	PLANNING CONSENT APPLICATION.
Project Name:	**LOT 503 FLYNN DRIVE NEERABUP (PHASE 1 AREA)** **Planning Consent Application associated with Extractive Industries License**
Project Nº:	PC18027
Client:	LANDCORP
Prepared by :	PERITAS CIVIL PTY LTD

Cnr Goodwood Pde & Vivian St
Burswood WA 6100

PO Box 134
Burswood WA 6100

T 08 6336 9299
F 08 6336 9288

E enquire@peritasgroup.com.au
www.peritasgroup.com.au

Prepared by:	Enzo Biagioni-Froudist
Position:	Principal, Civil
Signed:	
Date:	28/03/2018

Approved by:	Enzo Biagioni-Froudist
Position:	Principal, Civil
Signed:	
Date:	28/03/2018

Peritas Group Pty Ltd
ABN: 56 165 417 407
74 Goodwood Parade
Burswood WA 6100

PO Box 134,
Burswood WA 6100

Telephone: +61 8 63369299

Facsimile: +61 8 63369288
Internet: www.peritasgroup.com.au

CONTENTS PAGE NO

LIST OF FIGURES

Figure No.

Typical Photos showing Facilities required for quarrying operations

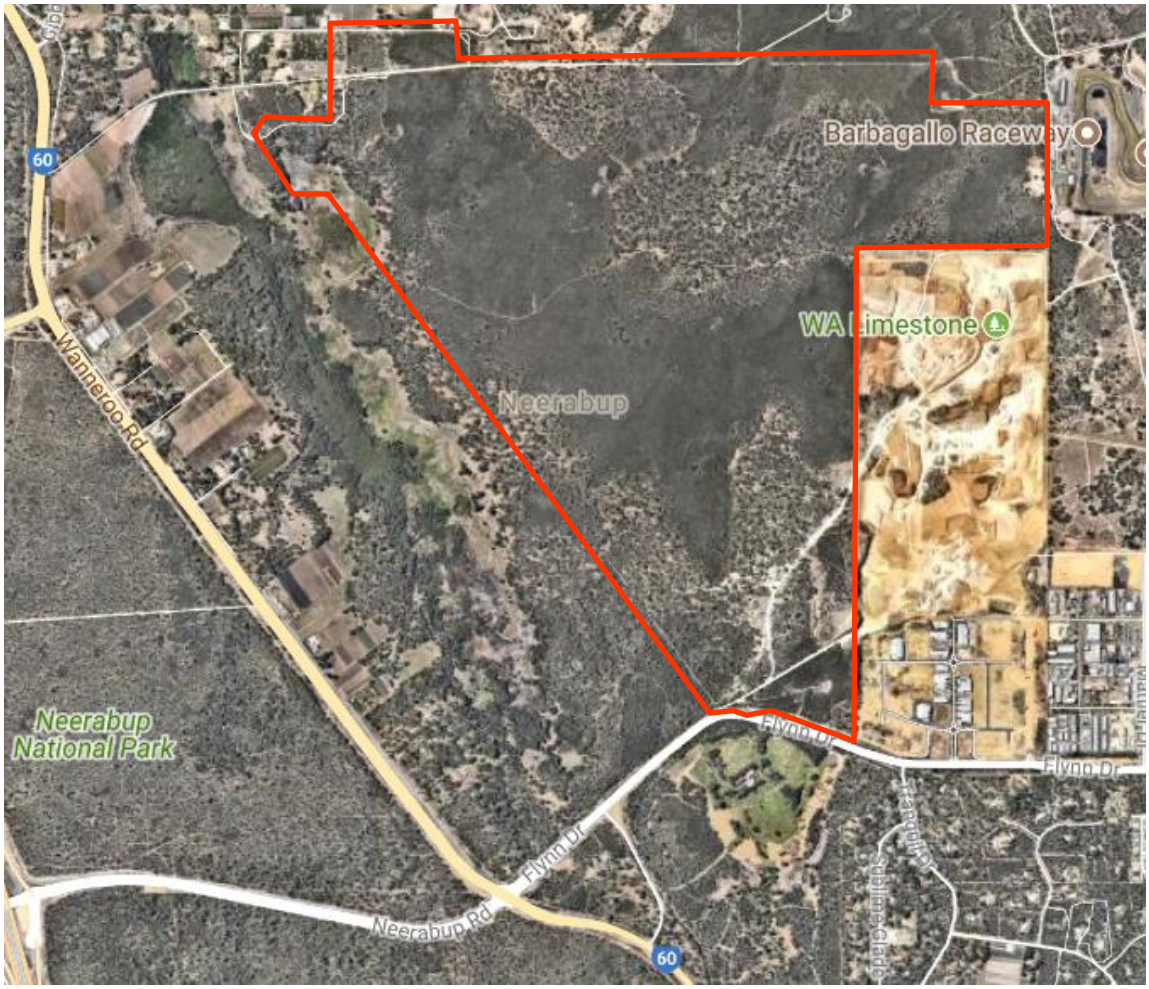
APPENDICES

1.0 INTRODUCTION

The West Australian Land Authority (LandCorp), owners of Lot 503 (formerly Lot 701) Flynn Drive Neerabup (Phase 1 clearing quarrying works, the subject of this application being a portion of **lot 503 on DP 409677**) seek approval for Planning Consent and Extractive Industries Licence to enable the extraction of limestone and sand resources from Phase 1 Lot 503 Flynn Drive, Neerabup.

This document details the requirements and makes application for the Planning Consent (DA Application). The extractive Industries Licence application is part of a separate document lodged separately and in conjunction with this application.

Figure 1 – Subject Site Location Plan

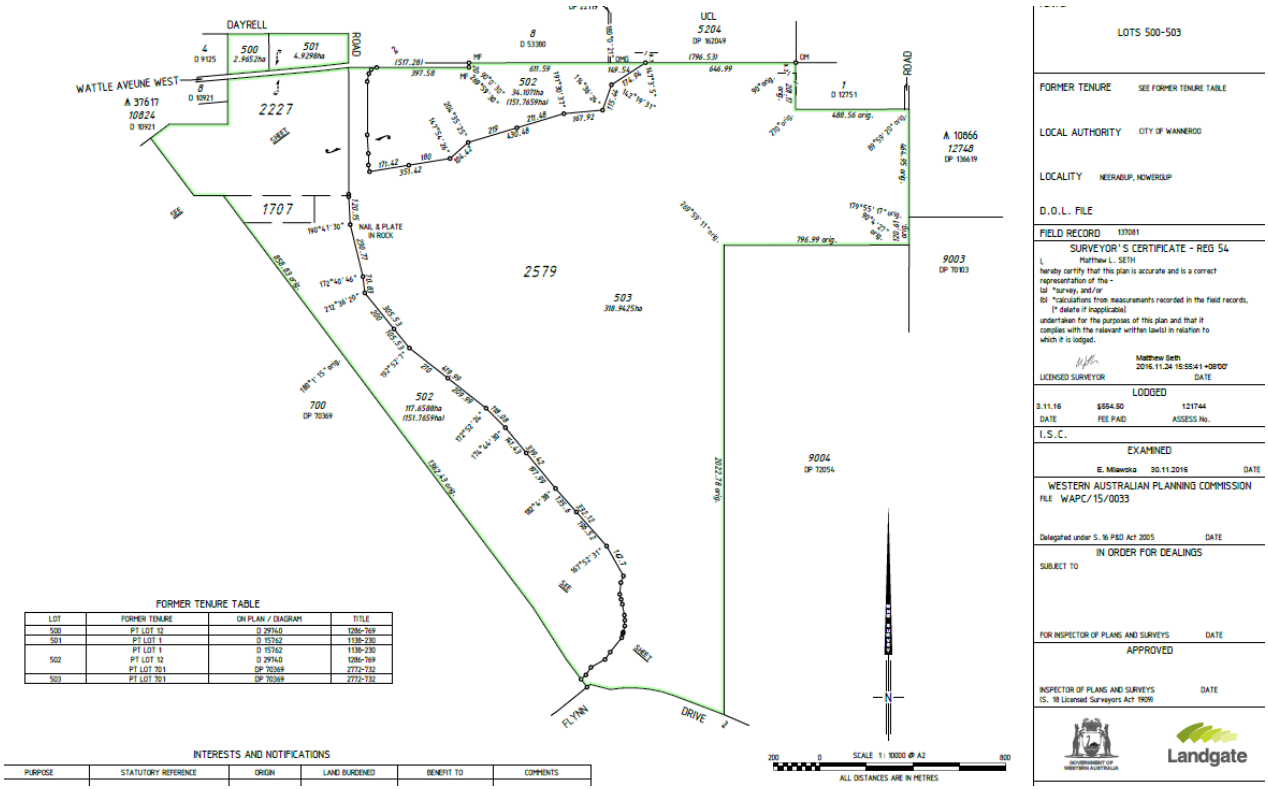


LandCorp purchased the subject land from Cockburn Cement in late 2010 with the intention of extending their existing quarrying and industrial development operations currently located to the east of the site (lot 22 Flynn Drive) where they have been operating a limestone quarry via a contracting agreement with an experienced quarrying group for over 25 years. The land forms part of the Neerabup Industrial Area which is strategically located within the North-West Corridor with excellent and future road linkages.

The subject land has been identified as a Priority Resource Location for sand and limestone and therefore Basic Raw Material Policy dictates that the area should be utilised for extraction of the resource prior to other land uses.

This application is for an Extractive Industries Licence for the Phase 1 development area (portion of Lot 503) as identified in Figures 2 & 3 which comprises some 93.4 hectares with an estimated resource of 15,000,000 cubic meters of sand and limestone resource.

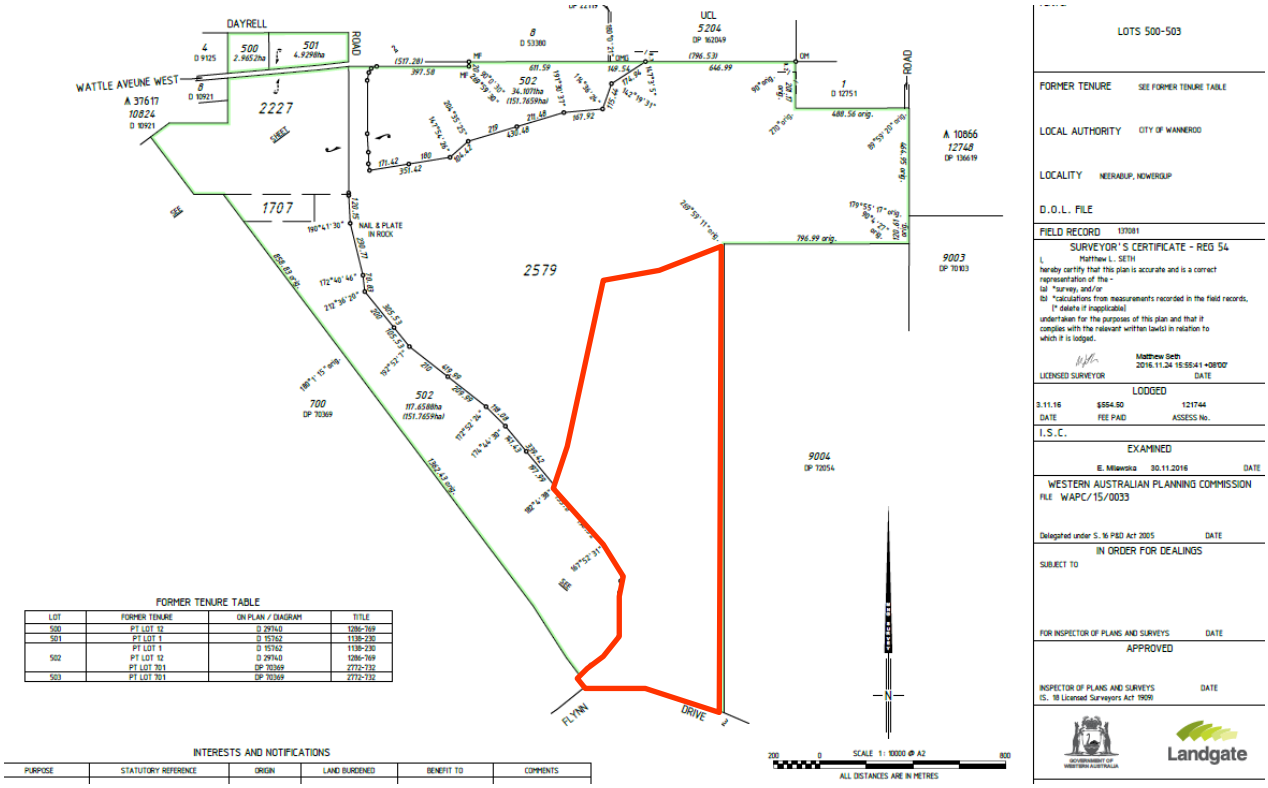
Figure 2 – Subject Lot location Plan – Lot 503



A clearing permit for the Phase 1 area within Lot 503 has been applied for via DWER (Refer to letter in **Appendix B**). The Department of Water and Environmental Regulation (DWER) has requested that a Development approval and extractive industries license be lodged and obtained from the City of Wanneroo before determining an application to clear the subject land as part of the environmental approvals for pre-mining activity.

The rate of extraction of the resource is anticipated to be some 600,000 to 800,000 tonnes per year.

Figure 3 – Lot 503 Phase 1 Application Area



The resource to be extracted will supply strategic sand and limestone resources to the north of Perth and the Perth Metropolitan Area.

The extraction of limestone and sand products from Phase 1 Lot 503 will be used to prepare the land surface to comply with the Neerabup Industrial Area Structure Plan No.17 ("**NIASP17**").

The proposal includes land restoration to progressively follow excavation as has been undertaken on the adjacent land holdings where to date the most southern 700 metres of the adjoining lot to the east (formerly Lot 22) has already been developed as industrial land.

The site lies in an important area of limestone resources that is strategic to the development of the Perth Metropolitan Area. The site is identified in Planning Policies such as Statement of Planning Policy 2.4, Basic Raw Materials as a Priority Limestone Resource.

The Phase 1 quarry operations areas are over 300 metres from the nearest dwellings at their closet location, however, initial mining operations will be at least 500m from any dwelling. The operations will be planned and designed to minimise visual, noise and dust impacts and progressively moving north away from the dwellings to the south and to the west of the site.

Proposed hours of operation will be from 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.

Perimeter bunds and strategic fences, combined with locked gates, will be maintained to prevent illegal entry. Warning signs will be maintained as required by the Department of Mines Industry Regulation and Safety and the City of Wanneroo.

No major complaints have been received in recent years in adjacent sites managed by LandCorp and regular monitoring of operations will be undertaken by the relevant regulatory authorities as experienced on the adjacent quarry sites.

APPROVAL SOUGHT

Approval is sought to remove the usable sand and limestone from Phase 1 Lot 503 for a period of 30 years to enable staged extraction, to comply with the proposed development of industrial land in line with the **NIASP17**.

1.1 Project Summary

ASPECT	PROPOSAL CHARACTERISTIC
EXCAVATION	
Total Resource Area (Phase 1)	93.4 hectares
Total disturbance area	93.4 hectares (Phase 1)
Total Area of Mining Footprint	93.4 hectares (Phase 1)
Sand-Limestone extraction	Up to 700,000 tonnes per year
Total estimated Resource	15 million BCM
Life of Project	>30 years
Area cleared per year	Average 3 – 5 hectares
Area mined per year	Average 2 – 3 hectares
Area open at any one time	20 plus hectares required including backfill to design
Dewatering requirements	None
Depth of excavations	10-20 metres
Native vegetation to be cleared	See attached DWER letter
PROCESSING	
Sand and Limestone	See excavation rate above
Water requirements	Supplied by existing Groundwater Extraction License estimated usage 12,000 kL per year
Water supply source	Supplied by a new bore to be constructed with approval from DWER
INFRASTRUCTURE	
Total area of plant and stockpiles	Located within existing excavated area
Area of settling ponds	Not required as site is too porous
Fuel storage	Proposed to be mobile refuelling with an onsite bunded and lined fuel storage tank of 10,000 L.
TRANSPORT	

Truck movements	Variable but an average of approximately 10 per hour
Access	Limestone internal haul road to Flynn Drive
WORKFORCE	
Construction	5 persons
Operation	10-12 persons
Hours of operation	Hours of operation will not change and will be 6.30am to 5.00pm Monday to Saturday inclusive, excluding public holidays

1.2 Project Management Summary

Factor	Summary	Reference
Mining Operations	• Open Cut excavation methods will be the same in operation and scale to those currently operating.	6.0 Mining Operations See also Project Summary above
Biodiversity Management Flora	• See attached DWER letter.	Attached as Appendix B. 4.1 Vegetation and Flora 7.1 Biodiversity Management
Biodiversity Management Fauna	• Refer to References	4.2 Fauna 7.1 Biodiversity Management
Plant Pathogens	• There is unlikely to be any impact and low risk of introducing plant diseases. • A plant Pathogen Management Plan will be implemented.	7.1.5 Dieback Management Plan
Weeds	• There is unlikely to be any impact and low risk of introducing new weed species. • A weed Management Plan will be implemented.	7.1.6 Weed Management Plan
Water Management	• The main risk to groundwater is from fuel leakage. • A management plan to be implemented by the quarrying contractor will meet will and comply with all Government policies and guidelines.	7.2 Water Management
Fuel and maintenance	• Fuel is to be brought to the site by mobile tanker. In addition, a 10,000 L tank is retained on site in a bunded lined facility. • Refuelling and maintenance will be the same as that used in the past. • A Refuelling and Maintenance Management Plan will be prepared and put in place by the quarrying contractor.	7.2.8 Refuelling and Maintenance
Visual Management	• The site is over 300 m distant from the closest dwelling, across already prepared industrial land and protected by vegetation and bunding.	7.3.1 Visual Management

Noise	• The closest dwelling is over 300 m distant from the proposed site. • Noise management procedures will be maintained for all parts of the operations.	7.3.2 Noise Management
Dust	• Dust is managed for Health and Safety under the Mines Safety and Inspection Act 1994 and administered by the Department of Minerals and Petroleum. • Dust management procedures will be used for all aspects of the operations to protect both the staff and environment. • There will be no changes to the previous operational procedures utilised by the proponent in their adjacent quarry operations. • The extraction of limestone will move further away from dwellings in the South. • A licensed bore and 13,000 L water tanker will be retained on site for dust suppression. • A Dust Management Plan will be maintained.	7.3.3 Dust Management
Fire	• Fire is seen as a low risk in quarries such as this, but could include fire in the surrounding vegetation or plant and equipment. • Fire management procedures are addressed. The selected contractors will be required to prepare full Safety Management Plans for all sites and will be implemented under the quarrying contract for the site. These plans include emergency procedures, muster stress, graining and contingencies.	7.3.4 Fire Management
Mine Closure	• Closure of land is to be progressive with the land being reformed to the **NIASP17** and to the requirements of LandCorp. • The development of industrial land follows excavation. • All equipment will be removed from site at the completion of activities and the disturbed land formed into a shape compatible with the surrounding areas.	8.0 Mine Closure Plan

Rehabilitation	• A Rehabilitation Plan will be prepared and relates primarily to interim stabilisation of the soils as necessary, pending redevelopment. • In most cases rehabilitation to native vegetation is not supported apart from an interim cover, as the land surface has to be reformed to create the industrial developments.	8.0 Mine Closure Plan

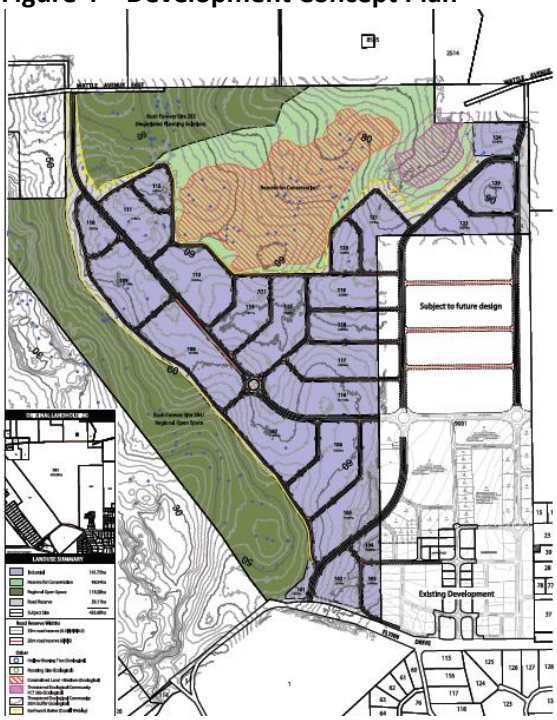
2.0 BACKGROUND INFORMATION

2.1 Site Location

This site comprises part of lot 503 on DP 409677 (Phase 1 area) is bounded by Flynn Drive to the South, Lot 22 (under development) to the east, the balance of lot 503 to the north and Bush Forever site 384 to the west.

The site is located some 32 km north of Perth and 10Km north of the Wanneroo townsite. **Refer to Figures 1 to 3 above**. A Structure Plan has been adopted by council and WAPC for the Neerabup Industrial Area (Neerabup Industrial Area Structure Plan No.17) and a concept plan for future development of the land based on the structure plan has been developed to guide development levels for the early phases of the resource extraction and quarry operations. (Refer to **Figure 4 below**).

Figure 4 – Development Concept Plan



2.2 Ownership & Proponent

The West Australian Land Authority (LandCorp), owners of the subject site (Phase 1 area portion of lot 503 on DP 409677) Flynn Drive Neerabup seek approval for an Extractive Industries Licence to enable the extraction of limestone and sand resources from Phase 1 Lot 503 Flynn Drive, Neerabup.

LandCorp purchased the subject land from Cockburn Cement in late 2010 with the intention of extending their existing quarrying and industrial development operations currently located to the east of the site (lot 22 Flynn Drive) where they have been operating a limestone quarry via a contracting agreement with an experienced quarrying group for over 25 years. The land forms part of the **NIASP17** which is strategically located within the North-West Corridor with excellent and future road linkages.

The subject land has been identified as a Priority Resource Location for sand and limestone and therefore Basic Raw Material Policy dictates that the area should be utilised for extraction of the resource prior to other land uses.

LOT	OWNERS	VOLUME	FOLIO	PLAN
503	Western Australian Land Authority Level 3, 40 The Esplanade Perth WA 6000			**409677**

The contact person responsible for all operations at the site is Mr Steve Bennett, LandCorp. Mr Bennett can be contacted at LandCorp's Head Office on 9482 7833.

2.3 Project Objectives

Phase 1 Lot 503 forms part of the **NIASP17** and contains strategic natural resources that are an extension of the resources being extracted from adjacent landholdings. This proposal achieves the purposes of extracting a valuable resource in line with Statement of Planning Policy No 2.4 Basic Raw Materials.

Importance and Rationale

In general, sand is used for the construction industry as both concrete sand and fill sand. The majority of the Swan Coastal Plain has now been sterilised for urban sprawl, rural living subdivisions and the Conservation Estate.

This has led to a situation where there are few limestone resources available within the northern Perth Metropolitan Area. In the northern Perth metropolitan area, all good limestone is either held predominantly by one operator or in the Neerabup Nowergup area, or is located in State Forest or the potential extension of the Yanchep National Park.

The whole site is underlain by high grade limestone. The limestone has always been earmarked for

extraction and has formed a key part of the resources held by LandCorp for many years in the Neerabup -Nowergup Area.

Limestone is also used for dimension stone, road bases, the construction industry, reconstituted stone, armour rock, and lime manufacture.

It is important to note that limestone and sand are only extracted for the community. Almost all sand and limestone is used on public works projects and for structural works, such as footings, dwellings, structural walls in subdivisions and for building materials.

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

The limestone on site and the surrounding area is a particularly valuable community resource.

The limestone has very high community value, as the Perth Metropolitan area spreads north, which is why the site has been listed by the Western Australian Planning Commission for many years as a Priority Resource.

The staged taking of the sand and limestone and the later use of the site for industrial land forms part of good co-ordinated land planning.

Limestone on this site is identified in Planning Policies such as Statement of Planning Policy 2.4, Basic Raw Materials as a Priority Limestone Resource.

- Abeysinghe P B, 1998, *Limestone and Limesand Resources of Western Australia,* Geological Survey of Western Australia, Mineral Resources Bulletin 18.
- Abeysinghe P B, 2003, *Silica resources of Western Australia,* Department of Mines and Petroleum, Mineral Resources Bulletin 21.
- Gozzard J R, 1987, *Limesand and Limestone Resources between Lance/in 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.*

An extended Licence period of 10 years is required to protect the resource and ensure that excavation is not hindered by the periodic need to reapply for approval, which can now take some years to achieve because of the number of approvals required, the workload of Government authorities, the number of authorities and agencies that now have to review a proposal and the lack of a co-ordinated and expedited planning and environmental approval process.

2.4 Aims of the proposal

This application report describes the environmental characteristics of the site, the methods and staged approach to excavation and rehabilitation/development, and proposes environmental management strategies as required.

The aims of the proposal are to;

- Obtain an Extractive Industries Licence with an approval period of 10 years in conjunction with a Development Approval of 30 years (subject of a separate application to be lodged concurrently).
- Excavate sand and limestone.
- Provide reserves of strategically located sand and limestone suited to a variety of end products.
- Prepare the site for LandCorp to conform to the **NIASP17**.
- Maximise the use of sand and 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 reducing transport distances and competition. This benefits the whole community.
- Comply with Statement of Planning Policy No 2.4 Basic Raw Materials, for the Metropolitan Area which state that basic raw materials should be taken prior to sterilisation of the area by development.

The following factors are considered in detail:

- The existing environment including soils, surface and ground hydrology, vegetation, flora and fauna;
- The application of guidelines and policies relevant to the proposal;
- Future mining operations including a staged excavation plan, infrastructure, access, and management of noise, dust, fuel and wastes; and
- A staged rehabilitation plan in conjunction with development of the site for the intended industrial development as identified in the approved structure plan for the Neerabup Industrial area.

2.5 Site Plans

Site Plans supporting the application are appended in **Appendix C**

3.0 EXISTING PHYSICAL ENVIRONMENT

3.1 Regional Geology

The resource lies on a ridge of Tamala Limestone that extends north south, inland from the west coast. Elevation of the limestone ridge averages 75 metres, rising to 80 metres in the north east.

Tamala Limestone, which outcrops along the south western coast of Western Australia, is an aeolian calcarenite (formed from wind blown calcareous sands) derived from beach sands. It consists of foraminifer, shell fragments and quartz grains, and therefore variation in the quality of the stone is normal both laterally and vertically.

The upper portion of the limestone is frequently recalcified to form hard capstone. In this area the capstone is restricted to small parts of the ridge. Pillars of limestone are common, separated by deep yellow sand, and are the main landform of the ridge. Away from the ridge the pinnacles drop out of the soil profile and the proportion of sand increases.

There is no evidence of karst features in the limestone exposed on the faces of the existing quarry. The geomorphology, geology and relationship to the water table make it unlikely that karst features will be found. They are more related to the edges of the wetlands to the west.

The existing excavations to the east of the site provide a good opportunity to assess the presence of caves and karst. None has been observed in either the existing adjoining quarry east of Lot 503 or south of Flynn Drive.

The resource area lies outside the Karst Risk Area identified by Csaky D, 2003.

The proposed base of the quarry at a concept minimum of RL 50-52 metres AHD rising to be compatible with the adjoining land and excavated areas is still over 20 metres above the regional and local water tables. The risk of surface cavities and discontinuities is also reduced by the sand which forms infill, grading to a deep layer, over the limestone

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

In this area the grade of the limestone can be up to 87% CaC03 (Gozzard, 1987, Limesand and Limestone resources between Lancelin and Sunbury, Western Australia, Geological Survey of Western Australia, Record 1987/5).

The Muchea Sheet of the 1:50,000 Geology Series indicates that the site is in an area underlain by sand derived from Tamala Limestone.

The underlying Tamala Limestone is recognised as a particularly variable material both in terms of its extent and degree of cementing. The limestone comprises a weakly to well cemented matrix with uncemented inclusions. Features such as pinnacles and cavities are known to exist in this type of material. Significant variations in rockhead elevation and cementation can occur over very short distances.

Subsurface conditions across the site can be generalised as:

- SAND -fine to medium grained, brown orange, with silt in parts, loose to medium dense, overlying

- LIMESTONE -fine to medium grained sand in a calcareous matrix, pale brown/ off white, weakly to well cemented.

3.2 Surface Hydrology

The site consists of highly permeable sandy soils overlying limestone formations, and infiltration of rainfall is the dominant hydrological process. Consequently, no surface drainage lines or seasonally inundated areas occur.

The final contours proposed by the **NIASP17** will rise from 52 metres AHD along the eastern boundary to 78 metres AHD on the north-eastern boundary. Therefore, the final land surface will be 20 metres above the highest known water table. Refer to Section 3.4 for discussion on proposed structure plan levels.

3.3 Groundwater

The Perth Groundwater Atlas indicates that the maximum expected groundwater levels at the site vary between about RL 30m on the eastern boundary to RL 24m along the western boundary. (Department of Environment, Perth Groundwater Atlas). Flow is to the south west.

Therefore, the groundwater level is well below the existing and proposed surface levels and will not be a constraint to the development of the site. Flow of ground water is to the west towards Lake Neerabup.

3.4 Topography & Structure Plan Levels

The existing topography of the site rises from a height of RL 50m AHD along the western boundary to 95 mAHD in the northeast of the site and up to RL 78m AHD adjacent to the common boundary with Lot 22.

The finished surface levels of the adopted Structure Plan provide for a site which generally grades from east at RL78 to west at RL53 in the north of the site and then from the northern and southern extremities at about 62m AHD to a central low area at RL50 AHD. The grading of the site is generally at 2% but there are some steeper areas with grades to 5%. Figure 5 details the final design levels which must be achieved to meet the requirements of the Structure Plan. **Refer to Figure 5 & 5A below.**

Figure 5 Structure Plan & Levels (2017)
Structure Plan

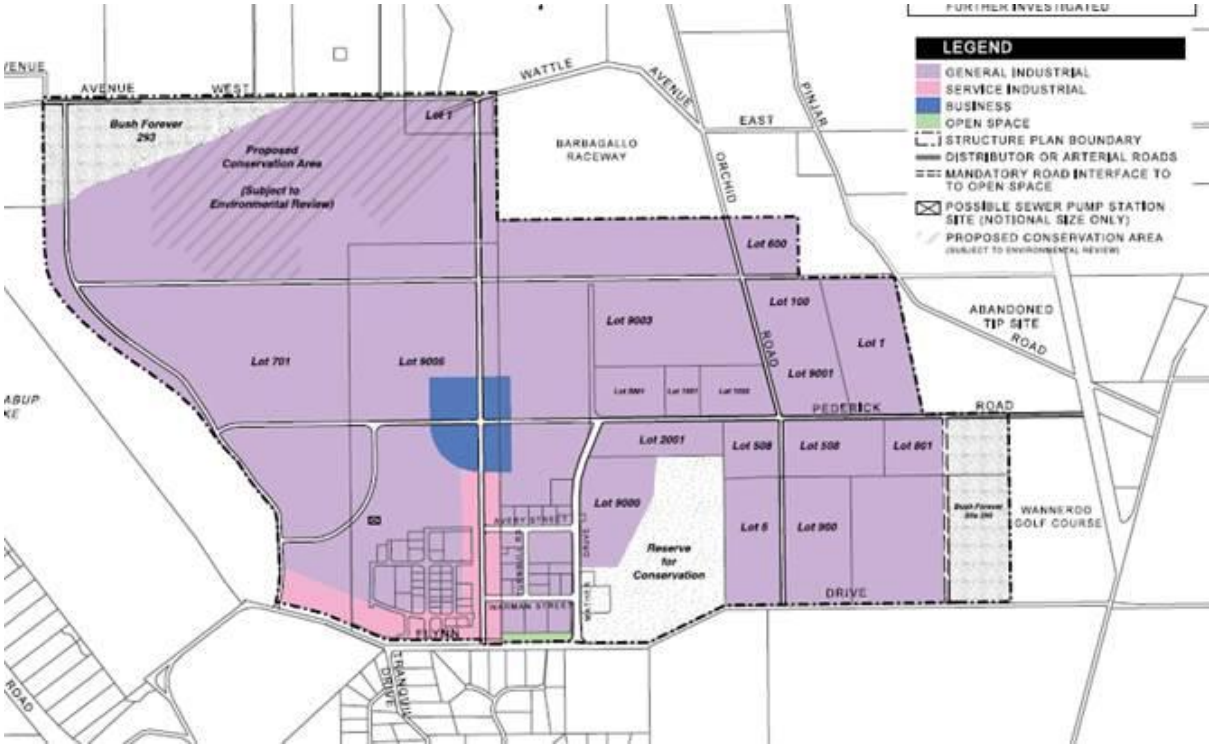
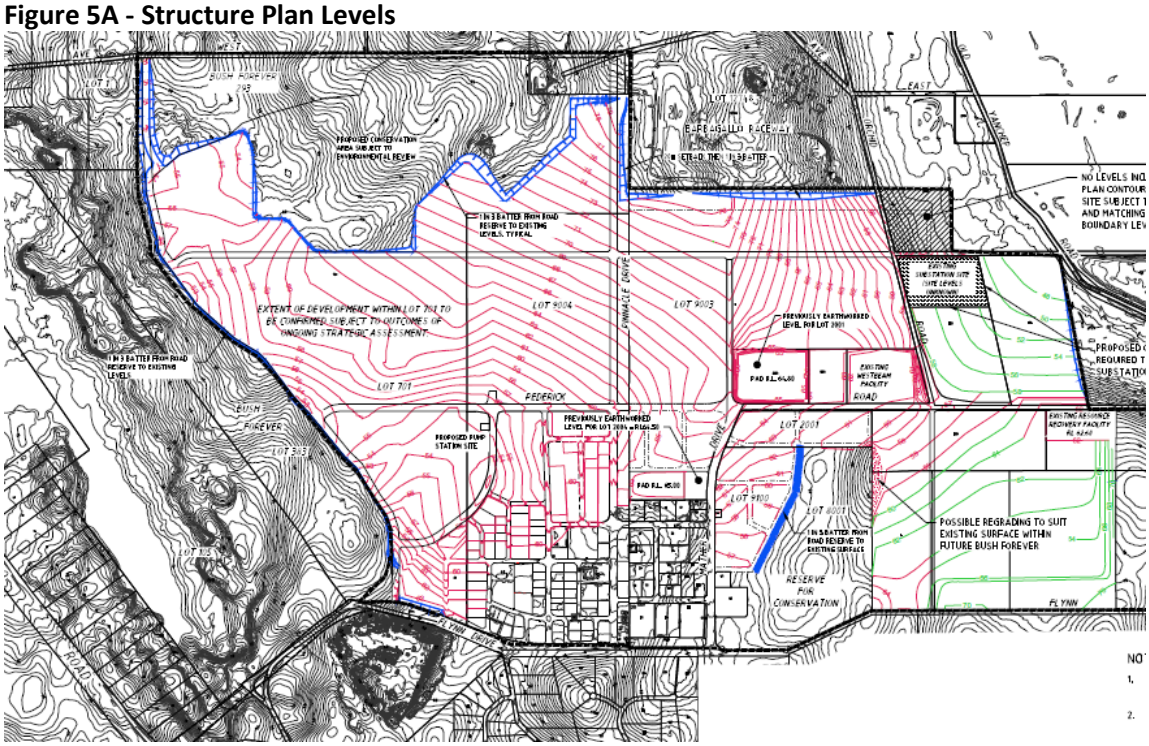


Figure 5A - Structure Plan Levels



Industrial land uses tend to have a large building footprint and level sites are preferred. Therefore, industrial lots are generally presented as a level pad with some retaining walls at the lot boundary. This was the approach adopted for the industrial development of the adjacent Lot 22.

Therefore, following the completion of limestone and sand extraction further earthworks would generally be required at subdivision stage to present lots which meet current market expectations.

3.5 Surrounding Land Uses

LandCorp's existing Limestone and sand quarry is located along the common eastern boundary of the subject site and Barbagallo Raceway is located to the NE of the site. Bush Forever Site No. 393 is located to the north of the proposed excavation area, Flynn Drive to the south and Bush Forever site 384 to the west.

The nearest residence is located approximately 300m south-east of the site to the south of Flynn Drive. This residence is part of a rural living estate. Other residences to the north of the site are rural properties in some cases already undertaking small scale extractive activities.

Consequently, the site can be considered relatively isolated in terms of sensitive adjacent land uses.

3.6 Description of the Resource

The area to be excavated consists of a low limestone ridge average height RL 75 metres and rising to 95 metres in the north east. The limestone is covered by a variable superficial deposit of yellow sand. The depth of the resource is limited by the final contours required by the **NIASP17** which rise from RL53 metres AHD in the central west to 78 metres AHD in the north-eastern corner and RL 63 metres in the south east. This provides for 20 metres depth of resource being available from the un-opened ground.

The degree of lithification of the limestone changes both horizontally and vertically from well cemented calcrete cap rock on the ridge, formed by additional cementation of the limestone, to softer less well cemented limestone at depth.

Sand covers much of the deposit away from the ridges and represents a resource of up to four metres deep which is used for fill and concrete sand as well as in rehabilitation.

Some material remains to be taken from the open ground, as the floor of the pit is brought into conformity with the required final contours.

There are several resources on the site; a ridge of limestone suited to rubble, road base and armour rock, and possibly limestone for block manufacture, together with a large resource of sand which is suitable for fill and may also be suitable for concrete manufacture. There is also high quality (metallurgical grade) limestone resources towards the northern boundary (under Bush Forever site 293).

Sand and roadbase prices are sensitive to transport distances so access to these resources can benefit local and future residents of the area by containing delivered prices.

Depending on the rate of excavation some 30 plus years of limestone and sand resources are available for extraction within the entire site area.

4.0 BIOLOGICAL ENVIRONMENT

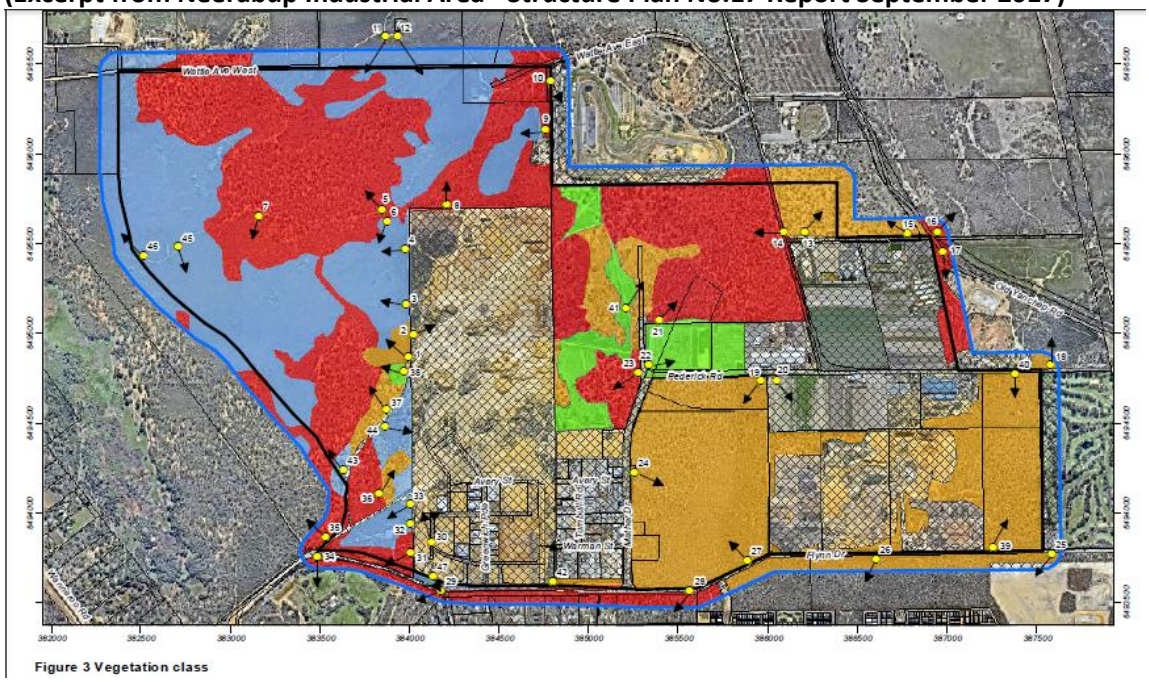
4.1 Vegetation & Flora

Bush Forever (Government of Western Australia, 2000) effectively supersedes System 6 recommendations for conservation in the Perth Metropolitan Region, focusing on the retention and protection of selected areas of native vegetation through a number of implementation methods.

Part of the site have been included in the Bush Forever process as part of Site No.293 & 384, Neerabup. The outcome is the definition of a conservation boundary through a Negotiated Planning Solution as depicted in Figure 2, which protects the areas identified within Bush Forever as having "Regionally Significant Bushland". Extractive industries as proposed also acknowledges and adopts this boundary.

The site is generally covered with native vegetation and extensive clearing will be required to facilitate resource extraction and earthworks to accommodate future industrial development.

Figure 6 - Vegetation Class
(Excerpt from Neerabup Industrial Area - Structure Plan No.17 Report September 2017)



A detailed description of the Flora and Fauna of the site in provide in the Environmental report by Ecological Australia (**Refer to Appendix D**).

4.2 Fauna

The site (Lot 503) is zoned for industrial purposes and is partly covered by native vegetation, which is the habitat for a range of native species. Refer Environmental report by Ecological Australia (**Appendix D**).

The survival of native fauna depends on the management of the rate of clearing and development of the site. Site development requires that the site be excavated and progressively cleared and developed for industrial use by LandCorp.
Progressive clearing will permit time for native fauna to migrate ahead of the loss of habitat caused during development of site.

4.3 Wetlands

There are no wetlands on site. Lake Neerabup occurs 0.5 km to the west. Lake Neerabup is maintained by westwards groundwater flow and is an expression of the superficial aquifer.

5.0 SOCIAL ENVIRONMENT

5.1 Alternative Resources

The limestone resources of the northern Perth Metropolitan area are seen as strategic resources for the community, which is why they are identified in SPP 2.4.

Most of the resources closer to Perth have been sterilised by development, conservation of vegetation considerations, and public intolerance.

In the northern Perth Metropolitan area high grade limestone that is available for community use is located on the land held by LandCorp or is located in State Forest or potential extension of the Yanchep National Park.

The Chamber of Commerce and Industry 1996, has investigated the limestone resources and found them to be restricted in the northern Perth Metropolitan Area.

See Chamber of Commerce and Industry, 1995 and 1996, *Managing the* Basic *Raw Materials of Perth and the Outer Metropolitan Region,* Parts 1 and 2 and Chamber of Commerce and Industry, 2008, Basic *Raw Materials* Access *and Availability.*

Sand and limestone are widely used community resources and the deposits that are not already sterilised are finite and should be used in a staged manner.

Should they not be available resources will have to be sourced from another location, at a significant greenhouse penalty from an area that is also likely to involve clearing.

5.2 Land Zonings

The land is currently zoned General Industrial under City of Wanneroo Town Planning Scheme No.2, which, with Council approval permits Extractive Industries as a discretionary "D" use.

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".*

Section 3.17 .3f commences *"There* is *a presumption in favour of applications for the extraction for* basic *raw materials in the* basic *raw materials resource areas* ..... "

Statement of Planning Policy 2.4 recognises the site as Priority Limestone Resource, Number 30/13. 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.

End Use

The extraction of limestone and sand is seen as the interim use to achieve an industrial end use as shown in the **NIASP17**. This progression of development is already occurring in the south of adjoining Lot 9005 (formerly Lot 22).

5.3 Surrounding Land Uses and Buffers

Refer to Section 3.0 above.

5.4 Progressive Planning

Excavation of the sand and limestone resources from Phase 1 Lot 503 are consistent with orderly planning of the site to achieve an industrial end use.

5.5 Community Consultation

The Proposed Extractive Industry Licence Application will be subject to public advertising to provide the community the opportunity to comment on the proposal. The application will also be referred to all relevant regulatory authorities by the City of Wanneroo.

5.6 Heritage

A search of the of the Department of Indigenous Affairs database was undertaken with no heritage sites identified within the project area. An Indigenous Heritage site survey of the Neerabup Industrial area including the subject site area was completed by LandCorp. Several sites are listed adjacent to Lake Neerabup including Orchestra Shell Cave. Lake Neerabup is 1 km distant to the West of the subject site.

HERITAGE			
Potential Impact	Management	Outcome Commitments	Action Required
Aboriginal sites	*Aboriginal Heritage Act 1972-1980* • 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.	The proponents will comply with the *Aboriginal Heritage Act 1972-1980*	None required at this time.
European Heritage	• There are no known sites		

5.7 Responsible Authorities

A number of Local and State authorities are involved as referral agencies for approval of extractive industry applications of this type or have an interest in the quarrying operations.

City of Wanneroo

- Has responsibility for local roads in this area.
- Issues Recommendations and Development Approval under the current Town Planning Scheme.
- Issues and oversees the Extractive Industries Licence.

Department of Mines Industry Regulation and Safety

- Controls the safety and methods of extraction.
- Oversees the health and safety of workers.
- Provides input into the need and protection of basic raw materials.

Department of Conservation Biodiversity and Attractions

- Oversees all significant environmental impacts.
- Licenses any screening plant used in the processing of limestone.
- Responsible for flora and fauna.

Department of Water and Environmental Regulation

- Issues guidelines for water quality management for extractive industries.
- Oversees protection of groundwater and water courses.

Western Australian Planning Commission

- Responsible for Statement of Planning Policy No 2.4, Basic Raw Materials Policy.
- Responsible for regional planning including the Metropolitan Region Scheme.
- Issues Planning Consent under the Metropolitan Region Scheme.

Main Roads WA

- Responsible for construction and maintenance of main roads and the use of these roads by truck traffic.

Department of Indigenous Affairs

- Oversees the Native Title Amendment Act and the *Aboriginal Heritage Act 1972 – 1980.*

6.0 MINING OPERATIONS AND MANAGEMENT

Environmental issues including dust, noise and traffic can 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. Measures to protect the site and minimise the influence of dieback are addressed under Environmental Management.

The following sections describe the future mining and management at the site.

6.1 Project Summary

ASPECT	**PROPOSAL CHARACTERISTIC**
EXCAVATION	
Total Resource Area (Phase 1)	93.4 hectares
Total disturbance area	93.4 hectares (Phase 1)
Total Area of Mining Footprint	93.4 hectares (Phase 1)
Sand-Limestone extraction	Up to 700,000 tonnes per year
Total estimated Resource	15 million BCM
Life of Project	>30 years
Area cleared per year	Average 3 – 5 hectares
Area mined per year	Average 2 – 3 hectares
Area open at any one time	20 plus hectares required including backfill to design
Dewatering requirements	None
Depth of excavations	10-20 metres
Native vegetation to be cleared	See attached DWER letter
PROCESSING	
Sand and Limestone	See excavation rate above
Water requirements	Supplied by existing Groundwater Extraction License estimated usage 12,000 kL per year
Water supply source	Supplied by a new bore to be constructed with approval from DWER

INFRASTRUCTURE	
Total area of plant and stockpiles	Located within existing excavated area
Area of settling ponds	Not required as site is too porous
Fuel storage	Proposed to be mobile refuelling with an onsite bunded and lined fuel storage tank of 10,000 L.
TRANSPORT	
Truck movements	Variable but an average of approximately 10 per hour
Access	Limestone internal haul road to Flynn Drive
WORKFORCE	
Construction	5 persons
Operation	10-12 persons
Hours of operation	Hours of operation will not change and will be 6.30am to 5.00pm Monday to Saturday inclusive, excluding public holidays

6.2 Extraction and Processing of the Resource

6.2.1 Excavation Method

The excavation of limestone will be cut to an undulating floor by gradually opening new ground as excavated ground is closed and rehabilitated to an industrial end use.

The excavation targets high grade limestone and to maximise the extraction of resource to meet government requirements, so selected parts of the exposed floor is cut lower than design levels dictate. Therefore, backfill is required in parts of the site to raise the floor elevation to comply with the requirements of the structure plan levels.

Limestone Excavation

Limestone can be taken for production of several types of products. It is possible that dimension stone blocks could be cut. Other limestone can be taken from site as rubble for use in clinker manufacture, roadbase for road construction or reconstituted block construction of retaining walls and decorative paving blocks.

A production rate of 700,000 tonnes per year is anticipated, depending on contracts won for product sale. It is possible that a larger tonnage may be required in any particular year.

Roadbase

Excavation will be carried out in sequence.

1. The excavation is similar to past excavation on Lot 9005 (formerly Lot 22) adjacent to Lot 503.

2. A bulldozer will be used to remove any 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 is 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 is stored in dumps, mulched or swapped with a nearby operator or developer to try and ensure that the material is not wasted.

5. The use of weed affected topsoil is managed to minimise the spread of weeds It is buried or sprayed to reduce the future weed loading on the site. See 7.1.6 Weed Management Plan.

6. Overburden, as yellow and brown sand and low grade limestone, is removed by pushing to the perimeter of the proposed pit to form perimeter bunding to the pit. Excess overburden is either directly transferred to a rehabilitation area or stored in low dumps for later rehabilitation use.

7. Limestone is to be excavated to a floor of the pit, from behind perimeter bunding and edge face at elevations 10 -20 below natural ground level.

8. The limestone will be deep ripped with a bull dozer which is pushed down a sloping face below the elevation of the perimeter bunding.

9. In the process the limestone is track rolled as the bulldozer pushes and this crushes the limestone.

10. The rubble produced is pushed into a stockpile from which it is loaded directly into road trucks for taking offsite for use as roadbase, raw feed for reconstituted block making, or for clinker manufacture.

11. To produce various sizes products for road bases the rubble may need to be crushed and screened. A loader will take material from the rubble stockpile created by the bulldozer and will then load it into a mobile crusher for reduction to the required size.

12. From the crusher the product may be screened and a series of stockpiles formed by a classifier, which is essentially a series of conveyor belts that form stockpiles of various grades of material.

13. It is possible that a small amount of bitumen stabilised road base products is produced. In this case limestone road base is mixed with a small volume of bitumen emulsion (about 2%) for use in road base and construction materials in a small portable screening plant.

14. All static and mobile equipment such as the loader, transport, crushers and screens will be located on the floor of the quarry to provide visual and acoustic screening. Stockpiles of products will be retained on the floor of the pit to reduce visual impact.

15. Water is used for dust suppression, to reduce the potential for dust generation from the movement of machinery and the effect of wind.

16. Blasting is not part of the normal operations to produce road base.

17. Subgrade material and overburden is normally stored in the bunds around the perimeter of the pit and then used to recontour the completed pit as the first stage of rehabilitation.

18. At the end of excavation the floor of the quarry is deep ripped, covered by a layer of overburden and top soil and rehabilitated with pasture and local indigenous tree/shrub species as an interim to future rural living land use.

19. 700,000 tonnes annually (average) is anticipated to be produced in any particular year in order to keep pace with anticipated demand for the extracted resource and product, but this may vary depending on the type and number of supply contracts won at any particular time.

Dimension Stone

Dimension stone cutting is not always used and currently there is no such production. However, if dimension stone is taken the operational sequence will be as follows.

1 The cutting floor is created behind the face and perimeter bund, a minimum of some 5 metres below natural ground level.

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

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

4 As dimension stone is to be cut, sections of the floor are lowered by the depth of one block until the whole floor is lowered. The next set of blocks are cut by the reinstallation 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 over time. The cutting saws are electric, using air cooling for the blades.

5 Water is used for dust suppression, to reduce the potential for dust generation from the movement of machinery and the effect of wind.

6 Blasting is not a normal part of the quarrying operations.

7 At the end of excavation, the cutting floor is used for limestone road base.

Armour Stone

1 Armour stone is the production of large boulders of several sizes for use in coastal construction. Normally only the harder recalcified surface rock is used. Occasionally larger blocks may be "popped" by explosives or broken with a rock breaker.

2 The market for armour stone is very intermittent and limited and it may be that this material is never produced from the pit. Blasting can be used to break larger pieces but in recent years a rock breaker has been preferred.

Details of the Rehabilitation are listed under 8. 0 Ongoing rehabilitation and Mine Closure Plan.

Sand Excavation

1 If sand is excavated, the active area is prepared in the same manner as described under Limestone Extraction above.

2 Sand is loaded directly to a road truck for fill sand.

3 Sand is cut down to the basal limestone which is then extracted.

4 Mixed sand and limestone may be screened to maximise the resources.

6.2.2 Pit Design & Staging

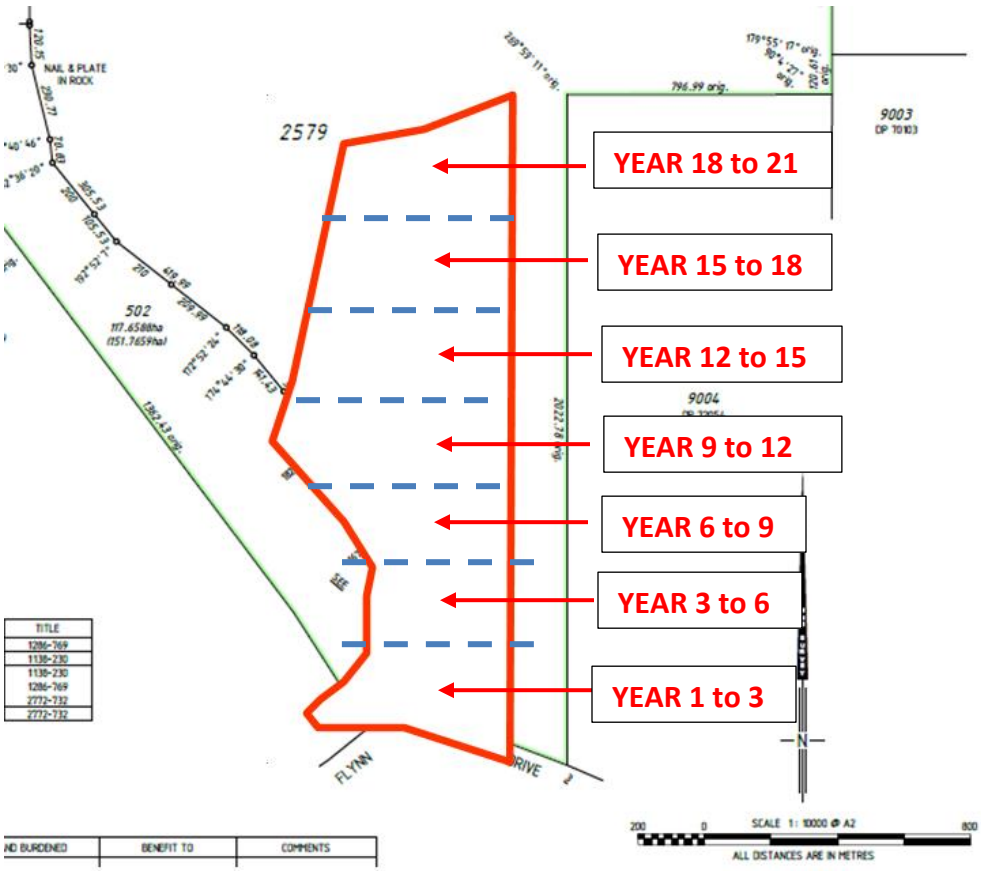
The proposed quarry excavations will proceed generally from east to west and most likely from the SE to NE. **Refer to Figure 7 for approximate staging**.

It is estimated that about 700,000 tonnes of limestone and sand products may be excavated from the site annually depending on sales contracts. It is possible that **if** large contracts are obtained a larger amount of material may be sold in a particular year.

The active area needs to be large enough to enable a range of limestone and sand products to be available at all times, and to provide sufficient area for processing/screening and for stockpiles. At least 5 -10 hectares of floor open at any time, in addition to internal roads, with two operators on site and to maintain site safety.

Excavation **will** be staged and cut downwards, taking the surface sand first and moving from the centre outwards in areas selected for excavation so as to minimise visual impact as well as gaining the maximum noise screening.

Figure 7 - Staged Quarry Operations (Lot 503 – Phase 1 Area)



The site will be cut below the planned final level where high-grade limestone occurs and will then backfilled to the planned final level with low grade limestone and sand. Engineering advice and compaction testing to the requirements of the contract with the landowner will be used to recontour, compact and stabilise the land.

Wherever possible rehabilitation will be commenced as areas are completed to ensure that the

amount of ground that is open at any one time is minimised. Final contouring of the quarry area will follow the proposed levels for the future roads and industrial lots.

It is anticipated that the life of the quarry will be at least 20 years depending on market demands.

1 The existing access road servicing Lot 9005 (formerly Lot 22) will be used from Flynn Drive. This access currently crossed through Lot 503 and may require diverting to a new alignment to suit quarry operations on lot 503.

2 The existing bitumen apron and entrance to Flynn Drive will be maintained.

3 The proposed excavation will be set back in excess of the normal 40 metre road buffer zones.

4 Normally a 20 metre setback from adjoining lots is used but this will not be the case with the adjoining Lot 9005 to the east because that land is currently being excavated and a consistent final land surface will be required between the properties in line with the approved structure plan levels (**Refer to Figure 5**).

5 The excavation to depth is proposed to be completed without the use of benches with the sand and limestone being separate operations and the sand taken from above the limestone.

Surface Restoration

1 A bulldozer is used to reform the proposed final land surface, infilling and back filling as required. Any fill is completed in small lifts, compacted and tested to comply with an industrial substrate. The floor is then subject to deep ripping the basal limestone followed by pushing and spreading of overburden and finally topsoil.

2 Rehabilitation is completed progressively as the pit moves across the resource. Land restoration is completed to the agreed final land surface in a manner similar to that used in the southern portion of Lot 9005 (formerly Lot 22) where early sections of the limestone pit have already been developed for industrial estate, with roads and new lots already formed.

3 As a last phase the perimeter bunds are pushed down and the batter land surface reformed.

6.2.3 Final Contours

Following mining, the finished levels will be gently sloping with a minimum elevation of 53 mAHD (**Figure 5**) approx. mid way along the western boundary with the Bush Forever site 383 to a peak of RL 79m AHD approx. in the north-east corner of the site in accordance with the approved Structure Plan levels. A vertical separation distance in accordance with the groundwater protection policy objectives. Furthermore, this final elevation will provide continuity with the final floor elevation of Lot 9005 which immediately adjoins the site's eastern boundary.

Finished batters will be used to integrate the mined surface with the natural remaining topography of the site, with the steepest batter being 1 in 3 on the northern and western boundaries (**Figure 5**). Working batters on the mine face will be left in a slumped condition at the end of each day and over weekends for safety reasons.

6.2.4 Processing of the Resources

The processing of resource will incorporate modern methods of equipment based screening and crushing to produce naturally graded or blended products suitable for industry use. Methods of excavation or processing, the permanent structures required or the equipment used, may require some change to suit modern equipment availability and development to ensure extraction and processing is undertaken with the latest and most efficient processes available to the quarrying industry.

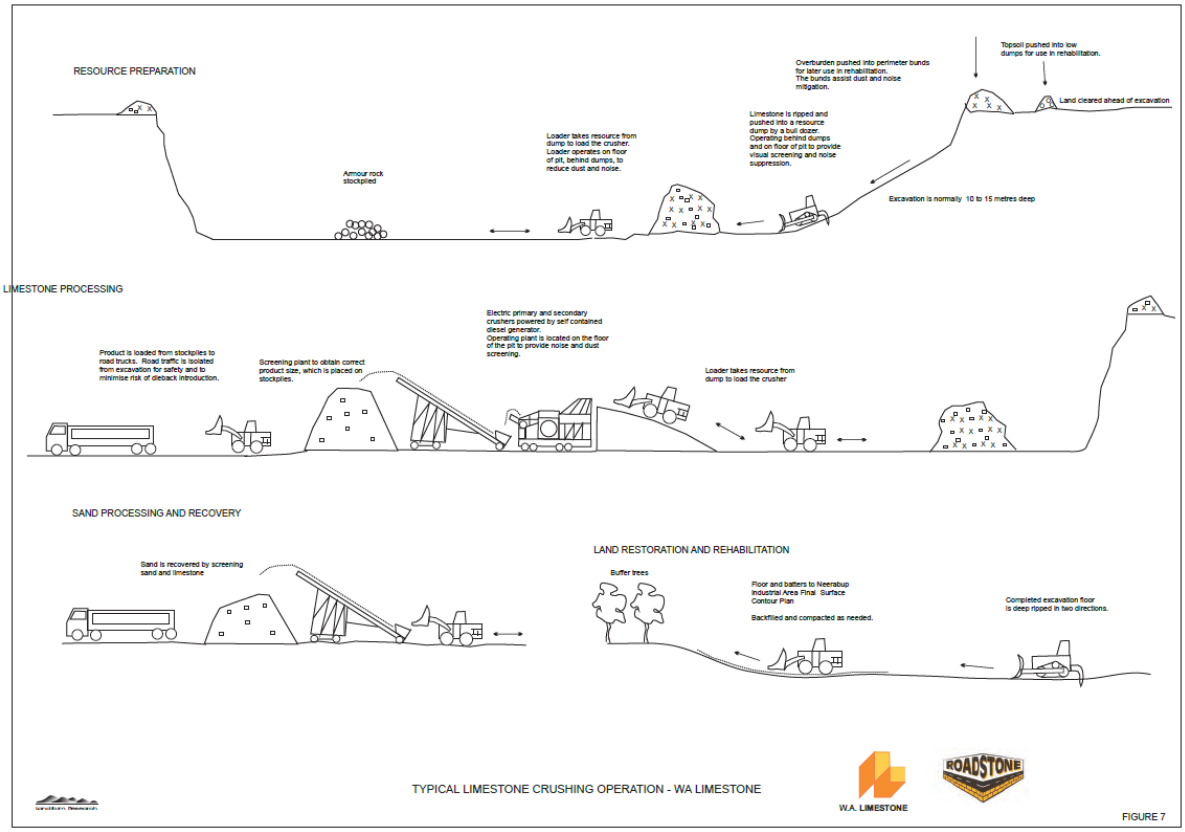
A site office in conjunction with an approved toilet system is to be located in the south west adjacent to the existing access road. The site office is to be located within a locked compound which will also enclose a weighbridge. A seatainer may be required for servicing and storage of minor equipment within the pit area.

Mobile telephone is available for emergencies and all mobile plant is able to communicate with the site office via two-way radio.

All static and operational equipment will continue to work on the quarry floor to provide maximum sound and visual screening wherever possible.

Refer to Figures 8 to 10 for typical site operations facilities, resource product and resource recovery methods at each stage of operation (some photos taken of existing operations on LandCorp operated Quarry of Lot 9005 (formerly Lot 22).

Figure 8 - Typical Mine Operations Flow Chart and Sequencing Diagram



Limestone

There are no proposed changes to the processing of limestone.

1 A mobile crushing plant and screens are used to prepare construction materials.

2 Crushing plants and screens are licensed or registered through DBCA as required for the site or as a mobile pit.

3 Annual throughput is anticipated to continue at 700,000 tonnes although more could be taken in any particular year as a result of the number and type of contracts won.

4 Mobile crushing plants are used. **Figures 8 to 10**.

5 From the crusher the product is screened and a series of stockpiles formed by a classifier, which is essentially a series of conveyor belts that form stockpiles of various grades of material.

6 It is possible that a small amount of bitumen stabilised road base products are produced. In this case limestone road base is mixed with a small volume of bitumen emulsion (about 2%) for use in road base and construction materials in a small portable screening plant.

7 A site office and service shed is to be located adjacent to the access road in the south-western corner of the site.

Sand

A screening plant may be used for the separation of limestone from sand. This plant, if used will be a small mobile plant that will be moved from time to time, as the face moves.

Any screening will be licensed through the DBCA as required for the site or plant depending on the annual throughput.

Figure 9- Typical Views of Operations and Resource Extraction and Product Produced

Bulldozer ripping limestone for excavation

Taking limestone from pushed up resource, November 2009

Loader feeding a working crusher

Loading a working crusher, November 2009

Limestone crushing plant

Crushing limestone, November 2009

The stabilised limestone plant with products in the background

Various grades of limestone product stockpiles

Various grades of limestone product stockpiles

Figure 10- Typical Photos showing Facilities required for quarrying operations

Weighbridge and site office

Fuel tank located in a bunded and lined facility

Truck wet down facility near the weighbridge

Operating water truck

Developed industrial land on the southern end of Lot 22

6.2.5 Stockpiles

Stockpiles of all products are retained on the floor of the pit to reduce visual impact. Relatively small stockpiles of 20 -40 000 tonnes are proposed to continue to be used. There may also be some small stockpiles of cut dimension stone placed on pallets if produced.

6.3 Hours of Operation

The proposed hours of mine operation are between 6:30am and 5 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.

HOURS OF OPERATION			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Operating times	Hours of operation will be 6.30am to 5.00pm Monday to Saturday inclusive, excluding public holidays.	The proponent will comply with the approved hours of operations.	Compliance with the Excavation Management Plan, Compliance with Licence and operating conditions.

6.4 Machinery & Equipment

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

- Electricity from Western Power is available to the site.
- A Telstra landline phone is available to the site.
- Licensed groundwater bore for the supply of construction water

Site office/lunchroom	A site office/lunchroom is to be 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 when the site is manned.
Storage sheds	A storage shed is to be located on site for the storage of maintenance items.
Bore	One bore is to be located on site, licensed from DWER; with an allocation of 12,000 kL per year for dust suppression.
Fenced compound	Fenced security compound at the weighbridge for the storage of machinery is to be used for security.
Bulldozer	1. Bulldozer equivalent to D111 is to be retained on site for production of the limestone and land clearing. 2. Pushing, track rolling, land clearing and reinstatement and movement of limestone and for use in land restoration.
Water tanker	A 13,000 L water truck is to be used for dust suppression on the access road and working floors as required.
Loader	Rubber tyred loaders (Cat 980) and excavator for the movement of limestone and sand.
Bobcat	A bobcat may be used to lift reconstituted blocks or dimension stone if these are produced on site.
Blasting	Not normally used.
Weighbridge	A weighbridge is to be located at the site office in the Southwest.
Mobile crushing and screening plant	• Mobile crushing plant (licensed by DBCA). • Mobile screening plants are used for the preparation of various grades of limestone sand potentially to separate sand from limestone. • Screening plant are electric and combined with a Genset generator. • At any one time up to two or more mobile crushers and screens will be operating on site.
Fuel storage	• Vehicles are to be refuelled from mobile tankers. • A fuel storage tank of 10,000 litres is to be located within the fenced compound, bunded and lined with an impermeable membrane, to Department of Mines and Petroleum and Department of Environment and Conservation standards.

6.5 Access & Transport

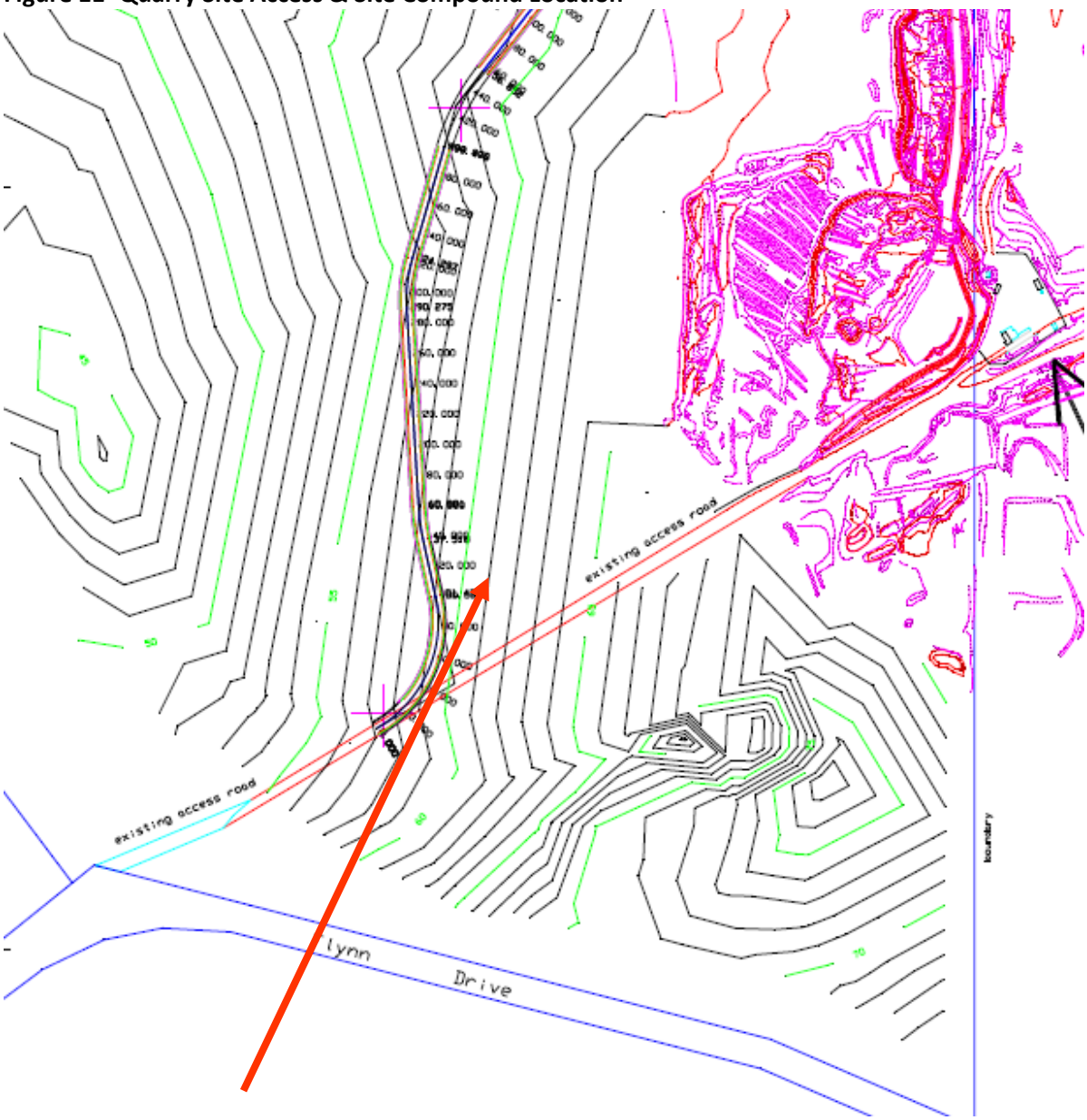
The quarry will be accessed from Flynn Drive. The existing access road into Lot 9005 (formerly Lot 22 to the east of the subject land) will be used for access to the Lot 503 Phase 1 quarrying operations. **See Figure 11**.

Unwanted access is restricted by small perimeter bunds and trenches, strategic placement of barriers of logs and boulders, and gates that will be locked when the site is unmanned and equipment retained on site. Fences are maintained and upgraded as required.

Warning signs are maintained as required by the Department of Mines Industry Regulation and Safety.

Based on average rates of excavation and annual sales approximately 10 laden trucks will leave the site every hour.

Figure 11- Quarry Site Access & Site Compound Location



Weighbridge Compound and Site Office

6.6 Workforce

The workforce will vary, depending on the level of operation, number and type of pits being excavated at any time and market demands, but usually a minimum of 10 -12 persons when busy.

6.7 Water Use

Water is to be mainly used for dust suppression.

A bore is to be provided on site licensed through the DWER. The landowner has an annual licence of 12 000 kl per year. A water truck will be retained on site full time and will have a capacity of 13,000 L. Daily, when conditions warrant the use of water, the water truck is anticipated to make 5 -6 rounds of the pit in dry conditions, which has been found to be sufficient to effectively minimise dust based on operations undertaken on the adjacent landholdings by the proponent. The amount of watering varies and may only be required for 1 -2 rounds on dry days in winter or not required on rainy days. **Refer to Figure 8 for typical facility details**.

Water will continue to be drawn from the licensed bore that is to be located within the fenced compound. From the bore, water is fed to tanks on site from which it can be quickly drawn for use.

Potable water is brought to the site as needed.

6.8 Safety

The site will operate to the *Mines Safety and Inspection Act 1994 and Regulations 1995,* which are administered by the Department of Mines Industry Regulation and Safety.

LandCorp propose to tender the quarrying operations to experienced quarrying contractors and operators and will require strong commitments to maintaining a safe working environment and to having demonstrated safe operations at their other facilities.

Companies to be selected will be required to develop and maintain a Safety Management Plan for the site, and a site specific Emergency Response Plan, to cover all operational procedures, which include workforce induction and training to ensure that all employees involved in sand and limestone excavation are made aware of the environmental and safety implications associated with all stages of the mining activities.

Where applicable Safe Operating Procedure Sheets will be required and prepared for all identified risks and hazards. Workers and staff are to be trained in the use of the procedures and all employees will be required to undertake site inductions and training as necessary prior to commencing work on the site.

Radio contact is to be available for all vehicles and the site is within mobile phone range.

See 6.5 Access and Transport for site security and 7.3.4 Fire Management.

A key aspect of site safety is to prevent unauthorised access and the provision of signage.

Safety will also be addressed within the lease and operation agreement between the quarry operators and LandCorp. This lease will require the Quarry Operators to comply with the *Occupational Safety and Health Act 1984.* The operation agreement will also require the preparation of a Safety Plan. As a Quarry the site must however operate to the *Mines Safety and Inspection Act 1984 and Regulations 1985.*

The Safety Plan is in place to assess the hazards at the site and provide a sequence of steps to reduce or deal with any hazard which is identified. The Safety Plan addresses the following Safety and Health Standards and will be adjusted to apply to extraction activities;

- Management Commitment
- Occupational Safety and Health Planning
- Consultation
- Hazard Management
- Training
- Sub-contractor Controls
- First Aid/Medical
- Rehabilitation
- Fire Prevention
- Occupational Hygiene
- Housekeeping
- Safety and Health Promotion
- Tenderer Safety Management Questionnaire
- Risk Assessment
- Safety and Health Performance Reporting
- Incident Notification

It is anticipated that the deepest excavation will continue to be a maximum of 10 -20 metres below natural ground level. Faces are left in compliance with the Mines Safety and Inspection Act at times when the site is unattended. This can include fencing, bunding, signage, stable slopes and other appropriate measures.

Signs required by the Department of Mines Industry Regulation and Safety are to be installed and maintained.

7.0 ENVIRONMENTAL IMPACTS

The likely environmental impacts are minimal on a well managed site. The issues are well known from existing limestone quarries in the local area and past operations.

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

7.1 Biodiversity Management

The site is to be cleared in accordance with the requirements of the approval to be issued by the Department of Water and Environmental regulation ("DWER"). Trees and shrubs will be removed from the quarry areas, with the topsoil remaining in place as required until such time as the quarrying operations require the stripping of the surficial overburden to expose the resource to be mined and processed as part of the extractive industries licence.

7.1.1 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.**

7.1.2 Vegetation & Flora

The final amount of flora and fauna habitat to be retained or provided will be decided through the planning processes, such as the **NIASP17**. This could include habitat areas, public open space or linkages.

The area of native vegetation, after development of the subject land for industrial purposes, will depend on the area of land allocated to, or rehabilitated with, native vegetation by LandCorp.

Local native species will be used in the revegetation of buffers, road reserves and other selected areas within the industrial development.

FLORA			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Flora	• The final landform and surface treatment is to be decided during the life of the project in consultation with LandCorp and to the requirements of LandCorp, in compliance with the approved Structure Plan. • The amount of ground open at any one time is minimised, where possible, but sufficient ground is needed to provide the required resource and to enable continued processing of limestone. • Progressive clearing and interim rehabilitation is to be undertaken where appropriate.	The proponent will comply with the requirements of the approved structure plan.	Undertake the rehabilitation actions.

7.1.3 Fauna

The final land use is industrial land, under the control and guidelines of the approved Structure Plan to be implemented by LandCorp. The amount of fauna habitat retained will depend on the area of land allocated to, or rehabilitated with, native vegetation

FAUNA			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Fauna	• Topsoil removal will be progressive and followed by revegetation to similar vegetation to that currently present. • The final landform and surface treatment is to be decided during the life of the project in consultation with LandCorp and to the requirements of LandCorp, in compliance of the approved Structure Plan.	The proponent will comply with the requirements of the approved structure plan.	Undertake the rehabilitation actions.

7.1.4 Wetlands

There are no wetlands on site. Lake Neerabup lies 0.5 Kms to the west of the proposed quarry site.

WETLANDS			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Wetlands	• There are no proposed changes to the water recharge on site.	None required	None necessary

7.1.5 Dieback Management Plan

Dieback of vegetation is often attributed to Phytophthora cinamomi even though there are other Phytophthora species and other diseases such as Armillaria that can cause dieback like symptoms. Microscopic soil-borne fungi of the genus Phytophthora kill a wide range of native plants and can cause severe damage to many vegetation types, particularly those from the families Proteaceae, Epacridaceae, Xanthorrhoeaceae and Myrtaceae.

In most cases dieback is caused by a pathogen which infests the plant and causes it to lose vigour, with leaves dying, and overtime may kill the plant. As such the management of Dieback is essentially related to plant hygiene when coming onto a site and within a site.

There are several guides to the management of Dieback.

- *Department of Environment and Conservation CALM Dieback Hygiene Manual 1992* is *a practical guide to Dieback management.*
- *Department of Environment and Conservation CALM* Best *Practice Guidelines for the Management of Phytophthora cinamomi, draft 2004.*
- *Dieback Working Group 2005, Management of Phytophthora Dieback in Extractive Industries.*
- *Dieback Working Group, 2000, Managing Phytophthora Dieback, Guidelines for Local Government.*

The Department of Environment and Conservation generally recognises that Dieback is less likely to impact on vegetation on limestone and Spearwood/Cottesloe Land Systems, Podger F D and K R Vear, 1998, Management of Phytophthora and disease caused by it, IN Phytophthora cinnamomi and the disease caused by it -protocol for identifying protectable areas and their priority for management, EPA 2000. However recently Murdoch University has identified a species of Phytophthora as having impacts on Tuart in calcareous soils.

Dieback is only likely to be an issue when equipment is brought to the site from a dieback affected area either through vehicles or plant and soil materials, therefore the following general principles are applied to Dieback management.

The aim of dieback management during excavation is to minimise the risk of entry of dieback into the site. The calcareous soils of the remnant vegetation may reduce the spread of some Phytophthora species. but there may be other pathogens such as Armillaria.

In many ways the management of the site for dieback is similar to that for the management of weeds, and the two management practices are considered together.

Even so, as the final end use will be industrial land, and the land to the east of the site being Lot 9005 (Lot 22) has already been cleared in the past, the risks from dieback are minimised on a site such as this. There is very little risk of the operations spreading dieback onto vegetation on adjoining properties as there is no access to those properties.

On the other hand, good management practices are used as part of the ongoing normal quarry operations.

The following management procedures are used on other LandCorp managed operating quarry sites and it should be noted that not all potential impacts apply to all parts of the proposed quarry operations.

- DBCA and Dieback Working Group 2005, Guidelines will continue to be followed.

- Dieback principles are followed even though there is a reduced risk of spread on calcareous soils such as this. (Podger F D and K R Vear, 1998, *Management of Phytophthora and disease caused by it, IN Phytophthora cinnamomi and the disease caused by it -protocol for identifying protectable areas and their priority for management,* EPA *2000).*

- The access road is to continue to be limestone.

- Vehicles are prohibited from entering vegetation ahead of excavation, apart from normal travel along made firebreaks and roads for normal security and maintenance activities.

- Dieback diseases are more likely to be transported under moist soil conditions.

- All vehicles and equipment are used during land clearing or land reinstatement, are clean and free from soil or plant material when arriving at site.

- When removing topsoil, the vehicles should run around the perimeter and then push inwards and not towards the pit.

- Remnant vegetation ahead of the stage to be excavated is quarantined by preventing land clearing vehicles from entering.

- No soil and vegetation is to be brought to the site apart from that to be used in rehabilitation and that which is dieback free.

- Plants to be used in rehabilitation are to be certified as dieback free sources.

- Unwanted access to vegetated areas is discouraged through a lack of tracks, signage, site marking and or fencing as appropriate

- Excavation vehicles are restricted to the excavation area apart from clearing land.

- Rehabilitated surfaces are free draining and do not contain wet or waterlogged conditions.

- Illegally dumped rubbish is removed promptly.

- When clearing land or firebreaks vehicles are to work from disturbed areas towards the pit; or in situations where dieback interpretation is not possible, from areas of higher quality vegetation to areas of lower quality vegetation.

- Roads are maintained as free draining and hard surfaced.

- A split operation will be undertaken where practicable, where the road transport vehicles only access one side of the stockpile or processing area and excavation vehicles operate on the other side of the stockpiles and processing, reducing the risk of contamination from road transport.

- DBCA has determined that material such as sand and limestone, taken from deeper in the regolith profile where there is no organic and other plant matter, carries low risk of spreading dieback. (DEC 2004).

- The Weed Management Policy will continue to be complied with.

- Topsoil will be cleared according to 8.0 Ongoing rehabilitation and Mine Closure Plan.

DIEBACK DISEASE			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Dieback Disease	*CALM Dieback Hygiene Manual 1992. CALM Best Practice Guidelines for the Management of Phytophthora cinamomi, draft 2004.* Dieback Working Group 2005, Management of *Phytophthora* Dieback in Extractive Industries. • The management procedures listed above will be followed, even though there is a minimal to no risk of dieback because access to surrounding land	The JV partners maintain their Dieback Management Policy to reduce the spread of *Phytophthora spp*.	Compliance with the Dieback Management Plan.

7.1.6 Weed Management Plan

The management of weeds is essentially similar to that for plant diseases. The impact of weeds is really the impact within the local area and the more they are controlled the better. It is desirable that the site does not become a haven for environmental weeds and therefore a management and control program is warranted at all sites.

Weeds can be declared under the Agriculture and Related Resources Protection Act 1976 which requires that Declared Weeds are eradicated. Other weeds are not Declared but may be classified as Environmental Weeds because they are well known for impacting on vegetation.

Generally, if the actions taken for Dieback are applied they will also control weeds. Not all potential impacts will apply to this quarry and the main impacts affecting this site are also listed.

Weed management will be used to minimise impact on site and on adjoining properties. Good management practices are used as part of the ongoing normal quarry operations.

A typical plan utilises the most appropriate on ground measures to minimise the risk of spread of Declared and Environmental weeds. The information provided here summarises the key points of the on ground management to be used as part of the management practices to be implemented at the proposed quarry operations on Lot 503.

Areas being rehabilitated are subjected to detailed weed management.

- The Dieback Management Actions are used to assist weed management.
- Inspections are conducted to monitor the presence and introduction of Environmental and

Declared Weeds on an annual or more frequent basis. On identification, Declared and significant environmental weeds are either be removed, buried, or sprayed with a herbicide.

- Large plants such as Castor Oil plants and Declared Weeds are periodically grubbed out or spot sprayed with a herbicide. Smaller weeds are treated.

- Areas of grass can be sprayed with Fusilade or similar grass selective herbicide. This can occur over the top of rehabilitated areas without significantly setting back the broad leafed species.

- All vehicles and equipment to be used during land clearing or land reinstatement, are clean and free from soil or plant material when arriving at site.

- No soil and vegetation is brought to the site apart from that to be used in rehabilitation.

- Plants to be used in rehabilitation are to be free from weeds.

- Vegetated areas ahead of excavation are quarantined to excavation vehicles until required.

- Unwanted access to vegetated areas is discouraged through signage, marking, a lack of tracks or external fencing.

- Weed affected top soils may need to be taken offsite, used in weed affected areas, buried by 500 mm soil/overburden or taken offsite.

- Illegally dumped rubbish is the major source of weeds and is removed promptly.

- No weed contaminated or suspect soil or plant material is to be brought onto the site.

- When clearing land or firebreaks vehicles work in conjunction with dieback principles and push from areas of better vegetation towards areas of lower quality vegetation.

- Weeds are sprayed with broad spectrum spray prior to planting or seeding in weed affected soils as required.

- Weed management works from the least affected areas to most affected.

- Ongoing monitoring of weeds should be undertaken at least annually in autumn, prior to winter rains.

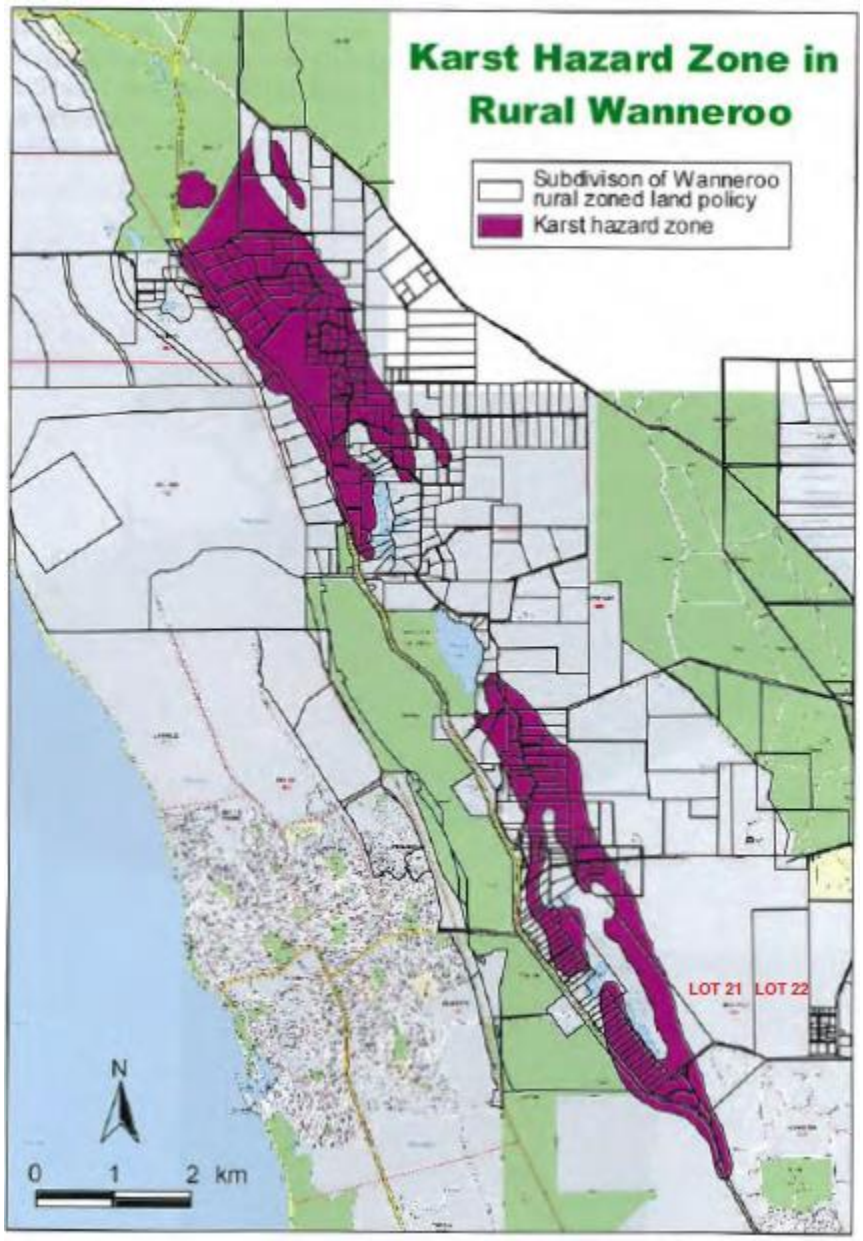
WEED MANAGEMENT			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Dieback Disease	*Agriculture and Related Resources Protection Act 1976.* • The weed management actions listed above are used as applicable to manage weeds on the site.	The proponents will implement and maintain a weed policy to try and prevent the introduction of Declared, Environmental or other weeds to the site, in particular in rehabilitation.	Compliance with the Management Plan.

7.1.7 Karst

No caves or sinkhole karst are known to occur locally on the resource area of Lot 503. Caves are known to occur along the western side of Neerabup Lake over 0.5- km to the west where organic rich water has formed cavities as it laterally exited from Lake Neerabup.

There are no known caves, based on local knowledge and an examination of the open quarry floor and previously excavated areas along the eastern boundary of lot 503. The site lies outside the known Karst belt, (Geoscience Australia 2005). **See Figure 12 Below.**

Figure 12- Karst Hazard Zones in Rural Wanneroo (Mapped by Lex Bastian)



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

Troglofauna, if they exist which is unlikely will be protected by leaving some 15 plus metres of limestone above the water table.

None of the risk factors listed in Guidance 54 are likely to occur. As Guidance 54 states that Stygofauna are aquatic they are unlikely to occur, and even if they did they will not be impacted on.

See also 3.1 Regional Geology.

KARST MANAGEMENT			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Karst Protection Stygofauna and Troglofauna	• There is no evidence of karst within the excavations. • There is a low risk of karst development and their dependant biota being present. • No caves of the water table have been intersected in this or adjoining quarries.	If caves are encountered, work will cease in that area, pending an assessment by a qualified person. Future actions will depend on the findings.	Ongoing

7.2 Water Management

7.2.1 Local Hydrology

Refer to Section 3.2.

IDEAL OPERATIONAL PROCEDURES	COMMITMENTS ON ACTIVITIES CONDUCTED ON SITE
Contain all stormwater on site and only release clean, treated water.	• The pit will be internally draining. • All stormwater collects on the porous floor of the pit and infiltrates into the ground as happens on the pit to the East for example.
Maintain all plant in good condition.	• All plants will be maintained in an efficient operational condition.
Maintain haul road and hardstand surfaces in good condition (free of potholes, rills and product spillages) and with suitable grades, and direct runoff to trapping and filtrating device.	• The hail road is limestone based, formed, graded, wetted down and maintained. • The crossover from Flynn Drive will be sealed.
Recycle water through sediment settling ponds if possible.	• The pit will be internally draining. As the pit floor is so porous it is difficult to achieve recycling, and there is normally not a wash cycle to recover water. Therefore, sediment settlement dams are not appropriate in this instance.
Provide an approved serviced portable or septic toilet system.	• An approved septic toilet system will be installed to meet health requirements.
Separate extraction, washdown and storm water if water is used.	• As stormwater is contained all water is treated as pit stormwater. • Stormwater from roads is shed to the adjoining soils and table drains.
Implement a site code outlining requirements for operators and drivers.	• This forms part of the normal operational procedures employed by the proponents or their contractors.
Avoid spillages on roads and clean up promptly.	• This forms part of the normal quarry operational procedures. The proponents propose to implement procedures consistent with the regulations and as are being employed at the adjacent quarry to deal with spillages of any type.
Conduct training programs on pollution minimisation practices.	• Site induction and training contains programs dealing with pollution prevention.
In the event of a spill or adverse incident, activities will be stopped in that area until the incident is resolved.	• This is included as part of the normal operational procedures and is proposed.

All significant adverse incidents are to be recorded, investigated and remediated. A record is to be kept of incidents and the Local Authority and Department of Environment and Conservation notified within 24 hours.	• A site office will be maintained. • A site record book will be retained. • Any incidents will be reported annually within 24 hours to the DBCA and City of Wanneroo.
Provide an environmental monitoring and audit program.	• The proponents will adopt internal monitoring and recording of operations.
Monitor water quality	• As there is no surface water, sampling of that waterbody is not appropriate. • Groundwater pollution risk is recognised as low by the DBCA and EPA who permit excavation of sand with a 3 metre separation to the water table in Priority 1 groundwater area.
Provide a complaint and remediation program in the event of non-conformities.	• A site record book will be maintained. • All complaints are to be investigated, remediated and recorded in the record book.
Comply with all operational conditions.	• This is normal operational procedures.

7.2.2 Protection of Water Quality

The protection of water whether groundwater or surface water is an important part of the management of quarries. Different types of quarries have different potential impacts which are listed below in general terms. Not all potential impacts will apply to this quarry and the main impacts affecting this site are also listed.

A number of documents provide guidance on the management and disposal of surface water that can lead to waterways, wetlands and underground water systems. These mainly apply to urban development but the methods are also applicable to the quarrying industry.

- Engineers Australia 2003, Australian Runoff Quality, National Committee on Water Engineering.
- Stormwater Management Manual for Western Australia, Department of Environment WA, 2004.
- Guidelines for Groundwater Protection in Australia, ARMCANZ, ANZECC, September 1995.
- Environmental Protection Authority Victoria/Melbourne Water, undated, Urban Stormwater, Best Practice Environmental Management Guidelines
- Water and Rivers Commission, 1998, Manual for Managing Urban Stormwater Quality in Western Australia.

Documents specific to the mining and quarrying operations are the DBCA DMIRS Water Quality Protection Guidelines for Mining and Mineral Processing.

- **Overview**

- Minesite water quality monitoring

- Minesite stormwater
- Mechanical servicing and workshop facilities
- Above-ground fuel and chemical storage
- Mine dewatering

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 2 metre vertical buffer is in place.

The proposed complies with Department of Environment and Conservation Guidelines.

The proposed procedures listed below summarise the water management to be used on site.

IDEAL OPERATIONAL PROCEDURES	**COMMITMENTS ON ACTIVITIES CONDUCTED ON SITE**
Contain all stormwater on site and only release clean, treated water.	• The pit will be internally draining. • All stormwater collects on the porous floor of the pit and infiltrates into the ground as happens on the pit to the East for example.
Maintain all plant in good condition.	• All plants will be maintained in an efficient operational condition.
Maintain haul road and hardstand surfaces in good condition (free of potholes, rills and product spillages) and with suitable grades, and direct runoff to trapping and filtrating device.	• The hail road will be formed using limestone base, formed, graded, wetted down and maintained. • The crossover from Flynn Drive will be sealed.
Recycle water through sediment settling ponds if possible.	• The pit will be internally draining. As the pit floor is so porous it is difficult to achieve recycling, and there is normally not a wash cycle to recover water. Therefore sediment settlement dams are not appropriate in this instance.
Provide an approved serviced portable or septic toilet system.	• An approved septic toilet system will be installed to meet health requirements.
Separate extraction, washdown and storm water if water is used.	• As stormwater will be contained all water is treated as pit stormwater. • Stormwater from roads will be shed to the adjoining soils and table drains.
Implement a site code outlining requirements for operators and drivers.	• This forms part of the normal operational procedures employed by the proponents or their contractors.
Avoid spillages on roads and clean up promptly.	• This forms part of the normal quarry operational procedures. The proponents propose to implement procedures consistent with the regulations and as are being

	employed at the adjacent quarry to deal with spillages of any type.
Conduct training programs on pollution minimisation practices.	• Site induction and training contains programs dealing with pollution prevention.
In the event of a spill or adverse incident, activities will be stopped in that area until the incident is resolved.	• This is included as part of the normal operational procedures and is proposed.
All significant adverse incidents are to be recorded, investigated and remediated. A record is to be kept of incidents and the Local Authority and Department of Environment and Conservation notified within 24 hours.	A site office will be maintained. • A site record book will be retained. • Any incidents will be reported annually within 24 hours to the DBCA and City of Wanneroo.
Provide an environmental monitoring and audit program.	• The proponents will adopt internal monitoring and recording of operations.
Monitor water quality	• As there is no surface water, sampling of that waterbody is not appropriate. • Groundwater pollution risk is recognised as low by the DBCA and EPA who permit excavation of sand with a 3 metre separation to the water table in Priority 1 groundwater area.
Provide a complaint and remediation program in the event of non-conformities.	• A site record book will be maintained. • All complaints are to be investigated, remediated and recorded in the record book.
Comply with all operational conditions.	• This is normal operational procedures.

7.2.3 Groundwater Protection & Water Use

A licenced bore from Department of Water is to be maintained for 12 000 kl per year usage. This has been found to be sufficient for good dust suppression on the adjacent site (Lot 9005 (formerly Lot 22), which is large by comparison to most other limestone pits on the Swan Coastal Plain, and with two operators on site as the joint venture arrangement.

A licensed bore is to be located within the fenced compound, with water being fed to an impermeable lined sump to allow rapid filling of the water trucks as required.

The Perth Groundwater Atlas indicates that the maximum expected groundwater levels at the site vary between about RL 30m on the eastern boundary to RL 24m along the western boundary. (Department of Environment, Perth Groundwater Atlas). Flow is to the south west.

The final contours proposed by the **NIASP17** will rise from 53 metres AHD in the centre of Lot 503 (western boundary) to 63 metres AHD on the southern boundary and 79 metres AHD on the northern boundary. Therefore, the final land surface will be over 20 metres above the highest known water table.

Salinity

There is no known salinity in the locality. Bore water is fresh.

Recharge and Water use

Water is to be used for dust suppression.

7.2.4 Surface Water, Dewatering & Drainage

Clearing will locally increase the recharge, through removal of the vegetation. (Environmental Protection Authority Bulletins 512, 788, 821 and 818). This will have locally result in an increase in recharge of 289 mm based on annual rainfall of 722 mm.
For example clearing will potentially increase the recharge by 2 889 kl per hectare per year.

With development to industrial land, increased proportions of hard surfaces that provide greater runoff will further increase the recharge.

The increase from clearing will be equivalent to an additional 145 mm rainfall annually (based on 20% increase for an annual rainfall of 722 mm), but will be balanced by the extraction of groundwater. Nine hectares of additional recharge as a result of land clearing will compensate for the 12 000 kl water taken from the groundwater system annually. With industrial development and say 50% hard surface formed, an additional 20 -30% recharge will occur, being equivalent to an additional 215 mm per year.

The additional recharge will assist the maintenance of local water tables in a drying climate.

The proposed operation complies with all Government Policies and Guidelines.

Water for dust suppression will be obtained from the licensed bore on site.

Potable water is brought to the site as needed.

7.2.5 Acid Sulphate Risk

There has been an increased interest in acid sulfate soils since the release of WAPC Planning Bulletin 64.

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.

The most definitive survey procedure was produced by the Acid Sulfate Soil Management Advisory Committee NSW, 1998, in their *Acid Sulfate Manual.* This Manual forms the basis for much of the assessment procedures in Australia, including those adopted by the Western Australian Planning Commission and the Department of Environment and Conservation. 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 is shown as Low to No Risk of acid sulfate conditions at depths of > 3 metres in WAPC Planning Bulletin 64.

A geological examination of the site showed that the site has no risk of containing acid sulfate conditions in the proposed depths of excavation. No evidence of acidic or reducing conditions have been encountered in any of the nearby quarries and none would be expected.

For example, the resource of limestone is high in the landscape, highly oxidised and alkaline. The same limestone is in fact used for neutralisation of acid soil conditions.

7.2.6 Waste Rock & Tailings Management

There will be no washing of limestone or products. Subgrade materials are incorporated into the fill to raise the final floor elevations.

7.2.7 Waste Materials

Unauthorised Access and Illegal Dumping

The potential for rubbish to be dumped relates mainly to poorly managed sites. Access to Lot 503 will be restricted by small perimeter trenches, strategic placement of logs and boulders and gates locked when the site is unmanned and equipment is retained on site. Fences will be maintained and upgraded as required.

Wastes generated will be recycled wherever possible and periodically disposed of at an approved landfill site. Any illegally dumped materials will be removed promptly to an approved landfill or other suitable site, depending on the nature of the material.

- **Solid Domestic and Light Industrial Wastes**

All solid domestic and light industrial wastes will be stored in commercial waste storage containers and/or removed to an approved landfill facility.

There will be no waste disposal onsite. Normal practice is for waste storage containers to be sealed so that rainfall cannot enter, therefore preventing the formation of leachates.

- **Vehicle Maintenance Wastes**

No major servicing will occur on site. The only servicing will most likely be minor lubrication as part of normal running operations.

Any waste chemicals derived during routine maintenance activities will be stored in appropriately sealed containers within a designated storage area or taken from site and disposed of at an approved facility. There is not proposed to be any wash down of mechanical equipment.

Domestic Wastewater Disposal

A septic toilet system is installed on site.

7.2.8 Refuelling & Maintenance

The protection of water from fuels and other chemicals is an important part of the management of quarries. Different types of quarries have different potential impacts which are listed below in general terms. Not all potential impacts will apply to this quarry and the main impacts affecting this site are also listed

Extraction of limestone is a clean operation similar to sand excavation in the nature of the risk to groundwater. No chemicals are used apart from normal lubricants, which is similar to sand excavation, and sand excavation is one of the few industries that are permitted to operate in a Priority 1 Public Drinking Water Source Area, indicating the clean nature of the activity. See Department of Water *Land Use Compatibility in Public Drinking Water Source Areas.*

All spills are cleaned up in accordance with the summarised procedures above and the Management Plans which are summarised below.

Documents specific to the fuel and maintenance are the DBCA -DMIRS Water Quality Protection Guidelines for Mining and Mineral Processing

- *Mechanical servicing and workshop facilities*
- *Above-ground fuel and chemical storage*

A list of the management actions for maintenance is provided above under 7.2.2. The actions will be used where applicable and as the opportunity presents to maintain water quality on this site.

The site will operate under and have in place safety and pollution management procedures for all operations. Regular independent audits are undertaken by LandCorp on all their development and operational sites.

Dangerous Goods and Hazardous Substances

There will be no transport, storage or handling of hazardous materials involved in limestone extraction.

Servicing and Maintenance

- All major servicing of vehicles will be conducted off site. Wastes generated from excavation and processing activities will be collected and removed off site weekly to an approved landfill site.

- Vehicle washdown will not be undertaken on site.

- Waste oil and other fluids derived from the routine maintenance of mobile machinery, will be transported off site and disposed of at an approved landfill site. Grease canisters, fuel filters, oil

filters and top-up oils will be stored in appropriate containers and brought to the site as required.

- Accidental spill containment and clean-up protocol will be implemented as necessary.

- Rubbish generated will be recycled wherever possible and periodically disposed of at an approved landfill site.

- The site will continue to be maintained in a tidy manner by removing all rubbish regularly offsite

Maintenance and Fuel Spill Management Plan

Fuel and maintenance will be carried out in accordance with the DBCA -DMIRS Water Quality Protection Guidelines for Mining and Mineral Processing, *Mechanical servicing and workshop facilities* and *Above-ground fuel and chemical storage.*

Mobile tankers will be used to refuel mobile and fixed plant when the site is manned.

In addition, a fuel storage tank of 10,000 litres is to be located within the fenced compound, bunded and lined with an impermeable membrane, to Department of Mines Industry Regulation and Safety and Department of Water and Environmental Regulation standards.

- Minor spills (e.g. 5 litres) will be recovered but will not affect the ground water because of the absorbent nature of the limestone and bacterial breakdown.

- Larger spills will be picked up and removed to an approved waste disposal site. The Department of Environment and Conservation and City of Wanneroo will be notified if a spill in excess of 5 litres occurs.

- Soil and resource will quickly be placed around the spill to contain it in as small an area as possible. When contained, the contaminated limestone will be scooped up and removed to an approved landfill or other approved site.

- Refuelling will be conducted in designated areas, where any spill can be contained. In addition, any spill will be immediately bunded and all contaminated soil removed to an appropriate location for remediation.

- Soils and hardstand such as those on this site are adsorptive. The main risk of contamination is the minor drips that occur during the removal of hoses etc. Minor spills are quickly degraded by soil microbial matter.

- Major servicing of large machinery is to be normally undertaken offsite or in specially designed facilities approved for the location of the quarry.

- Regular inspections and maintenance of fuel, oil and hydraulic fluids in storages and lines will be carried out for wear or faults.

- Servicing plant and equipment will be in accordance with a maintenance schedule.

- Refuelling and lubricating activities are to occur in designated areas, and equipment for the containment and cleanup of spills will be provided.

- Spillages are to be contained in plant and working areas by shutting down plant or equipment if the plant or equipment is the source of the spill (provided it is safe to do so).
- Waste substances and chemicals will be stored in accordance with the Site Waste Guidelines.
- Transport chemicals in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code).
- All significant adverse incidents (such as a fuel spill of >5 litres) in one dump, are to be recorded, investigated and remediated. A record is to be kept of incidents, and City of Wanneroo, DMIRS and DWER will be notified within 48 hours of an incident.

WATER QUALITY			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
General Management	*DBCA – DMIRS Water Quality Protection Guidelines for Mining and Mineral Processing* • *Overview* • *Minesite water quality monitoring* • *Minesite stormwater* • *Mechanical servicing and workshop facilities* • *Above-ground fuel and chemical storage* • *Mine dewatering* • Management procedures outlined above will protect water quality. • All spills are to be cleaned up as described in the Management Plan above.	The proponent will maintain the relevant water protection policies to minimise the potential for alteration to surface or ground water.	Compliance with the Management Plan.
Surface water	There is no surface water runoff and no dewatering. All water is contained within the pit and allowed to infiltrate into the limestone.	None necessary.	Compliance with the Management Plan.

Ground water	*DBCA – DMIRS Water Quality Protection Guidelines for Mining and Mineral Processing* • Interpretation of the geology and hydrology, shows that there will be no significant alteration to the groundwater regime. • Complies with all Government Policies. • The management actions listed above are complied with. • The current operational procedures will be continued.	The proponent will maintain the relevant water protection policies to minimise the potential for alteration to surface or ground water.	Compliance with the Management Plan.
Salinity	No evidence of surface water or salinity.	None necessary.	None necessary at this time.
Waste Materials	*DBCA – DMIRS Water Quality Protection Guidelines for Mining and Mineral Processing* • A septic toilet system is maintained on this site. • No liquid or solid wastes will be disposed of on site. • All waste will be collected and either recycled or disposed of at an approved waste disposal site.	The proponent will maintain the relevant water protection policies to minimise the potential for alteration to surface or ground water.	Compliance with the Management Plan.

7.3 Atmospheric Pollution and Noise

7.3.1 Visual Management

Visual Impact can occur in a number of circumstances, by the operation being set too high in the landscape, by being too close to neighbours and by insufficient visual protection.

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

The only potential visual issue is from Flynn Drive. In other directions the pit is set back more than 500 metres from any dwelling, behind existing vegetation and the developed industrial land. Even so perimeter bunds will be formed during the resource preparation.

The following procedures will be undertaken wherever possible to minimise visual impact from on site activities.

The excavation will operate from the floor of the pit behind the existing faces, which assists visual screening. Excavation will push towards the perimeters behind the existing faces, with the floor being progressively lowered.

IDEAL OPERATIONAL PROCEDURES	**COMMITMENTS ON ACTIVITIES CONDUCTED ON SITE**
Locate exposed features behind natural barriers and landform.	• The quarry and processing facilities will be set well back from Flynn Drive located behind perimeter bunding and on the floor of the pit.
Operate from the floor of the pit below natural ground level	• The pit is worked from the inside via an internal haul road.
Avoid breaks in the skyline due to workings and haul roads.	• The access road will be maintained but as the industrial development extends from the south the access road will have to be reformed and moved to the North.
Push overburden and overburden dumps into positions where they will not be seen or can form screening barriers.	• Perimeter bunds will be formed from overburden.
Construct screening bunds and plant tree and shrub screens to reduce visual impact.	• Perimeter bunds will be formed from overburden. • The ability to do this is restricted in the south by the already developed industrial land which has been formed at a higher elevation than the current pit floor.

	• The quarry and industrial development moves northwards as excavation progresses.
Stage workings and progressive rehabilitation to provide visual protection of later activities.	• A stayed procedure is to be implemented and maintained. • The quarry and individual development moves northwards as excavation progresses.
Cover barriers and landscaping with forms, colours and textures compatible with the natural environment.	• Plant is to be located on the floor of the pit so this is less applicable.
Adopt good house keeping practices such as orderly storage and removal of disused equipment or waste.	• The proponents will maintain a tidy work environment on all sites. • Waste will be regularly removed off site to an approved waste facility.
Provide progressive rehabilitation of all completed or disturbed areas.	• The quarry and industrial development moves northwards as excavation progresses.
Minimise the amount of ground used at any one time.	• Only ground required for excavation will be prepared and the industrial land development follows excavation.
Install fences and gates which are compatible with the style of the area.	• Gates and fences are to be installed at the entrance and as appropriate.
Minimise offsite impacts of night lighting.	• Night operations are not proposed. • Some security lighting is to be used, which is directed away from sensitive views, roads and premises.
Paint and maintain buildings exposed, plant and equipment with low impact colours.	• Plant will not normally be visible from Flynn Drive. • Proposed plant is small and consists of small portable and mobile items. • Plant is to be located on the floor of the pit, so this is less applicable.
Locate roads and access to prevent direct views into the site.	• The access road will be located behind maximum natural screening but as the industrial development extends from the south the access road will have to be relocated.
Locate buildings, plant and stockpiles in areas of low visual impact and maintain appropriate size.	• Plant and stockpiles are to be located on the floor of the pit.
Provide temporary revegetation of road embankments and disturbed areas as soon as practicable.	• As the land is being progressively development to industrial land this is not generally possible or required. • Some interim native vegetation has been used.
Control weeds and maintain amenity planting.	• A weed control program will be implemented.

	• Revegetation is to be incorporated into the industrial land development.
Ensure transport vehicles do not spill material on public roads and ensure prompt clean-up if it occurs.	• Company practices and drive/operator training addresses the need to minimise spill by ensuring the trucks are not overloaded or material is not left on the outside of the trays. • Collection of spills is to be carries out when reported. • Drivers will be instructed to be responsible for their load. • All loads will be required to be covered by company policy. • All loads leaving the site are to be covered.

Light Overspill

The site will not operate at night. The only lighting that might be required at night could be security lighting. Security lighting is to be located to minimise light visibility from roads and neighbours. The pit is to be stabilised by the use of top soil as discussed in 8.0 Mine Closure Plan. Excavated areas will be progressively rehabilitated as they are completed.

VISUAL MANAGEMENT			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Neighbours or road users	• The active working areas of the quarry are screened by the landform, large buffers and existing vegetation. • Excavation takes place from the floor of the pit, working outwards.	The proponents are committed to continued management of visual impact and will implement the measured outlined.	Compliance with the Excavation Management Plan. Ongoing.

7.3.2 Noise Management

Day-to-day noise produced by mining equipment will be limited to the loader and cartage trucks, and to a lesser extent the small mobile screen. Noise levels at the mine will need to conform to limits specified under Assigned Outdoor Neighbourhood Noise Levels for adjacent land.

As noted, the closest noise sensitive premise is residential development located approximately 300m south-east from the closest area proposed for mining on Phase 1 Lot 503 and some 500m from the initial quarrying operations and separated from the site by Flynn Drive.

Noise levels associated with the operation of the mine will be minimised by the following factors and management techniques:

- The activity level at the mine will be relatively low given that a restricted number of equipment types will be in operation and that no processing or blasting occurs;
- The location of the mine within the nominated buffers will reduce the potential for the lateral propagation of operational noise;
- Machinery at the site will only operate within the designated hours;
- The access road will be kept in good condition at all times to minimise the potential for noise generation from empty trucks entering the site;
- Any complaints received regarding noise disturbance will be recorded and follow-up action instigated immediately to minimise the cause, to the greatest practical extent.

Based on the previous analysis, and given that Flynn Drive is a busy distributor road carrying a large volume of both passenger and heavy haulage vehicles, the potential for impact on the residential area to the south-east is considered low.

However, in the event that justifiable noise complaints are received, the Quarry Operator will be required under his license agreement to engage the services of an acoustic consultant to identify the noise source and provide a solution.

7.3.3 Dust Management

The potential for dust generation may occur when topsoil is stripped, respread during rehabilitation, and from truck movements. However, the site is relatively well screened (as discussed previously in this report) and will be actively managed.

The Department of Environmental Protection has prepared a Site Classification Assessment Chart for dust and wind-borne material (DEP, 1996). This document is somewhat superseded by the DEP's Guidance for the Assessment of Environmental Factors – Prevention of Air Quality Impacts from Land Development Sites (DEP, 2000), however the latter does not include an Assessment Chart approach, which is considered useful in determining dust generation risk.

Applying the DEP (1996) Assessment Chart to the proposal based on a series of assumptions results in a **score of 119** (**Appendix A**), or **Classification 1**, which is subsequently considered "**low risk**".

In the case of Classification 1 proposals, the DEP considers that the proponent shall supply a contingency plan to the local government, which shall detail the activities to be undertaken should dust impacts occur. Contingency arrangements include allowance for water-cart operation, wind fencing and surface stabilisation, and minimising the area disturbed at any one time.

Consequently, the following management strategies will be implemented to prevent or minimise dust generation from the quarrying operations:

- All reasonable and practicable measures will be taken to minimise dust emissions from the mine and associated plant;
- Vegetation will be cleared and topsoil stripped in months and conditions less conducive to dust generation;
- Where possible, vegetation clearing and topsoil handling will be conducted on days when winds are from direction other than north or north-easterly, so that any dust produced will not be carried in the direction of Flynn Drive;
- The area disturbed or open at any one time will be minimised;
- All traffic areas will be maintained in a manner which minimises dust generation;
- A water cart, which is stationed on-site, will be used to water roads to prevent the generation of dust;
- All vehicles leaving the site are required to have loads covered.

In the unlikely event that justifiable dust complaints are received, Rocla will identify the dust source and provide an immediate solution.

7.3.4 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 summarised below together with the potential issues that relate to this site. The actions will be used where applicable and as the opportunity presents to minimise 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 unauthorised access*

There is less potential fire risk from quarries than other land uses because quarries operate on cleared land, and vehicles are restricted to cleared access roads, the pit floor, processing and stockpile areas.

These cleared areas form a natural firebreak. The main risk comes from an external fire in the surrounding vegetation, impacting on the quarry. As such the fire risk is less than the risk from a rural property.

Fire risk is normally controlled through the *Bush Fires Act 1954* and local authority bylaws.

FIRE PROTECTION			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Fire Protection	*Bush Fires Act 1954* • The excavated area provides a natural fire break. • Perimeter firebreaks are to be maintained. • Public access to the site is prohibited and fences maintained. • Water for dust minimisation is available for firefighting. • The excavation equipment is available to cut emergency firebreaks and has been used in the past. • The site is serviced by telephone.	The proponents will ensure the quarry operates to the standards in the *Mines Safety and Inspection Act 1994 and Regulations 1995.* The proponents will ensure the quarry complies with the City of Wanneroo fire safety requirements.	Maintenance of Fire Preparedness Plan. Ongoing.

8.0 ONGOING REHABILITATION & MINE CLOSURE PLAN

8.1 Land Use Policies

Lot 503 is zoned General Industry.

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

The site is owned by the Western Australian Land Authority, managed by LandCorp.

8.2 End Use

The extraction of limestone is seen as an interim use of the land prior to returning the site to an industrial land use.

Lot 503 is to be progressively converted to industrial land generally from the south to the north in compliance with the **NIASP17**.

8.3 Mine Closure Considerations

The potential for rehabilitation to native vegetation is therefore limited by the Structure Plan.

The use of interim revegetation remains an option but is normally constrained by the need not to impede future development.

The achievement of a cover of indigenous shrubs over the whole site is limited by the use of top soil which will contain a significant proportion of pasture seeds. Appropriate topsoil management does however remain an important element.

Conditions for plant growth on rehabilitated surfaces can be harsh, with low nutrient levels, low levels of water availability in summer, excessive heat, high pH, strong winds and high evapo-transpiration. The steps outlined below will reduce these impacts and increase the success of the rehabilitation program. Rehabilitation already undertaken on site shows that rehabilitation can be very successful, to the point of providing interim ground cover, if carried out at the correct time using suitable techniques.

The other difficulty is that the level of exotic species and pasture already within the topsoil on Lot 503 means that rehabilitation to indigenous vegetation will be more difficult. Topsoil that will be available will have high seed loads of pasture species which will severely restrict the establishment of native species.

8.4 Rehabilitation Objectives

Rehabilitation will be directed towards the final end use as Industrial Landuse in compliance with the **NIASP17**.
As such land restoration and rehabilitation could have three Options;

1 Land surface prepared in readiness for imminent development

2 Land stabilised and left for development at a future time

3 Land stabilised with an interim low vegetation cover of native plants pending decisions on final development.

The rehabilitation methodology which follows is the fall back Option 3 in the event that other land uses are not readily identifiable. Even though relatively full rehabilitation is described, it is unlikely to be used. Where an interim cover is required, species from an approved list (City of Wanneroo) will be used.

The species will therefore need to be selected to match the local plant communities or a restricted number of fast growing species may be used. The species to be used in rehabilitation may be different to that which originally occurred on site, because the land surface might be much lower and have higher levels of soil moisture, or the soil conditions may be different, as noted above the substrate will be limestone.

Rehabilitation may contain Dieback and Weed Management in addition to monitoring and replanting failed areas. There should also be a completion criteria against which the revegetation should be compared.

The interim rehabilitation will therefore continue to be used in strategic locations as a light seeding of local indigenous species to provide an interim cover of local native shrubs with scattered trees.

The same techniques have proved very successful in the past when rehabilitating Alcoa Australia land for future use as red mud lakes at Hope Valley and for rehabilitation of a block cutting quarry at Nowergup. This type of rehabilitation has been particularly successful where little topsoil has been available.

Rehabilitation Objectives

Rehabilitation Program to Native Vegetation if required by Option 3 if used.

Note that if any of Options 1 -3 are used this full revegetation program will not be required, but the key elements may still be used.

Whichever option is applicable to Weed and Dieback Management.

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

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 Industry Regulation and Safety 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

- A stable post-mining landscape, and the minimisation of wind erosion in conformity with planning and land use requirements applicable at the time of closure of each piece of land.

- A land surface that is compatible with the surrounding area and in accordance with the **NIASP17**.

- A self sustaining low density cover of native shrubs that will stabilise the land surface and be capable of regenerating following fire.

- Rehabilitation should be free of weeds likely to impact on the effectiveness of the vegetation.

Depending on the success of rehabilitation, land use requirements, 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

Vegetation is proposed to be cleared once DWER approvals are achieved. **Refer to Appendix B for details of DWER requirements.**

1 Topsoil clearing will be progressive and minimised to that required for each stage of excavation.

2 Consideration also needs to be given to the possibility that large fragments of vegetation may inhibit future use of the site. Alternatively, chipping of removed vegetation may be used.

3 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.

4 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.

Topsoil and Overburden Removal

1 . Where possible topsoil and overburden will be directly transferred from an area being cleared to an area to be rehabilitated. This is seen as important in both the parkland pasture and native vegetation areas.

2 Overburden, as yellow and brown sand and low grade limestone, will be pushed to the perimeters of the excavation, particularly the eastern edges, to assist with visual and noise screening. From there it can be used for the rehabilitation process and for raising the land to the final proposed elevation.

3 Excavation will be worked progressively in the stages as shown on the attached plan.

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

Landform Reconstruction and Contouring

1 All buildings, equipment and machinery will be removed from site.

2 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.

3 The final landform will be formed to the proposed land use defined at the time of each closure and in compliance with the final concept plan and the **NIASP17**.

4 The land surface will be a level floor with interim sloping batters at I : 3 to 1 : 4 vertical to horizontal to the flat floor and final elevations of 1 : 10.

5 The limestone floor and batter slopes will be deep ripped in two directions. The width between rip lines will be 1 metre intervals.

6 A minimum of 300 mm of overburden will be spread over the surface where available to

provide a substrate for revegetation. On limestone, rehabilitation can be very successful with minimum overburden when the floor is adequately deep ripped.

7 Research on limestone rehabilitation on mining leases demonstrates that good revegetation can be achieved by seeding into soft overburden and deep ripped limestone floor, if suitable local species are used.

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.

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.

Revegetation

1. Topsoil will be re-distributed in rehabilitated areas to depths of 50 mm where available.

2. 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. However, weed affected topsoil can create additional issues and may not be used.

3. 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.

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

5. 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.
6. Local provenance seed will be used wherever possible, selected for its ability to not impede the proposed final end use. A species list is attached.

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

8. 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.

9. 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.

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

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 50 kg/hectare, applied to rehabilitation areas in the year of planting. Nitrogen is provided by using leguminous seed in the seed mix.

Irrigation

1 Experience in quarries in Tamala Sand and limestone, has shown that when completed well there is no need for irrigation of the rehabilitation.

2 Irrigation was not used previously in the adjacent quarry operations (Lot 9005) and rehabilitation works.

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, interim revegetation will take place as soon as possible following landform and soil reconstruction.

8 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 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.

REHABILITATION			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Rehabilitation	• See the Rehabilitation, Weed Management and Dieback Plans outlines above. • Rehabilitation will aim to achieve compliance with the proposed end use at the time of each closure. • The rehabilitation aims to stabilise the excavated soils and batter slopes pending decisions being made on the future use of the excavated area. • All buildings, structures and equipment will be removed at the conclusion of excavation. • The final contours will be in accordance with the contours proposed by the **NIASP17**. • Monitoring of the rehabilitation will be undertaken.	The proponents will implement and maintain the Rehabilitation Plan to rehabilitate the excavated surface as outlined above.	Implement and maintain the rehabilitation program. Rehabilitate each completed section as soon as practicable.

9.0 REFERENCES

Department of Environmental Protection (1996). Land Development Sites and Impacts on Air Quality – A guideline for the prevention of dust and smoke pollution from land development sites in Western Australia.

Department of Environmental Protection (2000). Assessment of Environmental Factors – Prevention of Air Quality Impacts from Land Development Sites. Final Guidance No.18.

Environmental Protection Authority (1997). *Guidelines for Environment and Planning. Draft.* Environmental Protection Authority.

Government of Western Australia (2000). *Bush Forever.*

Heddle, E.M., Loneragan, O.W. and Havel, J.J. (1980). *Vegetation Complexes of the Darling System, Western Australia.* IN: Atlas of Natural Resources, Darling System, Western Australia. Maps and Explanatory Text. Department of Conservation and Land Management.

Ministry for Planning (MfP) (1995). *Urban Bushland Strategy.* Ministry for Planning, Western Australia.

Rokich, D.P., Dixon, K.W., Sivasithamparam, K. and Meney, K.A. (2000). Topsoil Handling and Storage Effects on Woodland Restoration in Western Australia. *Restoration Ecology* Vol.8, No.2, pp. 196-208.

Water and Rivers Commission (1997). Perth Groundwater Atlas.

FIGURES

Figure List

APPENDIX A

Site Classification Assessment Chart for dust and wind-borne material

(after DEP, 1996).

Appendix 1: Site risk assessment/classification for activities generating uncontaminated dust

Sheet 1: Site classification assessment chart

Part A. Nature of site

PART A. Nature of Site									
Item	Score Options								Allocated Score
1. Nuisance potential of soil when disturbed:	1	very low	2	Low	4	medium	6	high	4
2. Topography and protection provided by undisturbed vegetation.	1	Sheltered & screened	6	Medium screening	12	little screening	18	exposed & wind	1
3. Area of site disturbed by the works.	1	Less than 1ha	3	Between 1ha and 5ha	6	Between 5ha and 10ha	9	More than 10ha	3
4. Type of work being done.	1	roads or shallow trenches	3	road, drains & med depth sewers	6	roads, drains & partial earthworks	9	bulk earthworks deep trenches	9
								Total score for Part A	**17**
PART B. Proximity of Site to Improvements									
1. Distance of improvements from site.	1	More than 1Km	6	Between 1km and 500m	12	Between 100m and 500m	18	Less than 100m	1
2. Effect of prevailing winds (at time of construction) on improvements.	1	not affected	6	isolated improvements affected by one wind direction	9	Dense improvements affected by one wind direction	12	dense/sensitive improvements highly affected by prevailing winds.	6
								Total score for Part B	**7**

SITE CLASSIFICATION SORE (A x B) = 17 x 7 = 119

A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities.

Sheet 2: Site assessment details

Engineer for the owner	PERITAS CIVIL PTY LTD
Site Detail	LOT 503 FLYNN DRIVE, NEERABUP
Local government	CITY OF WANNEROO
Location of Works (use AMG Grid Reference from MS Director and nearest Main St.	NORTH OF FLYNN DRIVE NEAREST CROSS-STREET is WANNEROO ROAD & FLYNN DRIVE
Project Name/Stage	LOT 503 FLYNN DRIVE, NEERABUP – PHASE 1 AREA
Description of Works	EARTHWORKS, QUARRYING/RESOURCE EXTRACTION
Contract Dates (Starting/Completion/Period in weeks)	TBA
Score from Assessment Chart	**119**
Special Considerations	(refer to Appendix 1, Note 4)

Comments at Completion

(to include detail of dust-related problems and Provisions and Contingency Arrangements which were actually carried out)

(Copy of this completed sheet to be returned to the Department of Environmental Regulation)

Sheet 3: Notes relating to 'site assessment classification chart'

1. The site assessment chart is used to differentiate between Classifications 1, 2, 3 and 4, as defined within these guidelines. Classifications 2 and 3 are subject to Note 4, below.

2. Sites may be divided into two or more classifications depending mainly on the proximity of existing land uses.

3. In assessing the relevant score level, the 'effect of prevailing winds' must be carefully considered. While houses, commercial areas, market gardens, schools and factories have high sensitivity ratings, roads, parks and recreational areas have lower sensitivity ratings.

4. Construction during dry period (1 October – 31 March).

   (a) Where other land uses are within 100 metres of the site:

      (i) sites assessed as Class 3 will automatically become Class 4, and

      (ii) sites assessed as Class 2 will automatically become Class 3.

   (b) Where other land uses are situated between 100 metres and 500 metres from the site, an on-site re-evaluation of Class 3 sites shall be conducted by the engineer for the developer, the local government or the DEC to determine the extent of additional Class 4 requirements considered necessary (if any).

Sheet 4: Dust management and monitoring requirements for each site classification score

Based on the total score obtained from the 'SITE CLASSIFICATION ASSESSMENT CHART' and notwithstanding any allowance for special site conditions during the dry period, (refer to Note 4, Appendix 1) the following site classification will apply:

Site classification 1 — under 199;

Site classification 2 — 200 to 399;

Site classification 3 — 400 to 799, and

Site classification 4 — over 800.

Note: • Unique sites may need special assessment.
• It is essential that any contracts for construction work on site include the relevant contingency arrangements appropriate for the site classification.

- **Classification 1 (score under 199, considered negligible risk)**

Provisions:
• None required.
Contingency arrangements:
• None required.

- **Classification 2 (score between 200 and 399, considered low risk)**

Provisions:
• The developer shall supply a contingency plan to the local government, which shall detail the activities to be undertaken should dust impacts occur.

Contingency arrangements:
• Include an allowance for water-cart operation, wind fencing and surface stabilisation during the construction period for the purposes of dust suppression.
• All areas of disturbed land should be stabilised to ensure that the disturbed area exposed at any time is kept to a practical minimum.

Monitoring requirements:
• Complaints management system in place (complaints recorded and acted on promptly).
• Notice to be erected at the site, providing contact details of the person to be contacted and works.

- **Classification 3 (score between 400 and 799, considered medium risk)**

Provisions:
• Appropriate wind fencing of a length specified in the air quality management programme needs to be stored on site or available within one hour of being required by the engineer for the developer/local government/DEC.
• All areas of disturbed land should be stabilised to ensure that the disturbed area exposed at any time is kept to a practical minimum to prevent exceedence of dust standards (see Section 4.4.2).
• The engineer for the developer shall maintain close control of works with dust creating potential (for example, allowable length of open trenching).
• After all siteworks are completed, and before the contractor has vacated the site, the developer should ensure that the entire site is stable. The developer then retains responsibility for site stability until change of ownership/control takes place. After the change of ownership/control has taken place, the new owner or controlling party will inherit responsibility for site stabilisation.

Contingency arrangements:
• Suitable water-carts in good working condition and of not less than 10,000 litres capacity per 7.5 hectares of disturbed site, or other suitable alternatives, shall be available to commence watering on the site within 18 hours of being required to do so by the engineer for the developer/local government/DEC.
• Surface stabilisation equipment shall be available to commence operation on site within 48 hours of being required to do so by the engineer for the developer/local government/DEC and with sufficient capacity to cover the disturbed site area within a further 48 hours.
• Wind fencing shall be erected within 18 hours of the contractor being required to do so by the engineer for the developer/local government/DEC. Dust generating works on the site shall cease in the interim.
• If dust-related complaints are generated due to activities on the site, the developer may be required by the local government or an authorised DEC officer to distribute advisory notices to adjoining land occupiers within 48 hours. A notice form is provided in Sheet 5 of Appendix 1.
• If dust-related complaints are generated due to material which has been excavated for trenching, the developer shall ensure this material is stabilised within 48 hours of being requested to do so by the engineer for the developer, local government or an authorised DEC officer.
• Include an allowance for water-cart operation, wind fencing and surface stabilisation during the construction period for the purposes of dust and wind-borne material suppression.
• Include an allowance for surface stabilisation for the purposes of dust and wind-borne material suppression to be maintained after the construction period and until change of ownership/control takes place.

Monitoring requirements
• Site dust management system in place.
• On-site dust monitoring against short term criteria.
• Off-site (compliance) dust monitoring at site boundary (if close to sensitive receptors) or at sensitive receptors. See Section 4 and Appendix 4.
• Complaints management system in place (complaints recorded and acted on promptly).
• Exceedences to be reported to the relevant authority – DEC, Local Government or DOH.
• Notice to be erected at the site, providing contact details of the person to be contacted regarding the works.

Classification 4 (score over 800, considered high risk)

Provisions:
- Advisory notices shall be issued to adjoining land occupiers, the local government and the DEC at least 48 hours before site works commence. The notices shall include the name of the developer, engineer for the developer, contractor/s, contract period, contact telephone numbers of the site engineer and local government environmental health officer as detailed in Sheet 5 of Appendix 1.
- Fencing to the extent and in locations agreed to by the developer and local government shall be erected before any part of the site surface is disturbed.

Note: This provision does not necessarily mean that the total site boundary is to be fenced. The fence is to be installed to an extent which will protect adjacent land uses and in most cases should be erected on the edge of the area which will be disturbed rather than on the site boundary.
- An amount of wind fencing of a length specified in the air quality management programme needs to be stored on site or available within one hour of being required by the engineer for the developer/local government/DEC.
- The nominated wind fencing is to remain in position until the disturbed surface is stable.
- Surface stabilisation is to be applied to the disturbed area of each section of the site upon completion of the works in that section.
- The engineer for the developer shall maintain strict control of works with dust-creating potential. Material which has been excavated for trenching shall be stabilised if the trench is to be left exposed for longer than 72 hours.
- After all siteworks are completed, and before the contractor has vacated the site, the developer should ensure that the entire site is stable. The developer then retains responsibility for site stability until change of ownership/control takes place. After the change of ownership/control has taken place, the new owner or controlling party will inherit responsibility for site stabilisation.

Contingency arrangements:
- Suitable water-carts in good working condition and of not less than 10,000 litres capacity per 5 hectares of disturbed site, or an appropriate alternative, shall be available to commence immediate watering on the site.
- Surface stabilisation equipment shall be available to commence operation on site within 48 hours of being required to do so by the engineer for the developer/local government/DEC and with sufficient capacity to cover the disturbed site area within a further 48 hours.
- Additional wind fencing shall be erected within 18 hours of the contractor being required to do so by the engineer for the developer/local government/DEC. Dust generating works on the site shall cease in the interim.
- Include an allowance for water-cart operation, wind fencing and surface stabilisation during the construction period for the purposes of dust and wind-borne material suppression.
- Include an allowance for surface stabilisation for the purposes of dust and wind-borne material suppression to be maintained after the construction period and until change of ownership/control takes place.

Monitoring requirements
As for Classification 3.

APPENDIX B

DWER Letter dated 22 December 2017 regarding the status of the clearing application

Government of Western Australia
Department of Water and Environmental Regulation

Your ref:
Our ref: CPS 7405/1
Enquiries: Abbie Crawford
Phone: 6364 7126
Email: info-der@dwer.wa.gov.au

Mrs Rebecca Hide
Eco Logical Australia
PO Box 237
WEST PERTH BC WA 6872

Dear Mrs Hide

APPLICATION TO CLEAR NATIVE VEGETATION UNDER THE *ENVIRONMENTAL PROTECTION ACT 1986*

I refer to Western Australian Land Authority t/a LandCorp's application to clear 93.4 hectares of native vegetation within Lot 503 on Deposited Plan 409677, Neerabup, for the purposes of extractive industry and industrial development (Reference: CPS 7405/1). This application was received on 14 December 2016.

Thank you for correspondence dated 29 August 2017 in which you provided a response to the Department of Water and Environmental Regulation's letter of 14 July 2017. Thank you also for your correspondence dated 30 November 2017 which included a revised offset proposal.

Taking this information into consideration the preliminary assessment report has been updated and is attached for your review.

Please note, based on the preliminary assessment, it is likely that if granted a clearing permit will contain a fauna management condition, land degradation management condition and land acquisition offset condition.

In considering a clearing matter, the Chief Executive Officer (or Delegated Officer) shall have regard to any planning instrument or other matter considered relevant, in accordance with section 51O(4) of the EP Act. I am of the view that development approval and an extractive industry licence from the Shire of Wanneroo are relevant considerations. Therefore I will defer the decision on this application until you are able to provide a copy of these approvals.

Please ensure these approvals are provided within three months from the date of this letter. I advise that the Delegated Officer intends to make a decision on the application based on the information available in three months from the date of this letter. In the absence of receiving a copy of the development approval and extractive industry licence, it is possible that the application for a clearing permit may be refused, in accordance with section 51E(5)(b) of the EP Act.

If you have any queries regarding the progress of this application, please contact Senior Clearing Regulation Officer Ms Abbie Crawford on 6364 7126.

Yours sincerely

James Widenbar
MANAGER
CLEARING REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

22 December 2017

Attached: CPS 7405/1 Preliminary Assessment Report

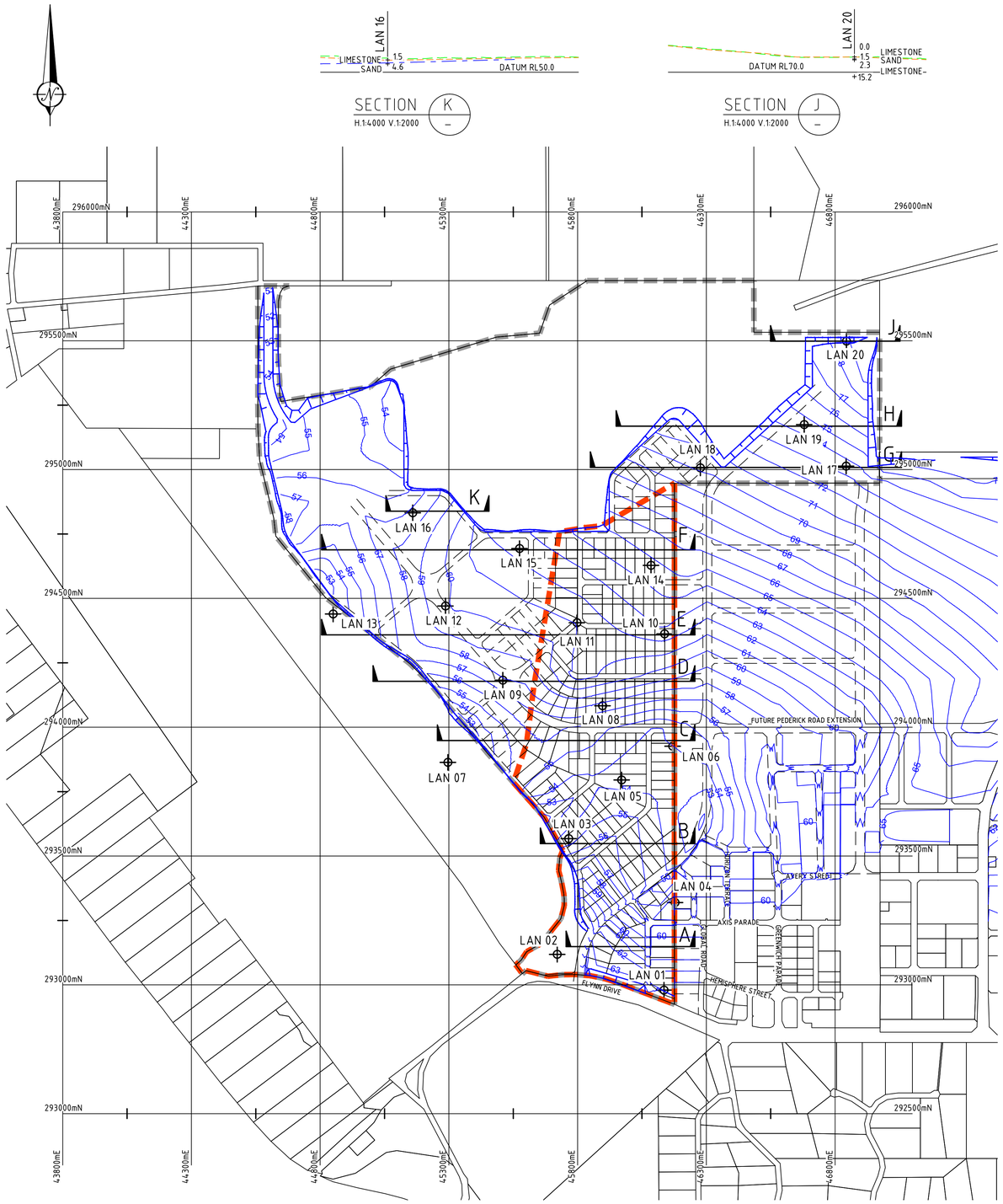
Cc: Ms Jessica Koeck, Department of the Environment and Energy – *Jessica.koeck@environment.gov.au*

APPENDIX C

Plans Associated with Development Application

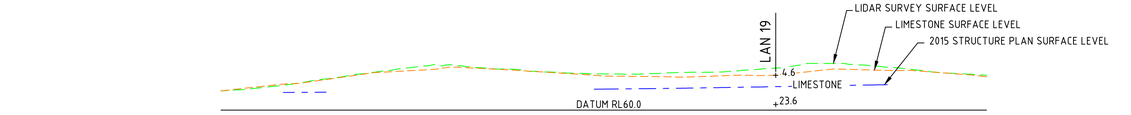
Drawings List

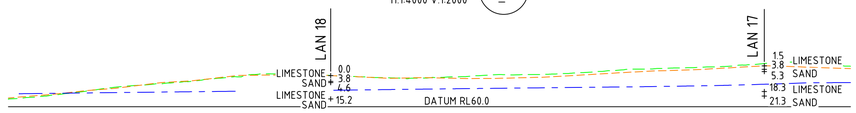
Drawing Number	Drawing Rev	Drawing description
PC18027-1	A	Resource Plan & Sections
PC18027-1	A	Limestone Surface Plan
PC18027-1	B	Deposited Plan
PC18027-1	A	Concept Subdivision Plan – Phase 1
PC18027-1	A	Surface Detail Plan – Sheet 1 of 3
PC18027-1	A	Surface Detail Plan – Sheet 2 of 3
PC18027-1	A	Surface Detail Plan – Sheet 3 of 3

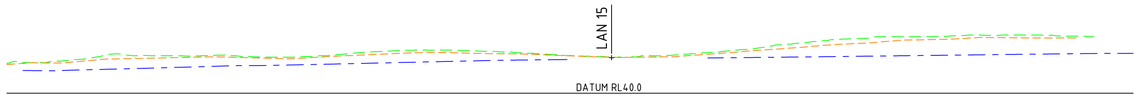


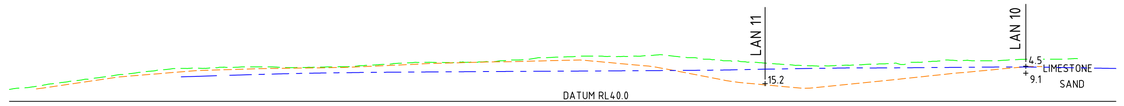
DRILL HOLE LOCATION PLAN

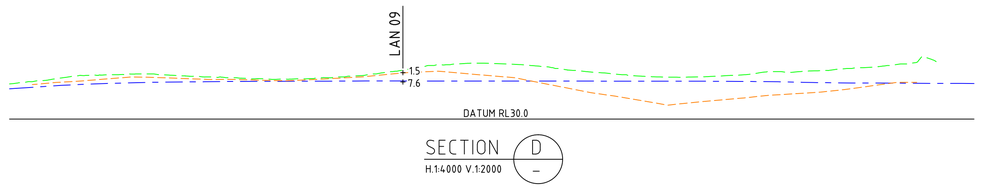
SCALE: 1:10000

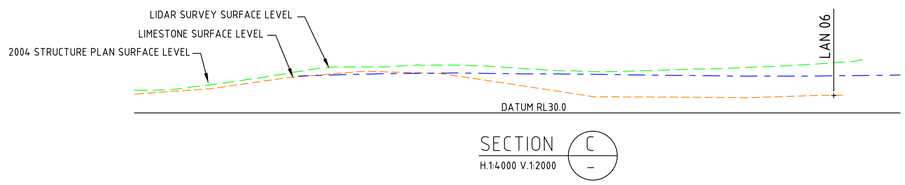


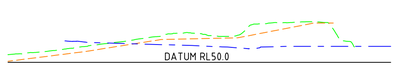


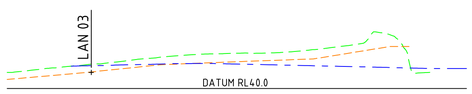












NOTES:

1. CADASTRAL BOUNDARIES SHOWN ARE FROM THE 'NEERABUP INDUSTRIAL AREA STRUCTURE PLAN'.
2. RESOURCE SECTIONS PROVIDED ARE DERIVED FROM DRILLING INVESTIGATIONS UNDERTAKEN BY PREVIOUS OWNERS OF LOT 701. THE RESULTS ARE PROVIDED FOR GUIDANCE ONLY AND ARE NOT WARRANTED TO BE CORRECT OR TO INFER THAT LANDCORP AND THEIR CONSULTANTS HAVE ESTABLISHED THE VIABILITY OF THE RESOURCE MATERIALS AVAILABLE ON THE SITE. PROPONENTS SHOULD MAKE THEIR OWN INTERPRETATION OF THE DATA IN THIS REGARD.

LEGEND:

- DESIGN CONTOURS (2015)
- LIMESTONE CONTOURS
- LIDAR CONTOURS
- LAN 01 — DRILL HOLE INVESTIGATION SITE
- LOT 503 BOUNDARY
- LOT 503 PHASE 1 APPLICATION BOUNDARY
- INVESTIGATION BOUNDARY

HORIZONTAL SCALE 1:4000 METRES
80 0 80 160 240m
40 0 40 80 120m
VERTICAL SCALE 1:2000 METRES
METRES
200 0 200 400 600m
SCALE 1:10000

M:\DCD\2017\DCD17025 Neerabup Quarry - Meridian Park\Acad\PC18027-CI\PC18027-CI-1300.dwg

No.	REVISION	BY	DATE
A	ISSUED FOR INFORMATION	MD	26.02.18

peritas group
PERTH OFFICE
P: +61 8 6336 9299
F: +61 8 6336 9288
E: enquire@peritasgroup.com.au
74 GOODWOOD PARADE
BURSWOOD WA 6100
P.O. BOX 134
BURSWOOD WA 6100

CLIENT: LANDCORP

PROJECT:
NEERABUP INDUSTRIAL AREA
LOT 503 FLYNN DRIVE NEERABUP

DRAWING TITLE:
RESOURCES PLAN AND SECTIONS

SCALE	AS SHOWN	FILE	
HORIZONTAL	–	DESIGN	MD
VERTICAL	–	DRAWN	MD
SURVEY DATUM	AHD	CHECKED	EBF
WAPC No		DATE	FEB 2018
CADFILE NAME	PC18027-CI	DRAWING No.	1300
REV.	A		

THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED BELOW

APPROVED .....

NORTHERN CONSTRAINTS BOUNDARY
(FINAL BOUNDARY OF QUARRYING AREA
SUBJECT TO ENVIRONMENTAL APPROVALS)

LAN 19 ⊕ 82.7
LAN 18 ⊕ 80.3
LAN 17 ⊕ 86.7
LAN 16 ⊕ 59.5
LAN 15 ⊕ 63.2
LAN 14 ⊕ 75.5
LAN 13 ⊕ 67.8
LAN 12 ⊕ 67.8
LAN 11 ⊕ 51.6
LAN 10 ⊕ 62.0
LAN 09 ⊕ 60.4
LAN 08 ⊕ 35.0
LAN 07 ⊕ 39.5
LAN 06 ⊕ 41.3
LAN 05 ⊕ 45.8
LAN 04 ⊕ 67.6
LAN 03 ⊕ 50.5
LAN 02 ⊕ 49.9
LAN 01 ⊕ 66.3

PART LOT 503
PHASE 1
93.2ha

FUTURE PEDERICK ROAD EXTENSION
AVERY STREET
HORIZON TERRACE
AXIS PARADE
GLOBAL RISE
GREENWICH PARADE
HEMISPHERE STREET
FLYNN DRIVE

LEGEND

- LIDAR SURVEY CONTOURS (2m)
- LIMESTONE SURFACE CONTOURS (2.0m)
- LOT 503 PHASE 1 APPLICATION BOUNDARY
- NORTHERN CONSTRAINTS BOUNDARY
- LAN 07 ⊕ 0.7 / 70.6 — BORE HOLE LIMESTONE SURFACE DEPTH/ELEVATION (AHD)
- + 0.5 / 66.3 — INTERPOLATED LIMESTONE SURFACE DEPTH/ELEVATION (AHD)

METRES
100 0 100 200 300m
SCALE 1:5000

LIMESTONE SURFACE PLAN
SCALE: 1:5000

M:\DCD\2017\DCD17025 Neerabup Quarry - Meridian Park\Acad\PC18027-CI\PC18027-CI-1301.dwg

No.	REVISION	BY	DATE
A	ISSUED FOR INFORMATION	MD	26.02.18

PERTH OFFICE
P: +61 8 6336 9299
F: +61 8 6336 9288
E: enquire@peritasgroup.com.au
74 GOODWOOD PARADE
BURSWOOD WA 6100
P.O. BOX 134
BURSWOOD WA 6100

CLIENT: LANDCORP

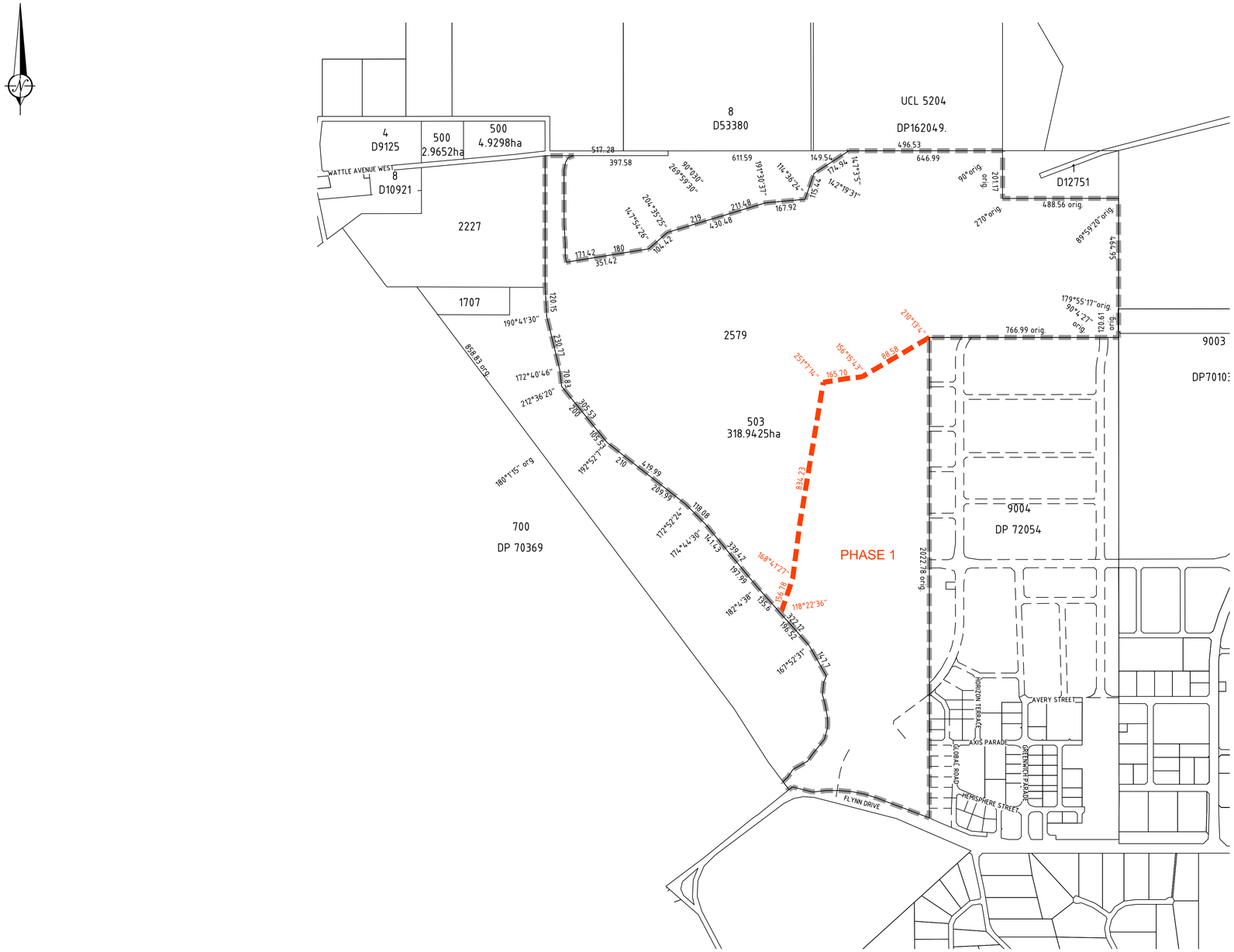
PROJECT:
NEERABUP INDUSTRIAL AREA
LOT 503 FLYNN DRIVE NEERABUP

DRAWING TITLE:
LIMESTONE SURFACE PLAN

SCALE	AS SHOWN	FILE	
HORIZONTAL	–	DESIGN	MD
VERTICAL	–	DRAWN	MD
SURVEY DATUM	AHD	CHECKED	EBF
WAPC No		DATE	FEB 2018
CADFILE NAME	PC18027-CI	DRAWING No.	1301
REV.	A		

THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED BELOW

APPROVED



DEPOSITED PLAN

SCALE: 1:10000

LEGEND:

- LOT 503 BOUNDARY
- LOT 503 PHASE 1 APPLICATION BOUNDARY

METRES

200 0 200 400 600m

SCALE 1:10000

M:\DCD\2017\DCD17025 Neerabup Quarry - Meridian Park\Acad\PC18027-CI\PC18027-CI-1302.dwg

No.	REVISION	BY	DATE
B	ISSUED FOR INFORMATION	MD	10.04.18
A	ISSUED FOR INFORMATION	MD	26.02.18

peritas group

PERTH OFFICE
P: +61 8 6336 9299
F: +61 8 6336 9288
E: enquire@peritasgroup.com.au
74 GOODWOOD PARADE
BURSWOOD WA 6100
P.O. BOX 134
BURSWOOD WA 6100

CLIENT: LANDCORP

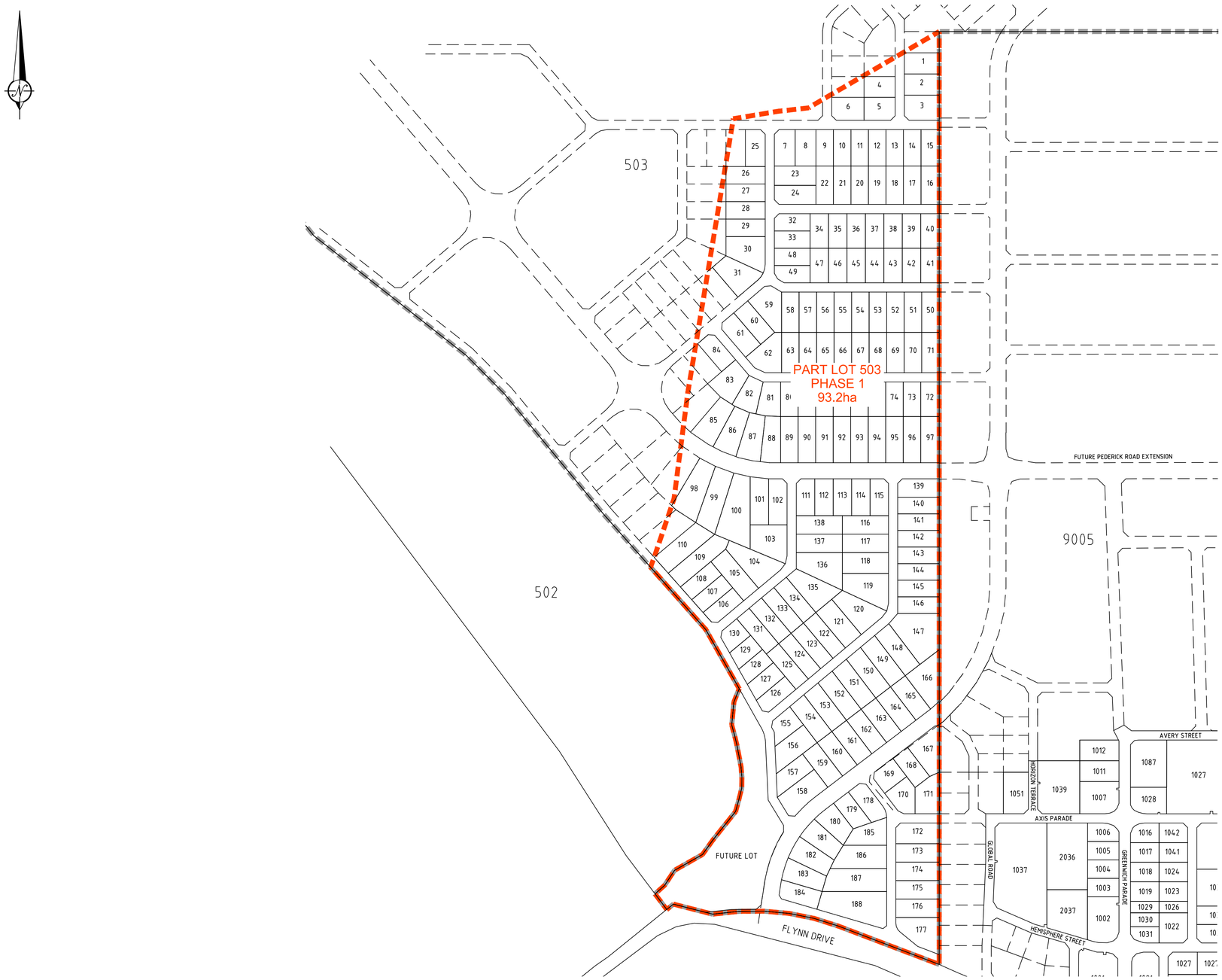
PROJECT:
NEERABUP INDUSTRIAL AREA
LOT 503 FLYNN DRIVE NEERABUP

DRAWING TITLE:
DEPOSITED PLAN

SCALE	AS SHOWN	FILE	
HORIZONTAL	–	DESIGN	MD
VERTICAL	–	DRAWN	MD
SURVEY DATUM	AHD	CHECKED	EBF
WAPC No		DATE	FEB 2018
CADFILE NAME	PC18027-CI	DRAWING No.	1302
REV.	B		

THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED BELOW

APPROVED .....



OVERALL LOT SUMMARY

SIZE	No. LOTS	% TOTAL LOTS	
2001m² – 3000m²	16	8.51%	MINIMUM LOT SIZE 2531m²
3001m² – 4000m²	126	67.02%	MAXIMUM LOT SIZE 8911m²
4001m² – 5000m²	27	14.36%	AVERAGE LOT SIZE 3733m²
5001m² – 6000m²	13	6.91%	TOTAL LOT AREA 70.1820ha
6001m² – 7000m²	3	1.60%	
7001m² – 10000m²	3	1.60%	
TOTAL LOTS	188		
FUTURE LOTS	1		

LEGEND:

LOT 503 BOUNDARY

LOT 503 PHASE 1 APPLICATION BOUNDARY

CONCEPT SUBDIVISION PLAN – PHASE 1

SCALE: 1:5000

METRES

100 0 100 200 300m

SCALE 1:5000

M:\DCD\2017\DCD17025 Neerabup Quarry - Meridian Park\Acad\PC18027-CI\PC18027-CI-1303.dwg

No.	REVISION	BY	DATE
A	ISSUED FOR INFORMATION	MD	26.02.18

PERTH OFFICE
P: +61 8 6336 9299
F: +61 8 6336 9288
E: enquire@peritasgroup.com.au
74 GOODWOOD PARADE
BURSWOOD WA 6100
P.O. BOX 134
BURSWOOD WA 6100

CLIENT: LANDCORP

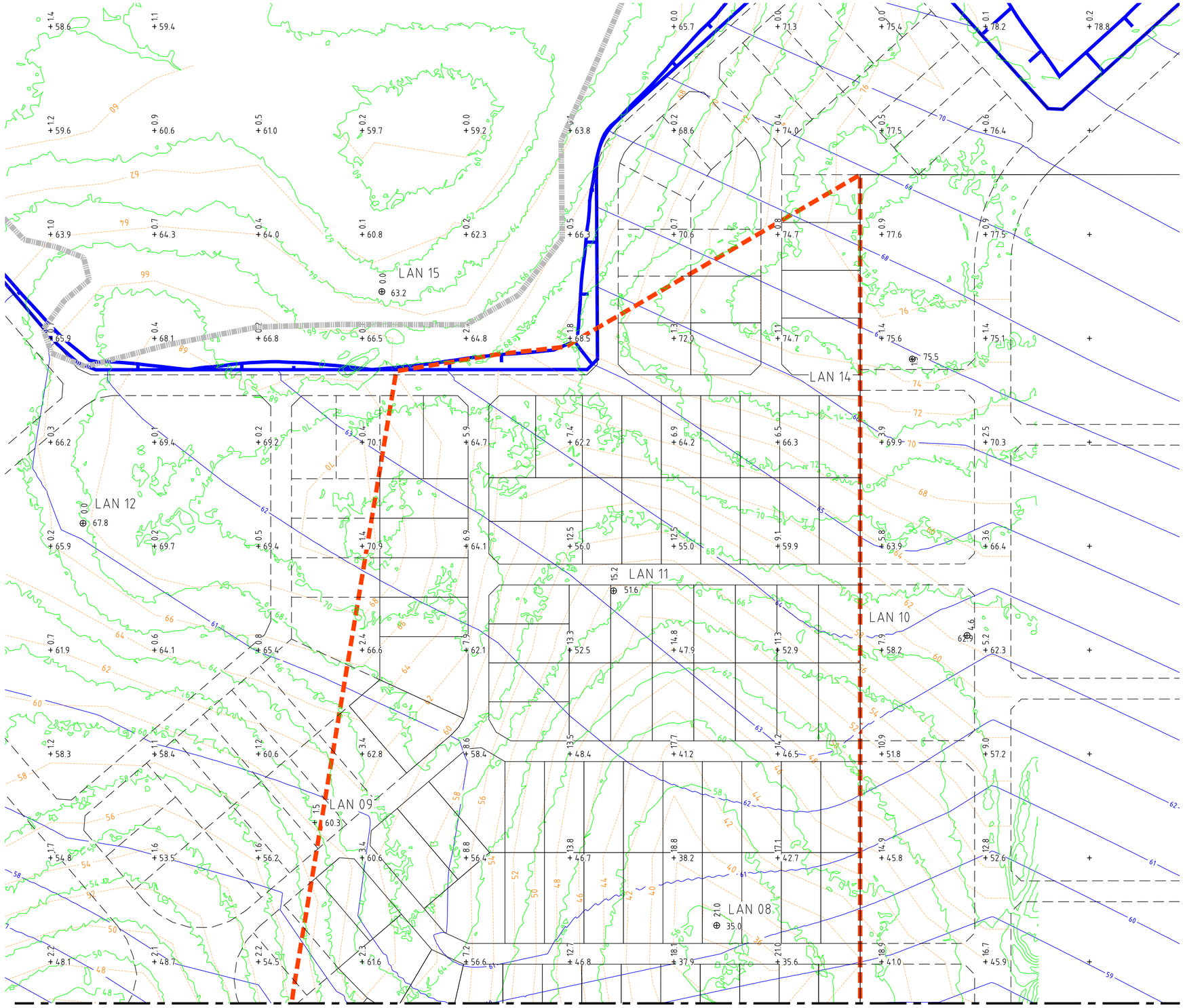
PROJECT: NEERABUP INDUSTRIAL AREA
LOT 503 FLYNN DRIVE NEERABUP

DRAWING TITLE: CONCEPT SUBDIVISION PLAN
PHASE 1

SCALE	AS SHOWN	FILE	
HORIZONTAL	–	DESIGN	MD
VERTICAL	–	DRAWN	MD
SURVEY DATUM	AHD	CHECKED	EBF
WAPC No		DATE	FEB 2018
CADFILE NAME	PC18027-CI	DRAWING No.	1303
REV.	A		

THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED BELOW

APPROVED .....



LEGEND

- DESIGN CONTOURS (2015)
- LIDAR SURVEY CONTOURS (2m)
- LIMESTONE SURFACE CONTOURS (2.0m)
- LOT 503 PHASE 1 APPLICATION BOUNDARY
- NORTHERN CONSTRAINTS BOUNDARY
- BORE HOLE LIMESTONE SURFACE DEPTH/ELEVATION (AHD)
- INTERPOLATED LIMESTONE SURFACE DEPTH/ELEVATION (AHD)

JOINS TO DWG PC18027-CI-1305

SURFACE DETAIL PLAN

SCALE: 1:2000

METRES

40 0 40 80 120m

SCALE 1:2000

M:\DCD\2017\DCD17025 Neerabup Quarry - Meridian Park\Acad\PC18027-CI\PC18027-CI-1304-1306.dwg

No.	REVISION	BY	DATE
A	ISSUED FOR INFORMATION	MD	10.04.18

PERTH OFFICE
P: +61 8 6336 9299
F: +61 8 6336 9288
E: enquire@peritasgroup.com.au
74 GOODWOOD PARADE
BURSWOOD WA 6100
P.O. BOX 134
BURSWOOD WA 6100

CLIENT: LANDCORP

PROJECT:
NEERABUP INDUSTRIAL AREA
LOT 503 FLYNN DRIVE NEERABUP

DRAWING TITLE:
SURFACE DETAIL PLAN
SHEET 1 OF 3

SCALE	AS SHOWN	FILE	
HORIZONTAL	–	DESIGN	MD
VERTICAL	–	DRAWN	MD
SURVEY DATUM	AHD	CHECKED	EBF
WAPC No		DATE	FEB 2018
CADFILE NAME	PC18027-CI	DRAWING No.	1304
REV.	A	APPROVED	

THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED BELOW

JOINS TO DWG PC18027-CI-1304

LAN 07

LAN 06

LAN 05

LAN 03

LAN 04

HORIZON TERRACE

LEGEND

- DESIGN CONTOURS (2015)
- LIDAR SURVEY CONTOURS (2m)
- LIMESTONE SURFACE CONTOURS (2.0m)
- LOT 503 PHASE 1 APPLICATION BOUNDARY
- NORTHERN CONSTRAINTS BOUNDARY
- BORE HOLE LIMESTONE SURFACE DEPTH/ELEVATION (AHD)
- INTERPOLATED LIMESTONE SURFACE DEPTH/ELEVATION (AHD)

JOINS TO DWG PC18027-CI-1306

METRES

40 0 40 80 120m

SCALE 1:2000

SURFACE DETAIL PLAN

SCALE: 1:2000

M:\DCD\2017\DCD17025 Neerabup Quarry - Meridian Park\Acad\PC18027-CI\PC18027-CI-1304-1306.dwg

No.	REVISION	BY	DATE
A	ISSUED FOR INFORMATION	MD	10.04.18

peritas group

PERTH OFFICE
P: +61 8 6336 9299
F: +61 8 6336 9288
E: enquire@peritasgroup.com.au
74 GOODWOOD PARADE
BURSWOOD WA 6100
P.O. BOX 134
BURSWOOD WA 6100

CLIENT: LANDCORP

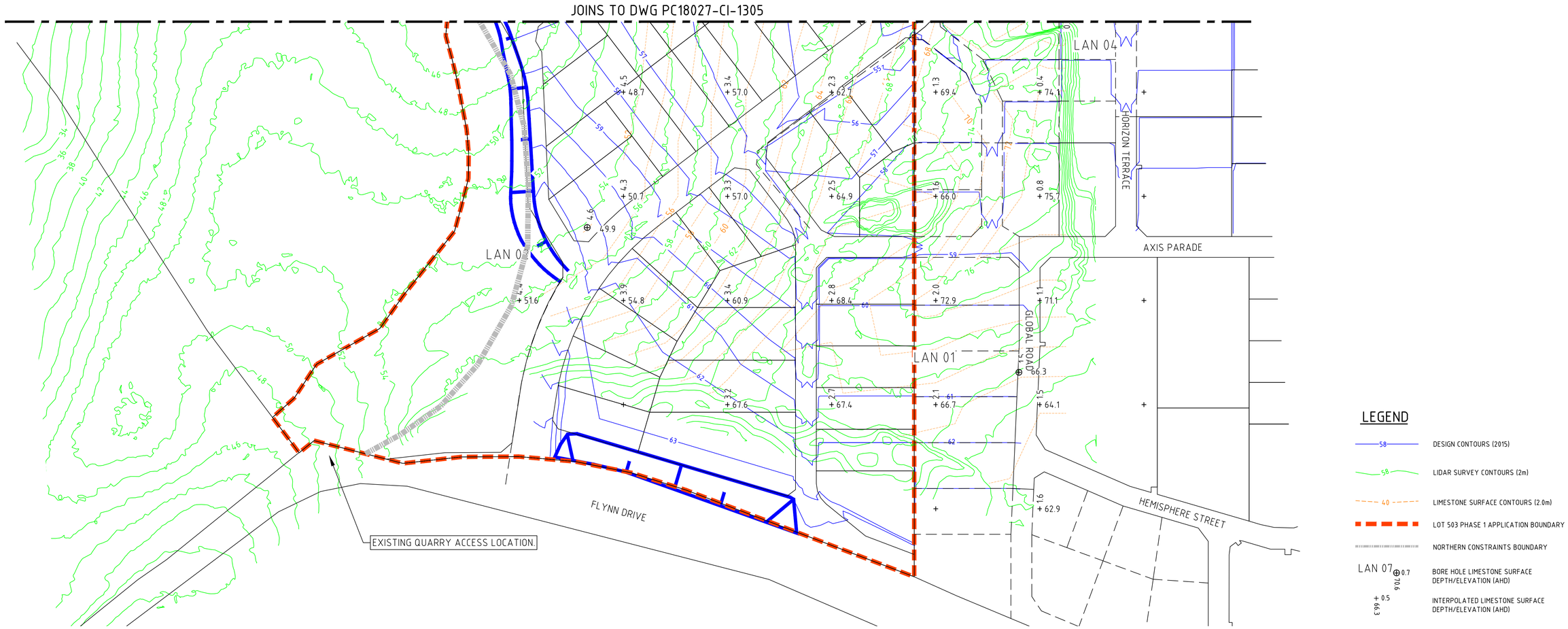
PROJECT:
NEERABUP INDUSTRIAL AREA
LOT 503 FLYNN DRIVE NEERABUP

DRAWING TITLE:
SURFACE DETAIL PLAN
SHEET 2 OF 3

SCALE	AS SHOWN	FILE	
HORIZONTAL	–	DESIGN	MD
VERTICAL	–	DRAWN	MD
SURVEY DATUM	AHD	CHECKED	EBF
WAPC No		DATE	FEB 2018
CADFILE NAME	PC18027-CI	DRAWING No.	1305
REV.	A		

THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED BELOW

APPROVED



SURFACE DETAIL PLAN

SCALE: 1:2000

METRES
40 0 40 80 120m
SCALE 1:2000

M:\DCD\2017\DCD17025 Neerabup Quarry - Meridian Park\Acad\PC18027-CI\PC18027-CI-1304-1306.dwg

No.	REVISION	BY	DATE
A	ISSUED FOR INFORMATION	MD	10.04.18

peritas group
PERTH OFFICE
P: +61 8 6336 9299
F: +61 8 6336 9288
E: enquire@peritasgroup.com.au
74 GOODWOOD PARADE
BURSWOOD WA 6100
P.O. BOX 134
BURSWOOD WA 6100

CLIENT: LANDCORP

PROJECT: NEERABUP INDUSTRIAL AREA
LOT 503 FLYNN DRIVE NEERABUP

DRAWING TITLE: SURFACE DETAIL PLAN
SHEET 3 OF 3

SCALE	AS SHOWN	FILE	
HORIZONTAL	–	DESIGN	MD
VERTICAL	–	DRAWN	MD
SURVEY DATUM	AHD	CHECKED	EBF
WAPC No		DATE	FEB 2018
CADFILE NAME	PC18027-CI	DRAWING No.	1306
REV.	A		

THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED BELOW

APPROVED .....