix 2	Low to moderate	Low
		Noise levels and operational procedures will be used to protect on site personnel health and safety.	The operations are designed to minimize on site noise and the potential for offsite noise. There have been no known issues or complaints associated with noise. Sand and limestone quarrying must comply with the *Mines Safety and Inspection Act* for Health and Safety. Officers from the DMIRS will regularly inspect the site and the site must be registered under the DMIRS SRS system.	8.3.2 Noise Management 7.0 Safety Appendix 2	Moderate to high for worker impact. Moderate for local amenity	Low
		Emissions gases and other	There are no gaseous or other potential		Low	Low

		materials potentially adverse to human health will not be used or will be managed.	harmful emissions from the operations.			
		Potential impacts from blasting will comply with the *Environmental Protection (Noise) Regulations 1997* and guidelines for ground vibration.	There is no blasting. Only Localized popping as described and directed by DMIRS		Low	Low
		Employ procedures and design the operations to minimize the risk of excessive greenhouse emissions.	The operations are designed to minimize fuel use and transport routes. There are no proposed changes to transport routes or operations from past activity.	5.5 Equipment – Loading and Transport	Low	Low
Heritage	To ensure that historical and cultural associations are not adversely affected.	Known aboriginal heritage sites will be protected.	There are no known aboriginal sites on the DAA database. A commitment is made to stop and assess any site if uncovered.	4.3 Heritage	Low	Low
		Sites of European heritage will be protected.	None known		NA	
		Heritage sites uncovered during operations will be independently assessed and managed through communication with the community, Government and traditional owners.	A commitment is made to this. There are no known heritage sites.	4.3 Heritage	Low	Low
Human Health Amenity	To ensure that human health is not adversely affected.	Human health is protected from adverse impacts of dust, noise, other emissions and chemicals.	Sand and limestone quarrying must comply with the *Mines Safety and Inspection Act* for Health and Safety. Officers from the DMIRS will regularly inspect the site and the site must be registered under the DMIRS SRS system.		Moderate to high for worker impact. Low for local amenity	Low
	Transport routes and operations are designed to minimize local impacts	Transport may impact on local, and regional roads or school bus routes.	There are no proposed changes to the operations in terms of intensity or nature of the operations. Transport is along bitumen roads, continuing to use Godel, Gibbs and Nowergup Roads. The transport route is also used by other local rural industries.	5.5 Equipment – Loading and Transport	Low	Low
	Local Amenity	The operations have been designed to provide sufficient buffers and visual protection.	This is an existing operation. There are no proposed changes to the operations apart from a small change in location, being further away	5.2.1 Landuses and Buffers 5.2.2 Aesthetics	Low	Low

			from dwellings and low in the landscape. There are no proposed changes to the location of nearby sensitive premises at 400 to 500 meters plus. A caretaker's dwelling lies on Lot 101. The location complies with the EPA Generic Buffer Guidelines. The operations are designed to minimize visual impact and are not significantly visible from the roads			
INTEGRATING FACTORS						
Offsets	To counterbalance any significant residual environmental impacts or uncertainty through the application of offsets	Offsets are provided as necessary to reduce or mitigate the impacts on the development and operation of the project.	The operations are small. Up to 9.0 hectares of native limestone shrub land vegetation will be cleared. This will be considered by the DWER through the Clearing Permit process and by the Commonwealth through the *EPBC Act 1999* and potential offsets. A Clearing Permit will be sought from DWER and the clearing application will be sent to the Commonwealth for review. Offsets will be negotiated between the company and State and Commonwealth. Any Clearing Permit will have conditions imposed on it by the DWER and if the clearing is determined to be a Controlled Action by the Commonwealth, additional conditions will be placed on any such approval	Section 3.0 Fauna Appendix 1	NA	
		Offsets are used to enhance the local environment, habitats, biodiversity and other identified factors.	Negotiated offsets for clearing native vegetation are proposed. See above.	Section 3.0 Fauna Appendix 1	NA	
Rehabilitation and Closure	To ensure that premises are closed, decommissioned and rehabilitated in an ecologically sustainable manner, consistent with agreed outcomes and land uses, and without unacceptable liability to the	All infrastructure, roads, hardstand, non-natural materials are to be removed from site progressively when not required and all removed at the end of the project.	The site is located in parkland pasture with native vegetation and will be returned to pasture and native vegetation.	9.0 Mine Closure Plan	Moderate - High	Low
		No materials are to be left on site that may cause long term detrimental outcomes in	All materials and plant associated with their operations will be removed at the end of excavation.	9.0 Mine Closure Plan	Moderate - High	Low

	State	terms of impacts to soils, water, heritage, vegetation health or other factors.				
		All contaminated materials are to be removed from site prior to closure.	There are no contaminating materials apart from fuel and lubricants. Commitments are made to do this. Contingencies are in place.	9.0 Mine Closure Plan Attached Water Management Plan Appendix 3	Low to moderate	Low
		Landforms and other geomorphological features are to be compatible with the local area and end use and be sustainable in the long term.	The operations are relatively small, located out of sight of local roads and will be progressively rehabilitated. The site will be returned to parkland pasture and native vegetation. Soils will be reformed to a sustainable structure.	5.3.2 Final Contours 9.0 Mine Closure Plan	Low	Low
		Soils are reconstructed to be able to sustain an ecological sustainable vegetation or other cover consistent with the end use and long term proposal for the site.	The operations are relatively small, located out of sight of local roads and will be progressively rehabilitated. The site will be returned to parkland pasture and native vegetation. Soils will be reformed to a sustainable structure.	5.3.2 Final Contours 9.0 Mine Closure Plan	Low	Low
		Weed levels are not to cause significant impacts revegetation.	A weed and dieback management plan is in place. Even though pasture grasses are present across the previously cleared areas, weed management is used. The only significant weed identified during the botanical studies is two small populations of Bridal Creeper. These will be dealt with through normal weed management.	Weed and Dieback Management in Appendix 1	Low	Low
		Ongoing monitoring of the rehabilitation will be conducted to ensure that any areas not meeting completion criteria are added to or replaced as necessary to enable the relevant criteria to be met.	This is proposed	9.0 Mine Closure Plan	Low - moderate	Low
OTHER FACTORS						
Resource Requirements	Basic Raw Materials are required for continued use by the community and for future developments.	There is significant basic raw material on site that is suitable for community resources.	The site is an existing limestone and sand operation. Limestone is used for dimension stone, road bases, the construction industry, reconstituted	1.5 Project Objectives 4.1 Planning Issues.	NA	

			stone, armour rock, lime and cement manufacture. On this site the limestone is used for dimension stone, cut stone products and the manufacture of construction materials such as road base, sand and limestone blocks. The proposal achieves the dual purposes of extracting a valuable resource in line with State Planning Policy No 2.4 Basic Raw Materials Site; 30/13. The site is listed as a Regionally Significant Basic Raw Material on Geological Survey of Western Australia Mapping. This site is the only resource held private by Italia Limestone in the Northern Perth Metropolitan Area and their only privately owned dimension stone.			
Planning Compliance	To comply with Government Policy, planning zones and procedures.	The project is designed to comply with State and Local Planning requirements.	The operations are an existing quarry with Planning Approval and Extractive Industry Licence. The operations are listed in SPP2.4 as Site 30/13.	4.1 Planning Issues. Appendix 4	NA	
Community Consultation	To provide a community consultation process commensurate with the size nature and time line of the project.	Community consultation will be handled by community input within the application and assessment phases, as through direct community consultation as required and contact numbers being displayed at the entrance. An "Open Door Policy" is used to enable ongoing dialogue between the operator and the community.	This is an existing limestone extraction operation that has been working for many years. No significant changes are proposed to the scale of the operations as rehabilitation will follow excavation.		NA	
		An effective complaints procedure is provided, combined with effective remedial procedures.	A complaints procedure is proposed.	See attached Dust Management Plan Appendix 2	Low	Low
Safety	To ensure that the project provides high levels of safety to on site personnel and the community	Ensure that the project provides high levels of safety to on site personnel.	Limestone quarrying must comply with the *Mines Safety and Inspection Act* for Health and Safety. Officers from the DMIRS will regularly inspect the site and the site must be registered under the DMIRS SRS system. The operations are required to be registered under the DMIRS SRS system.	5.0 Mining Operations 7.0 Safety	Low	Low

			Fire and safety management systems are in place and will be continued.			
		Ensure that potential impacts are retained on site and do not cause significant risk of safety to the local and wider community.	There are no proposed changes to the operations. The site is fenced and installed with locked gates.		Low	Low
		Have in place a transport policy to ensure that transport along public roads is conducted in a safe manner.	There are no proposed changes to the operations, transport route or volumes of sand and limestone removed annually.	5.5 Access and Transport	Low	Low
Geotechnical Integrity	To ensure that all ground and geological materials is safe commensurate with the operations and final land surface.	The operational and final land surfaces will be made safe and not subject to subsidence, slippage or other adverse conditions.	The operations are designed to comply and operate to the *Mines Safety and Inspection Act 1994.* There are no significant changes proposed to the methods of excavation.	5.0 Mining Operations 6.0 Geotechnical Factors	Low	Low
		The quarry and operations will comply with the *Mines Safety and Inspection Act 1994.*	Italia is committed to complying with the relevant Acts and Regulations. The pit is regularly inspected by officers from the DMIRS Safety Division.	4.0 Project Description 7.0 Safety	Low	Low
		The operational and final surfaces and features are designed to be not affected by extreme climate events.	The site is internally draining with large capacity to retain water. No impact from extreme weather events result on the pit or to the pit or rehabilitated surface. Limestone is very stable and strong. It is not readily eroded.	9.0 Mine Closure Plan 5.2.3 Final Contours	Low	Low
		The operational and final surfaces and features are designed be sustainable not significantly impacted by climate change or extreme weather events.	The site is internally draining with large capacity to retain water. No impact from climate change is likely in the pit or to the pit or rehabilitated surface. Limestone is stable and strong. It is not readily eroded.	9.0 Mine Closure Plan 5.2.3 Final Contours	Low	Low

CONTENTS

1.0 BACKGROUND INFORMATION

1.1 Background

Italia Stone Group seeks Approval to renew Planning Consent and Extractive Industries Licence to enable the continued extraction of limestone from Lots 103 to 104 Godel Road and McLennan Drive Nowergup to maintain the supply of dimension stone and construction materials and an extension of the operations to Lot 101 and 102 Godel Road and McLennan Drive Nowergup.

Italia Stone Group have operated on Lots 103 and 104 since the 1980's and limestone extraction has taken place in the local area for many years prior to that time.

Italia Stone Group, has, over the years, built up a significant Perth based business providing limestone for the community, and is a valuable contributor to the local community.

1.2 Location

Lots 101, 102, 103 and 104 are located in Godel Road and McLennan Drive, Nowergup.

1.3 Land Ownership and Agreements

Lots 101, 102, 103 and 104, Mclennan Drive Nowergup, have been partially excavated for limestone through Planning Approval and Extractive Industries Licences.

The whole site is classified as a Priority Limestone Resource in State Planning Policy No 2.4 Basic Raw Materials, and this site is nominated as Site 30/13.

LOT	OWNERS	VOLUME	FOLIO	PLAN
101	Mark Conlan, Ridolfo Fazio and Sarina Koleszko. Dangan Nominees Pty Ltd, Suite 3, 643 Newcastle Street, Leederville	1654	584	14371
102	Renmore Pty Ltd, 154 High Street, Fremantle	1654	585	14371
103	Giuseppina Fazio, 35 Barrett Street Spearwood Sebastiano Catalano and Rosaria Catalano, 42 Doolette Street Spearwood.	1654	586	14371
104	Giuseppina Fazio, 35 Barrett Street Spearwood Sebastiano Catalano and Rosaria Catalano, 42 Doolette Street Spearwood.	1654	587	14371

The dwelling on Lot 101 is to be used as a caretaker's residence but not for excavation at this stage. There are no proposed changes to the dwelling, rather as it is a rental property the only change may be a change in tenant at some future time when the existing tenant withdraws from the role of caretaker.

1.4 Proponent

The proponent is Italia Stone Group.

Contact can be made through;

The General Manager
Italia Stone Group
55 Miguel Road,
Bibra Lake WA 6163

Phone 9418 1437

1.5 Project Objectives

Italia is a long time producer of dimension limestone and limestone products for the local construction industry.

This proposal is to enable Italia to continue excavation of the reserves of limestone to meet their continued production requirements and satisfy community needs in the northern Perth Metropolitan Area.

It is proposed to leave the excavated area as a gently undulating floor at an elevation down to 30 metres AHD rising gently at the edges to match the existing surrounding land surface.

The proposal achieves the dual purposes of extracting a valuable resource in line with State Planning Policy No 2.4 Basic Raw Materials; Site 30/13.

The site is listed as a Regionally Significant Basic Raw Material on Geological Survey of Western Australia Mapping.

Importance and Rationale

In general, limestone is used for dimension stone, road bases, the construction industry, reconstituted stone, armour rock, lime and cement manufacture. On this site the limestone is used for dimension stone, cut stone products and the manufacture of construction materials such as road base, sand and limestone blocks.

Whilst these resources might seem common, most of the resources closer to Perth have been sterilised by development, conservation of vegetation, and public intolerance.

For example, in the northern Perth metropolitan area all good limestone is either held predominantly by one company or is located in State Forest or the potential extension of the Yanchep National Park.

Not all limestone has the same characteristics, and the best deposits are valuable community assets. The limestone on site and the surrounding area is a particularly valuable community resource. Quality material that is suitable for construction purposes has very high community value, as the Perth Metropolitan area spreads north, which is why it has been nominated for many years as a Priority Limestone Resource.

Limestone on this site is identified in Planning Policies such as State Planning Policy 2.4, Basic Raw Materials as a Priority Limestone Resource. The site is listed as Site 30/13. Figure 2.

The limestone resource is listed as a Regionally Significant Limestone Resource on Western Australian Geological Survey mapping.

Alternative Resources

Limestone is required for road base, lime for neutralising acidic conditions and for structural construction. Limestone is common locally, but most is sterilised by conservation, private property and small lots, and vegetation that has been classified as significant.

Therefore existing limestone operations such as this should be permitted to continue, to maximise the available limestone and minimise the impact on vegetation.

See;

- Abeysinghe P B, 1998, *Limestone and Limesand Resources of Western Australia*, Geological Survey of Western Australia, Mineral Resources Bulletin 18.
- Gozzard J R, 1987, *Limesand and Limestone Resources between Lancelin and Bunbury*, Geol Surv WA, Record 1987/5
- Western Australia, Western Australian Planning Commission*, Statement of Planning Policy 2.4, Basic Raw Materials.*
- Chamber of Commerce and Industry, 1995 and 1996, *Managing the Basic Raw Materials of Perth and the Outer Metropolitan Region*, Parts 1 and 2.
- Chamber of Commerce and Industry, 2008, *Basic Raw Materials Access and Availability*.
- Fetherston J M, 2007, *Dimension Stone in Western Australia*, Volume 1, Department of Mines and Petroleum, Mineral Resources Bulletin 23.

Limestone is only extracted for the community benefit, and utilised as a manufactured building product. If there was no community demand for limestone as a building product it would be unlikely that this natural resource would ever be utilised for any other purpose and would have no economic significance.

The resource is strategically located and has the potential to provide raw materials for the manufacturing and construction industry for 20 plus years.

The need for the resource is well known but is sometimes not given due weight in the assessment processes by all levels of Government.

Proposals such as this are often considered in isolation without reviewing the wider environmental impacts.

If the resource is not taken from this site it will have to be taken from another site where similar or more land clearing is required.

Requested Approval

Approval is sought to remove the usable limestone and sand from Lots 101, 102, 103 and 104 over a period of 20 years to enable staged extraction and satisfy long term community needs.

The taking of limestone from these approved leases will help maximise the land use for the site by using the limestone for construction purposes in the northern Perth Metropolitan area prior to the site becoming sterilised.

1.6 Aims of the Proposal

The aims of the proposal are to;

- Renew current Planning Approval and Extractive Industries Licence on Lots 103 and 104 for a further 20 years. Extend the application to cover Lots 101 and 102 as well.
- Excavate limestone and sand from previously excavated areas.
- Provide reserves of strategically located limestone suited to a variety of end products, such as dimension stone, and construction materials.
- Maximise the use of limestone to the north of Perth, to enable greenhouse gases, transport, and other environmental issues associated with alternative resources, to be minimised.
- Help to keep the prices of local limestone products at the lowest possible levels, by maintaining small transport distances and competition. This benefits the whole community.
- Comply with State Planning Policy No 2.4 Basic Raw Materials, and Rural Land Policies for the Metropolitan Area, which state that basic raw materials should be taken prior to sterilisation of the area by development.

1.7 Site Plans

Site plans are shown in the attached Figures.

2.0 PHYSICAL ENVIRONMENT

2.1 Geology and Geomorphology

The site drops from 50 metres AHD in central parts of the site, immediately east of the existing workings and on the ridge on Lot 102, down to 36 metres AHD in the north east on Lot 101.

It consists of two parts of limestone ridges that run south east along Lot 102 and north west along Lots 103 and 104, dropping to the north east under a sheet of sand that deepens to the northeast as the elevation drops in a broad shallow swale.

The ridge in the central parts has been partially excavated for dimension stone construction materials.

The site is underlain by the Tamala Limestone which, although widespread along the coastal area of Western Australia, is restricted in its availability in strategic locations by existing land uses.

The limestone is an aeolian calcarenite (formed from wind blown calcareous sands) derived from beach sands, and, over the years, has been subjected to solutions which have caused some patches of rock to be harder than others. The age of the limestone is late Pleistocene. In other localities dates of between 25 000 and 100 000 years have been obtained for the Tamala Limestone.

Calcrete formation has occurred on top of the ridge as calcium carbonate has been dissolved and re-precipitated, although under the vegetation on this site reprecipitation is reduced because the ridge is less prominent and weak. This has formed a hard cap rock of higher calcium carbonate content and resulted in minor pinnacle formation and solution structures. See Perth Environmental Geology 1: 50 000 Series, Yanchep and Perth maps, (Geological Survey, 1982 and 1986).

Potential for Karst

The site has been inspected by Lindsay Stephens, who has a BSc majoring in Geology and Geomorphology and an MSc in Plant Ecology, on several occasions but in more detail in 2007 and subsequently and most recently in June 2015.

Caves are most common where groundwater is flowing strongly from near a source of acidic water such as a wetland or river. They occur at the water table in such situations and grow as a result of dissolution and collapse.

From discussions with Lex Bastian and Dr Brenton Knott of UWA, it appears that significant cave development occurs where there are substantial flows of subterranean water, for example where the water table dips quickly or where there is an impermeable basement or steeply dipping groundwater contours that concentrate the groundwater flows. These conditions do not occur on site.

No caves or sinkhole karst are known to occur locally. The site lies outside the Karst Risk Area identified by Csaky D, 2003 and outside the Karst Risk Area identified in the City of Wanneroo Local Planning Policy 4.1.3: Caves and Karstic Features.

There has been extensive excavation on site and in quarries adjoining to the south and north and no evidence of caves has been discovered. All these quarries have been regularly inspected by Lindsay Stephens, of Landform Research during the annual reporting processes. Faces of up to 10 metres and large cutting floors occur but there is no evidence of caves. In addition the water table is 20 meters below ground surface.

Karst is solution structures developed on a rock, usually calcium carbonate based, by the dissolution and precipitation of minerals. The most common form of karst is associated with limestones.

Karst can be surface features such as rills and sharp edges, small cavities or caves.

If the karst features are significant, caves, collapse structures, structurally "weak ground" and other related features could develop.

For karst to form, the limestone must be of high grade. If a rock does not have sufficient amounts of calcium carbonate, when the calcium carbonate dissolves, the non soluble materials will fill any void and significant karst structures may not develop.

Caves and karst features in the Wanneroo area result from syngenetic karst formation in which the original limesand dunes are partially dissolved and reprecipitated to lithify the material to Tamala Limestone. This is called Syngenetic Karst or "soft rock" karst.

In Australia syngenetic karst is most commonly associated with the coastal limestones that occur along the western and southern Australian coasts from Shark Bay to Mt Gambier.

On the Swan Coastal Plan karst only develops in the coastal or Tamala Limestones.

A summary of the formation of karst is contained in the report by *Grimes K G, 2006 Syngenetic karst in Australia: a review, Helictite 39 (2) 2006*.

Groundwater flows from east to west from the Bassendaean Sands and through the limestone. For caves to develop the groundwater must be acidic. At the point of intersection the acidity begins to dissolve the limestone. Once neutralised the groundwater has no power to dissolve further limestone.

Therefore the greatest dissolution occurs at the interface between the sand and the limestone or wetland and limestone, with progressively less development in a short distance westwards.

The site lies well west of the sand – limestone interface near Hopkins Road and therefore on site the groundwater has been neutralized and has little or no erosive power. Even if the limestone overlies sand precipitation moving don through the limestone is neutralized. The risk of cave development is therefore low. The greatest risk is the limestone west of the lake systems such as Lake Nowergup where caves and karst do occur.

The water table is 21 metres AHD in the east dropping to 18 metres in the west (Department of Environment and Conservation, 2004, *Perth Groundwater Atlas*). Flow is to the west. The proposed base of excavation provides for a separation to the water table of over 9 metres.

Hence Lots 101 – 104 lie east from the karst risk areas.

Therefore the risk of the presence of caves or karst is considered low.

The photographs of the site show the large cutting floor, which has been cut for dimension stone. The limestone is solid and does not contain cavities as can be readily seen by looking at the existing floor. Cavities and discontinuities normally preclude limestone from being cut for dimension stone.

Any cave development has to have an erosive source of ground water, which does not occur on site because the groundwater has to traverse through limestone which extends to Hopkins Road and is neutralised prior to arriving at site. Any erosion would also occur at the water table.

This is consistent with the City of Wanneroo Local Planning Policy 4.13 which shows that the edge of the line of "medium" risk of karst runs north west to south east, west of the excavated part of the limestone, in the current area of sand and limestone stockpiles. The line of "Medium" risk lies approximately across the western 20% of the proposed pit in the area of mainly sand excavation.

Not only is there no evidence of an erosive source of water and the site lies mostly outside the karst risk area, but a ten metre separation to the groundwater provides additional safeguards.

2.2 Description of the Resource

Significant reserves of Tamala Limestone, averaging between 70% and 80% calcium carbonate, exist under the site, together with significant sand reserves in the swales to the west and north east.

The degree of lithification (hardness) of the limestone changes both vertically and horizontally over the site and determines the use to which each type of limestone can be put.

On this site the limestone only outcrops in the central part of the site, just east of the existing pit. The remainder of the site is covered by deep sand with limestone pinnacles variously approaching the surface. The sand will form a resource in its own right. Sandy subsoils will form overburden whilst the sand may in part require screening to separate sand from limestone pinnacles.

Although the resource extends to depth, extraction will be limited to a lowest elevation of approximately 30 metres AHD.

The total estimated resource will depend on the amount of native vegetation to be retained because there is a potential Threatened Ecological Community on site. It will also depend on final levels as the limestone extends to depth. However over 2.5 million m^3 of sand and limestone is anticipated to be available.

2.3 Regolith and Soils

The Tamala Limestone is covered by shallow, yellow brown, calcareous loamy sands that have originated as a result of weathering of the limestone on the central ridge. Deeper sand occurs in the swale to the north.

Sand shed from the weathering limestone provides the soil cover on, the limestone, deepening to the south and west. Even though the ridge are underlain by limestone the soils generally consists of sand that varies from shallow to deep and in places, for example the eastern ridge, the limestone only outcrops as occasional pinnacles,

Soil coverage can be significant with shallow yellow brown sands over isolated to common limestone outcrop. The soils are classified as Cottesloe soils. On the lower elevations the soils become deeper and tend to be the Spearwood Sands. These sands have been cleared for agriculture in the past.

All soils are siliceous yellow sands.

2.4 Climate

The climate of the area is Mediterranean with warm to hot summers and cool wet winters.

The closest recording station is Beenyup (Wanneroo), although averages of only six years' data have been recorded. Other weather data must be taken from Perth.

The highest temperatures are in February, with an average of 30.0 maxima, and the lowest are recorded in July with average maxima of 18 degrees Celsius and 7.4 degrees C minima.

Rainfall for the area is slightly less than Perth at 722 mm compared to Perth's 869 mm, of which more than 90% falls in the months April to October inclusive. Evaporation is high and exceeds rainfall in all but the four wettest months, May to September.

The prevailing winds are from the south west, particularly in the afternoon. In summer the easterly in the mornings and the sea breeze in the afternoon can be quite strong. At 3.00 pm wind speeds exceed 10 kph for 80 % of the time in summer but only 30 % to 40 % in winter. At other times the wind speed is calm for 30 % of the time in winter at 9.00 am and 10 % in summer, with 40 % of the time exceeding 10 kph in summer and 20 % in excess of 10 kph in winter.

2.5 Hydrogeology

Additional information is provided in the attached Water Management Plan.

There is no surface drainage due to the porosity and permeability of the limestone, with precipitation draining to the water table.

The site is well drained with the water table being 21 metres AHD in the east dropping to 18 metres in the west (Department of Environment and Conservation, 2004, *Perth Groundwater Atlas*). Flow is to the west. The current base of excavation is variable but near 30 metres AHD. This provides for a separation to the water table of 10 metres.

The sand and limestone is porous and there is no surface water runoff, with all surface water being retained within the pit.

Flow of ground water is to the west towards the ocean.

2.6 Acid Sulfate

There has been an increased interest in acid sulfate soils since the release of WAPC Planning Bulletin 64 and DEC/DWER 2013, Identification and investigation of acid sulfate soils and acidic landscapes.

However the interest has been over-reactive, with assessments sought and risk applied in many areas where there is no geological risk or evidence of acid sulfate potential or actual conditions.

Definitive survey procedure is produced in DEC (DWER) 2013, *Identification of Acid Sulfate Soils and acidic Landscapes* and within document Acid Sulfate Soil Management Advisory Committee NSW, 1998, *Acid Sulfate Manual.* This information forms the basis for much of the assessment procedures in Australia, including those adopted by the Western Australian Planning Commission and the Department of Environmental Regulation.

The *Acid Sulfate Manual* adopts the procedure of reviewing the published data followed up by field assessment, which has been completed for this site. If a geological risk is determined, then a Preliminary Acid Sulfate Assessment is conducted.

The site has been visited by Lindsay Stephens of Landform Research and the sand observed.

On this site the sandy soils and deeper sands are highly oxidised with limestone exposed on the surface. The limestone is alkaline and has neutralised any acidity, hence the presence of the yellow brown goethite coatings. The base of the pit is at an elevation over 9 metres above the groundwater, and demonstrates the oxidised conditions present.

No peat or organic matter has been intersected in the pit, is present in the faces or floor, and none is likely on an elevated sand ridge with no potential for acid sulphate conditions to form.

3.0 BIOLOGICAL ENVIRONMENT

3.1 Vegetation and Flora

The site has been assessed by Arthur Weston during 2014 and previously by Lindsay Stephens of Landform Research. The flora and vegetation was assessed and the results provided in a separate report attached as Appendix 1.

The vegetation on the limestone ridges varies from completely cleared to vegetation in good condition.

The more sandy areas around the perimeter, in the east and west, have been cleared for agricultural purposes in the past and have some regrowth. They have also been subjected to grazing. They are predominantly parkland pasture.

The limestone ridges are described as Good to Very Good on the Bush Forever 2000 condition scale with some small areas of vegetation in Excellent Condition. For the perimeter areas the vegetation is classed as Degraded to Completely Degraded on Bush Forever Scale, being parkland pasture with only pasture understorey to understorey of pasture containing scattered native species.

The vegetation on the limestone is designated as Cottesloe Complex, Central and South, as identified by Heddle et al, 1980, *Vegetation Complexes of the Darling System, Western Australia in Atlas of Natural Resources, Darling System, Western Australia,* Department of Conservation and Environment.

See Biodiversity Management Plan attached as Appendix 1 and 8.0 Environmental Impacts and Management.

3.2 Fauna

A database search was made by the Department of Parks and Wildlife A search of the EPBC database was also conducted. These are attached to Appendix 1.

Possibly the most significant fauna are Black Cockatoos which have been recorded in the general area. The listed taxa are *Calyptorhynchus latirostris*, with *Caloptorhynchus* sp being recorded in 2005 at Pinjar. *Calyptorhynchus baudinii* has not been locally recorded on DBCA databases. Both are listed on State (under the *Wildlife Conservation Act 1950*) and EPBC conservation databases. On the State database the taxa are listed in Schedule 1 as “Fauna that is rare or is likely to become extinct”.

Carnaby’s Cockatoo *Calyptorhynchus latirostris* have been observed on site on several occasions feeding on *Banksia (Dryandra*) sessilis

The Scrubland vegetation does provide food resources for the cockatoos and therefore revegetation to local native species will be used. The species chosen will include those known to supply food resources. These can provide flowers and seed within 5 plus years. Clearing and rehabilitation will be progressive to minimise any local impact on Cockatoos.

Bamford Consulting Ecologists, in a personal communication, noted that large nesting hollows were required and these are generally only found in old large Tuart trees, which do not occur on the proposed area for clearing of limestone.

The trees over much of the remainder are regrowth and smaller and have not yet developed to an age where hollows of sufficient size will develop.

The amount of land open at any one time is not expected to change. As land is opened land will be closed. Currently this is not possible because of the area of ground required for processing and manufacture and the need for resources.

Rehabilitation is proposed to be to local native species. Whilst habitat will be cleared progressively, it will be replaced at the end of excavation by native vegetation of local native species, which should assist in retaining fauna habitats.

Potential impacts on Black Cockatoos will be dealt with through the Clearing Application process at which time communication with the Commonwealth will be undertaken and offsets if required will be negotiated.

See Biodiversity Management Plan attached as Appendix 1 and 8.0 Environmental Impacts and Management

3.3 Wetlands

There are no wetlands near the resource area with the closest being Lake Nowergup 1 km to the west.

3.4 Stygofauna and Troglofauna

EPA Guidance 54, concentrates on Stygofauna, which occur in caves and "are aquatic subterranean animals, found in a variety of groundwater systems".

Troglofauna occur in air chambers in underground caves or smaller voids.

There is no evidence of caves and the limestone is not sufficiently isolated apart to impact on short range terrestrial species.

Limestone outcrop is common locally on the ridge and at the kiln reserve just to the north.

Therefore there is minimal risk of troglofauna or ground fauna that live in crevices occurring on the excavation site or within the resource area being significantly impacted on because of the small excavation area, staging, and creation of similar habitats in the reconstructed landform.

See Biodiversity Management Plan attached as Appendix 1 and 8.0 Environmental Impacts and Management

3.5 Weeds and Plant Diseases

Weed and plant disease management plans are included in the Biodiversity Management Plan attached as Appendix 1.

The site appears to be dieback free but there are exotic species and pasture species associated with the disturbed areas and parkland pasture.

The species of weed and their local distribution is discussed in the Flora and Vegetation Study completed by Arthur Weston and included in the attached Biodiversity Management Plan

4.0 SOCIAL ENVIRONMENT

4.1 Planning Issues

4.1.1 State Planning Policies

The State Planning Policy Framework provides for the implementation of a planning framework through the recognition and implementation of Regional Planning Policies above Local Planning Schemes and Policies.

Within each layer of planning, there are a number of key policies and strategies to provide guidance to planning and development to enable sustainable communities to develop, expand and prosper without compromising the environment and future generations.

Planning is governed under the *Planning and Development Act 2005.* This Act enables Government to introduce State and Regional Planning Schemes, Policies and Strategies to provide direction for future planning. The State and Regional Schemes sit above Town Planning Schemes and Strategies introduced by Local Government.

Strategies and Policies provide guidance on how planning is to be undertaken and how proposed developments are to be considered. These Strategies and Policies are at the State, Regional and Local levels.

Schemes are gazetted documents that provide for consideration and approval of proposed developments. These are normally at the Regional and Local Level.

In addition to the documents produced under the *Planning and Development Act 2005,* the *Local Government Act 1995* provides Local Governments with a mechanism to prepare Local Laws to manage issues of local significance.

As noted above the policies have little relevance over mining tenements on Crown Land in State Forest, but they do have relevance to the local roads, and the recognition of the need for limestone for dwellings, roads and construction.

Even though they are implemented under the *Planning and Development Act 2005,* over which the *Mining Act 1978* prevails, the policies have some relevance in providing guidance on the provision of basic raw materials for the community. They also have relevance in that the Department of Mines and Petroleum seeks advice from the Local Authority when assessing mining proposals.

Some policies do have relevance such as the State Industrial Buffer Policy and Basic Raw Materials Policy.

With respect to the supply of sand and limestone, the overarching document is the;

- State Planning Policy 1.0 State Planning Framework.

Complementing this are a number of Relevant State Policies;

- State Planning Policy 2.0, Environment and Natural Resources Policy
- State Planning Policy 2.4, Basic Raw Materials
- State Planning Policy 4.1, State Industrial Buffer Policy
- State Planning Policy 2.8, Bushland Policy for the Perth Metropolitan Region.

- ***State Planning Policy 2.0, Environment and Natural Resources Policy***

This policy provides for the protection of all natural resources under a number of sections;

5.1 General Measures
5.2 Water Quality including stormwater and wetlands
5.3 Air Quality
5.4 Soil and Land Quality
5.5 Biodiversity
5.6 Agricultural Land and Rangelands
5.7 Minerals Petroleum and Basic Raw Materials
5.8 Marine Resources and Aquaculture
5.9 Landscape
5.10 Greenhouse Gas Emissions and Energy Efficiency.

In addition to recognising the importance of protecting air quality, soil and land quality, water and wetlands and landscapes, the importance of Basic Raw Materials to the community is identified with reference to *SPP 2.4 Basic Raw Materials*, *State Gravel Strategy 1998* and *State Lime Strategy 2001*. See Section 2.1 of this management plan.

Section 5.7 of SPP 2.0, deals with Minerals, Petroleum and Basic Raw Materials.

Part of Section 5.7 states;

> *Basic raw materials include sand, clay, hard rock, limestone and gravel together with other construction and road building requirements. A ready supply of basic raw materials close to development areas is required in order to keep down the cost of land development and the price of housing.*
>
> *Planning strategies, schemes and decision making should:*
>
> *ii. Identify and protect important basic raw materials and provide for their extraction and use in accordance with State Planning Policy No 10 (2.4); Basic Raw Materials.*
>
> *iii. Support sequencing of uses where appropriate to maximise options and resultant benefits to community and the environment.*

The other factors of the natural environment are provided with the best protection possible, by this management plan, by selection of the site, operational staging and footprint and rehabilitation, bearing in mind the constraints of excavating and processing the resource.

SPP 2 Environmental and Natural Resources Policy

Section 5.7 deals with Minerals, Petroleum and Basic Raw Materials. Part of Section 5.7 states;
Basic raw materials include sand, clay, hard rock, limestone and gravel together with other construction and road building requirements. A ready supply of basic raw materials close to development areas is required in order to keep down the cost of land development and the price of housing.

Planning strategies, schemes and decision making should:

ii. Identify and protect important basic raw materials and provide for their extraction and use in accordance with State Planning Policy No 10 (2.5); Basic Raw Materials.

iii. Support sequencing of uses where appropriate to maximise options and resultant benefits to community and the environment.

State Planning Policies are also required to be considered under the Local Authority Town Planning Scheme.

- ***State Planning Policy 2.4, Basic Raw Materials, 2000***

State Planning Policy 2.4 recognises the site as a Priority Limestone Resource. This is also recognised in the Metropolitan Rural Plan and The North West Structure Plan. Furthermore SPP 2.4 requires that resources be staged and taken prior to sterilisation by other land uses.

The need for limestone is also recognised by the Chamber of Commerce and Industry in their comprehensive summary of Basic Raw Materials, (*Managing the Basic Raw materials of the Perth and Outer Metropolitan Region, April 1996*).

The Western Australian Planning Commission State Planning Policy 2.4, was released in July 2000. This site would fall under the provisions of IX 6.1.1. Section IX 6.3 provides some planning protection for the existing limestone excavation by directing planning decisions to protect the resource.

The site is a very valuable community asset, as limestone can continue to be extracted with minimal community inconvenience in the local region.

SPP 2.4 supports the principle that basic raw materials should be taken before they become sterilised by development. It provides guidelines to local government to recognise the importance of not permitting conflicting land uses to impinge on the operation and enable the resource to be taken in a staged manner.

This policy makes many statements on the intent and actions which local authorities should use to protect and manage basic raw materials.

Section 3.4 is very specific in explaining that basic raw materials need identification and protection because of increased urban expansion and conservation measures, (3.4.1), (3.4.2) and (3.4.4). Sections 3.4.5 and 3.4.6 recognise that environmental and amenity matters need to be considered.

There are specific provisions in Section 6.2 Local Planning Scheme Provisions, such as;

> *No support for the prohibition of extractive industries in zones that permit broad rural land uses.*
>
> *Providing an appropriate P, D or A use.*
>
> *Not precluding the extraction of basic raw materials on land which is not identified as a Priority Resource Location, Key Extraction Area* or Extraction Area (6.4.2).

The Western Australian Geological Survey has produced new mapping identifying Strategically Important Basic Raw Materials across private land and State Forest. The Geological Survey recognised the sand resources as a valuable community asset.

- ***SPP 2.5 – Agricultural and Rural Land Use Planning***

State Planning Policy No 2.5, Agricultural and Rural Land Use Planning, makes provision for the extraction of basic raw materials.

SPP 2.5 in Point 9 states that "The location of rural residential and rural small holdings should avoid unacceptable impacts on, or sterilisation, of natural primary resources including prospective areas for mineralisation and basic raw materials .....".

State Planning Policies are required to be considered under the Local Authority Town Planning Schemes as is the "identification and protection" for staged use, of basic raw materials.

- ***State Planning Policy No 4.1, State Industrial Buffer Policy***

SPP 4.1 discusses the need to consider adjoining land uses when locating buffers but does not prescribe set buffers for operations such as this. The development and processing of the resource has been designed to maintain maximum buffer distances. In situations where the buffers are less, actions such as the provision of perimeter bunding to provide visual and noise management, tree planting and operational procedures, are used to mitigate and reduce impacts.

This is discussed further in Section 5.1 Surrounding Landuses Buffers of this document.

- ***State Planning Strategy, 1997***

The Western Australian Planning Commission (WAPC) released the *State Planning Strategy in 1997*. It comprises a range of strategies, actions, policies and plans to guide the planning and development of regional and local areas in Western Australia and assists in achieving a coordinated response to the planning challenges and issues of the future by State and Local Governments.

The State Planning Strategy contains the following five key principles. These are:

- Environment & resources: to protect and enhance the key natural and cultural assets of the State and to deliver to all Western Australians a high quality of life which is based on sound environmentally sustainable principles.
- Community: to respond to social changes and facilitate the creation of vibrant, accessible, safe and self-reliant communities.
- Economy: to actively assist in the creation of regional wealth, support the development of new industries and encourage economic activity in accordance with sustainable development principles.
- Infrastructure: to facilitate strategic development of regional Western Australia by taking account of the special assets and accommodating the individual requirements of each region.
- Regional Development: to assist the development of regional Western Australia by taking account of the special assets and accommodating the individual requirements of each region.

- ***Directions 2031 and Beyond (WAPC 2010)***

Directions 2031 and Beyond provides data on the land uses and growth of the Perth Metropolitan and Peel areas over the 20 years to 2031.

- ***Perth and Peel @ 3.5 million - 2018***

Perth and Peel @ 3.5million, developed by the Western Australian Planning Commission has determined that the Metropolitan Area will grow significantly between 2012 and 2050

The Outlook also forecasts that there will be many new dwellings south of the Swan River. Before 2050 the limestone south of the Swan River will be exhausted or nearly exhausted and this limestone will be required.

The construction of dwellings needs limestone for roads, natural and reconstituted limestone blocks for preparing the individual lots, in addition to concrete and other products that include some limestone.

Perth to Peel @ 3.5 million Planning Framework hghlights this site as forming part of the Significant basic raw materials and notes that 72% of all the limestone occurs in this region (Plan 9 of the North West Sub-regional Planning Framework).

- ***Metropolitan Region Scheme***

The Metropolitan Region Scheme lies under the umbrella of the Planning and Development Act 2005. It provides overall direction to planning through the Metropolitan Region Scheme. Approvals are required under the Scheme but are normally delegated to the Local Authority. However in the case of Extractive Industries the delegated authority was revoked and all extractive industries are assessed by the Western Australian Planning Commission and issued with a separate and additional approval under the Metropolitan Region Scheme.

4.1.2 Local Government Policies and Planning Schemes

- **City of Wanneroo District Planning Scheme 2**

The objectives of the Scheme are to support and protect intensive agriculture and horticulture and basic raw materials from incompatible land uses such as subdivision.

Section 3.17.1b of the City of Wanneroo District Planning Scheme has the objective; *"protect from incompatible uses or subdivision, basic raw materials priority areas and basic raw materials key extraction areas".*

Section3.17.3f commences" There is a presumption in favour of applications for the extraction for basic raw materials in the basic raw materials resource areas ……"

The current Zoning is Rural Resource in which extraction is encouraged by the Town Planning Scheme.

- **City of Wanneroo Local Law - Basic Raw Materials Policy**

The City of Wanneroo Basic Raw Materials Policy provides direction to Council on Basic Raw Materials and their control.

Extractive Industries are normally issued with Planning Consent and an Extractive Industries Licence.

The City of Wanneroo Basic Raw Materials Policy was recently updated. The proposed continued limestone extraction is designed to comply with the updated Policy.

4.1.3 End Use – Sequential Planning

The extraction of limestone and sand is seen as an interim use prior to a return of the area to local native species, in areas of native vegetation with parkland pasture, in previously cleared areas, enabling a final end use of rural living or alternative compatible use.

At this stage the most appropriate end use is to restore the surface to be visually compatible with the surrounding rural land surface.

No sequential land planning can be made because the future use is not known. Therefore the most appropriate end use is to restore the existing cleared and parkland pasture land with native vegetation around the perimeter and in strategic locations. Thiis would enable semi-rural land uses and rural uses. Any other use will require rezoning of the land. Even so the proposed revegetation would be suitable for rural living if rezoning was to occur at some point in the future.

4.1.4 Social Impacts

There are no proposed changes to the scale and nature of the excavations for the next few years.

As far as is known there have been no complaints within the last five years.

4.1.5 Surrounding Landuses and Buffers

- **Separation to Dwellings**

State Planning Policy No 2.5, Agricultural and Rural Land Use Planning, makes provision for the extraction of basic raw materials as does State Planning Policy 2.4 Basic Raw Materials.

Both policies have similar aims. SPP 2.5 in Point 9 states that "The location of rural residential and rural small holdings should avoid unacceptable impacts on, or sterilisation of natural primary resources including prospective areas for mineralisation and basic raw materials ....."

The issue of appropriate buffers is a matter of the distance and protection measures to prevent impact on adjoining land users. This applies mainly to noise, dust and visual impact, all of which are treated separately.

A number of Government Policies relate to buffer distances and the protection of basic raw materials. State Planning Policy No 4.1, State Industrial Buffer Policy, (draft July 2004) discusses the need to consider adjoining land uses when locating buffers but does not prescribe set buffers for operations such as this.

Generic buffer requirements were developed by the Victorian Government and used by the Environmental Protection Authority as the basis for a Draft guideline on recommended buffer distances. These formed the basis of EPA Guidance Statement Number 3, Separation Distance between Industrial and Sensitive Land Uses, June 2005.

EPA guidance "Separation Distances between Industrial and Sensitive Land Uses", June 2005 lists the generic buffers for sand and limestone pits as 300 - 500 metres depending on the extent of processing. A generic buffer relates to the distance at which there are unlikely to be any problems without some further investigations and does not mean that smaller buffers are not acceptable. EPA Guidance for the Assessment of Environmental Factors No 3 June 2005 provides for a case by case separation, based on the potential impacts.

The issue of appropriate buffers is a matter of the distance and protection measures to prevent impact on adjoining land users. This applies mainly to noise, dust and visual impact, all of which are treated separately.

Based on the nature of the equipment used and excavation methods proposed, the extraction of sandstone is most similar to limestone excavation. Therefore a generic buffer of 300 – 500 metres is appropriate. The Guidance states that for quarries other than hard rock, where crushing, milling and grinding occur, a site by site buffer is appropriate.

There will be continued crushing milling or grinding similar to all other limestone pits.

A Department of Environment Regulation Licence is in place for the western half of the site and will be extended to cover the proposed excavation area. L8718/2012/1.

The walls of the pit, perimeter bunding and nature of the ridge landform will be used to reduce noise transmission.

Excavation will be worked from inside out on the floor of the pit working below natural ground level.

The main issues are the potential generation of dust and noise.

There are not proposed to be any changes to the past operations on site. Italia owns the surrounding properties and limestone extraction occurs on the adjoining land to the south.

Buffer distances to the closest dwellings are proposed to be a minimum of 400 metres, with the closest dwelling being to the south west, associated with an intensive animal production (poultry?) facility. The majority of the excavation will be significantly further away from dwellings. Other dwellings are over 500 metres away.

The closest dwelling is not in line with the prevailing easterly morning winds and south westerly sea breezes.

The excavation of limestone from the site therefore complies with the generic buffer policies.

There is no reason why continued excavation of the resources on site cannot be completed in a similar manner based on proven excavation and buffering practices.

The walls of the pit and perimeter bunding will be used to reduce noise transmission.

The 20 metre buffer zones will be retained along the southern and eastern perimeter boundaries with a 40 metre road buffer.

4.2 Community Consultation

The proposed excavation program and quarry will be circulated to Government Departments and Authorities by the City of Wanneroo.

Complaints Procedures

A complaints register is in place as part of Italia normal operational procedure. As far as is known there have been no complaints within the last five years.

Any complaints will be recorded, investigated and, if substantiated, action will be taken as required. The details of all complaints will be contained in a record keeping facility at Italia Head office.

4.3 Heritage

The database of the Sites Department of the Department of Aboriginal Affairs has no record of any aboriginal sites on the subject land.

The site has been grazed, and partially farmed and used for limestone extraction for many years. Therefore disturbance of the soils has been a regular occurrence over much of the land.

Should any evidence of early aboriginal occupation be uncovered, development will be stopped pending an assessment by a recognised consultant.

If the site is confirmed as a site under the provisions of *Section 15 of the Aboriginal Heritage Act 1972-1980* and Amendments operations will cease pending relevant negotiations.

4.4 Compliance and other Legislation

A number of local and state government authorities are responsible for overseeing the safety and environmental management of quarries in the area. These include;

City of Wanneroo

- Provides input to the Planning Consent process conducted by the Western Australian Planning Commission.
- Issues Planning Consent and the Extractive Industries Licence for the quarry.
- Regulates land zonings and planning in conjunction with the Western Australian Planning Commission
- Controls the measures used to prevent bush fires.
- Issues approvals for transport vehicle owners to apply to MRWA (Main Roads) for permits to utilise oversize vehicles on specific roads.

Department of Mines Industry Regulation and Safety

- Controls the safety and methods of excavation and covers the health and safety of the workers through the *Mines Safety and Inspection Act 1994 and Regulations 1995.*

- Currently undertaking a survey of the limestone resources in the Perth metropolitan Area.

- A Project Management Plan is in place and the operations are approved under the Department of Mines and Petroleum SRS System.

Department of Biodiversity Conservation and Attractions

- Overseas flora and fauna issues.

- Overseas land uses and the health of Lake Nowergup.

Department of Water Environment Regulation

- Has input into the use and maintenance of Lake Nowergup and groundwater through guidelines.

- Issues Water Licences. Italia holds a current Water Licence for 5 000 kL per year for this site and has an additional 5 000 kL per year available if required within the same groundwater sub-area that is currently used on leased land at M70/138 Wesco Road; GWL48200(2).

- Issues Licences under Part V of the Environmental Protrction Act 1986. Issues Licences for crushing and processing if required. A Department of Environment Licence is in place for the western half of the site and will be extended to cover the proposed excavation area. (L8718/2012/1).

- Oversees the *Environmental Protection (Noise) Regulations 1997*.

- Issues Clearing Permits.

Main Roads

- Has input into the use of highways and issues extra mass permits for road transport vehicles.

Department of Planning Land and Heritage

- Responsible in conjunction with the Western Australian Planning Commission for Planning Policies and Stategic Planning.

- Provides approval under the Metropolitan Regon Scheme for quarries.

- Maintains records of aboriginal sites and administers the *WA Aboriginal Heritage Act 1972.*

Western Australian Planning Commission

- Responsible for the Metropolitan Region Scheme.

- Responsible for long term regional planning
- Determines Planning Consent for Extractive Industries under the Metropolitan Region Scheme.
- Responsible for State Planning Policy 2.4, Basic Raw Materials Strategy.

5.0 MINING OPERATIONS

Environmental issues including dust, noise and traffic can be managed in such a way to minimize or eliminate any potential impact on the local community. Dust and noise can be contained by the methods of extraction to be used and the control measures which will be put into place. Measures to protect the site and minimise the influence of dieback are addressed under Environmental Management.

This is an extension of existing operations, with no proposed changes to the methods of excavation. Italia Stone group is experienced in this type of quarrying and has an excellent record in the excavation of basic raw materials.

5.1 Project Summary

ASPECT	PROPOSAL CHARACTERISTIC
EXCAVATION	
Total area of excavation	41.2 hectares
Total disturbance area	17.0 ha cleared partially excavated 15.0 ha vegetation in Excellent condition 9.2 ha in Degraded to Very Good Condition
Total area of mining footprint	
Limestone and sand extraction	50 000 – 100 000 tonnes per year with the possibility of a larger contract in a particular year.
Total estimated resource	> 2.5 million BCM
Life of project	> 20 years
Area cleared per year	Average 1 ha
Area mined per year	Average 1 ha
Dewatering requirements	None
Maximum depth of excavations	3 - 20 metres
Native vegetation to be cleared	A Clearing Permit was provided for the existing area and a new permit will be applied for any new vegetated ground to be cleared.
PROCESSING	
Limestone and sand	See excavation rate above. Processing will include manufacture of reconstituted stone blocks
Water requirements	Supplied and controlled by Licensed Bore
Water supply source	Licensed bore 5 000 kl per year (GWL48200 (2).
INFRASTRUCTURE	
Total area of plant and stock	Located within existing excavated area. No changes; approximately 0.5 ha needed.
Area of settling ponds	Not required
Fuel storage	Proposed to be mobile refuelling brought to site as necessary.
TRANSPORT	
Truck movements	Variable but approximately 2 per hour.
Access	Limestone internal road to McLennan Drive.
WORKFORCE	
Construction	Existing operation.
Operation	20 years
Hours of operation	Hours of operation will not change, and will be 6.30 am to 5.00 pm Monday to Saturday inclusive, excluding public holidays for bulldozing and processing.

5.2 Extraction and Processing of the Resource

5.2.1 Excavation

Limestone and sand has been excavated from this site for over 40 years and from the local area for 100 years.

There are no proposed changes to the scale and intensity of operations that have been used in the past without complaint.

Environmental issues including dust, noise and traffic are not anticipated to change in their risk or impact and can continue to be managed in such a way to minimise or eliminate any potential impact on the local community.

Dust and noise can be contained by the methods of extraction to be used and the control measures which will be put into place.

Exposure of the resource

When new ground is opened vegetation will firstly be removed, followed by topsoil, which will be used for direct transfer to areas being rehabilitated. If this is not possible it will be stored in low dumps for later use in rehabilitation.

Overburden will then be removed and also stored in dumps for future use in rehabilitation.

The topsoil and overburden will be removed by excavator to expose the rock.

Extraction

The method of excavation of the limestone and sand is proposed to be similar to the existing quarry.

Excavation will be carried out as a sequence.

1. The excavation will continue from previous activities.

2. Remove the vegetation cover by pushing it into windrows, for use on the batters to minimise soil erosion and spreading on the final land surface as part of the final rehabilitation.

3. Where practicable vegetation will be directly transferred to an area being rehabilitated. Smaller indigenous shrub material will be used in the rehabilitation process when available and suitable; for example on batter slopes of completed areas.

4. If direct transfer is not possible the vegetation will be stored in dumps, mulched or swapped with a nearby operator to try and ensure that the material is not wasted.

5. Any topsoil will be removed for spreading directly onto areas to be revegetated and the screening or perimeter bunds. If direct spreading is not possible the top soil will be stored in low dumps, for spreading at a later date. See 7.0 Mine Closure.

6. The use of weed affected topsoil will be managed to minimise the spread of weeds. It may be buried or sprayed to reduce the future weed loading on the site. See Weed Management Plan in the Biodiversity Management, Appendix 1.

7. Soil and overburden, as yellow and brown sand and low grade limestone, will then be removed and either directly transferred to a rehabilitation area or stored in low dumps for later rehabilitation use. Where this is not used overburden will be stored in dumps for future use in rehabilitation or the creation of bunds.

8. Limestone interburden, if encountered, will be incorporated into the overburden dumps for later use in re-contouring the land surface at the conclusion of excavation.

9. In instances where hard rock (rock too hard for ripping by dozer) is encountered localized explosives popping may be utilized to liberate or break the rock before being pulled out by dozer or excavator. It is not anticipated that popping would occur more than 2 times per calendar month. These operations are governed by DMIRS and can only be performed by qualified, licenced shot firers.

10. Excavation will be worked progressively to produce the anticipated requirements of 50 000 to 100 000 tonnes per year, depending on contracts won. It is possible that a larger tonnage may be required in any particular year.

Construction Materials

11. A bull dozer will be used to remove the cap rock and surface limestone. The bulldozer will then be used to track crush the limestone for use in the production of construction materials through crushing and screening.

    Currently no additional materials are brought to site as there are no manufacturing. The only materials brought to site are servicing, fuel materials and normal equipment. In future the only additional material may be small quantities of cement for possible future reconstituted limestone block manufacturing.

Dimension Stone

For dimension stone the sequence will be slightly different and as follows.

- A bull dozer will be used to remove the cap rock and surface limestone, to produce a relatively flat cutting floor of soft limestone.

- A grader will be used to smooth and level the floor, as flat as possible, to allow the installation of rails and cutting machines.

- When dimension stone is to be cut, sections of the floor will be lowered by the depth of one block until the whole floor is lowered. The next set of blocks will be cut by the re-installation of the rails and cutting machines on the lowered floor and the process repeated. This method of excavation means that the cutting floor is gradually lowered below the land surface. The cutting saws are electric, using air cooling for the blades.

12. Water is used for dust suppression, to reduce the potential for dust generation from the movement of machinery and the effect of wind. A bore Licence is held from the Department of Water (GWL48200 (2).

13. All static and other equipment, such as block making machinery, mobile crushers or screens, will continue to be located on the floor of the quarry, screened by earth bunds, where possible, to provide visual and acoustic screening. There is currently no proposal to change the location of the existing facilities on site.

14. Subgrade material and overburden will normally be stored in the bunds around the perimeter of the pit and then used to re-contour the completed pit as the first stage of rehabilitation.

15. At the end of excavation the floor of the quarry will be deep ripped, covered by a layer of overburden and top soil and rehabilitated with local indigenous tree/shrub species in areas of existing native vegetation, or parkland pasture in already cleared areas.

16. At the end of excavation the floor of the quarry will be deep ripped, covered by overburden and top soil (if not weed affected) and rehabilitated to a constructed soil. See 9.0 Mine Closure. And Rehabilitation.

Details of the Rehabilitation are listed under 9.0 Mine Closure.

5.2.2 Pit Design and Staging

Pit Design

1. 40 metre road buffer zones will be retained along McLennan Road perimeter boundaries. 20 metre buffers will be maintained along southern property boundaries of Lots 102 and 103 and along the eastern boundary of Lots 101 and 102.

2. Limestone will be excavated down to approximately 30 metres AHD which provides for 9 plus metres separation to the highest known water table.

3. The excavation to depth is proposed to be completed without the use of benches.

4. The pit will be extended by entering from the south, progressively taking the limestone as shown in Figure 3.

The batter slopes will be retained at no steeper than 1: 4 vertical to horizontal

Where possible rehabilitation will be progressive, but, because of the nature of the excavation, it will be restricted to completed faces and it is likely that it will be some years before rehabilitation can be commenced.

Rehabilitation will be commenced as available areas are completed to ensure that the amount of ground that is open at any one time is minimised.

Staging

The pit is divided into a number of stages.

With this type of operation it is difficult to be precise with staging as there are a number of activities occurring on site at any one time. Also the resources of limestone and sand vary across the site with some high grade and some lower grade. The stages chosen are a realistic estimate of their activity and time frame.

Using smaller stages with tighter time frames are unlikely to be able to be adhered to and will therefore have little usefulness.

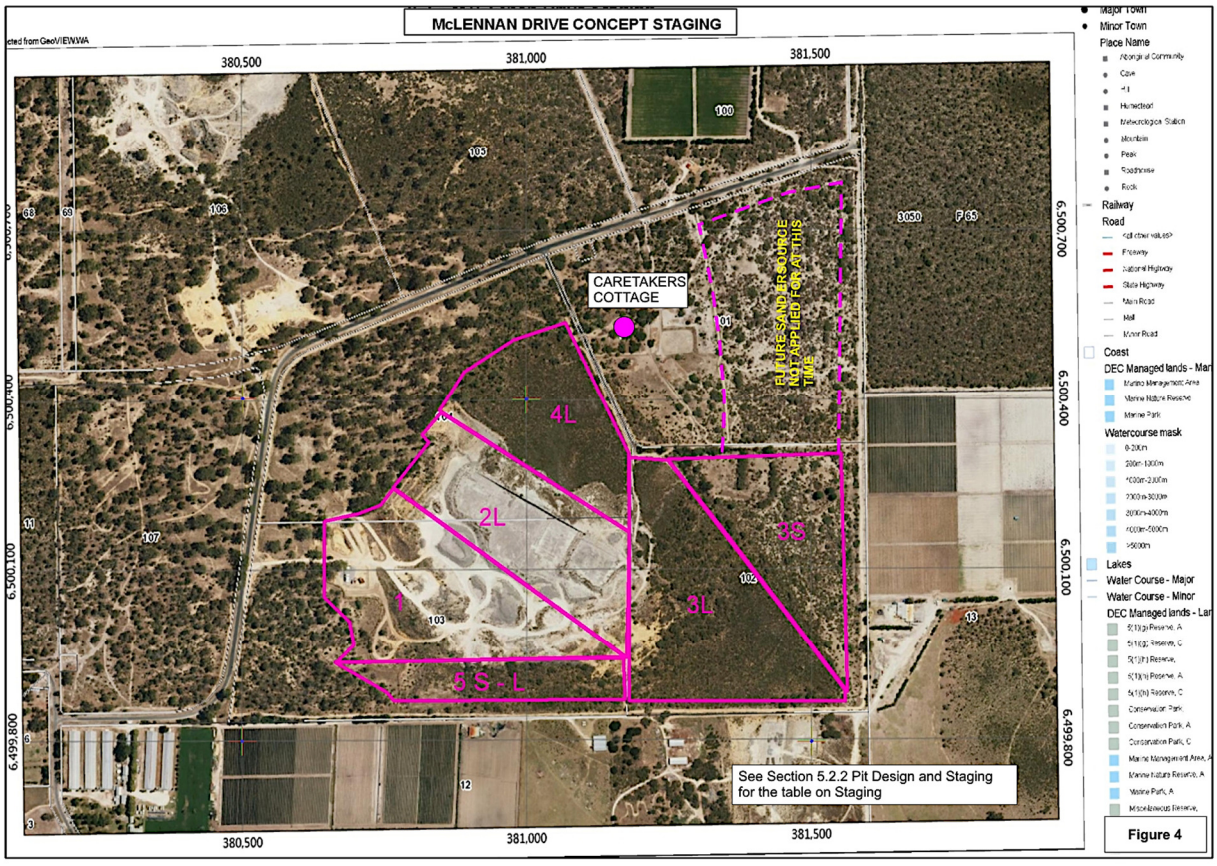
What material can be taken depends on market demands. For example Stage 2L was worked previously for natural dimension stone blocks, but there is less market currently for these and the market is more for reconstituted blocks and limestone rubble. For that material a new excavation will be open, preserving the limestone suitable for natural blocks to a time when the market requires that material.

Also different stages need to be open for sand and limestone.

The stages need to be large to enable the pit to be workable and are summarised in the concept staging table below.

STAGE	AREA	DESCRIPTION	EXCAVATED	REHABILITATED
1	9.0 ha	Current facilities, some stockpiles, mine training roads and access.	Partially open Operational until 2038	Closed at the end of excavation. Closed progressively 2025 - 2038
2L	7.6 ha	Old dimension stone pit for limestone. Preserved for future dimension stone cutting. The anticipated site of reconstituted limestone block manufacture	Open Excavated until 2025 when part of the site will be used for reconstituted block manufacture	Depends on markets Closed progressively 2023 – 2025, with the reconstituted block manufacture area to remain open.
3L	9.7 ha	Proposed dimension and rubble limestone resource	2018 - 2023	Closed progressively 2023 - 2028
3S	6.3 ha	Proposed sand resource	2018 - 2023	Close progressively 2023 - 2028
4L	6.2 ha	Longer term limestone dimension stone resource	2023 - 2033	Closed progressively 2028 - 2038
5 S - L	2.4 ha	Sand and limestone resource	2021 - 2026	Closed progressively 2026 - 2028

Figure 4



Concept Staging of the pit. See the table above.

5.2.3 Final Contours

The proposed final landform is to cut the floor of the pit to a level at which further stone cannot be extracted or the quality of stone does not justify further excavation. At this stage this elevation is not known, but is likely to be similar to the existing quarry floor, rising to the east up the hill. Figures 8 and 9.

The excavation will lower the land surface in that area by 2 - 20 plus metres depending on the location on the hill. From that level the slopes and faces will be battered back to resemble natural land forms including rock outcrop.

The floor of the pit is anticipated to be a minimum of 30 metres AHD rising gently to the surrounding land surface.

The end land surface will be in accordance with the safety considerations of the *Mines Safety and Inspection Act 1995* and the requirements and guidelines of the Department of Mines and Petroleum; for example Guidelines on Safety Bund Walls Around Abandoned Open Pits 1991.

A bulldozer will then be used to push down overburden from above, pushing it down across the broken blocks and backfilled blocks.

At the end of excavation any overburden will be used to backfill benches for revegetation. The end use will, however, remain as a void with rehabilitated benched sides in compliance with the safety considerations of *the Mines Safety and Inspection Act 1995* and the requirements and guidelines of the Department of Mines and Petroleum; for example *Guidelines on Safety Bund Walls Around Abandoned Open Pits 1991.*

Overburden will be taken from the overburden dumps to push up across the ds. A final batter slope of 1: 4 vertical to horizontal is proposed. This will form a stable slope that can be planted to local native vegetation.

Concept final batter slopes and a contour plan are attached.

5.2.4 Processing of the Resource

A mobile crushing plant and screens will be used to prepare construction materials.

Crushing plants and screens are licensed or registered through DWER (L8718/2012/1). This Licence will be extended to cover all the proposed extraction.

Annual throughput is anticipated to be up to 50 000 – 100 000 tonnes although more could be taken in any particular year as a result of the number and type of contracts won.

A site office and service shed is located within a secure compound, located adjacent to the existing pit. See Figures 3A, 3B and 3C.

All crushers, screens and stockpiles are either sprayed with water or are enclosed, where possible, to reduce the emission of dust from all parts of the crushing plant.

It is proposed that reconstituted block making will be conducted in Stage 2L, on the existing cutting floor.

This will involve the placement of a concrete pad and the use of mobile crushing and screening plants as well as a mobile limestone batching plant.

The only materials required for the reconstituted block manufacture is the inclusion of a small amount of cement imported to site. This normally varies from 5 – 7 % depending on the calcium carbonate content of the limestone.

5.2.5 Stockpiles

Stockpiles of products will be retained on the floor of the pit to reduce visual impact.

As limestone can be extracted as required, relatively small stockpiles of 10 – 50 000 tonnes are proposed.

There will be some small stockpiles of cut dimension stone placed on pallets.

5.3 Hours of Operation

Hours of operation will continue to be 6.30 am to 5.00 pm Monday to Saturday inclusive, excluding public holidays, for bulldozing and processing.

Transporting material on Saturday is normal today because of the short distance of the quarry from major arterial roads, and the change of Saturday to a day of normal commercial trading in recent years.

5.4 Machinery and Equipment

The operation will use modern equipment that is regularly serviced.

The following equipment is likely to be used during the excavation and processing of limestone.

Continued training of Italia personnel is proposed, using the existing mobile plant on site. Additional mobile plant will be used for training as currently occurs on site, but with small site will normally be limited to one haul truck, one to 2 loaders, one excavator and one bulldozer in addition to other smaller plant normally used on quarries.

Secure compound	This is already present on site as shown on the attached Figures 3 and 7.
Site office/lunchroom	A site office/lunchroom is maintained on site for the management and security of small items.
Toilet system	A serviced portable toilet system is to be installed at the site office.
Storage sheds	A storage shed is located on site for the storage of maintenance items and for support to the quarry. The location of these facilities is shown in Figures 3 and 7.
Bore	One bore is present, licensed from Department of Water GWL48200 (2).
Bulldozer	Pushing, track rolling and movement of limestone and for use in land restoration.
Water tanker	Used for dust suppression on the access road and working floors as required.
Loader and bobcat	The loader will be used for the movement of limestone, loading road trucks and feeding crushing and screening plant. A second loader may be required. The bobcat is used to lift reconstituted blocks.
Blasting	Not proposed but could be used in a limited way if a contract for armour rock for coastal works is required. Prior to blasting the City of Wanneroo will be informed of the number, time and type of blasts and the closest dwellings to the south west, will be notified.
Weighbridge	At this stage a weighbridge is not proposed but may be used if required.
Mobile crushing and screening plant	A mobile crushing and screening plant is required for the preparation of raw feed to the processing plant and the preparation of road bases and construction materials. This will be located on the floor of the pit. (DER L8718/2012/1).
Fuel Storage	Vehicles will be refuelled from mobile tankers, Onsite fuel storage is not required.
Explosives Compound	Storage of Explosives as governed by DMIRS Licences (ETS002771 and SST000252)

All static and operational equipment will work on the quarry floor to provide maximum sound and visual screening where possible. Processing will not change. All mobile and static plant is registered or licensed by the Department of Environment Regulation. (DER L8718/2012/1).

5.5 Access and Transport

The quarry will continue to be accessed from Godel Road. Access from other locations is restricted by small perimeter trenches, strategic placement of logs and boulders and gates that will be locked when the site is unmanned and equipment is retained on site. Fences will be maintained and upgraded as required.

Warning signs are maintained as required by the Department of Mines and Petroleum and the City of Wanneroo, placed along the boundary fences to DMIRS standards under the *Mine Safety and Inspection Act.*

As an indication, approximately 1- 2 laden trucks leave the site every hour.

A Traffic Management Plan was prepared by Greenfield Technical Services and is attached as Appendix 5.

Access in the site varies as the excavation proceeds. As the pit floor is extracted the road access routes are extended and change regularly over the life of the operation as occurs in all limestone quarries. Providing the access roads on a site plan will therefore not be correct as excavation advances, because the location of these will change. The roads for training will also change as the quarry advances and the enlarged quarry floor is used for training. A review of historical aerial photographs show how the access roads have changed over time in this and other limestone quarries in the City of Wanneroo.

The current training roads are shown on Figure 3, and the concept locations for the internal roads are also shown.

The crossover to Godel Road will be sealed for a distance of 50 metres.

5.6 Workforce

The workforce will vary, depending on the level of operation and market demands, but usually 3 plus persons can be expected to be working on site at any one time.

5.7 Water Use

Water is to be mainly used for dust suppression.

There is a bore on site Licensed by DWER for 5 000 kl per year (GWL48200 (2). The Licence has a further allocation of 5 000 kL that is currently being used on lease land on M70/138 and can be used on this site as it is in the same Groundwater Subarea if required.

Potable water is brought to the site as needed.

Dust suppression is normally only required for active areas such as internal roads and hardstand, block cutting and sawing. The water is also required to cool the cutting facilities such as the wire saw and circular saw or any drills.

Some dust suppression may also be required for traffic on the floor of the pit during active times.

6.0 GEOTECHNICAL FACTORS

Geotechnical Design Implications

The limestone is at shallow depth with minimal overburden. Extraction will commence on the floor of the existing pit and from natural ground level.

The limestone is structurally strong, with variable bedding. Dip is often gently to the east or west with significant dune type cross bedding.

The beds are worked as benches based on natural bedding.

The working procedures comply with normal operational procedures for small Open Pit Mines as required and described by the *Department of Mines and Petroleum Guidelines, Mines Safety and Inspection Act 1994 and Regulations 1995* and Read and Stacey 2009.

Inspectors from DMIRS are responsible for overseeing the Health and Safety of the operations. They normally inspect quarries such as this from time to time.

The operator on site is nominated as the Local Site Manager.

Even though vertical faces will be produced, as far as quarries go, the structural integrity and small bench elevation to be used will minimise any risk of slope failure, unless a block was undercut which is not how the limestone is extracted.

The greatest risk is from someone falling over the benched face or of a poorly located stone sitting above the face. Faces are likely to be up to 5 - 7 meters in elevation, with the working faces lower, in a manner similar to the existing and other limestone quarries.

The only design implications are to approach the face and excavate in a manner that does not compromise the stability of the rocks, and more weathered materials above the faces.

Normal practice is to scrape the soil, overburden and weathered materials from above the operational faces, leaving room to continue future excavation as the face is pushed back in benches.

Final Surface

The end use will, however, remain a gently sloping floor with rehabilitated sloping sides in compliance with the safety considerations of *the Mines Safety and Inspection Act 1995* and the requirements and guidelines of the Department of Mines and Petroleum; for example *Guidelines on Safety Bund Walls Around Abandoned Open Pits 1991.*

The proposed final landform is to cut the floor of the pit to a level at which further stone cannot be extracted or the quality of stone does not justify further excavation.

The excavation will lower the land surface in that area by 2 - 20 plus metres depending on the location on the hill. From that level the slopes and faces will be battered back to resemble natural land forms including rock outcrop.

The brow of the faces will be "knocked off" most likely by small explosive charges or excavator. Loose rock will be pushed into the void from above. Additionally blocks on the floor of the pit will be pushed back to the face to fill the void.

A bulldozer will then be used to push down overburden from above, pushing it down across the broken blocks and backfilled blocks.

Overburden will be taken from the overburden dumps to push up across the blocks. A final batter slope of 1: 4 vertical to horizontal is proposed. This will form a stable slope that can be planted to local native vegetation.

Karst Risk

Karst Risk is discussed in Section 2.1 Geology and Geomorphology. The site has been assessed by Lindsay Stephens of Landform Research and lies east from the area identified as karst risk.

The photographs of the site show the large cutting floor, which has been cut for dimension stone. The limestone is solid and does not contain cavities as can be readily seen by looking at the existing floor. Cavities and discontinuities normally preclude limestone from being cut for dimension stone.

This is consistent with the City of Wanneroo Local Planning Policy 4.13 which shows that the edge of the line of “medium” risk of karst runs north west to south east, west of the excavated part of the limestone, in the current area of sand and limestone stockpiles. The line of “Medium” risk lies approximately across the western 20% of the proposed pit in the area of mainly sand excavation.

Any cave development has to have an erosive source of ground water, which does not occur on site because the groundwater has to traverse through limestone which extends to Hopkins Road and is neutralised prior to arriving at site. Any erosion would also occur at the water table.

Not only is there no evidence of an erosive source of water and the site lies mostly outside the karst risk area, but a ten meter separation to the groundwater provides additional safeguards.

7.0 SAFETY

All quarries operate under the provisions of the *Mines Safety and Inspection Act 1994 and Regulations 1995.* These are administered by the Department of Mines and Petroleum.

The regulation is achieved through the DMIRS Safety Regulations and Reporting Systems (SRS).

All quarries on commencement are required to register with the SRS system. As part of the registration a Project Management Plan is required to be produced and lodged online after all planning approvals are in place and prior to commencement.

The Project Management Plan will use some material from this Management Plan and concentrate on the onsite operations as they relate to health and safety.

Officers from the Safety Division of the DMIRS will regularly inspect the operations in relation to health and safety.

The site will operate to the *Mines Safety and Inspection Act 1994 and Regulations 1995,* which are administered by the Department of Mines and Petroleum. Inspectors visit the site regularly.

The proponent is committed to maintaining a safe working environment.

The site is fenced with farm style fencing and there is a secure compound with 1.8 metre high wire diamond mesh in the central west of the site.

Warning signs are installed and will be upgraded as necessary to the Department of Mines and Petroleum specification, as approved by the district inspectors.

Completed faces will be left in a safe manner to the requirements of Department of Mines and Petroleum for the abandonment of small hard rock quarries.

Project Management Plans are used to cover operational procedures which include workforce induction and training to ensure that all employees involved in sandstone extraction are made aware of the environmental and safety implications associated with all stages of the mining activities.

Where applicable Safe Operating Procedure Sheets are in place and made available for hazards. Workers and staff will be trained in the use of the procedures and all employees provided with site induction and training as necessary prior to commencing work on the site.

The site is within mobile phone range.

Fire Management

The excavation area will form a natural firebreak; the access road will also assist. Water available on site can be used for fire fighting.

The safety of workers is managed through a Safety Management Plan developed through the *Mines Safety and Inspection Act 1994 and Regulations 1995.*

There are a number of management actions that can be taken in quarries to minimise fire risk and these will be used wherever possible. The general management actions are summarized below together with the potential issues that relate to this site. The actions will be used where applicable and as the opportunity presents to minimize fire risk.

- Restrict vehicles to operational area, particularly on high fire risk days
- Use diesel rather than petrol powered vehicles
- Maintain perimeter fire breaks as required
- Ensure fire risk is addressed and maintained through the site Safety Management Procedures
- Provide an emergency muster area, communications and worker induction and training
- Establish on site water supplies for potential use in extinguishing fire
- Secure the site from unauthorized access
- Public access will not be permitted.
- Stop work and prevent the movement of vehicles on days deemed to be high – extreme fire risk days, in line with normal farm practice.
- Maintain perimeter fire breaks as required
- Provide an emergency muster area, communications and worker induction and training
- Establish on site water supplies for potential use in extinguishing fire
- If on site, the loader can be used to assist with emergency fire breaks.

8.0 ENVIRONMENTAL IMPACTS AND MANAGEMENT

The likely environmental impacts are minimal on a well managed site.

An Environmental Risk Management is included in the Summary. That Risk Management identified the main risks as being Vegetation and Flora, Dust, Noise and Water.

In order to make each section more self contained the Environmental Management is included at the end of each section.

The proposed operation is very small, intermittent and conducted on cleared land.

8.1 Biodiversity Management

Flora

The vegetation of the area has been assessed by Arthur Weston, and during site visits over the past 20 years by Lindsay Stephens of Landform Research. See Appendix 1.

The existing pits are cleared.

Arthur Weston notes that the survey area vegetation is mapped by Beard (1979), at a scale of 1:250 000, as Banksia Low Woodland (bLi), with Jarrah-Tuart Woodland more than 1 km east of it and Jarrah-Marri Woodland less than 1 km west of it. Beard (1979, pp. 20, 31**)** describes the survey area vegetation as belonging to the south-central or Muchea section of Bassendean System vegetation in the Drummond Subdistrict.

The mapping of Shepherd *et al.* (2002) is similar to that of Beard (1979, 1981); it shows the vegetation of the survey area as Low woodland: *Banksia* (Vegetation Association 949). Beeston *et al.* (2002) note that 40.25% of the pre-European extent of Vegetation Association 949 remains.

Heddle *et al.* (1978) show the survey area as being in an eastern part of the Cottesloe Vegetation Complex – Central and South (52). They describe the native vegetation of this complex as being “heaths on the limestone outcrops” and, on deeper sands, a mosaic of tuart woodland and tuart-jarrah-marri open-forest (Heddle *et al.* 1978, 1980).

Field mapping by Weston 2015 (See Appendix 1) revealed the following vegetation communities;

Arthur Weston compared the vegetation and the sample quadrats to the Floristic Community Types by a variety of methods.

He concluded in the summary;

“Neither FCT 26a or any other Threatened Ecological Community or species or other taxon of Threatened or Priority Flora was unequivocally identified in the survey area”.

He further concluded in the Summary of his report, that “It is possible, though unlikely, that the M vegetation east of the centre of Area C is a representation of FCT 26a”.

Even so Community Type M has been excluded from the proposed excavation area as has the adjoining bufffer areas of Community Types BM and X.

Community Type BM is potentially FCT 24 a Priority 3 listed Community that acts as a buffer to FCT 26a. It is possible that Community Type BM in the south east may be FCT 24, but this is isolated from FCT26a.

Arthur Weston lists the remainder of the vegetation proposed to be cleared is listed as FCT27 and FCT 26b. See Figure 4

Based on the vegetation the proposed area of extraction has been identified and is shown in Figure 4 together with Staging.

VEGETATION OF THE PROPOSED EXCAVATION AREA

The vegetation across the excavation area is variable from cleared vegetation on the sand resource in the east and parkland pasture in the west and south. In recent years this vegetaiton has been partially allowed to regrow but still retains a variable but significant groundcover of pasture species.

The limestone resource is generally covered by Limestone Shrub and heath vegetation grading to *Banksia* and Eucalypt Low Woodland.

A small area adjacent to the existing cutting floor was assessed in detail by Arthur Weston who found that it could not definitely be shown to be the Threatened Floristic Community FCT 26a, however it may possibly be ascribed to that community.

The section of vegetation is excluded from the proposed excavation, together with a buffer vegetation. The Buffer vegetation has affinities to the Priority FCT 24 ranging to FCT27 and FCT 26b.

The limestone ridge in the south east has an area of *Banksia sessilis* Open Tall Scrub – Tall Shrubland, over *Melaleuca systena* and Mixed Shrubs that may also be FCT 24, but that population is isolated and not required to support the potential FCT26a. It is therefore included in the area proposed for excavation. See Figure 4.

The vegetation communities on the propsed excaation area

- *Allocasuarina fraseriana* Low Woodland - Open Low Woodland, with a few *Nuytsia floribunda, Eucalyptus gomphocephala* and *Eucalyptus todtiana* low trees, over *Banksia sessilis – Xanthorrhoea preissii – Hakea trifurcata - Allocasuarina humilis* Shrubland, over *Hibbertia hypericoides* Open Low Heath, over *Desmocladus fasciculatus* and *D. flexuosus* Sedgelands to Open Sedgelands.

- *Banksia sessilis* Open Tall Scrub – Tall Shrubland over *Calothamnus quadrifidus* Open Low Heath – Open Low Shrubland (with *Grevillea vestita* in the south) containing weedy grasses and a few *Hakea trifurcata, Mesomelaena pseudostygia* and *Banksia sessilis* plants.

- *Banksia sessilis* Open Tall Scrub – Tall Shrubland, over *Melaleuca systena* and Mixed Shrubs (with *Xanthorrhoea preissii, Banksia sessilis, Hakea trifurcata*) Shrubland to Open Heath, over *Melaleuca systena - Hibbertia hypericoides* Open Low Heath with some stands, *Desmocladus flexuosus, Hypochaeris glabra, Grevillea preissii, Dianella revoluta, Melaleuca huegelii* and *Acacia rostellifera* plants.

- *Xanthorrhoea preissii* Shrubland to Open Tall Scrub, often with *Banksia sess*ilis, or other shrubs over pasture and exotic species.

- *Eucalyptus decipiens* Low Woodland to Open Woodland over *Banksia sessilis - Xanthorrhoea preissii – Allocasuarina humilis* Shrubland to Open Shrubland over *Hibbertia hypericoides* Open Low Heath – Open Low Shrubland containing grasses and other established alien species

- Cleared land being open excavation or pasture
- Previously cleared land that was sown to pasture but now has some scattered native vegetation regrowth.

The areas excluded from excavation include the potential FCT 26a and the Tuart Open Forest – Woodland that is effectively parkland pasture.

Species

A total of 168 species and taxa were recorded by Arthur Weston, 2015.

No Priority or Threatened species or taxa were recorded.

Two small populations of Bridal Creeper (*Asparagus asparagoides)* were recorded. This is a Declared Weed. See Appendix 1.

Closure and Revegetation

At the end of excavation the quarry and processing areas will be progressively rehabilitated to parkland pasture with local native species around the perimeter, in vegetation corridors and buffers as shown in Figure 5.

Land restoration and rehabilitation is addressed in Section 9.0 Mine Closure and Rehabilitation.

Land Clearing

Clearing is controlled under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004.* These regulations provide for a number of principles against which clearing is assessed.

	CLEARING PRINCIPLE *(Schedule 5 Environmental Protection Amendment Act, 1986*
1a	*High Level of diversity*
1b	*Significant fauna habitat*
1c	*Necessary to existence of Rare flora*
1d	*Threatened Ecological Community*
1e	*Significant area of vegetation in an area that has been extensively cleared*
1f	*Wetland or watercourse*
1g	*Land degradation*
1h	*Impact on adjacent or nearby conservation areas*
1i	*Deterioration of underground water*
1j	*Increase flooding*

A Clearing Permit CPS 3003/1 was previously issued until 7 June 2014.

A new Clearing Permit will be applied for once Planning Approval has been obtained. The manner of clearing is addressed in Section 9.0 Mine Closure and Rehabilitation.

Fauna

The amount of fauna is dependent on the amount and quality of the habitat. Fauna can be expected to be restricted in the previously cleared and currently cleared areas.

Examination of fauna studies conducted nearby and from databases of Department of Parks and Wildlife and those covered by the *EPBC Act 1999* show that the most significant fauna to potentially be impacted are Black Cockatoos, which have been recorded in the general area. These are listed on State (under the *Wildlife Conservation Act 1950*) and EPBC conservation databases. On the State database the taxa are listed in Schedule 1 as "Fauna that is rare or is likely to become extinct". See Appendix 1.

The potential impacts are for temporary loss of 9.0 hectares of feeding habitat.

Black Cockatoos will be protected by a number of methods.

- There will be a gradual excavation and rehabilitation to local native species and parkland pasture. See 9.0 Mine Closure and Rehabilitation Plan. It is not anticipated that any enlargement of the current open ground will be required, but rather the area of open ground will move across the site as land is opened and land is rehabilitated.

- Local species known to be suitable for food will be included in the rehabilitation. These normally take in the order of 5 years to produce flowers and seeds and this, combined with the native vegetation to be retained, should enable the site still to be used by Black Cockatoos both during and at the completion of excavation.

- The potential impact on Black Cockatoo feeding habitat is addressed under Clearing Principle 1a during the assessment of a Clearing Permit. With a potential disturbance to 9.0 ha of Black Cockatoo feeding habitat, referral to the Commonwealth under the *EPBC Act 1999* will be required. The potential impacts on habitat and any offsets will be de eloped and conditioned on approvals issued under the Clearing Permit and *EPBC Act 1999*. See Appendix 1.

Wetlands

There are no wetlands on site. The closest wetland is Lake Nowergup, 700 metres to the west.

Groundwater flow is east to west.

A groundwater and fuel management plan is proposed to minimise and mitigate risk of liquids entering the system. See Appendix 3.

8.2 Water Management

A separate Water Management Plan is attached as Appendix 3

The extraction of limestone is a chemically free operation with the only liquids used being lubricants for machinery. Extractive Industries are one of the few industries permitted to operate in Groundwater Source Protection Areas provided a 3 metre vertical buffer is in place.

Apart from lubricants, excavation methods are very clean with no chemicals being used. The same methods are to be used that have not resulted in any adverse spills or impacts.

Non essential or old plant and materials will be removed from the site. Locked gates and the existing fences will be maintained to prevent illegal dumping and contamination of water.

All major servicing of vehicles will continue to be conducted off site. Wastes generated on site will be collected and removed off site regularly to an approved landfill site. Regular inspections (at least weekly) will be conducted to ensure no wastes, litter and the like are present in or around the excavation area.

Vehicle and plant washdown will be required.

Fuel will not be stored on site.

8.3 Atmospheric Pollution and Noise

Visual Management, Dust and Noise Management are identified as potentially being a low risk that requires management.

There have no changes to the local land uses and setbacks to the closest residences within the last five years.

Buffer distances to the closest dwellings are proposed to be a minimum of 400 metres, with the closest dwelling being to the south west, associated with an intensive animal production (poultry?) facility. The majority of the excavation will be significantly further away from dwellings. Other dwellings are over 500 metres away.

There have not been any known complaints during the past five years in relation to the operations.

There are comprehensive management actions and commitments in place to manage potential visual noise and dust impacts.

The risks and management are described in the Atmospheric Management Plan attached as Appendix 2.

9.0 MINE CLOSURE and REHABILITATION

9.1 Land Use Policies

The site is located on Lots 101 – 104, McLennan Drive and Godel Road, Nowergup.

The land is zoned Rural – Resource.

The site is covered by SPP 2.4 Basic Raw Materials Policy as a Priority Resource.

9.2 End Use

The extraction areas will be returned to agriculture production as pasture and native vegetation.

At the end of excavation, any overburden will be used to backfill the site in compliance with the safety considerations of the *Mines Safety and Inspection Act 1994* and the requirements and guidelines of the Department of Mines and Petroleum; For example *Guidelines on Safety Bund Walls Around Abandoned Open Pits 1991.*

9.3 Mine Closure Considerations

The extraction of limestone and sand is seen as an interim use prior to a return of the area to local native species, in areas of native vegetation with parkland pasture in previously cleared areas, enabling a final end use of rural living or alternative compatible use.

At this stage the most appropriate end use is to restore the surface to be visually compatible with the surrounding rural land surface.

No sequential land planning can be made because the future use is not known. Therefore the most appropriate end use is to restore the existing cleared and parkland pasture land with native vegetation around the perimeter and in strategic locations. Thiis would enable semi-rural land uses and rural uses. Any other use will require rezoning of the land. Even so the proposed revegetation would be suitable for rural living if rezoning was to occur at some point in the future.

The land to the south is currently being excavated for limestone. Market gardens and poultry farms are located to the south west and east and a small horticulture activity is located to the north east.

Rehabilitation will be directed towards revegetation to parkland pasture and local native species.

Rehabilitation will contain Dieback and Weed Management in addition to monitoring and replanting failed areas.

Appropriate topsoil management is seen to be an important element in achieving successful rehabilitation and plant re-establishment on the restored surface.

Rehabilitation will progressively follow mining, with completed areas of the excavation being revegetated as soon as practicable.

Rehabilitation is to take place during the first winter months to minimise compaction effects.

The site specific issues that relate to this site are also listed to explain how this site compares to the general rehabilitation guidelines.

9.4 Rehabilitation Objectives

The aim of the rehabilitation program is revegetation to parkland pasture and local native species suitable for a range of land uses.

The concept excavated floor is proposed to be a minimum of 30 metres AHD rising gently to the surrounding land surface with batter slopes of 1 : 4 vertical to horizontal.

The final land surface will be smoothed to be compatible with the existing natural landform of the area.

1. Quarry faces will be checked for stability and any substandard faces will be made safe to Department of Mines and Petroleum standards.

2. As the limestone is porous there will be no need for upslope contour or diversion banks to prevent water entering the void. Similarly there will be no need for drainage works on the floor of the void.

Revegetation activities will be integrated into the excavation and land clearing process. The process of collecting local seed and the direct return of topsoils for use in rehabilitation will be pursued wherever possible in order to maintain vegetation provenance. Because of the nature of the timing of the operation there may be a need to liaise with nearby operators to swap topsoil if there are no on site areas on which to directly place the topsoil.

Appropriate topsoil management is seen to be an important element in achieving successful rehabilitation and plant re-establishment on the restored surface.

Completion criteria – See Figure 5 for the locations

- Stable post-mining landscape, and the minimisation of wind erosion.

- Provide for the protection of the local groundwater resource in terms of both quality and quantity.

- Achieve weed species at levels not likely to threaten the native species.

Parkland Pasture

- Provide a self sustaining cover of parkland pasture on existing cleared areas, and local native groundcovers, shrubs and trees on areas of native vegetation to be cleared. See Figure 5.

- Achieve clumps and belts of trees and shrubs at 50 per hectare in the parkland pasture areas.

Native Vegetation

- Achieve plant density of 1 native plant per 3 m^2 in native vegetation rehabilitation at three years.

- Achieve a species richness of 10 native species per 100 m^2 in native vegetation rehabilitation at three years.

Depending on the success of rehabilitation, evolving community standards, and new research, the completion criteria may be adjusted to reflect emerging trends and also adjusted in terms of cover and species richness, depending on the results achieved and emerging technologies or techniques.

Vegetation Clearing

Appropriate topsoil and overburden recovery and management is seen to be an important element in achieving successful rehabilitation and plant re-establishment on the restored surface.

9.5 Rehabilitation Procedures

Vegetation Clearing

1. The site is a mixture of native vegetation and previously cleared areas and parkland pasture.

2. A Clearing Permit will be required and is to be applied for concurrently. Referral to the Commonwealth will be made under the EPBC Act 1999.

3. Pasture will be taken with the topsoil.

4. Seeds and other genetic material will be collected from native vegetation if suitable areas are available for rehabilitation. This will assist in the preservation of genetic material, such as on batter slopes and in green belts.

5. Where practicable vegetation will be directly transferred to a batter slope or other area being rehabilitated. Smaller indigenous shrub material will be used in the rehabilitation process when available and suitable, for example on the batter slopes of worked out areas. It will be laid on re-formed slopes to reduce wind and water erosion as well as provide a source of seeds for revegetation.

6. If direct transfer is not possible the vegetation will be stored in low dumps to 1 metre high or swapped with a nearby operator to try and ensure that the material is not wasted.

Removal of Structures

1. All buildings, fixtures and other structures, equipment and machinery not required for future land uses will be removed from site.

2. Buildings will be removed, hard stand, structures metal, fences, buildings concrete pipes and the like will be removed unless they are integral to future land uses as part of sequential planning.

3. The floor will be retained as gently sloping, installed with a sediment settlement sump.

Landform Reconstruction and Contouring

1. The floor will be deep ripped with the faces of the pit battered down and backfilled to generally 1 – 4 vertical to horizontal. The excavation area and slopes will contain some rock to simulate natural conditions and will be planted with local native species. The pit floor will be undulating at less than 1: 8 vertical to horizontal.

2. The site will be left safe at the end of excavation, to Department of Mines and Petroleum Standards for the abandonment of quarries.

3. The land surface will be formed to the requirements of the *Mines Safety and Inspection Act 1994 and Regulations 1995* as a final land surface.

4. To achieve this the brow of faces will be "knocked off", most likely by small explosive charges. Loose rock would then be pushed into the void from above.

5. Additionally blocks and overburden on the floor of the pit will be pushed back to the face to fill the void.

6. A bulldozer would then be used to push down overburden from above, pushing it down across the broken blocks and backfilled blocks.

7. A minimum of 300 mm of overburden will be spread over the surface where available to provide a substrate for agricultural soils, followed by topsoil.

8. Experience by Landform Research on limestone rehabilitation on mining leases north of Wesco Road is that good revegetation can be achieved by planting into soft overburden and deep ripped limestone floor, if suitable local species are used.

Topsoil and Overburden Removal Replacement

1. Where possible topsoil and overburden will be directly transferred from an area being cleared to an area to be rehabilitated. This will retain the organic carbon fraction, improving soil properties such as resistance to water and wind erosion and moisture retention.

2. Topsoil will be spread directly from an area being cleared where possible, otherwise reclaimed from a topsoil dump.

3. Overburden, when available, will be pushed to the northern and western perimeters to assist with visual and noise screening. From there it can be used for the rehabilitation process.

4. Where possible topsoil clearing and excavation will be undertaken in wetter months.

Vegetation Establishment

- ***Pre-Planting/Seeding Weed Control***

Pre-seeding weed control is only likely to be required where topsoils are used that contain weed species such as in the existing parkland pasture areas.

If required, this is normally only conducted after overburden and topsoil have been spread and any seeds have been allowed to germinate. Broadscale weed treatment can be detrimental to the germination and growth of native species but may be required if the weed load is to be reduced.

In May, after the first autumn rains, check for grass germination. Where grass has the potential to inhibit rehabilitation, such as areas to be returned to native vegetation, use a licensed contractor to spray with Fusillade or other suitable herbicide. In areas of parkland pasture, grass cover is desirable.

1. Any weeds likely to significantly impact on the rehabilitation will be sprayed with Roundup or similar herbicide or grubbed out, depending on the species involved. Weed affected topsoil and overburden will be buried. The Weed Management Plan will form the basis of weed treatment. Depending on the nature of the planting substrate, a broad spectrum spraying program may be used. In areas where grass only is a potential problem, grass specific sprays will be used. In some areas where topsoil from cleared native vegetation is available no spraying may be required.

2. See Appendix 1 for Weed and Dieback Management Procedures.

Revegetation

Steeper slopes, batters and areas of native vegetation. See Figure 5

1. Italia will spread any vegetation, plus leaf, root and organic matter collected from the land clearing procedures. This will increase the total organic carbon fraction, improving soil properties such as resistance to water and wind erosion and moisture retention. The difference in properties between existing topsoil and subsoils is not considered a major impediment to rehabilitation of native species in the area.

2. Topsoil will be re-distributed in rehabilitated areas to depths of 50 mm where available. Whilst burning is not always practicable the mixing of topsoil with ash and charcoal from burnt vegetation has shown a demonstrated improvement in the germination of local native species by triggering some species that do not normally germinate and by increasing germination rates. (Landform Research at Pickering Brook Gravel Quarry).

3. Topsoil provides a useful source of seed for rehabilitation when the correct handling of the topsoil is used, stripped and replaced dry (autumn direct return). Maximum depth of 50 mm can be used to optimise revegetation of species-rich plant communities.

4. Studies have shown that topsoil stripping and placement is best undertaken in summer for maximum germination, but this raises the potential for additional dust generation from the fine humus particles.

5. Topsoil will be spread directly from an area being cleared where possible, otherwise reclaimed from a topsoil dump.

6. Topsoil will be spread at depths of 50 mm and should be spread during summer, preferably by the end of February.

7. Rehabilitation will take place during the first winter months following the restoration earth works of each particular section of quarry. Leaving the completed earth works for one season will reduce the success of rehabilitation by at least 50%, due to compaction effects.

8. Local provenance seed will be collected from the site or purchased from commercial seed collectors. Tube plants are also desirable because they reduce the risk of failure by providing a third method of establishment;

   - topsoil spreading
   - seed spreading
   - tube plants

   A species list is attached.

9. A combination of the three methods is always preferred by Landform Research and has proven to be the most versatile and successful. The amount and species of additional seed and tube stock depends on the quality and seed store within the topsoil, and may vary from stage to stage.

10. Seeds of indigenous species will be scattered during late summer at the rate of approximately 1 - 2 kg seeds per hectare if required.

11. Seeding conducted in summer will use scarified leguminous seeds that have been "dry smoked". Seeding conducted in July to August will have the leguminous seeds heat treated and all seeds will be smoke treated by soaking in "smoke water" for 24 hours prior to seeding.

12. Seed spreading will be achieved either using mechanical seed dispersal equipment or using manual methods. Bulking with a spreading agent such as sawdust, vermiculite or sand is desirable.

13. Plant additional tube plants of local native species per hectare, at rates of 200 – 1 000 in June in the areas of native vegetation, depending on the quality of the topsoil and its potential weed load.

14. Use a 10 g tree tablet or small handful of fertiliser beside each tube plant.

15. Rehabilitation will progressively follow mining with completed areas of the excavation being revegetated as soon as practicable.

- ***Pasture and Parkland Areas***

1. The preferred method of revegetation is to use the pasture seed from existing topsoil on pasture areas. However this may be deficient and additional seed is likely to be required.

2. Topsoil will be spread to increase the total organic carbon fraction, improving soil properties such as resistance to water and wind erosion and moisture retention.

3. Topsoil provides a useful source of seed for rehabilitation when the correct handling of the topsoil is used, stripped and replaced dry (autumn direct return).

4. However if sufficient seed is not available or does not germinate then additional seed will be added. The establishment of pasture, including the selection of the pasture species is appended to this Management Plan. The documentation is produced by the Department of Agriculture and Food.

5. For pasture land in this situation it is essential that the species are matched to the soil types and rainfall. The location falls into the "High Rainfall Coastal" planting regime with sandy to loamy gravel soils. Suitable perennial legumes include Birdsfoot trefoil, Lucerne, Strawberry Clover, and Sulla. Perennial pasture includes Perennial Ryegrass, Phalaris, Cocksfoot, and Summer Active Tall Fescue, Kikuyu and Rhodes Grass. Annual pasture species include Italian Ryegrass, Serradella, subterranean clover.

6. The actual species used will be determined by the individual season, nature of the rainfall in the preceding months and stocking/hay production proposed by the landholder which may change from time to time.

7. Seeding rates are 2 – 5 kg/ha depending on the species used; for example Ryegrass is seeded at 3 kg/ha whereas Rhodes Grass is seeded at 4 kg/ha.

8. Studies have shown that topsoil stripping and placement is best undertaken in summer for maximum germination, but this raises the potential for additional dust generation from the fine humus particles.

9. Any weeds likely to significantly impact on the rehabilitation are to be sprayed with Roundup or similar herbicide or grubbed out, depending on the species involved. Generally this has not been required in the past because the weed load is low. Pasture species may need to be sprayed with a grass specific spray such as Fusilade or a broad spectrum spray such as Glyphosate to reduce the competition with the revegetation.

10. If sufficient vegetation does not germinate from the respread top soil, the area will be seeded in early autumn with a mixture of pasture species. The species will be selected on advice from a consultant or the Department of Agriculture and Food.

Fertiliser

1. Fertiliser is not always required and will add nutrients to the ground water. If used a fertiliser containing low nitrogen, phosphorous and potassium, and trace elements, is recommended to be spread at rates of up to 100 kg/hectare, applied to rehabilitation areas in the year of planting. Nitrogen is provided by using leguminous seed in the seed mix.

2. Further investigation will be needed to determine suitable rates and the timing of fertilisation. It may be possible to integrate seed dispersal and fertilisation into a single pass. The fertiliser will need to supply macro-nutrients, phosphorus, nitrogen and potassium, and other micro-nutrients.

Irrigation

1. Experience by Landform Research in rehabilitation of quarries in Bassendean Sand and limestone has shown that, when completed well, there is no need for irrigation of the rehabilitation. It is cheaper to use additional seed than to install irrigation. For example irrigation was not used on rehabilitation on the adjoining lease which has had successful interim revegetation to local native species. Interim rehabilitation conducted on limestone on M70/339, located 2.5 km to the north east, is progressing well, demonstrating the potential for effective rehabilitation to be undertaken.

2. Also, water for irrigation is unlikely to be available because of reduced water allocations.

3. Should there be a high mortality rate in germinated seedlings after the first year, due to lack of water, the feasibility of providing irrigation will be investigated.

Erosion Control

1. Soil erosion occurs when soil is exposed and disturbed by wind or water. Erosion involves soil particles being detached from areas not adequately protected by vegetation, and moved down-slope. This is not normally a significant problem in limestone which crusts after the first winter.

2. The soils are very permeable and runoff is normally minimal unless surface materials become non-wetting. Even so experience shows that there is minimal non wetting and surface particle movement under such conditions.

3. Water erosion on the batter slopes can be avoided by the permeability of the materials and by leaving the surface soft, rough and undulating, with the undulations running along contour. The final machinery run should be along contour and not down slope.

4. Limestone, when subjected to rainfall, forms a crust that is impervious to further erosion unless disturbed.

5. Wind erosion will be controlled by rehabilitating the disturbed ground as soon as practicable.

6. If wind erosion and soil stability become an issue measures will be taken to stabilise the soils. These could include but not be limited to fence wind breaks, spray mulching, cover crops, interim native vegetation or spreading mulch and vegetation.

7. For rehabilitation areas, revegetation will take place as soon as possible following landform and soil reconstruction.

8. Cleared vegetation will be transferred from an area being cleared, to protect against erosion, assist with habitat creation and provide a seed source.

9. Control of wind erosion potential will be assisted by spreading brush and vegetation across the topsoil on the batter slopes and reconstructed soils where local native vegetation is to be established.

Monitoring

1. During late summer an assessment of the success of the rehabilitation will be made to determine the rehabilitation requirements for the following winter.

2. Monitoring includes visual assessments and, where necessary, counts to determine the success of the rehabilitation and restoration, as follows;

    - plant density
    - plant growth
    - plant deaths
    - regeneration
    - weed infestation

3. As necessary steps will be taken to correct any deficiencies in the vegetation.

4. Rehabilitation of each stage will be monitored for a period of three years to ensure that the revegetation meets the completion criteria of providing self sustaining indigenous shrub vegetation.

5. If rabbit damage is detected either place guards around the tube stock or bait using commercial baits laid under low concrete slabs. Kangaroos are difficult to control other than by culling but this is not desired. Normally impact from kangaroos is regarded as acceptable damage.

6. Provide ongoing weed management to identify and treat significant environmental weeds or weeds likely to impact on the rehabilitation.

7. Plants that have not survived are to be assessed to determine the number of replacement plants required. To this is to be added the number of additional plants required to be installed in the following winter to bring any deficiencies up to the completion criteria.

8. In areas of rehabilitation that do not meet the completion criteria measures are to be taken to increase the stem density to achieve the completion criteria. This could include but not be limited to;

    - additional seeding,
    - planting additional tube plants,
    - additional use of fresh topsoil.

Suggested Plant Species to be Used

The species identified in the Flora and Vegetation Study will be used. However not all of these will be commercially available and some will be returned through the use of local topsoil.

All species are suitable for seeding

X To form signficant portion of the species list
T Suitable as tube plant

PARKLAND PASTURE		
Trees and Shrubs	*Acacia rostellifera* *Banksia attenuata* *Banksia menziesii* *Eucalyptus foecunda* *Eucalyptus decipiens* *Eucalyptus gomphocephala* *Calothamnus quadrifidus* *Calothamnus sanguineus* *Jacksonia sternbergiana* *Jacksonia floribunda* *Melaleuca huegelii* *Melaleuca systena*	*Eucalyptus calophylla* *Allocasuarina fraseriana* *Banksia grandis* *Eucalyptus marginata* *Eucalyptus todtiana* *Xylomelum occidentale* *Hakea prostrata* *Hakea ruscifolia* *Hakea trifurcata* *Melaleuca thymoides* *Viminaria juncea*
NATIVE VEGETATION		
Tree/ Tall Shrub	*Acacia rostellifera* *Acacia saligna* *Banksia attenuata* *Banksia menziesii* *Eucalyptus foecunda* *Eucalyptus decipiens* *Eucalyptus gomphocephala*	*Eucalyptus calophylla* *Allocasuarina fraseriana* *Banksia ilicifolia* *Banksia grandis* *Eucalyptus marginata* *Eucalyptus todtiana* *Xylomelum occidentale*
Shrub	*Calothamnus quadrifidus* *Dryandra (Banksia) sessilis* *Grevillea preissii* *Jacksonia sericea* *Jacksonia sternbergiana* *Jacksonia floribunda* *Macrozamia riedlei* *Melaleuca huegelii* *Melaleuca systena*	*Hakea prostrata* *Hakea ruscifolia* *Hakea trifurcata* *Spyridium globulosum* *Xanthorrhoea preissii* *Melaleuca thymoides* *Nuytsia floribunda* *Viminaria juncea*
Understorey shrub / ground cover	*Acacia pulchella* *Acacia lasiocarpa* *Acacia cochlearis* *Leucopogan spp* *Hibbertia hypericoides* *Hibbertia racemosa* *Patersonia occidentalis* *Austrodanthonia occidentalis* *Austrostipa elegantissma* *Austrostipa flavescens* *Austrostipa occidentalis* *Conostylis aculeata* *Conostylis setosa* *Dampiera linearis*	*Bossiaea eriocarpa* *Hardenbergia comptoniana* *Haemodorum spicatum* *Hemiandra glabra* *Hovea trisperma* *Kennedia prostrata* *Lepidosperma squamatum* *Podotheca gnaphaliodes* *Scaevola canescens* *Trachymene coerulaea* *Anigozanthos humilis* *Anigozanthos manglesii*

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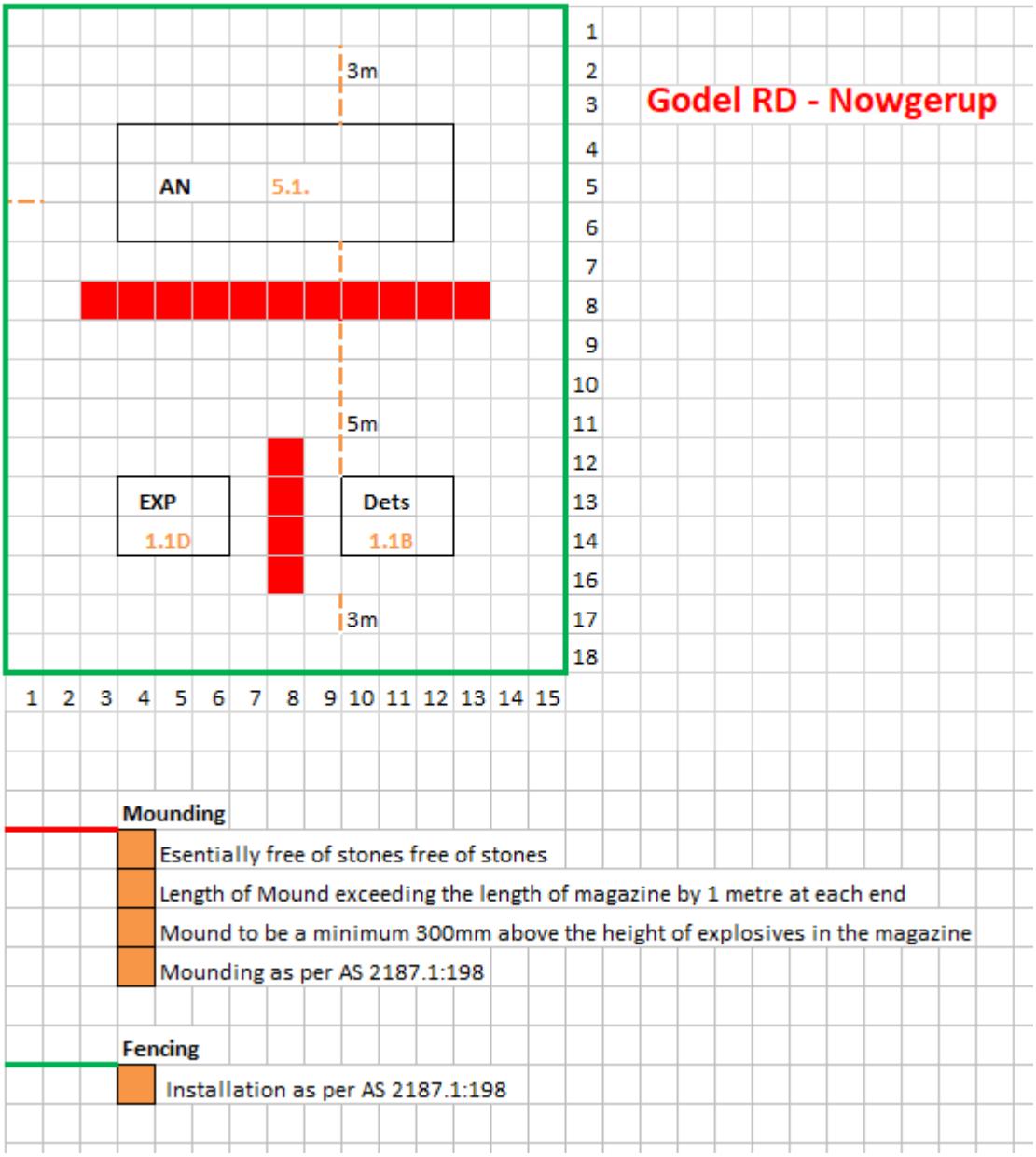
Explosives Compound

Location

Layout


Godel RD - Nowgerup
3m
AN
5.1.
5m
EXP
1.1D
Dets
1.1B
3m
Mounding
Esentially free of stones free of stones
Length of Mound exceeding the length of magazine by 1 metre at each end
Mound to be a minimum 300mm above the height of explosives in the magazine
Mounding as per AS 2187.1:198
Fencing
Installation as per AS 2187.1:198

Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**
Resources Safety

1 Adelaide Terrace, East Perth WA 6004
Postal address: Mineral House, 100 Plain Street, East Perth WA 6004
Telephone: (08) 9358 8001
Email: cso@dmirs.wa.gov.au
ABN 69 410 335 356

SECURITY SENSITIVE AMMONIUM NITRATE (SSAN) STORAGE LICENCE

Issued in accordance with the *Dangerous Goods Safety Act 2004* and regulations
GST Exempt – (Div. 81)

Chief Officer Ross Stidolph

Licence number SST000252
Date of issue 20/10/2017
Expiry date 20/10/2022

ITALIA STONE GROUP PTY LTD
55 MIGUEL RD
BIBRA LAKE WA 6163

Business name and address for inspection
ITALIA STONE GROUP PTY LTD
GODEL RD
NOWERGUP WA 6032

This licence authorises the holder to store security sensitive ammonium nitrate within Western Australia, in accordance with the application and any conditions, as specified below.

Storage

Name	Maximum physical capacity
AMMONIUM NITRATE	8000 KG

Technical conditions

Receipt

Licence no.	SST000252	Receipt no.	01-054056
Receipt date	20/10/2017	Amount	$152.00

Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**
Resources Safety

1 Adelaide Terrace, East Perth WA 6004
Postal address: Mineral House, 100 Plain Street, East Perth WA 6004
Telephone: (08) 9358 8001
Email: cso@dmirs.wa.gov.au
ABN 69 410 335 356

EXPLOSIVES STORAGE LICENCE

Issued in accordance with the *Dangerous Goods Safety Act 2004* and regulations
GST Exempt – (Div. 81)

Chief Officer Ross Stidolph

Licence number ETS002771
Date of issue 20/10/2017
Expiry date 20/10/2022

ITALIA STONE GROUP PTY LTD
55 MIGUEL RD
BIBRA LAKE WA 6163

Business name and address for inspection
ITALIA STONE GROUP PTY LTD
GODEL RD
NOWERGUP WA 6032

This licence authorises the holder to store authorised explosives within Western Australia in accordance with the application and any conditions, as specified below.

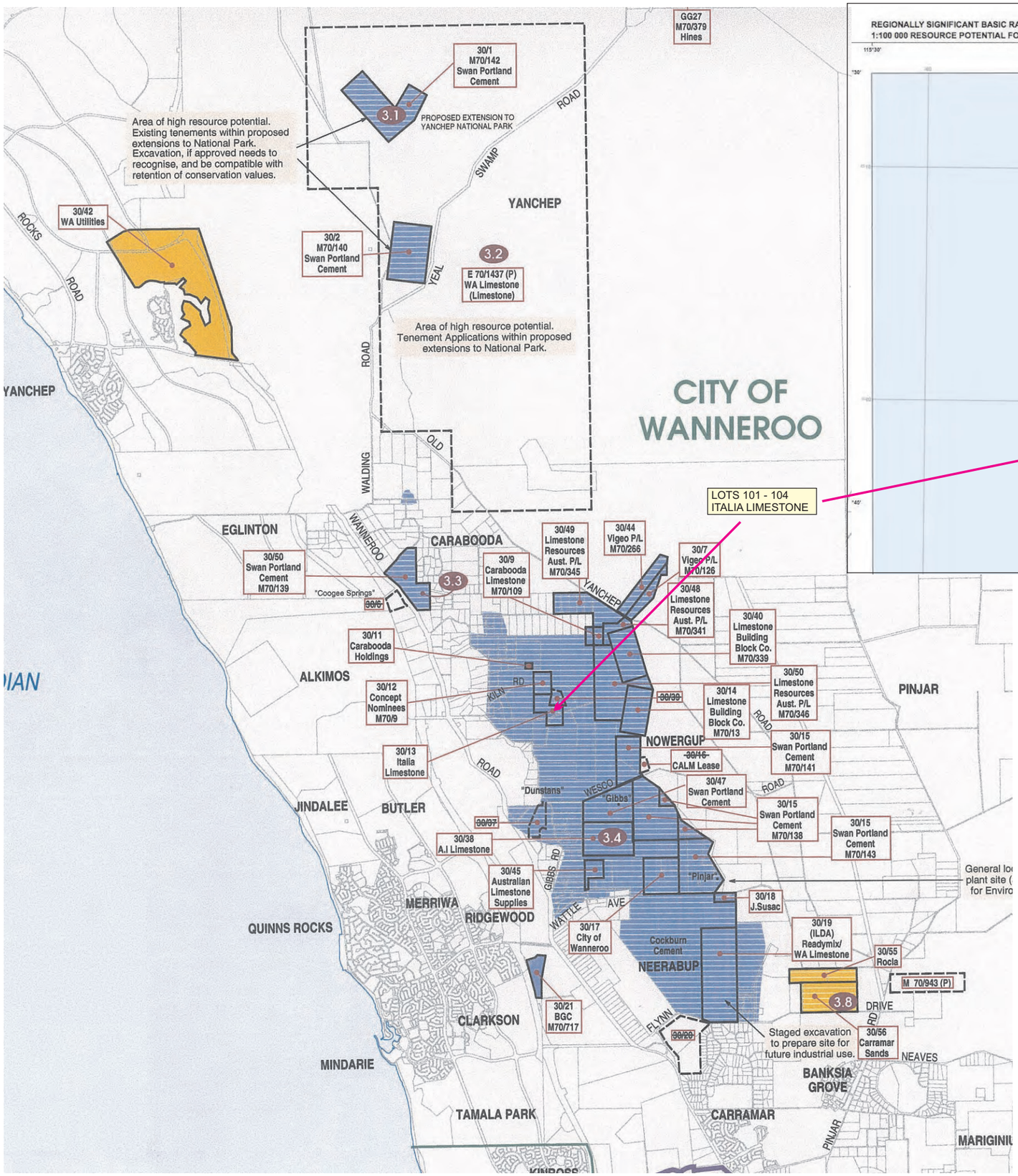
Storage

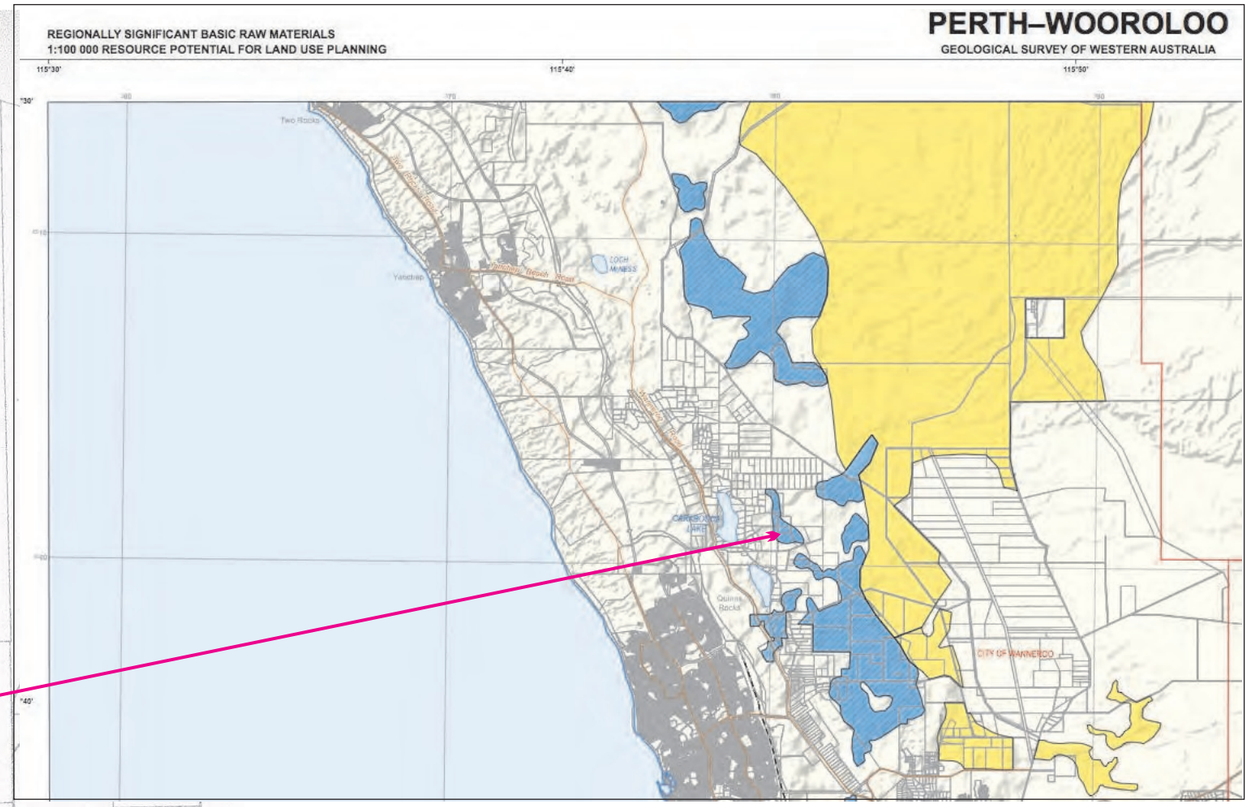
Magazine ID	Explosives type	Capacity NEQ	No. of detonators
NOWEXPO1	BLASTING EXPLOSIVES	1500 KG	
NOWDET01	DETONATORS		2000 EACH

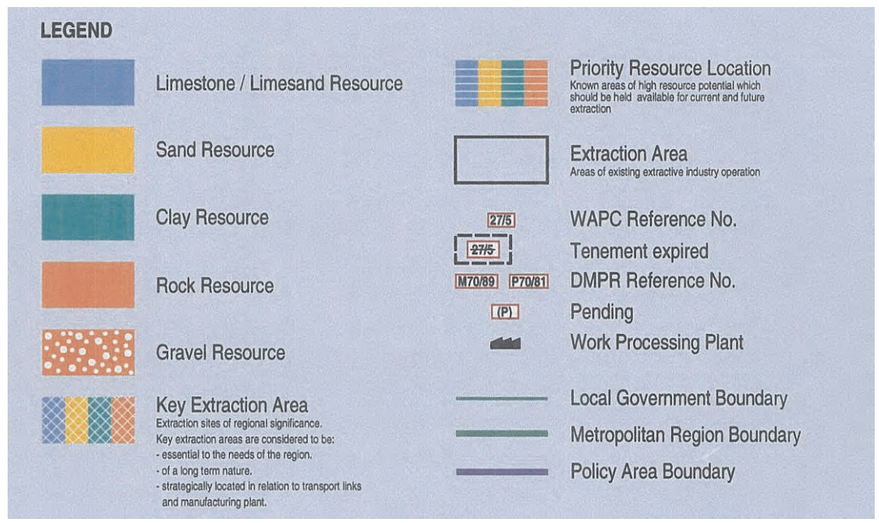
Technical conditions

Receipt

Licence no.	ETS002771	Receipt no.	01-054055
Receipt date	20/10/2017	Amount	$129.00







STATE PLANNING POLICY 2.4
LIMESTONE RESOURCES
RECOMMENDED FOR COMMUNITY USE

ITALIA STONE GROUP	
LOCATION and SPP2.4 LOTS 101 - 104, MCLENNAN DRIVE, NOWERGUP	
Landform Research	
Basemap SPP2.4	May 2015

FIGURE 1

Dwelling from aerial and ground

Proposed pit

ITALIA STONE GROUP PTY LTD	
SURROUNDING LAND USES 101 – 104 MCLENNAN DRIVE and GODEL ROAD	
Landform Research	APRIL 2018
Basemap NEARMAP	Scale See Plan

0 250 m

Figure 2

FUTURE SAND ERSOURCE NOT APPLIED FOR AT THIS TIME

Caretakers cottage for security purposes

LOT 101

LOT 104

LIMESTONE ROADBASE AND LIME

CURRENT LIMESTONE DIMENSION STONE PIT

SAND RESOURCE

LIMESTONE ROADBASE AND LIME

SAND RESOURCE

FACILITIES

LOT 103

LIMESTONE ROADBASE AND LIME

SAND AND LIMESTONE RESOURCE

SAND AND LIMESTONE RESOURCE

LOT 102

SAND RESOURCE

NEW LIMESTONE DIMENSION STONE PIT

LIMESTONE ROADBASE AND LIME

nearmap
current : clear : change

NEARMAP 2018

0 100 m

Power line

Proposed excavation footprint

Figure 3A

AUGUST 2018

Power line and posts

Shed

Dwelling

Internal access road used for mine training

Concept location of access road for quarrying

Fenced compound for vehicle storage and facilities

Perimeter fencing 1.2 metres high. sign posted in accordance with DMIRS requirements

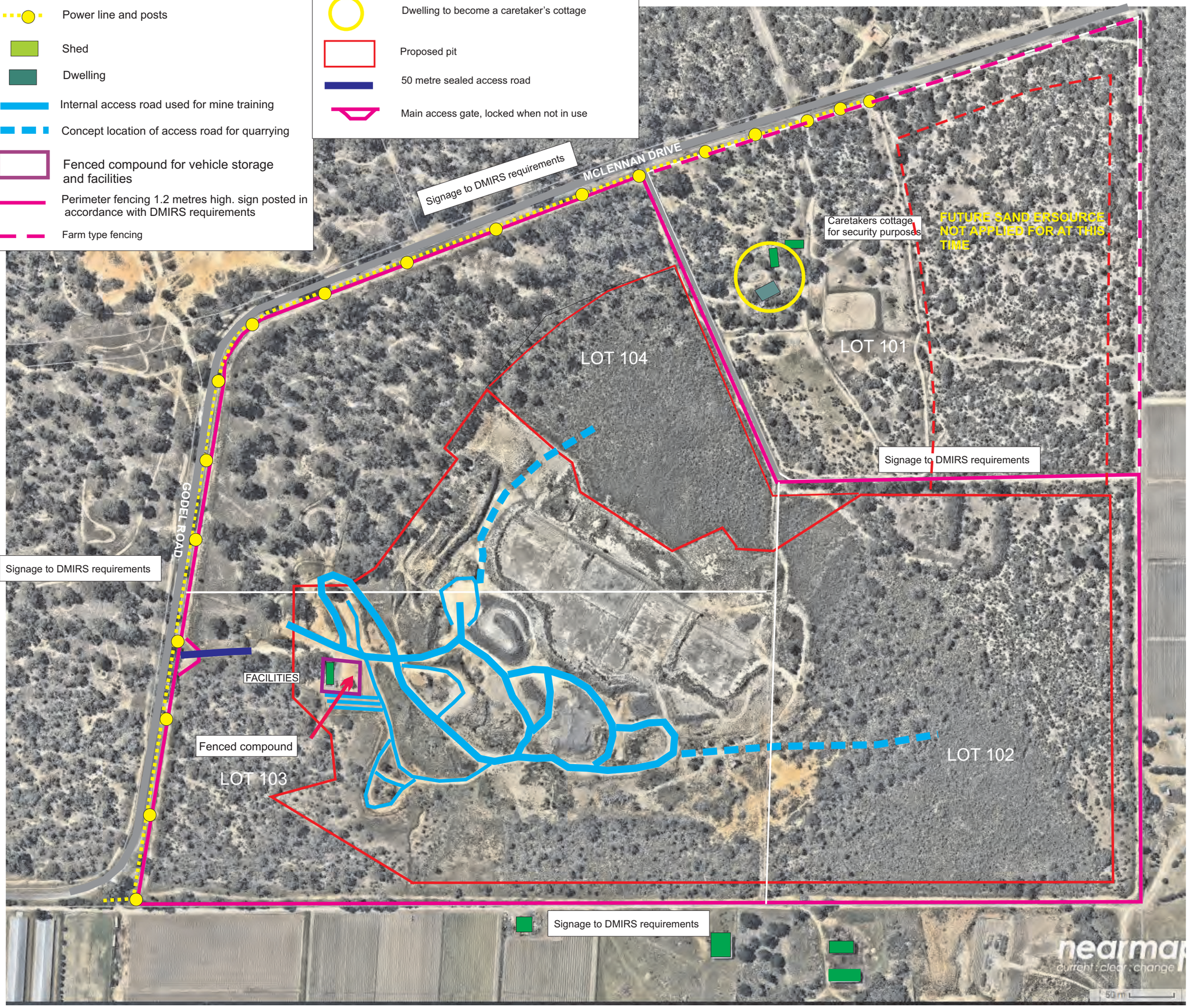
Farm type fencing

Dwelling to become a caretaker's cottage

Proposed pit

50 metre sealed access road

Main access gate, locked when not in use



0 100 m

FEATURE FOOTPRINT
See Figure 3C

NEARMAP

Figure 3B

AUGUST 2018

Signage off Godell Road north of entrance.
Note the elevated fence at this location.

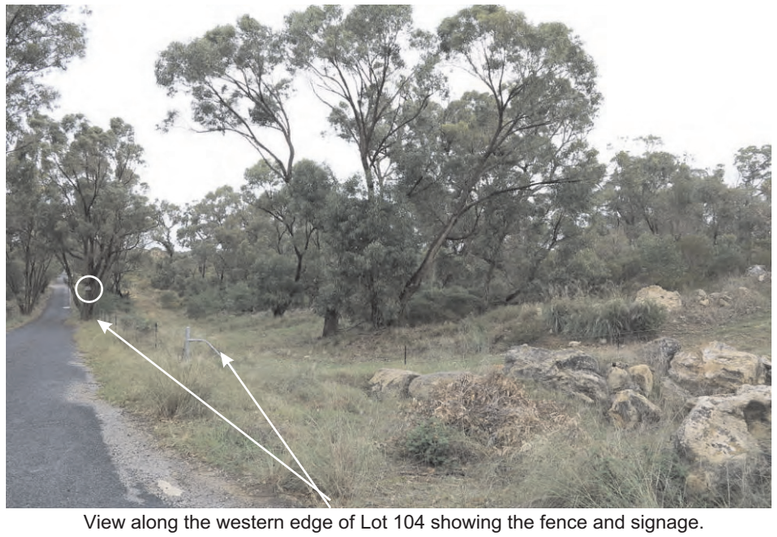
Signage at the entrance at Godell Road

Entrance gate from Godell Road showing locks and 1.8 metres high.

Fence and power line along Mclennan Drive. view west.

Fence at the eastern access road, with kangaroo gate for the free movement of wildlife

View south from the access road at Godell Road. Note the 1.8 metre fence at this location and power lines.



View along the western edge of Lot 104 showing the fence and signage.

1.8 metre high compound with security lights (S) and 4 transportable units (T) with shade roofs

FEATURE PHOTOGRAPHS
See Figure 3B

Figure 3C

McLENNAN DRIVE CONCEPT STAGING

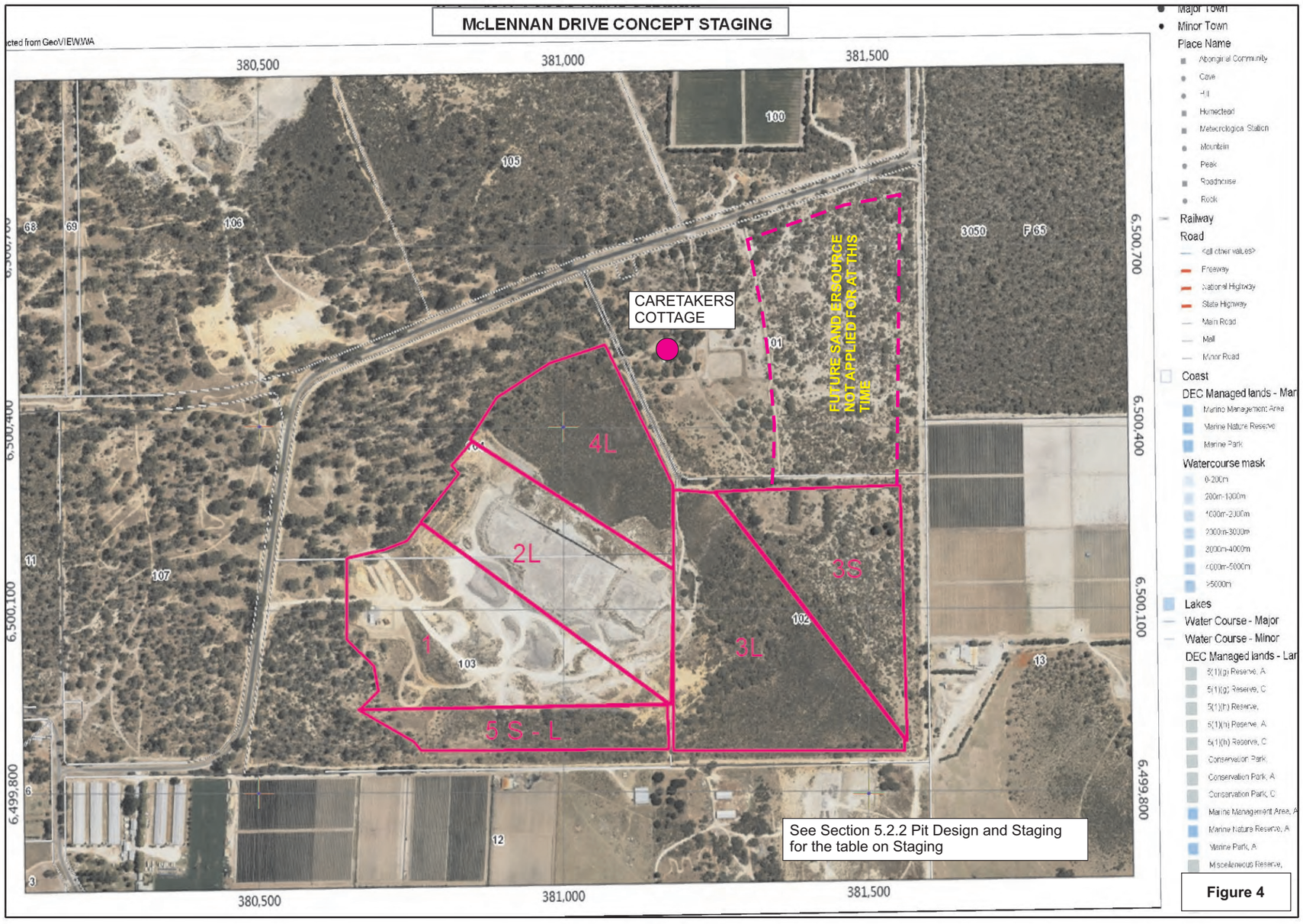


Figure 4

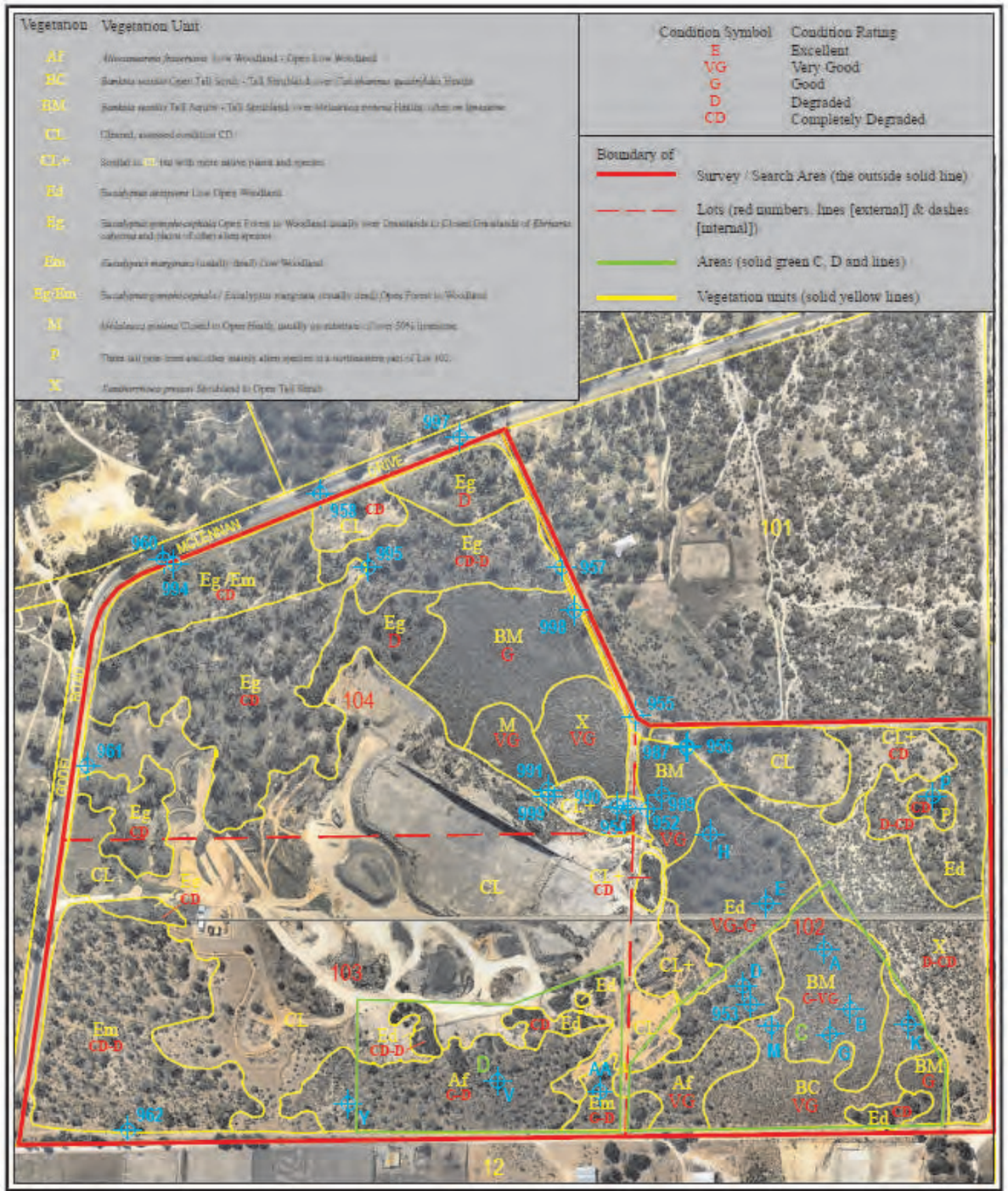


FIGURE 1 - VEGETATION UNITS

LOCATION & VEGETATION OF AREAS C & D AND OF LOTS 102 - 104 McLENNAN DRIVE & GODEL ROAD NOWERGUP

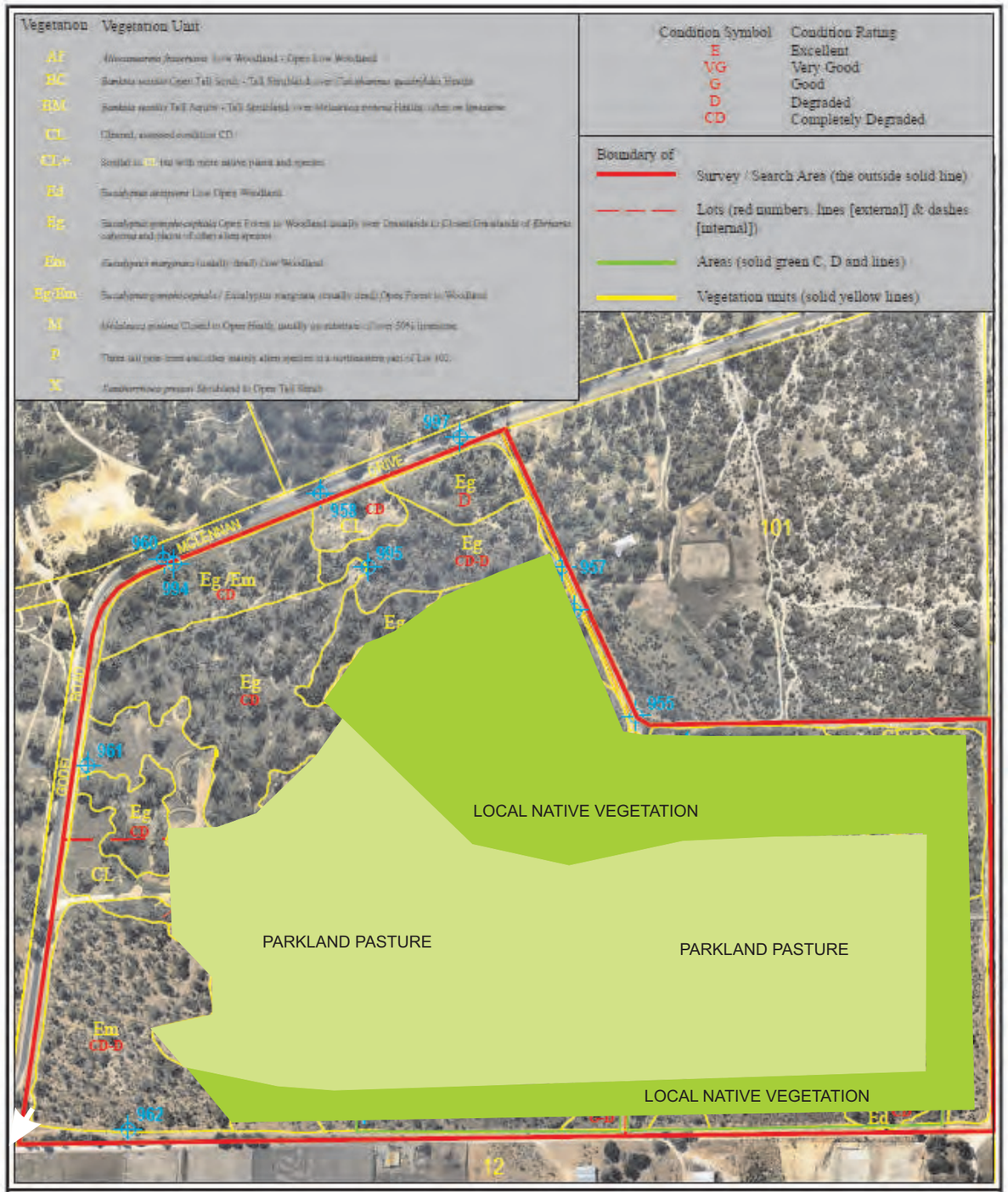


FIGURE 1 - VEGETATION UNITS

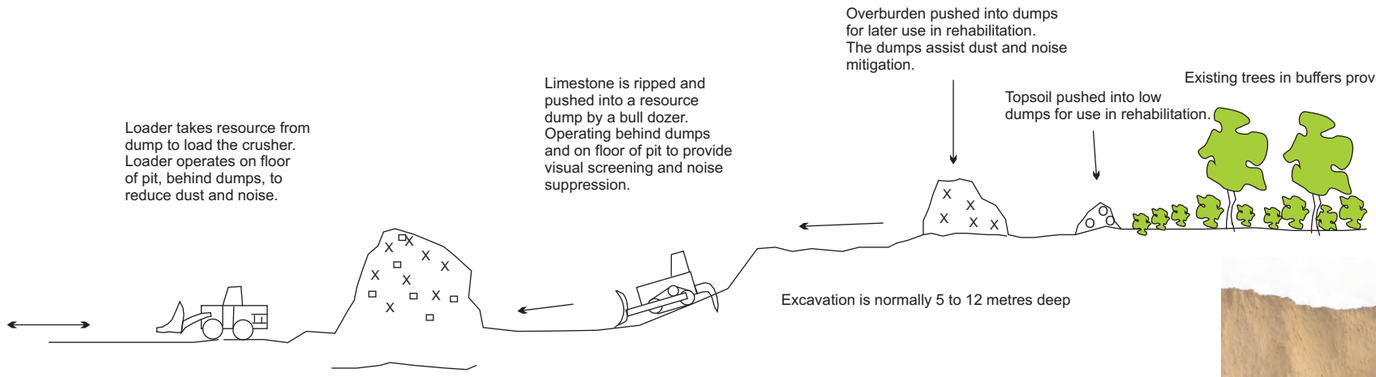
LOCATION & VEGETATION OF AREAS C & D AND OF LOTS 102 - 104 McLENNAN DRIVE & GODEL ROAD NOWERGUP

CONCEPT REVEGETATION PLAN

Figure 5

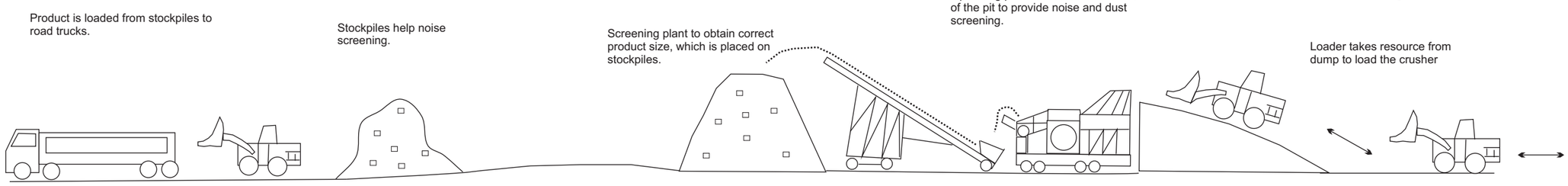
ROADBASE PRODUCTION

Bulldozer ripping and crushing limestone



Loader, loading limestone

ROADBASE PROCESSING



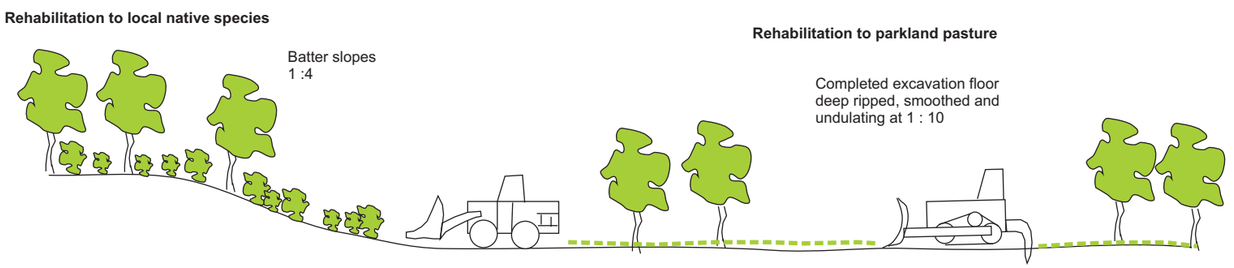
DIMENSION STONE PRODUCTION

Limestone block cutting

Various grades of limestone products

Mobile crushing plant

LAND RESTORATION

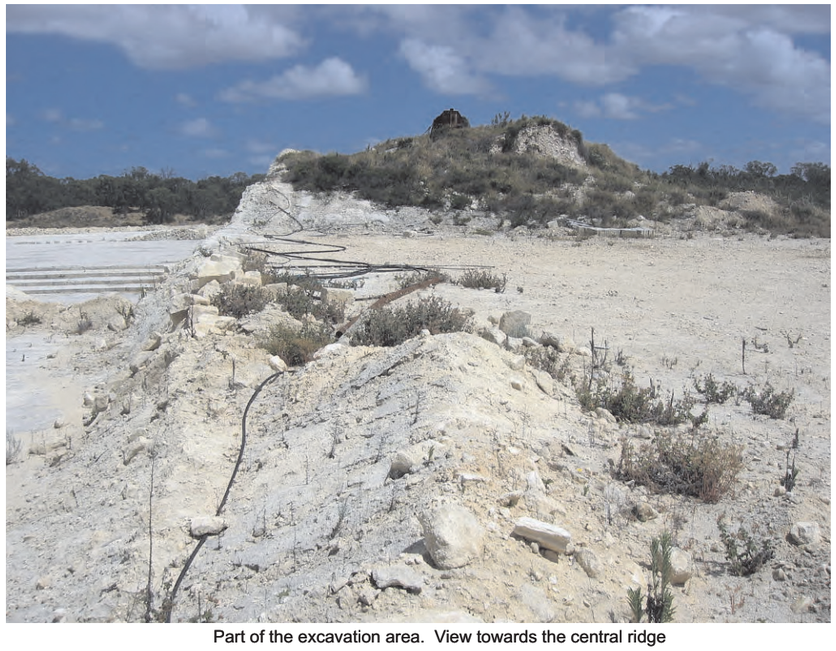


Landform Research

TYPICAL LIMESTONE EXCAVATION OPERATION - ITALIA STONE GROUP

Figure 6

Overview of the limestone quarry, showing the cutting floors. View west from the ridge



Part of the excavation area. View towards the central ridge

ITALIA STONE GROUP PTY LTD	
EXISTING YARD AND PIT 101 – 104 MCLENNAN DRIVE and GODEL ROAD	
Landform Research	April 2018
Basemap NEARMAP	Scale See Plan

Figure 7

ITALIA STONE GROUP PTY LTD	
EXISTING CONCEPT FINAL CONTOURS 101 – 104 MCLENNAN DRIVE and GODEL ROAD	
Landform Research	APRIL 2018
Basemap NEARMAP	Scale See Plan

0 100 m

LOT 101

LOT 102

LOT 103

LOT 104

NOWERGUP

McLennan Dr

Godel Rd

Figure 8