Extractive Industry Application
&
Clay Extraction Management Plan

Lot M1326 Wandena Road, Muchea

prepared for
Boral Bricks Western Australia Pty Ltd
(Midland Brick)

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PLANNING DESIGN ENVIRONMENT

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Executive summary

Land Insights acts for Boral Bricks Western Australia Pty Ltd (Midland Brick) and lodge this application on their behalf. The application is for an extension of Planning Approval and Extractive Industry Licence for the extraction of clay on Lot M1326 Wandena Road, Muchea. Planning approval and an Extractive Industry Licence were issued in 2009 and expire in June 2017.

The site has been use for extractive industries for over 20 years and adjoining Reserve 24776 has been used for excavation for over 60 years. Substantial clay supplies still exist on site, hence the need for an extension to the approvals.

This application is for an extension to the Planning Approval and Extractive Industry Licence for a duration of 7 years. The requirements of the *Shire of Chittering Extractive Industries Local Law 2014* are addressed within this document.

SUBJECT	DESCRIPTION
Operating times	The hours of operation will be from 06:00-17:00 hours from Monday to Friday and 06:00-14:00 hours on Saturdays. No operation will occur on Sundays or Public Holidays.
Life of project	Beyond 7 years, depending on demand for material.
Site preparation	Some clearing of parkland cleared vegetation may be required. Access, signage, gates and fencing already established.
Access	Access to the site will be from the existing access on Wandena Road.
Vehicle movements	Variable depending on demand for clay. Estimated that clay will be transported from the site on 90-140 days per year. There will be approximately 50-70 truck movements per day on each of the days when the resource is transported (depending on the type, number of trucks available and demand).
Pit Area	The area occupied by the extractive industry (pit area and stockpiling area) is approximately 11.27 hectares.
Staging	The future extraction area has been identified and shown on the attached plans. It will be excavated in a staged manner depending on demand.
Depth	Depth of excavation is approximately 16 – 20 metres.

SUBJECT	DESCRIPTION
Excavation process	An earthworks campaign refers to the excavation and stockpiling of material. Excavation generally takes place during the drier months and material is stockpiled on site. Earthworks can take place anytime between September and April when conditions are appropriate. During the earthworks campaign, trucks will be loaded with clay directly from the pit. A 'excavation campaign' refers to the excavation of material to be placed onto stockpiles for use over the wetter months. In general the steps will involve the following: • Trees will be cleared and the wood will be disposed of appropriately. • Topsoil will be removed and transferred directly to an area being rehabilitated on the site or stockpiled for later use. Stockpile areas will be 0.5 – 1.0 metres in height. • Overburden will be scraped from the pit area to a depth of approximately 2 – 5 metres. It will be transferred to an area being rehabilitated, placed around the perimeter of the site to create bund walls or stockpiled for later use. Stockpiles will be located adjacent to pit areas for readiness to push into the pit as part of land restoration. • Excavation will continue to be worked as an 'inside out operation' as much as possible, commencing east and progressing west. In doing this, vehicles normally work on the floor of the pit and work towards the edges as much as possible. The purpose of this is to reduce disturbance to surrounding areas. • The depth of excavation will vary depending on the availability of the resource, however is expected to reach depths of up 20 metres. • Clay will be excavated by a bulldozer, scraper or excavator to a depth of up to 20 metres. • Excavation will generally take place from east to west across the area identified on the attached plan in a staged manner, depending on demand. • Clay will be moved by dump trucks from the pit area and loaded directly onto trucks for transport from the site. • During a 'excavation campaign', material will be excavated and moved directly onto stockpiles to create supply for the winter months. An excavation campaign typically lasts 2-3 months so that enough material is excavated and stockpiled for the wetter months. • As the resource contains several grades of clay, benches may need to be created in the pit face to separate the different types of clay. They will also need to be stored as separate stockpiles. • Material is stockpiled at the southern end of the site. Four types of clay are stockpiled in this area. During the wetter months, trucks will be loaded with clay from the stockpiles. • Water will be retained on site and directed into the detention basins. Water in these basins will be used for dust suppression or fire fighting as required.

SUBJECT	DESCRIPTION
Direction of excavation	Excavation will progress in a westerly direction from the existing pit areas.
Stockpiling	Material will be stockpiled and carted from the site when required.
Drainage	Water is collected in the pits on site and is used for dust suppression.
Refuelling	Mobile refuelling. No storage of fuel on site.
Structures	Structures are placed on site for workers (such as small office, lunch room and portable toilets).
Decommissioning and rehabilitation	The pits will be recontoured and rehabilitated into pasture. A majority of the southern part of the site has been rehabilitated over the years.

The proposed clay extraction will comply with the dust management plan, noise management plan, water management plan, refuelling management plan and rehabilitation management plans contained within the following report.

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1 Introduction

1.1 Background

Land Insights acts for Boral Bricks Western Australia Pty Ltd (Midland Brick) and lodge this application on their behalf for Lot M1326 Wandena Road, Muchea. The purpose of this report is to apply for an extension to the Planning Approval and an Extractive Industry Licence to provide for the continued extraction of clay resources on site. Planning approval and an extractive industry licence were issued in 2009 and expire in June 2017.

This application is for an extension to the Planning Approval and Extractive Industry Licence for a duration of 7 years. The signed application form is at Appendix A.

The site has been use for extractive industries for decades. Substantial clay supplies still exist on site, hence the need for an extension to the approvals.

1.2 Purpose of report

The purpose of this report is to provide supporting information for an application for an extension to the Planning Approval and an Extractive Industry Licence for a period of 7 years. The requirements of the *Shire of Chittering Extractive Industries Local Law 2014* are addressed within this document. The prescribed application forms have been completed and delivered to the Shire.

1.3 Importance of clay and rationale

The extraction of clay is an important process in the supply of bricks and other construction materials for the community. The continued demand for housing results in a continued demand for basic raw materials, including clay. If the community demand for construction resources (to build homes etc.) wasn't present then there would be no need for the pits. The availability of clay resources in close proximity to the Perth Metropolitan Area is also important as it reduces transportation and construction costs to the community. It should be noted that clay deposits near the Perth Metropolitan Area are scattered and under pressure from other land uses which threatened to sterilise the resource.

The importance of clay to the community is documented in the following government reports:

- WAPC, (2000), *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.*

The excavation activities on the site will continue to provide valuable clay resources to the community and the construction industry in years to come. Similar grades of clay in other pits are nearing exhaustion and therefore this pit will continue to be of high value to Midland Brick and enable them to provide a full range of products.

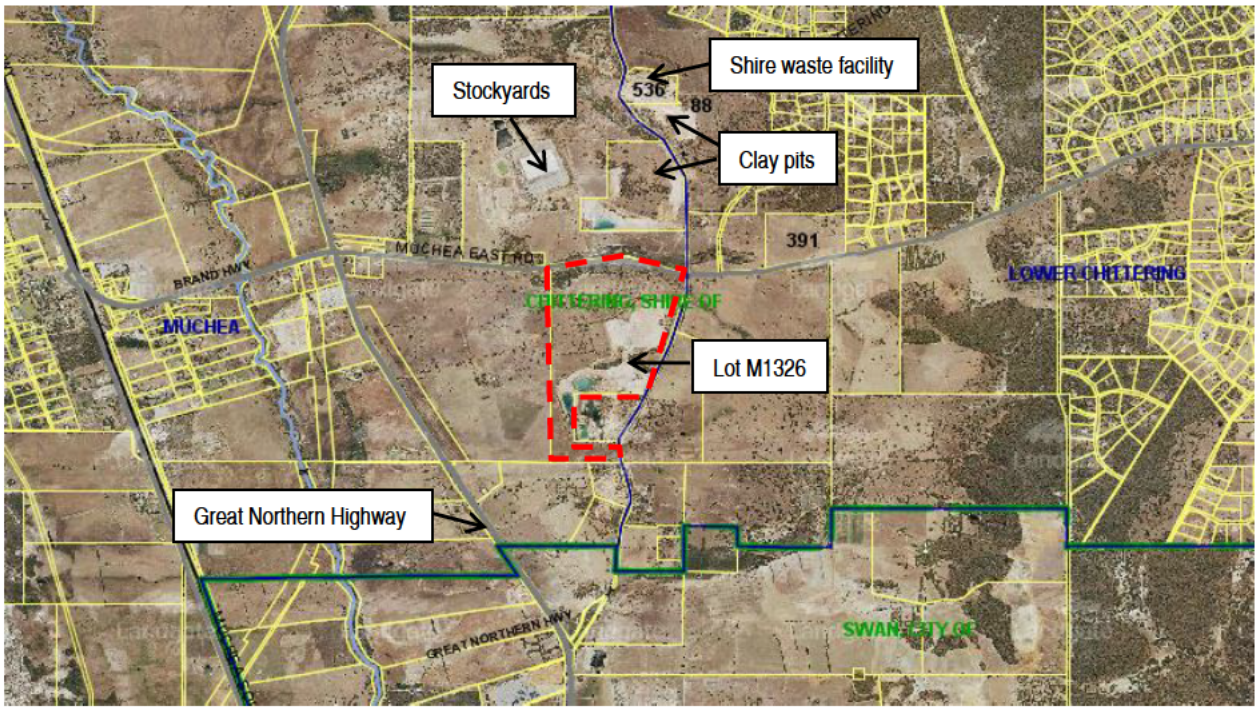
1.4 Ownership

Extraction occurs across Lot M1326 Wandena Road, Muchea. The site is located at the intersection of Muchea East Road and Wandena Road, approximately 3 kilometres to the east of Muchea. Lot M1326

is approximately 120 hectares in size. Extraction currently occurs across the central portions. Reserve R24776 is located in the centre of Lot M1326. It has been used for extractive industries for over 60 years. It has management orders with the Department of Planning for the purpose of *gravel* extraction.

Lot M1326 is owned by Bernard Herrara and has the following information on the Certificate of Title (Appendix C):

- Volume: 1185
- Folio: 869.



Source: Landgate

1.5 Description of resource

The clay resource is a white to cream kaolin clay of sedimentary origin. Several types of clay are present on the site which requires a larger excavation area to be open at any one time. Clay types vary from hard shale/mudstone to more plastic kaolin with up to 4 grades of shale/mudstone recognised for brick making. During excavation the various clay types are worked separately to prevent contamination and to ensure consistent material for blending with other clays. The useable clay reserve occupies an area as shown on the attached plan to a depth of approximately 20 metres.

The clay is part of a sedimentary sequence of slightly varying clays and shales. The clays are left as remnant ridges following erosion and weathering. With changes to the landform and elevation, different beds of clay are present in different locations. Muchea area is the only known location where the formation crops out onto the surface. Clay has been excavated from this area for many years because of the uniqueness of the resources and its proximity to the Metropolitan area.

The useable clay is intermittent and restricted by the depth of overburden and changes in grainsize and composition. These changes in composition lead to variation in plasticity and behaviour when fired. A range of clays are available from the Muchea area and are blended together or blended with clays from other areas to increase use of the resource and to provide a wide range of clay products.

2 Site description

2.1 Climate

The south-west of Western Australia has a Mediterranean climate which is characterised by hot, dry summers and cool, wet winters.

Climatic data is recorded at Pearce RAAF station, approximately 10.7km from Muchea. The mean annual rainfall is 653.10mm with a majority falling over June to August.

Average maximum temperatures reach 33.5°C in January and 17.8°C in July. The average minimum temperatures fall to 8.2°C in August.

2.2 Geology

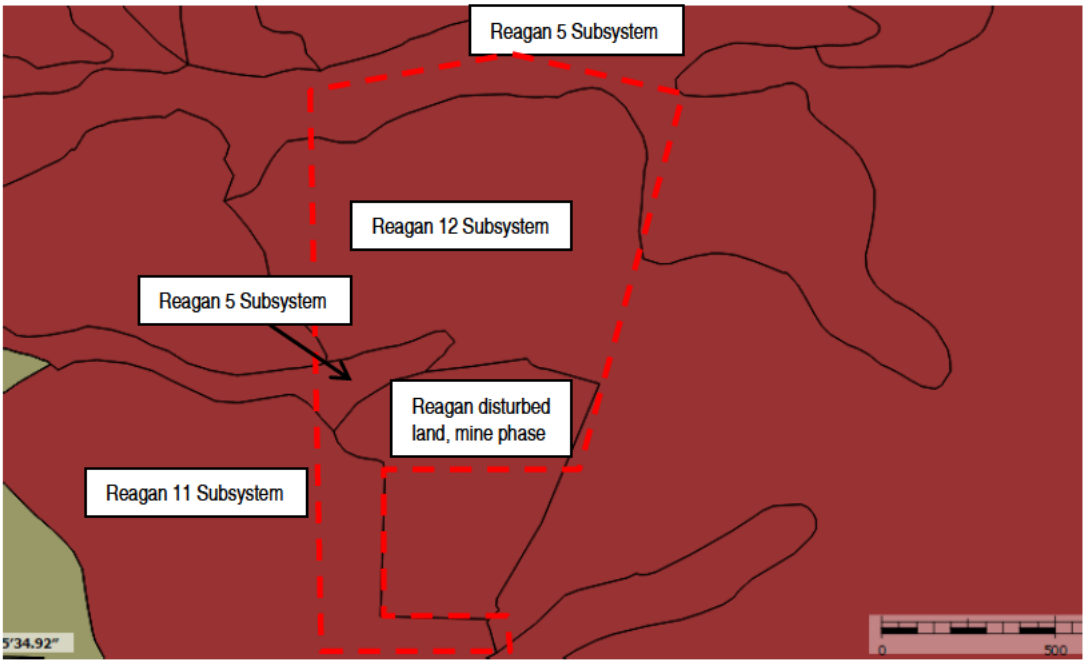
The clay resource occurs on the eastern edge of the Perth Basin, as a series of low ridges located on the Gingin Scarp. The site is underlain by Mesozoic sediments, predominantly clays of Cretaceous age commonly ascribed to the Leederville Formation and sometimes the Osbourne Formation, although the lithological description better fits with the Osbourne Formation which overlies the Leederville Formation (Landform Research, 2007).

The sediments are horizontally bedded marine shales that are white where oxidised but below the proposed excavation can be dark, organic and slightly pyritic at depth below the water table. The shales can carry some salt. The clays are of shallow water, marine origin. Shallow laterite gravel soils cap the sequence, formed during prolonged weathering in seasonally wet and dry conditions which persisted for some time during the late Tertiary Period. The laterite material, which is generally gravelly, is considered as overburden (Landform Research, 2007).

2.3 Soils

The soils which form the overburden are loamy gravels, grading to gravelly loams and clay with depth. Soil-landscape units, soil types and soil qualities are mapped by the Department of Agriculture and Food (DAFWA) and can be accessed on their online data system at http://maps.agric.wa.gov.au/nrm-info/. The soil-landscape units across the site are Reagan Subsystem which is described as *loamy sands overlying sandy loams to sandy clay loam at approximately 1m* (Reagan 12 Subsystem). Along the drainage lines at the northern end and centre of the property the soil is described as *poorly drained grey siliceous and pale yellow-brown sands* (Reagan 5 Subsystem).

The subsystems across the site as shown on the DAFWA online mapping is below.



Acid sulphate soils are common in this locality. Midland Brick have existing management plans to address this issue, and annual reports are provided to the Shire of Chittering.

2.4 Topography and Landform

The site is slightly undulating with the highest point located at approximately 130 metres AHD (Australian Height Datum) at the eastern side of the property and the lowest point is approximately 80 metres AHD along the creek line at the northern end and the south-west corner. Three drainage lines are located through the property which correspond to sloping areas. One creekline crosses through the northern end of the property, another drains through the central portion of the site and a third passes along the southern boundary.

2.5 Vegetation and Fauna

The site is largely parkland cleared. It is dominated by pasture grasses with some eucalypts scattered throughout. Native vegetation has been historically cleared to facilitate rural activity in the area. The dominant species are *Eucalyptus wandoo* with some scattered *E. calophylla, E. accedens* and the occasional *E. rudis.* The existing parkland cleared vegetation community has little chance of long term survival as seedlings are grazed.

The Heddle vegetation mapping identifies the majority of the site as *Yanga* vegetation complex, with a small area at the western side as *Mogumber complex – south* vegetation complex. The DAFWA online database identifies 2 pre-European vegetation complexes across the site; 'Gingin_1020' across a majority of the site and 'Pinjarra_4' across the western side. The broad floristic formation description is 'Eucalyptus Woodland'. These are described further below:

- Gingin_1020 – Medium forest; jarrah-marri/Medium Woodland; marri-wandoo
- Pinjarra_4 – Medium woodland; marri and wandoo

Revegetation activities have been carried out at the creekline at the northern end of the site. This vegetation has a significant number of mature Eucalypts and some understorey.

Screening vegetation has been established around the perimeter of the site, particularly along Wandena Road. Some additional screening vegetation will be planted along the western boundary of the site where the new extraction area is proposed.

Vegetation has also been planted throughout the site, particularly along the drainage line which passes through the centre of the site. The drainage line has been planted with reeds and rushes of Juncaceae and Restionaceae species together with trees and shrubs (mixture of native and eastern states varieties). Some areas of site have also been rehabilitated and revegetated.

Some clearing of scattered eucalyptus trees will be required to facilitate future pit expansion. A Clearing Permit will be applied for from the Department of Environment Regulation (DER) in accordance with the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. The vegetation within the future extraction area consists of a mixture of native and non-local Eucalypts (planted by the landowner).

2.6 Fauna

The site has been extensively cleared and degraded as a result of past agricultural use and therefore natural habitats are largely disturbed. Some areas within the site could be utilised by some fauna species including the watercourse at the northern end of the site, the drainage line through the centre of the property and the buffer/screening vegetation. Water birds are known to occasionally use the dams and detention basins on site.

2.7 Surface Hydrology

The site is located within the *Swan Avon_Lower Swan* catchment area and the *Ellen Brook* subcatchment. No public drinking water source areas are located within or in close proximity to the site.

Three drainage lines are located through the property which correspond to sloping areas. One creekline crosses through the northern end of the property, a second drains through the central portion of the site and a third passes through the southern end. The drainage line at the northern end has been extensively rehabilitated as a landcare project with the local landcare centre with funds provided from Midland Brick. The central drainage line has also been revegetated by Midland Brick.

The *Geomorphic Wetlands Swan Coastal Plain Dataset* indicates that a *Multiple Use* wetland is located at the northern end of the property. A small *Conservation* category wetland is located in the center of the site. The Conservation wetland category is also identified as an *Environmentally Sensitive Area* by the Department of Environment Regulation.

The conservation wetland in the centre of the site was degraded and cleared many years ago. Historic aerial photography demonstrates that prior to revevegation by Midland Brick, this site was a cleared low-lying area. Midland Brick has revegetated over the years to improve the quality of this area.

Water within the excavation area is directed into detention basins. The water from the detention basins is retained within the excavation area and is not permitted to run off to the surrounding area. Evaporation reduces the water volumes in summer. Further information about water quality is contained within the annual reports prepared by Midland Brick.

2.8 Groundwater hydrology

The Leederville Formation of sands and shales underlies the site. The recharge area is located to the east of the site. The aquifer runs under the site to the west. There may be some leakage to deeper aquifers but this is less likely because the shale may act as an aquiclude (Landform Research, 2007).

2.9 Surrounding land uses

Surrounding properties are used for extractive industry, rural land uses and rural industry. This area is known as the Muchea Employment Node and includes a range rural industry such as the Muchea feed lots and stockyards, transport depots, poultry farms and horse studs.

2.10 Heritage

The site is listed in the Shire of Chittering Municipal heritage list as 'Wandena Quarry' (category 5). The statement of significance is:

> *The site is associated with MBC, the materials for brick manufacturing and 'development' of the environment.*

A search of the Aboriginal Heritage Database was undertaken. One Registered Site is identified in the broader locality and covers the site. The site is listed as *Ellen Brook – Upper Swan* which encompasses the Ellen Brook catchment area. No Other Heritage Sites are identified on the site. A number of Heritage Surveys have been undertaken in the area.

3 Planning framework

3.1 State Planning Policy 2.4 – Basic Raw Materials

SPP 2.4 sets out the matters which are to be taken into account and given effect to by the Commission and local governments in considering zoning, subdivision and development applications for extractive industries (for the extraction of basic raw materials) and zoning, subdivision and development applications in the vicinity of identified basic raw material resource areas.

The objectives of the policy are to:

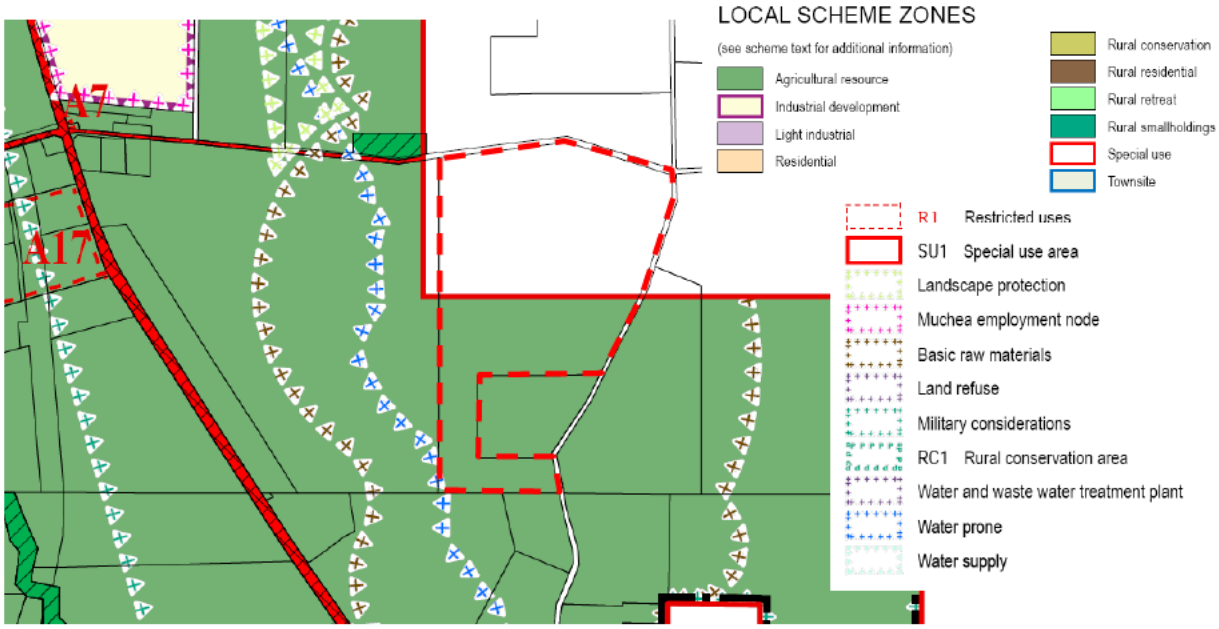
- *identify the location and extent of known basic raw material resources;*
- *protect Priority Resource Locations, Key Extraction Areas and Extraction Areas from being developed for incompatible land uses which could limit future exploitation;*
- *ensure that the use and development of land for the extraction of basic raw materials does not adversely affect the environment or amenity in the locality of the operation during or after extraction;*
- *provide a consistent planning approval process for extractive industry proposals including the early consideration of sequential land uses.*

The site is identified as a *Priority Resource Location* in SPP 2.4. These are described in the policy as *locations of regionally significant resources which should be recognised for future basic raw materials extraction and not be constrained by incompatible uses or development.*

It is also located within an Extraction Area which is described as *existing extractive industries operating under the Mining Act 1978, the Local Government Act 1996, a regional planning scheme or a town planning scheme. They should be protected in the short term but will eventually be replaced by other uses or reserves.*

3.2 Shire of Chittering Town Planning Scheme No. 6

The site is zoned *Agricultural Resource* in TPS No. 6. The objectives of this zone are described in the following table.



OBJECTIVE	COMMENT
To preserve productive land suitable for grazing, cropping and intensive horticulture and other compatible productive rural uses in a sustainable manner;	Although the site is used for extractive activities, once site rehabilitation and revegetation has occurred, the land can continue to be used for rural uses. The remainder of the site not already used for extraction can still be used for some rural purposes.
To protect the landform and landscape values of the district against despoliation and land degradation;	Visual amenity of the surrounding areas is protected through the use of vegetation and overburden bund walls which screen the site. Site rehabilitation after site decommissioning will also improve the landform and landscape values.
To encourage intensive agriculture and associated tourist facilities, where appropriate;	After decommissioning, the site will be rehabilitated to facilitate continued rural use.
To allow for the extraction of basic raw materials where it is environmentally and socially acceptable.	The site has been used for extractive industry for many years and further resources are still available. This application is for an extension of approval. Midland Brick have environmental management plans in place.

Basic raw materials are addressed in Clause 4.15 k of the scheme. The objectives for extraction of basic raw materials are addressed in the table below.

OBJECTIVE	COMMENT
Extraction of essential materials for roads and construction are to be permitted in areas where they will not adversely affect living environments, the landscape quality or contribute to land degradation problems during and after operations	Comprehensive management plans are already in place to manage the impact on the environment, landscape and land degradation.
Extraction of basic raw materials within the rural zones is to be managed in accordance with best industry practices including consideration of end use and rehabilitation at time of decommission	An Extraction Management Plan and a suite of environmental management plans have been prepared for the operation to help Midland Brick achieve best practice environmental management. A Rehabilitation Management Plan has been prepared for the site.
Appropriate buffer areas are to be applied to protect both the extractive operations as well as the living or agricultural environment in nearby areas.	Appropriate separation distances have been established from the operation to sensitive land uses.
Local government will not support development within those buffer areas, which may be detrimental to the efficiency of the industries. This is to protect the basic raw materials precincts from development that may compromise its operations.	Development of sensitive land uses has not occurred within the buffer areas.

The site is located within the Basic Raw Materials Special Control Area. The planning considerations for development in this area are addressed in Clause 5.4 (as depicted below):

> *5.4.2 Purpose*
> *To secure known basic raw materials resources, and protect future resources.*
> *5.4.3 Planning Requirements*
> *Development approval is required to extend a dwelling or other building within the Buffer Area. No new dwellings shall be approved within this buffer area.*
> *5.4.4 Relevant Considerations*
> *Whether development in the buffer area will affect future Extractive Industry operations.*
> *5.4.5 Referral of Applications for Rezoning or Development approval*
> *The Local Government may refer any Application for Development approval or any amendment to vary a Special Control Area boundary to any relevant authority or community organisation.*

The application for an extension to the planning approval and extractive industry licence complies with the scheme requirements for development in the Basic Raw Materials Special Control Area. The boundary of the Special Control Area seems to have been drawn to ensure the quarry is protected by a 500 metre buffer.

The site and broader area is also located within the Military Considerations Special Control Area. The purpose of this area is *To protect the integrity of the operations of the RAAF Air Base Pearce and its flight paths and to provide conditions on development on land within the designated Special Control Areas which may be effected by noise and to minimise the number of people residing in the delineated flight path subject to significant levels of aircraft noise.* No dwellings or sensitive land uses are proposed as part of this development and therefore complies with the purpose of this Special Control Area.

3.3 Shire of Chittering Local Planning Strategy

The Shire of Chittering Local Planning Strategy (LPS) indicates that the site is located within the *Agricultural Resource* zone and within the *Basic Raw Materials – Clay* overlay. It is also located within the Primary Basic Raw Materials Area which is described as:

> *The main area for basic raw materials is the lower part of the shire although there are numerous small pits for gravel and sand throughout the rest of the shire. Extraction of essential materials for roads and construction are to be permitted in areas where they will not adversely affect living environments, tourism, and the landscape quality or contribute to land degradation problems during and after operations.*

The aims of this area are:

OBJECTIVE	COMMENT
To manage the extraction of basic raw materials within the rural zones in accordance with best industry practices including consideration of end use and rehabilitation at time of decommission.	An Extraction Management Plan and a suite of environmental management plans have been prepared for the operation to help Midland Brick achieve best practice environmental management. A Rehabilitation Management Plan has been prepared for the site.
To ensure appropriate buffer areas are applied to protect the extractive operations as well as the living or agricultural environment in nearby areas.	Appropriate buffers and separation distances have been established around the site.

The site is also identified as being located within the *Muchea Employment Precinct Industrial Area.*

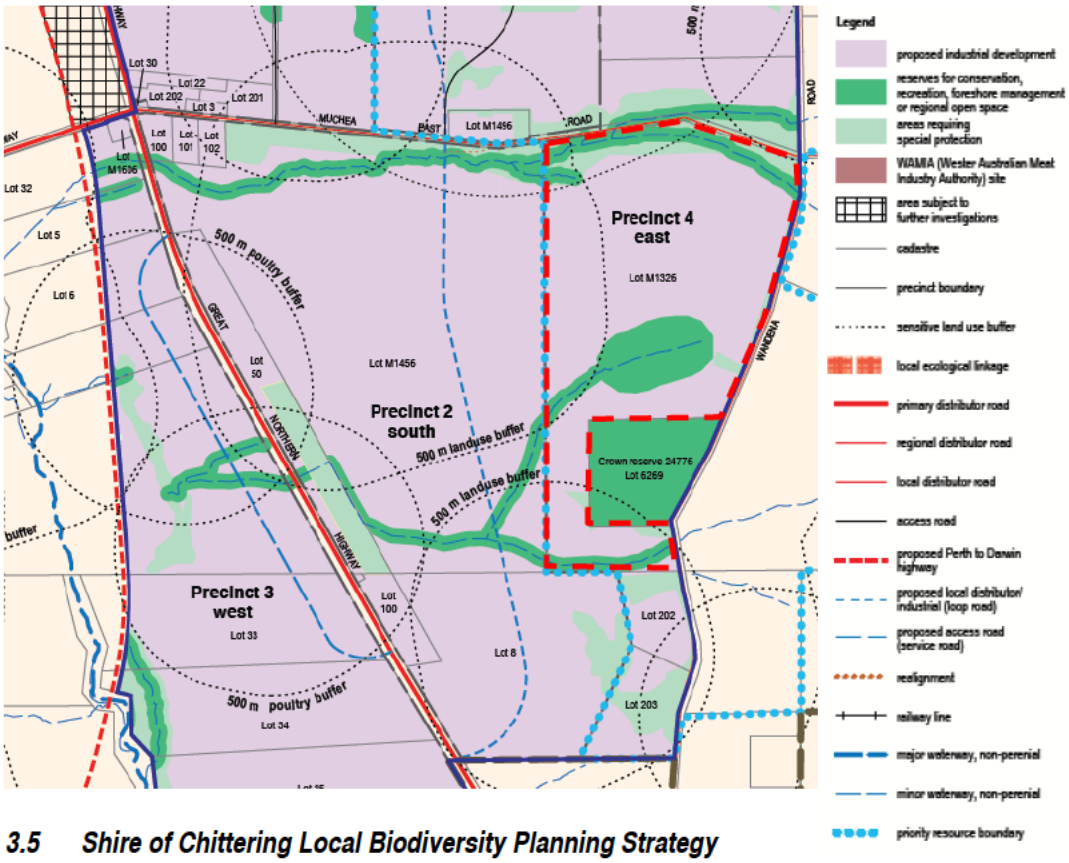
3.4 Muchea Employment Node Structure Plan

The Muchea Employment Node is an area set aside for service-based uses such as transport, livestock, fabrication, warehousing, wholesaling and general commercial use. This structure plan provides a 20 year land use planning framework for the area.

Lot M1326 is located within *Precinct 4 – East.* The precinct policy statements for Precinct 4 are addressed in the table below. They provide site specific requirements for future planning and development of individual precincts.

OBJECTIVE	COMMENT
The sequential development of Precinct 4 (east) is subject to the extraction of the clay resource and site rehabilitation suitable for industrial development in accordance with a Final Surface Contour Plan. The plan shall be prepared prior to subdivision and/or development.	This application for an extension to the planning approval and EIL will allow for continued extraction of clay resources before the land is developed and sterilised.

OBJECTIVE	COMMENT
The waterways (plus 30m buffer), conservation category wetland (plus 100m buffer), good quality remnant vegetation and heritage listed Wandena Quarries shall be protected within a reserve/s for Conservation, Recreation, Foreshore Protection or Public Open Space. Appropriate management measures shall be taken to rehabilitate the conservation category wetland in consultation with DEC. *The management and development of the Wandena Quarry Site shall be agreed with the Shire of Chittering in consultation with the Heritage Council.*	The operation is located approximately 250 metres from the wetland at the northern end of the site. This wetland has been rehabilitated extensively by the Chittering Landcare Centre, with funds provided by Midland Brick, to improve the environmental values of this area. It has arguably much higher values than the central wetland. Midland Brick have undertaken rehabilitation of the central wetland over the years. Prior to this the wetland was completely cleared of native vegetation and just a low-lying sump.
A landscape buffer of at least 50 metres shall be continued along the southern frontage of the Muchea East Road and shall incorporate the wetlands and areas of remnant vegetation towards the eastern end of the structure plan area.	A buffer of at least 50 metres will be applied to the wetland and watercourse across the northern end of the site. The separation distance from the northern wetland to the proposed extraction area is approximately 250 metres.
For lots that do not require subdivision prior to development occurring, primary wastewater treatment shall be via aerobic treatment units followed by secondary treatment in leach drains given the low groundwater levels.	N/A
Higher water use type industries with a minimum lot size of 4 000 m2 may be established in this area provided that wastewater can be demonstrated to be managed in accordance with an endorsed local water management strategy.	N/A
Structures higher than 15 m north of Muchea East Road and 45 m south of Muchea East Road require referral to RAAF.	N/A



3.5 *Shire of Chittering Local Biodiversity Planning Strategy*

The Local Biodiversity Strategy provides a strategic approach to planning for the conservation of local natural areas across all land tenure.

The following recommendations are made for the Employment Node precinct.

> *Objective of the Employment Node is to provide for establishment of services and light industry with opportunities for local employment. However, heavy and noxious industry is not permitted.*
> *Precinct specific recommendations*
> - *Retention and protection of remnant vegetation to form a buffer between the industrial areas and the adjoining rural residential areas.*
> - *Rehabilitation of priority areas to improve connectivity should be a condition of future development.*
> - *Ensure all creeks are protected with adequate buffers.*
> - *Seek to protect 273 hectares of remaining, primarily regionally significant native vegetation and retain additional 54 hectares.*

No local natural areas or ecological linkages are identified through the site. The watercourse at the northern end of the site will be left undisturbed from the extractive industry operation. The operation will be located approximately 250 metres from the wetland. This will help achieve the objectives of the Employment Node as detailed above.

3.6 EPA Guidance Statement 3 – Separation Distances between Industrial and Sensitive Land Uses

The EPA's Guidance Statement No. 3 provides a guideline on the separation distances and buffers for a range of industrial land uses to sensitive land uses (such as residential dwellings). The distances stated in the policy assume the land use is not managed and, should best practice environmental management take place, these distances can be reduced.

The operations on site fit into the category *Clay extraction or processing.* The potential impacts are listed as noise and dust. The separation distance is given *as 500-1000 metres, depending on size and processing*, however this can be less with appropriate environmental management. In addition, no processing takes place on site. It should be noted that in the EPA's *Draft Environmental Assessment Guideline for Separation distances between industrial and sensitive land uses* the separation distance is 300-500 metres.

Midland Brick use a number of management procedures to manage potential impacts such as dust, noise and amenity. These are addressed in more detail in the chapter below, however they include (but are not limited to) vegetation screening around the site, noise reduction techniques and dust management procedures.

One residence is located on the property. The current distance to the extraction area is approximately 200 metres. The proposed extraction is shown on the plans at Appendix B and have been drawn with a setback of 100 metres from the house. There is an existing agreement in place between the landowner and Midland Brick regarding the use of the property and the setback distances.

The next closest residence is located approximately 600 metres to the north-east of the excavation area. All other residences are located well over 500 metres from the site.

4 Works and excavation program

4.1 Background

The purpose of this report is to apply for and extension to the planning approval and an extractive industry licence for Lot M1326 Wandena Road, Muchea for a 7 year period. Clay excavation currently occurs on the adjoining lot to the north and north-east which are operated and managed by Midland Brick. The works and excavation program is described below.

4.2 Controls

Excavation activities on site will be conducted in accordance with the *Mines Safety and Inspection Act (1994) and Regulations (1995).* Operations are managed by a licenced Quarry Manager and inspections occur on a daily basis during the excavation program.

Operation inspections are regularity carried out by the Resources Safety division of the Department of Mines and Petroleum who inspect safety, operational procedures and workplace health such as dust and noise.

Midland Brick has procedures in place to manage safety, health, environmental impact, site completion and rehabilitation. All workers are required to wear full protective safety and high visibility gear when on site. All vehicles have two-way radio capability. No light vehicles are permitted on site without registering with the mobile plant on site. Full personal protection is required for all persons on site at all times. The site is within mobile phone range and all vehicles are equipped with two-way radios.

It is anticipated that the deepest excavation will be 20 metres below natural ground level. Fences and warning signs required by the Department of Mines and Petroleum and the Shire of Chittering will be maintained.

4.3 Excavation procedure

This application is for the continuation of extractive industries on Lot M1326. Excavation has already been undertaken across the central portion of the site. It is expected that the pit will remain in operation for the duration of the licence (7 years) and possibly beyond that time period. This time period might vary depending on the demand for clay, the rate of excavation and other external factors.

Excavation of clay takes place in a sequence of steps which can be broadly broken down into the 'Excavation Campaign' (i.e. removal of topsoil and overburden, excavation of clay to stockpile) and 'Carting Campaign' (transport of clay from the pit or stockpiles to the factories).

Earthworks and Excavation campaigns

An earthworks campaign refers to the excavation and stockpiling of material. Excavation generally takes place during the drier months and material is stockpiled on site. Earthworks can take place anytime between September and April when conditions are appropriate. During the earthworks campaign, trucks will be loaded with clay directly from the pit. An 'excavation campaign' refers to the excavation of material to be placed onto stockpiles for use over the wetter months.

No processing will take place on the site. This operational procedure has been determined to help minimise disturbance to the neighbouring residents and other locals.

In general the steps will involve the following:

- Trees will be cleared and the wood will be disposed of appropriately.
- Topsoil will be removed and transferred directly to an area being rehabilitated on the site or stockpiled for later use. Stockpile areas will be 0.5 – 1.0 metres in height.
- Overburden will be scraped from the pit area to a depth of approximately 2 – 5 metres. It will be transferred to an area being rehabilitated, placed around the perimeter of the site to create bund walls or stockpiled for later use. Stockpiles will be located adjacent to pit areas for readiness to push into the pit as part of land restoration.
- Excavation will continue to be worked as an 'inside out operation' as much as possible, commencing east and progressing west. In doing this, vehicles normally work on the floor of the pit and work towards the edges as much as possible. The purpose of this is to reduce disturbance to surrounding areas.
- The depth of excavation will vary depending on the availability of the resource, however is expected to reach depths of up 20 metres.
- Clay will be excavated by a bulldozer, scraper or excavator to a depth of up to 20 metres.
- Excavation will generally take place from east to west across the area identified on the attached plan in a staged manner, depending on demand.
- Clay will be moved by dump trucks from the pit area and loaded directly onto trucks for transport from the site.
- During an 'excavation campaign', material will be excavated and moved directly onto stockpiles to create supply for the winter months. An excavation campaign typically lasts 2-3 months so that enough material is excavated and stockpiled for the wetter months.
- As the resource contains several grades of clay, benches may need to be created in the pit face to separate the different types of clay. They will also need to be stored as separate stockpiles.
- Material is stockpiled at the southern end of the site. Four types of clay are stockpiled in this area. During the wetter months, trucks will be loaded with clay from the stockpiles.
- Water will be retained on site and directed into the detention basins. Water in these basins will be used for dust suppression or fire fighting as required.

It should be noted that the areas identified for stockpiling topsoil overburden and clay may change over time as the excavation moves in a staged progression.

Cartage campaign

Loading and carting from the site will occur throughout the year when clay is required. During the drier months, clay is excavated from the pit and loaded directly onto trucks for transport from the site. During the wetter months the stockpiles are used. The number of truck movements depend on the demand for the specific type of clay on site and the quantities required. Truck movements and access is described further below.

Hours of operation

The hours of operation will be from 06:00-17:00 hrs from Monday to Friday and 06:00 – 14:00 on Saturday. No operation will occur on Sundays or Public Holidays.

The flexibility of the 6 day week operation is seen as necessary to maintain efficiency because not all parts of the site can be excavated at all times of the year.

4.4 Stages and timing

Excavation has already been undertaken across the central and southern parts of the site. Some areas have been rehabilitated, however, as is explained in Chapter 1.5, several types of clay are present on the site which requires a larger excavation area to be open at any one time. The next stage has been identified to the west of the existing pit as shown on the attached plans. These areas where also identified as future excavation areas in previous applications. The area will be excavated in stages depending on demand and the types of clay present.

It's expected that the pit will remain in operation for the duration of the licence (7 years) and possibly beyond that time period. This time period might vary depending on the demand for clay, the rate of excavation and other external factors.

4.5 Depths and extent of excavation

The existing pits have been extracted to a depth of around 16 metres. Excavation will be cut downwards and in 'benches' to maintain separation of the various clays. It is anticipated that the future extraction areas could be dug to a depth of 20 metres.

The pit area will generally follow the pit outline as indicated in the plan at Appendix B. The pit is located within the central portion of Lot M1326. The area of the future stage is likely to be approximately 11.27 hectares.

It's important to note that despite the careful planning and onsite investigations which help determine the location of the resource, the pit area is likely to vary slightly from the areas depicted on the plans as new material might be found.

4.6 Depth, description and quantity of overburden

Overburden, consisting of sand with lateritic clays is removed prior to excavation commencing in new areas. Overburden will be scraped from the pit area to a depth of approximately 2 – 5 metres. It will be transferred to an area being rehabilitated, placed around the perimeter of the site to create bund walls or stockpiled for later use. Stockpiles will be located adjacent to pit areas for readiness to push into the pit as part of land restoration. Overburden will be stored in accordance with Agriculture WA soil conservation guidelines.

4.7 Site preparation

Minimal site preparation is necessary as the site has already been used for extractive industries for a number of years. Some vegetation may need to be cleared and a Clearing Permit will be applied for from the Department of Environment Regulation in accordance with the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. The internal access track has already been established and access to and from the highway already exists. Visual screening is already provided from the vegetation along the boundaries. Some additional vegetation screening will be planted along the western boundary where the new extraction area is proposed.

4.8 Access arrangements

Access to the site is from an existing crossover at Wandena Road, on the eastern side of the property. The cross over and a short section of the internal access track is bitumen. Internal access tracks are well established throughout the site. These provide access to stockpile areas and to the pit area. The tracks and stockpiles are on hard surfaces and the tracks and sprinkled with a layer of sand to reduce mud on truck tyres.

A truck wash-down facility is located at the entrance to the site. It washes the tyres and bottom of the truck to reduce mud on the road. A pumping station and a small dam is located adjacent to the wash-down facility.

Unauthorised access to the site is restricted by a locked gate at the entrances.

Trucks travel south down Wandena Road and access the Great Northern Highway at the intersection of Wandena Road.

4.9 Truck movements

As the rate of clay extraction is not expected to change over the next few years, there will be a continuation of the current transport activity with some fluctuations due to the cyclic demand for clay building products. The carting regime will vary depending on the weather and demand for a particular type of clay.

It is expected that truck movements will be similar to what already exists from the site. Clay is transported from the site on throughout the year. It is estimated that clay will be transported from the site on 90-140 days per year. There will be approximately 50-70 truck movements per day on each of the days when the resource is transported (depending on the type, number of trucks available and demand).

Trucks used for the extraction are ridged (8) wheeler trucks with 5 axle dog trailers.

A vehicle wet down facility is located on the access road to ensure clay is wet prior to transport. All vehicles are fitted with automatic tarpaulins which cover clay during transport. Both of these methods help to supress dust.

4.10 Plant and on-site equipment

A small lunchroom and portable toilet is situated on the property. Both are located close to the site entrance, in-between the access and stockpile area. The toilet is frequently serviced by Coates Hire.

Over the years, the company has improved efficiency by purchasing larger equipment as it has become available. With the increase size and weight of the equipment, the recovery of resource can be maximised. The equipment required for excavation will be brought in on a seasonal basis and will include scrapers, a bulldozer, a front-end loader, a water cart and a grader. This equipment is removed at the end of each 'earthworks campaign'.

No storage of fuel and oil is required on site. Vehicles are refuelled on the floor of the excavation or operational area, as currently occurs.

No processing, crushing, screening or blasting will occur on site.

All supplies will be delivered and rubbish will be stored in large bins which will be emptied at an appropriate rubbish tip.

4.11 Site drainage conditions

Water within the excavation area is directed into detention basins. The water from the detention basins is retained within the excavation area and is not permitted to run off to the surrounding area. Evaporation reduces the water volumes in summer. Further information about water quality is contained within the annual reports prepared by Midland Brick.

Further information on drainage management and groundwater management is contained within the Water Management Plan at Chapter 5.4 below.

4.12 Rehabilitation

A large amount of rehabilitation has already taken place across the site and the adjoining reserve, particularly in the southern parts of the site. The reserve was revegetated many years ago and vegetation has become well established. Recontouring and revegetation at the southern part of the excavation on Lot M1326 is ongoing. Most of this area has been recontoured and revegetation has taken place.

Recontouring has already commenced within the pit area at the northern part of the site.

Midland Brick has a number of environmental initiatives and supports revegetation and restoration activities elsewhere on this and other properties in the area. They are working with the Chittering Landcare Centre on a few projects at the present with one of those being the restoration of a wetland on another property just north of the waste facility. This area has recently been fenced and will undergo weed management and revegetation in the near future.

The rehabilitation management plan is provided in Chapter 5 below.

4.13 Workforce

Workers will be on site primarily during earthworks campaign or carting campaigns. At such times the workforce will vary from 1-6 workers in addition to the truck drivers who enter and leave the site.

4.14 Public safety

Excavation will be discontinuous. There will be times when there is no excavation on site and no trucks entering or leaving the site as stockpiles will be used at another site. It is more efficient to excavate material for a period of weeks to produce stockpiles from which clay can be transported when required.

Public access to the site is restricted and appropriate warning signs are placed at the entrance regarding quarrying and restricted entrance. The site has locked gates when it is not being worked. Warning signs for trucks are also used to alert road users at the entrance to Wandena Road.

It is anticipated that the deepest excavation will be 20 metres below natural ground level. Fences and warning signs required by the Department of Mines and Petroleum and the Shire of Chittering will be maintained.

4.15 Fire management

Fire risk associated with extractive industries is generally less than the risk from general farming as the open area of excavation forms a natural firebreak. The pit area is also used for the emergency muster area. Fire safety is incorporated into safety management for the site. It is located within mobile phone range which will assist in the event of an emergency.

Water contained within the detention basins on site is available for firefighting if required. Earth moving equipment and the water tanker are also available for firefighting (if located on site).

Perimeter fire breaks are maintained around the site.

5 Environmental Management Plan

5.1 Introduction

The Environmental Management Plan contains information and management actions to ensure the clay extraction activities have minimal environmental impacts and to help return the land to an appropriate end use. This chapter includes the following:

- Dust Management Plan
- Noise Management Plan
- Water Management Plan
- Refuelling Management Plan
- Dieback Management Plan
- Visual Management and separation distances
- Waste Management Plan
- Vegetation Management Plan
- Rehabilitation Management Plan
- Final Site Clean-up.

5.2 Dust Management Plan

This Dust Management Plan aims to describe the measures that will be used by Midland Brick to reduce the creation and effect of dust. These actions are described further below.

Excessive dust has the potential to impact on both the on-site workers and adjoining landowners (if it travels off-site). Dust can originate from certain activities and from strong winds. It is most likely to be generated by traffic moving across the site and excavated floor. Potential impacts are addressed by reducing the dust generation from quarrying, transporting around the site and onto trucks. Management actions to reduce dust impacts are described below. Experience with the existing operation is that dust can be managed through implementation of appropriate dust management procedures. In addition, clay resources are found to stay relatively moist, even during summer.

Monitoring of Weather Conditions

The operators will ensure that weather conditions are monitored in order to keep track of dust producing conditions and to help predict whether conditions are likely to produce significant level of dust. Characteristics which are likely to have greatest effect on dust generation are the humidity, wind speed and direction and the likelihood of precipitation. Monitoring of expected wind conditions from the Bureau of Meteorology website can be undertaken and extreme variations can be recorded.

Complaints Procedure

The complaints procedure is described below. It is also important that all complaints are recorded. The process is described below:

- Complaints made to the Quarry Manager will be documented and dealt with expeditiously.
- Complaints received either directly from the complainant or via the Shire of Chittering will be reviewed by the Quarry Manager and interested parties to assess:
    (i) the legitimacy of the complaint;
    (ii) the aspects of the operation that triggered the complaint;

(iii) management actions required to address the issues raised to bring operations into line with conditions imposed on the extractive operation by the Shire of Chittering under the Extractive Industry Licence.

- Actions deemed necessary to bring operations into line with relevant legislation, regulation and licence conditions will be undertaken immediately and before works are recommenced.
- Summaries of complaints and actions taken to address each specific issue will be recorded in the Complaints Register.

Complainants and the Shire of Chittering will be notified in writing of the date, time and nature of the complaint received, results of the investigation, remedial actions undertaken and date and time of recommencement of works. If any complaints are received, necessary action will take place to help rectify the issue.

Watering

Dust suppression is generally achieved through the use of a 'dust suppression agent', most commonly water. The application of water over areas prone to the generation of dust helps to reduce the likelihood that small dust particles being picked up by the wind.

A truck wash-down facility is located at the entrance to the site. It washes the tyres and bottom of the truck to reduce mud on the road. A pumping station and a small dam is located adjacent to the wash-down facility.

Watering will be conducted as required utilising a water cart. This will depend on the amount of dust being produced and the weather conditions. It is most likely that watering will occur during summer months rather than winter months owing to the increased moisture content of the material during winter.

Water will be available from the detention basins. The frequency and amount of water applied will be dependent upon local conditions and observable dust generation. Therefore, it is difficult to specify the quantity of water to be used as conditions will vary from day to day.

Other dust management procedures

All trucks will be covered by Enviro-tarp prior to leaving the site. The Quarry Manager will also make random checks at the site to ensure that dust suppression is adequate.

The property is slightly undulating and the proposed excavation and stockpiling areas are located within the lower areas of the landscape which means that they're sheltered by higher ground. The screening vegetation also helps to control dust. Perimeter vegetation and bunding helps reduce the speed of winds through the property and act a filter for airborne dust particles. The closest occupied residence is located approximately 600m to the north-east of the pit area (apart from the landowner) which is within the setback of 500-1000 metres recommended by the EPA.

Midland Brick has its own Rick Based Hygiene Management Plan (as required under the Regulations outlined in Section 4.2) to regulate and monitor the exposure of operators to dust, noise and vibration.

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING
Potential impact on adjoining sensitive land uses.	1. Maintain adequate separation distances to sensitive land uses on adjoining properties.	Impact to surrounding areas from dust will be minimised by complying with the Excavation Management Plan.	Ongoing
	2. Excavate from the pit floor which will generally be below natural ground level.		Ongoing
	3. Create and maintain screening barriers with overburden.		Ongoing
	4. Create and maintain vegetation screening barriers.		Ongoing
	5. Maintain all equipment in good condition.		Ongoing
	6. Maintain internal access roads in good condition.		Ongoing
	7. Wet down access roads and pit areas with water as required.		Ongoing
	8. Cover loads on trucks with a tarp as required.		Ongoing
	9. Schedule activities such as clearing vegetation and removing top soil and overburden at times when materials are less likely to blow or during suitable wind conditions.		Ongoing
	10. When winds are sufficiently strong to negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved.		Ongoing
	11. All non-conformances and noise and vibration related complaints immediately reported to the Quarry Manager.		Ongoing
	12. Following complaints, the source of any excessive noise or vibration will be identified and work practices will be modified or re-scheduled to reduce or eliminate the risk of future events.		Ongoing
	13. Continue training programmes on noise control requirements to all workers and contractors.		Ongoing

5.3 Noise & Vibration Management Plan

This Noise Management Plan sets out the management actions that will be used by Midland Brick to reduce the creation and effect of noise producing activities. These actions are set out in the table below.

The clay extraction process does not involve blasting or major noise-generating practices. Noise generated from work on site is largely from trucks and earthmoving equipment (including reverse beepers). It has the potential to impact on site workers and nearby sensitive land uses (such as residential dwellings). This can be addressed by reducing the noise generated by the operations and ensuring adequate separation distances.

The operator of the site makes the following commitments in relation to noise:

1. Manage noise levels in accordance with the *Environmental Protection (Noise) Regulations 1997*.

2. Monitor noise levels upon instruction from the Department of Environment Regulation.
3. Manage vibration in accordance with *Australian Standard AS 2670.2 – Evaluation of Human Exposure to Whole Body Vibration (1990)*
4. Manage noise levels to workers on site in accordance with the *Mines Safety and Inspection Act 1994 and Regulations 1995.*

Noise mitigation and management

The nearest external residence to the operation is approximately 600 metres to the north-east of the proposed pit which is within the distance of 500-1000 metres recommended by the EPA's *Guidance Statement No. 3 – Separation Distances between Industrial and Sensitive Land Uses.*

Normal clay excavation is a relatively quiet operation (as no blasting or processing takes place on site). Excavation will be up to 20 metres below the natural ground level and the site is surrounding by screening vegetation to provide additional noise buffers. As extraction progresses the ground level will lower, resulting in the operation of machinery at levels below the surrounding ground level. This will act as a noise insulator and significantly reduce any residual noise associated with the operation of machinery on site. Occasionally an excavator or bulldozer may be required to work from natural ground level to increase efficiency or safety. Ripping or pushing by a bulldozer on the natural ground level has the potential to be the noisiest part of the operation.

All equipment used for excavation is relatively new and well maintained which aims to minimise noise generation. Noise levels will be governed by the *Environmental Protection (Noise) Regulations 1997.* The noise emitted by the main excavation equipment on site (i.e. excavator and loader) is similar to that of farm machinery.

Operations will only take place during the approved hours of operation, which is in accordance with the noise regulations.

All workers will be supplied with noise protection equipment and noise management will be in accordance with the *Mines Safety and Inspection Act 1994 and Regulations 1995.* Midland Brick has its own Rick Based Hygiene Management Plan (as required under the above-mentioned Regulations) to regulate and monitor the exposure of operators to dust, noise and vibration.

Noise management procedures are set out in the table below.

Complaints Procedure

The complaints procedure is described below. It is essential that any complaints relating to the creation of excessive noise are recorded, further investigated and acted on. The procedure is described below:

- Complaints made to the Quarry Manager will be documented and dealt with expeditiously.
- Complaints received either directly from the complainant or via the Shire of Chittering will be reviewed by the Quarry Manager and interested parties to assess:
    (i) the legitimacy of the complaint;
    (ii) the aspects of the operation that triggered the complaint;

(iii) management actions required to address the issues raised to bring operations into line with conditions imposed on the extractive operation by the Shire of Chittering under the Extractive Industry Licence.

- Actions deemed necessary to bring operations into line with relevant legislation, regulation and licence conditions will be undertaken immediately and before works are recommenced.
- Summaries of complaints and actions taken to address each specific issue will be recorded in the Complaints Register.

Complainants and the Shire of Chittering will be notified in writing of the date, time and nature of the complaint received, results of the investigation, remedial actions undertaken and date and time of recommencement of works.

Vibration management

Vibration is not expected to be an issue due to the relatively small nature of machinery on site, and the lack of blasting. The operator will comply with the *Australian Standard AS 2670.2 – Evaluation of Human Exposure to Whole Body Vibration (1990).*

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING
Noise may impact on adjoining sensitive land uses.	1. Maintain adequate separation distances to sensitive land uses on adjoining properties.	Impact to surrounding areas from noise will be minimised by complying with the Excavation Management Plan. Comply with the Environmental Protection (Noise) Regulations 1997 and the Mines Safety and Inspection Act 1994 and Regulations 1995.	Ongoing
	2. Excavate from the floor of the pit which will generally be below natural ground level.		Ongoing
	3. Create and maintain screening barriers with overburden.		Ongoing
	4. Create and maintain vegetation screening barriers.		Ongoing
	5. Adhering to the hours of normal operation, with work conducted in the hours identified in the Excavation Management Plan.		Ongoing
	6. All plant equipment and vehicles being fitted with appropriate noise suppression equipment to reduce noise levels so far as is practicable, with machines the quietest reasonably available.		Ongoing
	7. Maintain all equipment in good condition.		Ongoing
	8. Use warning lights rather than aud ble sirens or beepers on mobile equipment wherever possible.		Ongoing
	9. All non-conformances and noise and vibration related complaints immediately reported to the Quarry Manager.		Ongoing
	10. Following complaints, the source of any excessive noise or vibration will be identified and work practices will be modified or re-scheduled to reduce or eliminate the risk of future events.		Ongoing
	11. Continue training programmes on noise control requirements to all workers and contractors.		Ongoing

5.4 Water Management Plan

This Water Management Plan sets out the management procedures in place for the protection of surface and groundwater features. Management of water is addressed in the Department of Water's *Water Quality Protection Guidelines for Mining and Mineral Processing* (Department of Water, 2000).

Surface and groundwater

All stormwater drainage will be contained within the excavation area. Rainwater which falls into the proposed pit area will be directed into existing pit areas and drainage basins. A separation distance of approximately 250 metres will be maintained from the proposed excavation area to the northern wetland. Midland Brick have worked with the Chittering Landcare Centre to fund revegetation and restoration of the environmental values of the wetland area. There will be no alterations to the drainage lines as a result of the continued extraction. Midland Brick is also working with the Chittering Landcare Centre on the restoration of a wetland area on the property adjacent to the Chittering Waste Facility on Wandena Road, just north of this site.

No groundwater has been intercepted from previous excavation and it is not expected that groundwater will be encountered from future digging. No dewatering will be required on site.

Acid sulphate soils

Midland Brick has operated on the Muchea shale deposits in the area and on this particular site for many years. The shale deposits are known to contain minor sulphides which are capable of developing acidic conditions. The detention basins are regularly tested by Midland Brick for salinity and pH. The clay is regularly tested for total sulphur, pH and salinity.

An Acid Sulphate Soil Management Plan has been prepared for the site by Cardno.

Water management procedures are described in the table below.

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING
Impact on surface and groundwater	1. Maintain adequate buffers to sensitive watercourses and wetlands.	Compliance with water protection policies, the Acid Sulphate Soils Management Plan and this Excavation Management Plan.	Ongoing
	2. Maintain the final land surface at least 2 metres above the groundwater table.		Ongoing
	3. Contain all stormwater runoff on site within the detention basins.		Ongoing
	4. Ensure that there is capacity on the detention basins for high rainfall events.		Ongoing
	5. Maintain all machinery in good condition to minimise risk of leaks and spills.		Ongoing
	6. Maintain the internal access road in good condition.		Ongoing
	7. Avoid spillages on roads and clean up promptly.		Ongoing
	8. Ensure rubbish is disposed of appropriately.		Ongoing
	9. Remove any illegally dumped rubbish promptly.		Ongoing

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING
	10. Provide an appropriately serviced portable toilet for on-site workers.		Ongoing
	11. Continue training programmes on water management requirements to all workers and contractors.		Ongoing
	12. Any significant adverse impacts to be recorded, investigated and remediated.		Ongoing
	13. Continue with periodic water testing of detention basins and groundwater bores.		Ongoing
	14. Water retained on site can be used for dust suppression and tree watering if required (particularly during the summer months). Water is also likely to be lost through evaporation during summer.		Ongoing
	15. Comply with the Acid Sulphate Soil Management Plan already prepared for the site.		Ongoing

5.5 Refuelling Management Plan

Protection of water resources from fuels and other chemicals will be managed through the Refuelling Management Plan.

Refuelling from tankers will be continued. This method is used on most mine and construction sites and used on other Midland Brick properties. No fuel or chemicals or lubricants will be stored on site. Refuelling will be undertaken in the active pit area to allow for containment if a spill does occur.

The clays on site are normally impermeable (Landform Research, 2007). The main risk of contamination is the minor drips that occur during removal of the hoses etc. These minor spills are quickly degraded by soil microbial matter. Soil and resource should quickly be placed around a spill to contain it. Any drips or minor spills should be scooped up with the clay resource and sent to the Middle Swan works site where they are burnt with the clay during the firing process. Large spills should be removed from the site to an approved disposal area. The only other risk is rupture of the tank, however the tanks are designed to manage this.

The clay extraction process is a chemically free operation.

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING
Impact on surface and groundwater	1. No fuels, lubricants or chemicals will be stored on site. They are brought to the site as required.	Compliance with DMP regulations and this Excavation Management Plan.	Ongoing
	2. Major servicing of all machinery is to be done off site.		Ongoing

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING
	3. Service all machinery and equipment in accordance with the maintenance schedule prescribed.		Ongoing
	4. Use an accidental spill containment and cleanup protocol.		Ongoing
	5. Regularly inspect fuel, oil and hydraulic fluids on machinery for wear or faults.		Ongoing
	6. Ensure refuelling and lubricating occurs in designated areas and equipment for the containment and clean-up of spills is provided.		Ongoing
	7. Contain spillages in working areas by shutting down equipment.		Ongoing
	8. Transport chemicals in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail.		Ongoing
	9. Any drips or minor spills should be scooped up with the clay resource and sent to the Middle Swan works site and burnt with the clay during the firing process.		Ongoing
	10. Any large spills should be removed from the site to an approved disposal area.		Ongoing
	11. Maintain the site in a tidy manner.		Ongoing
	12. All significant incidents are to be recorded, investigated and remediated.		Ongoing

5.6 Dieback Management Plan

'Dieback' is the common name given to the pathogen *Phytophthora cinnamomi.* It is a soil borne water mould, which invades and destroys the root systems of many native flora species in Western Australia. It is only a real threat to plant species that grow in areas that receive over 400mm of rain per annum. Approximately 40% of native plant species in Western Australia are susceptible to the pathogen.

P. cinnamomi is easily spread throughout plant communities. It is able to produce spores, which are dispersed through the movement of soil particles. A variety of vectors can disperse soil particles (and the spores they carry) from one environment including native species, humans, vehicles, machinery and other equipment. As a result, if soil particles from an area infected with *P. cinnamomi* are dispersed, new areas can be infected. *P. cinnamomi* also produces zoospores, which are dispersed through free-flowing water from one area to another. The ease in which the pathogen can spread has greatly contributed to its extensive occurrence and consequent destruction of large areas of native vegetation. Therefore, it is important that measures are put into place to prevent the further spread of *P. cinnamomi.*

As a general rule, areas currently infected with *P. cinnamomi* should be identified and provisions should be put into place to prevent the pathogen from spreading elsewhere. Areas that are currently not

infected and that pose a risk to infection should have measures put into place to prevent this from occurring.

It is considered that the potential dieback risk is low given the operational area is cleared and no vegetated areas will be accessed. Deep clay excavations are separated from topsoil and overburden and therefore have low risk of dieback contamination. Access tracks have already been established and all trucks and vehicles will keep to the tracks or operational area. Stormwater is contained within the operational area and is not permitted to flow offsite. A dedicated wash down area is not considered necessary as the risk of dieback is low.

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING
Infection of native vegetation with dieback disease	1. All trucks and vehicles will be restricted to access tracks and the operational area.	Compliance with *Best Practice Guidelines for the Management of Phytophthora cinnamoni* (CALM, 2004), the *Dieback Hygiene Manual* (CALM, 1992) and this Excavation Management Plan.	Ongoing
	2. Water runoff will be directed towards detention basins within the existing pit area to prevent runoff to surrounding vegetated areas.		Ongoing
	3. Illegally dumped rubbish will be removed.		Ongoing
	4. Fencing, locked gates and signs are located around the perimeter of the property to deter trespassers.		Ongoing
	5. No contaminated or suspect soil or plant particles will be brought on site.		Ongoing
	6. All equipment and vehicles which have come from a dieback infected area are required to be cleaned prior to leaving their location.		Ongoing

5.7 Visual Management and Separation Distances

Separation distances and buffers serve the function of providing distance to sensitive land uses (such as residential dwellings). Implementation of separation distances and buffers should be used in conjunction with other management procedures (such as noise, dust and visual management). Visual impact can occur if the operation is set too high in the landscape, has insufficient visual protection or is too close to dwellings.

Separation distances are prescribed in EPA's *Guidance Statement No. 3 – Separation Distances between Industrial and Sensitive Land Uses*. It provides a guideline on the separation distances and buffers for a range of industrial land uses to sensitive land uses. The distances stated in the policy assume the land use is not managed and, should best practice environmental management take place, these distances can be reduced.

The operations on site fit into the category *Clay extraction or processing* which has a recommended separation distance of 500-1000 metres (depending on the scale of the project, the extent of processing and the anticipated activities). This distance can be less with appropriate environmental management. The potential impacts are listed as noise and dust and these are addressed in the Dust Management Plan and Noise Management Plan.

One residence is located on the property. The current distance to the extraction area is approximately 200 metres and the new extraction area will have a setback of 100 metres from the house. There is an existing agreement in place between the landowner and Midland Brick regarding the use of the property and the setback distances. The next closest residence is located approximately 600 metres to the north-east of the excavation area. All other residences are located well over 500 metres from the site.

Buffers are also established around the clay resource to protect it from sterilisation and encroachment of sensitive land uses. The *Basic Raw Materials Special Control Area* in the Shire's Local Planning Scheme has taken into account these buffers.

Vegetation screening and bunds are located around the site to provide visual screening. Some additional screening vegetation will be planted along the western boundary of the site where the new extraction area is proposed. Bunding will also be located along the western side of the new extraction area. The site can be glimpsed from the highway in some parts, although this is mostly just a small portion of stockpile areas.

The management actions in place to address separation distances are outlined below:

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING
Adjoining properties	1. The topography of the site helps to ensure that the pit and stockpiling area will be screened from the road and surrounding areas.	Impact to surrounding areas from noise, dust or visual amenity will be minimised by complying with the Excavation Management Plan.	Ongoing
	2. Vegetation screening exists around the site to protect visual amenity and to prevent surrounding areas from dust impact. Vegetation is a mixture of trees and shrubs to provide adequate screening and predominantly comprises of Eucalypts. Additional screening will be planted if required, particularly along the western boundary.		Already well established.
	3. Construct screening bunds using overburden.		Ongoing
	4. No processing of clay occurs on site which greatly reduces the potential for impact. Noise will generally be limited to sound made by trucks and machinery (which aren't generally much louder than farm vehicles).		Ongoing
	5. Clay extraction and transport only occurs during certain periods throughout the year. This means that no activity will occur on site for periods at a time.		Ongoing
	6. The site is surrounded by rural land, rural industry or other extraction sites. Midland Brick also own some surrounding and nearby properties or has agreements to secure buffers.		Ongoing

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING
	7. The nearest residence (apart from the landowner's residence) is over 500 metres to the north-east of the site. Midland Brick have an agreement in place with the owner of Lot M1326.		Ongoing
	8. The development will be setback as appropriate from the road (minimum 40 metres).		Ongoing
	9. Excavations take place from the inside out on the floor of the pit, approximately 20 metres below ground level. The high walls of the pit will help screen it from the roads and surrounding properties.		Ongoing
	10. Rehabilitation of old, decommissioned pits to improve the visual appearance of these areas.		Ongoing
	11. Locate transportable buildings, plant and stockpiles in areas of low visual impact.		Ongoing
	12. The operation complies with all Shire and State Government planning policies.		Ongoing

5.8 Waste Management Plan

Unauthorised access

The potential for illegal dumping of rubbish occurs from trespassers entering the site illegally. The site is currently fenced around the perimeter, gates are locked and signs are present which warn the public that the site is an open pit. This is to prevent and deter trespassers from entering the site.

Solid domestic waste and light industrial waste

The site will only be operational intermittingly throughout the year so the potential for creating waste is small. Solid waste and light industrial waste will be stored in appropriate containers and removed from the site frequently to an approved landfill site. Midland Brick also has a policy on recycling. Any illegally dumped material will be removed promptly and removed to an approved landfill site.

Wastewater disposal

Workers will only be present on site for a few weeks each year. A small office/lunchroom and a portable toilet are located on site. Wastewater will be disposed of from these facilities appropriately.

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING
Impact of waste on surrounding environment	1. Keep the site tidy and remove rubbish from the site to an approved waste disposal facility as required.	Compliance with this Excavation Management Plan	Ongoing
	2. Recycle waster where poss ble.		Ongoing
	3. Gates will be locked at all times when the site is not being operated on.		Ongoing
	4. Fences will be maintained around the site.		Ongoing

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING
	5. Maintain the portable toilet facilities as required.		Ongoing

5.9 Vegetation Management Plan

The site has been historically cleared for farmland and remaining vegetation across the new extraction area comprises parkland cleared vegetation. The vegetation condition of this area is poor. Species onsite include *Eucalyptus wandoo, E. calophylla* and *E. accedens*. Midland Brick have undertaken a large amount of revegetation on the site over the years including screening vegetation along the road and through the site (to protect visual amenity), revegetation of the northern wetland (in conjunction with the Chittering Landcare Centre), revegetation of the central wetland and rehabilitation of the decommissioned pits on the Reserve. This revegetation across the property also helps to create ecological linkages for the movement of fauna across the site.

Midland Brick will apply for a Clearing Permit with the Department of Environment Regulation as required by the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. The vegetation within the future extraction area consists of a mixture of native and non-local Eucalypts (planted by the landowner).

Rehabilitation on the Reserve (leased to Midland Brick) and the decommissioned southern areas will be ongoing. A majority of the site cannot be rehabilitated at this stage due to the need for stockpiling areas and the variety of clays located across the site.

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING
Impact on native vegetation	1. Apply for a Clearing Permit from the DER as required.	Comply with the appropriate state government policies and with this Excavation Management Plan.	When required/as needed.
	2. Extraction across the new stage will occur in a progressive manner to avoid clearing vegetation until necessary.		Ongoing
	3. Continue with landcare activities on site.		Ongoing
	4. Continue to work with the Chittering Landcare Centre.		Ongoing

5.10 Rehabilitation Management Plan

Rehabilitation objectives

The historical use of the site has been for grazing and hay production and a majority of the property was historically cleared for this purpose. The site is zoned *Agricultural Resource* and the objectives of this zone provide for maintenance of productive agricultural use following extraction. Therefore, the objective of rehabilitation is not to return the vegetation to a pre-European state. After extraction activities have ceased the land will be re-contoured to facilitate the use of the land for agriculture. The aims of the Revegetation Management Plan are to:

1. Re-contoure the pit areas to a safe and stable condition with the floor at the completed mining level. Dams will exist in the lowest points.
2. Rehabilitate by placing topsoil over the re-contoured area and planting with grasses, legumes and some clusters of trees.

End Use

After extraction activities have ceased the land will be re-contoured to facilitate the use of the land for agriculture with some clusters of trees.

Landform re-contouring

Overburden will be used to re-contour the pit areas to a safe and stable condition and the floor will be at the completed mining level. Steep slopes will be stable and safe. Topsoil is replaced on top of the overburden. Some re-contouring has already taken place at the southern end of the site.

Revegetation & maintenance

The site should be inspected during summer to determine the number of plants to be ordered and the weed management required. The site will be revegetated with grasses and legumes with some clusters of trees. Native plants should be ordered from a nursery in summer so they are ready by the next winter. This will be co-ordinated with Chittering Landcare Centre. Further advice on suitable tree species will be obtained from relevant government agencies and the Chittering Landcare Centre at the time. The following species are recommended:

- *Acacia acuminate*
- *A. microbotrya*
- *Eucalyptus accedens* (Powderbark wandoo)
- *E. rudis* (Flooded Gum)
- *E. wandoo* (Wandoo)
- *Corymbia calophylla* (Marri)
- Viminaria juncea.

The Chittering Landcare Centre will be invited to actively participate in the rehabilitation of the site. Midland Brick has a good working relationship with Chittering Landcare Centre.

The rehabilitated areas should be ripped and soil prepared prior to planting. Areas to be planted with should also be sprayed for weeds to give seedlings a greater chance of survival. This should be undertaken during Autumn, a few weeks before planting.

It is not anticipated that irrigation will be required to re-establish vegetation across the site, however water should be available from detention basins if required.

Planted areas will be assessed during the following summer to determine the success rate and supplementary planting required to account for plant loss. Additional seedlings will be ordered (if required) and planting will take place again in early winter the following year. The final rehabilitation will be monitored for a period of three years to ensure revegetation meets the completion criteria.

Weed management

The disturbed nature of the property and its past use for rural purposes has resulted in an abundance of weeds (mainly pasture species) which currently exist on the property. It would be impossible and irrational to try to eradicate all weeds on the site. Parkland cleared vegetation will unavoidably consist of a range of weed species present as groundcover and understorey. However, to help manage the spread of weeds, particularly weeds which pose significant environmental risk, the following management actions should be adhered to. In general, the procedures for management of dieback will also assist with weed management. Areas being revegetated will be sprayed for weeds prior to planting.

Completion Criteria

The completion criteria for the rehabilitation management plan are as follows:

- The land surface is in stable condition
- Pasture cover is self-sustaining
- Native vegetation which has been planted will be self-sustaining and comprise of some clusters of trees over the site.

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING
Unsuccessful rehabilitation	1. Use overburden to re-contour decommissioned excavation areas and overlay with topsoil.	Compliance with the Rehabilitation Management Plan.	Ongoing
	2. Maintain water drainage throughout the site.		Ongoing
	3. Create gentle sloping banks to reduce the risk of water erosion.		During rehabilitation
	4. Order native plants/seedlings from a nursery in summer.		Summer, when required
	5. Undertake weed control prior to planting, such as spraying for weeds.		Autumn, a few weeks before planting commences.
	6. Undertake planting during early winter to allow seedlings to benefit from natural rainfall.		Early winter
	7. Install tree guards if required to protect against animal grazing.		During planting
	8. Vehicles are to keep to tracks and the operational areas.		Ongoing
	9. No weed contaminated or suspect soil or plant particles will be brought on site		Ongoing
	10. The site is kept secure with perimeter fencing, signs and locked gates to avoid rubbish dumping from trespassers.		Ongoing
	11. All rubbish is removed promptly from the site.		Ongoing
	12. Weed affected soils are not used for rehabilitation.		Ongoing

POTENTIAL IMPACT	MANAGEMENT/ACTION	COMMITTMENT	TIMING
	13. The site is monitored for the presence of weeds that pose a sign ficant environmental risk.		Ongoing
	14. Weed management will be integrated with usual rural weed management practices.		Ongoing
	15. Assess the success of revegetation and undertake additional planting the following year if necessary.		The year following rehabilitation
	16. Monitor the rehabilitated areas for a period of three years to ensure the completion criteria are met.		Annually after rehabilitation for three years.

5.11 Final site clean-up

All wastes on site will be appropriately managed during and after operation of the site in order to avoid environmental degradation. They will either be recycled or taken to an approved waste disposal site. Rubbish will be stored in large bins, which will be emptied at an appropriate rubbish tip. Clay excavation activities do not require the use of chemicals apart from lubrication materials and fuel.

After clay extraction activities have ceased, all equipment will be removed from the site and the final stages of rehabilitation and revegetation will occur.

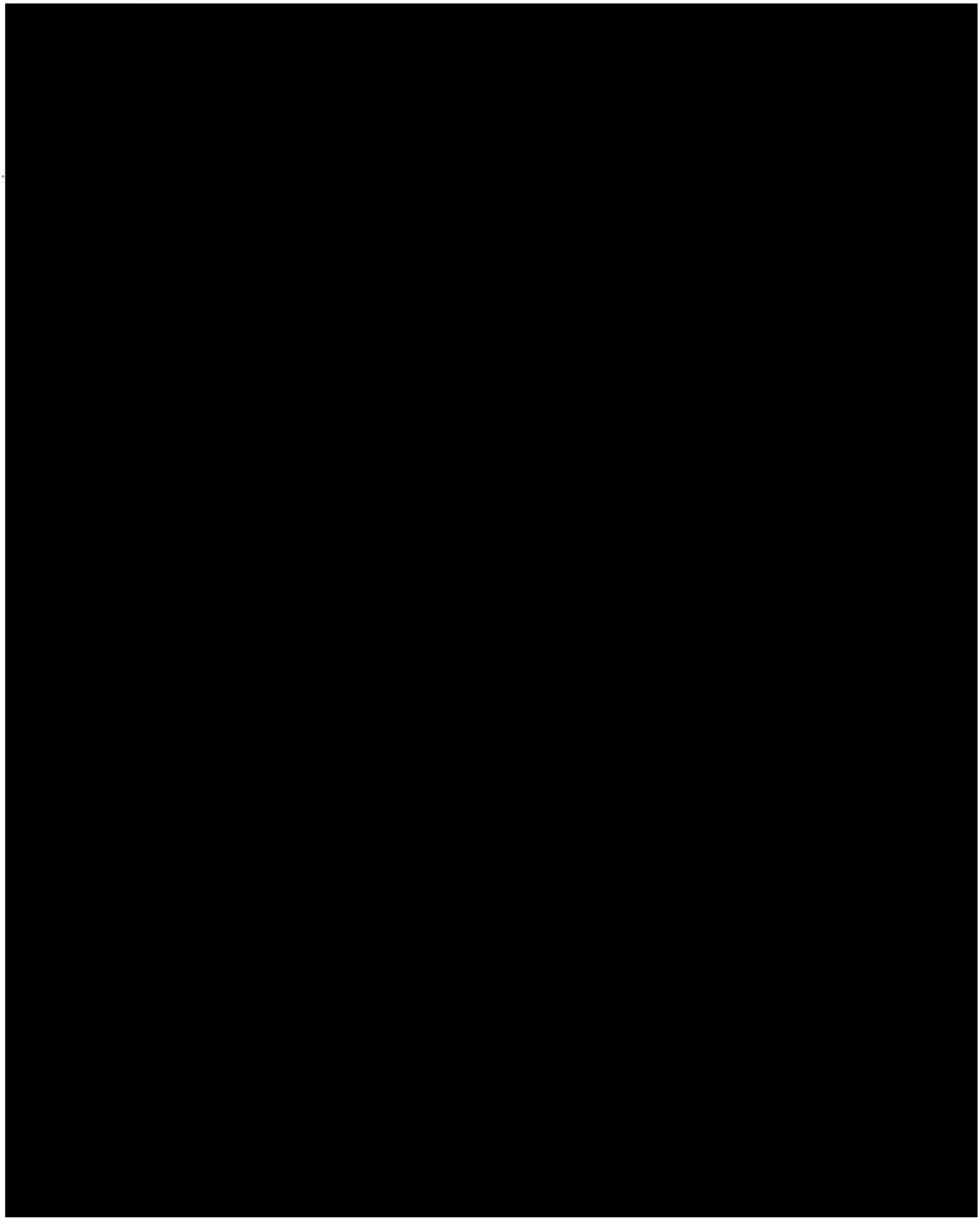
APPENDIX A

Application Form

Submit by Email | Print Form

Town Planning Scheme No 6

SCHEDULE SEVEN
APPLICATION FOR PLANNING APPROVAL



Local Government Act 1960

Municipality of the Shire of Chittering

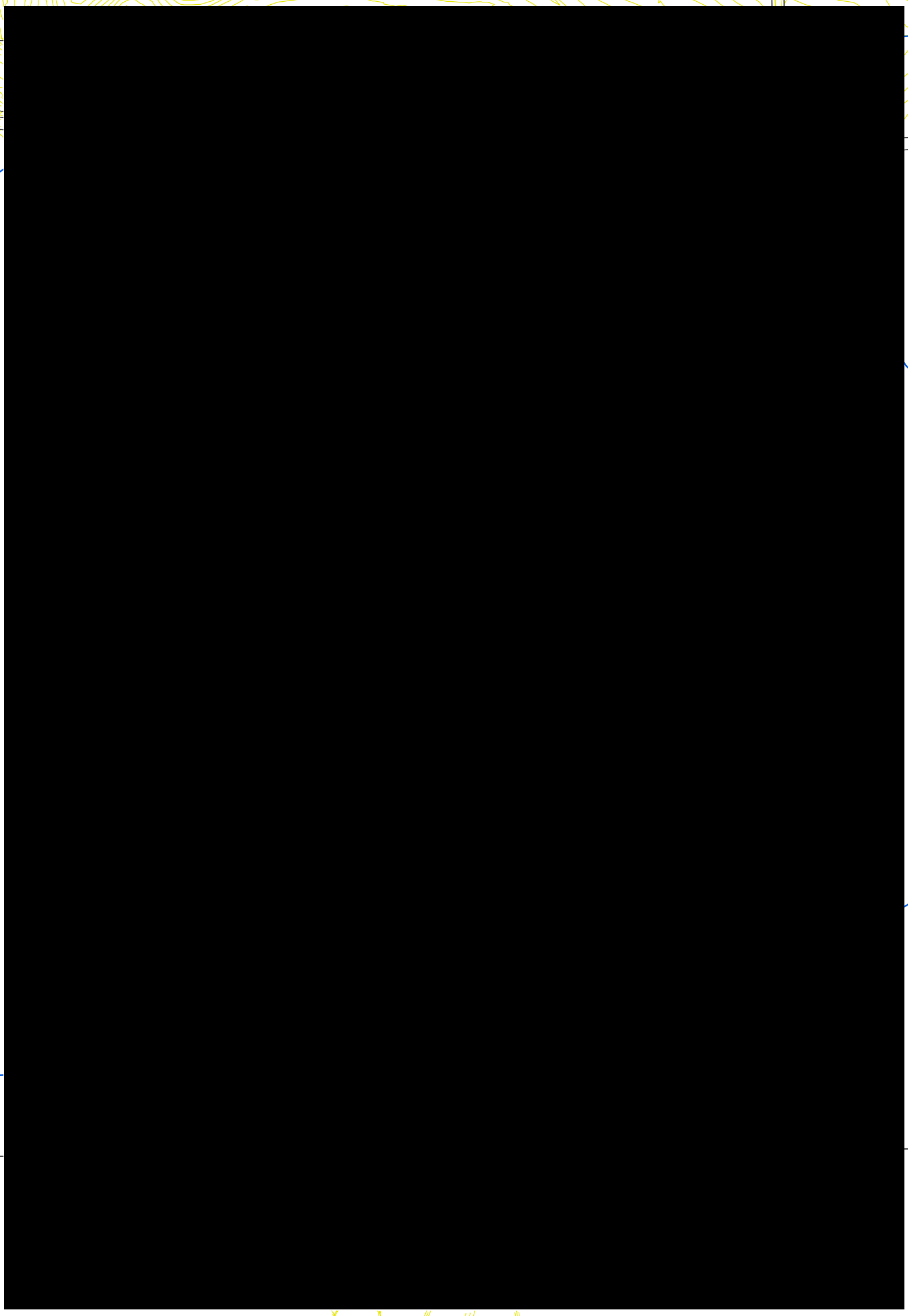
By-law Relating to Extractive Industries

First Schedule

APPLICATION FOR EXCAVATION LICENCE

APPENDIX B

Plans



APPENDIX C

Certificate of Title

APPENDIX D

Site Photos

Locked gates located at the site entrance

Truck washdown area located at the site entrance, taken facing towards Wandena Road

Pumping station for the vehicle washdown area and small lunchroom

Clay stockpiles

Lot M1326 Wandena Road, Muchea
Site Photos

Clay stockpiles

Existing clay pit

Lot M1326 Wandena Road, Muchea
Site Photos

Previous stage being backfilled and recontoured

The next stage of excavation is proposed within this existing paddock

Lot M1326 Wandena Road, Muchea
Site Photos

The next stage of excavation is proposed within this existing paddock

Extensive rehabilitation and revegetation has taken place within the reserve (far left) and decommissioned pits. Photo taken looking south-west from the stockpile area.
Lot M1326 Wandena Road, Muchea
Site Photos

Rehabilitation has taken place in stages over the years. The above photos show trees planted many years ago by Midland Brick.

Examples of more recent plantings are shown above.

Lot M1326 Wandena Road, Muchea
Site Photos