GOVERNMENT OF WESTERN AUSTRALIA

Environmental Protection Authority

Chief Executive Officer
Shire of Chittering
PO BOX 70
BINDOON WA 6502

Your Ref:
Our Ref: CMS15304
Enquiries: Teresa Bryant [redacted]
Email: [redacted]

NOTICE UNDER SECTION 39A(3)
Environmental Protection Act 1986

PROPOSAL: **Extractive Industry Clay Lot 7 Toy Road Bindoon**
LOCATION: **Shire of Chittering**
PROPONENT: **Brikmakers**
DECISION: **Not Assessed: Public Advice Given**

The above proposal has been referred to the Environmental Protection Authority (EPA) for consideration of its potential environmental impact.

This proposal raises a number of environmental issues. However, the overall environmental impact of the proposal is not so significant as to require assessment by the EPA, and the subsequent setting of formal conditions by the Minister for Environment under Part IV of the *Environmental Protection Act 1986*. Accordingly, the EPA has determined not to assess this proposal.

Nevertheless, the EPA has provided the attached advice to the proponent and other relevant authorities on the environmental aspects of the proposal.

The EPA's decision to not assess the proposal is open to appeal. There is a 14-day period, closing 10 May 2016, during which, on payment of the appeal fee, an appellant may ask the Minister to consider directing the EPA to reconsider this decision or conduct a formal assessment.

SHIRE OF CHITTERING
RECEIVED
02 May 2016
Officer CMDS
File A1282
Ref D16705[illegible]

Level 8, The Atrium, 168 St Georges Terrace, Perth, Western Australia 6000
Telephone 08 6145 0800 Facsimile 08 6145 0895 Email info@epa.wa.gov.au

Locked Bag 10, East Perth WA 6892

www.epa.wa.gov.au

Information on the outcome of the appeals process is available through the Appeals Convenor's website, www.appealsconvenor.wa.gov.au, or by telephoning [redacted] after the closing date of appeals.

This advice is provided for your information.

[redacted]

Naomi Arrowsmith
Director
Strategic Policy and Planning Division

Delegate of the Chairman of the Environmental Protection Authority
Under Notice of Delegation No. 33 published 17 December 2013

26 April 2016

Encl: Public Advice

PUBLIC ADVICE UNDER SECTION 39A(7) ENVIRONMENTAL PROTECTION ACT 1986

EXTRACTIVE INDUSTRY - CLAY

Summary

Brikmakers Pty Ltd proposes to extract clay from Lot 7 Toy Rd Bindoon, within the Shire of Chittering. Approximately 15 hectares (ha) of predominately pasture land will be disturbed for the construction of two clay excavation pits, a stockpile area, two dams, and bunds. Upgrading of a causeway across the Brockman River, which traverses west to east along the southern portion of the property, together with a new crossover to Toy Road is also proposed.

Excavation is proposed to occur in two stages and whilst operations are expected to continue for 20 years, the proponent is initially seeking development approval for a 10 year period. The development envelope is shown in Attachment 1.

The proposal was advertised for public comment and the Environmental Protection Authority (EPA) notes that eight public comments were received. The submissions raised a number of issues including impacts to the Brockman River, potential for acid sulphate soils, clearing of vegetation and associated impacts to fauna, amenity and inconsistencies in the reports.

The EPA has considered the proposal in accordance with the requirements of the *Environmental Protection Act 1986* (EP Act) and the *Environmental Impact Assessment Administrative Procedures 2012.* In making its decision on whether to assess the proposal, the EPA considered the 10 aspects of the significance test as set out in clause 7 of the *Environmental Impact Assessment Administrative Procedures 2012:*

1. values, sensitivity and quality of the environment which is likely to be impacted;
2. extent (intensity, duration, magnitude and geographic footprint) of the likely impacts;
3. consequence of the likely impacts (or change);
4. resilience of the environment to cope with the impacts or change;
5. cumulative impacts with other projects;
6. level of confidence in the prediction of impacts and the success of proposed mitigation;
7. objects of the Act, polices, guidelines, procedures and standards against which a proposal can be assessed;
8. presence of strategic planning policy framework;
9. presence of other statutory decision-making processes which regulate the mitigation of the potential effects on the environment to meet the EPA's objectives and principles for EIA; and
10. public concern about the likely effects of the proposal, if implemented, on the environment.

In considering the potential direct and indirect impacts of the proposal on the Hydrological processes and Inland water environmental quality, Flora and vegetation, Terrestrial fauna and Amenity, the EPA has had particular regard to:

- advice from the Department of Water (DoW) that:
    - intersection of waterways/drainage lines and the proposed bridge over the Brockman River will be subject to a bed and banks permit;
    - a minimum 30 metre (m) setback to the fringing vegetation of the waterways and drainage lines should be applied; and
    - the WMP should be amended to the satisfaction of DoW;
- the impacts to flora and vegetation, which are not likely to pose a significant impact due to the development envelope occurring in an area that is predominately cleared and previously used for grazing;
- the sites limited habitat value and small amount of clearing required, together with proponents commitment to assess trees for nesting hollows and retain where possible, prior to clearing;
- the impacts to amenity in the form of noise, dust and visual which are not likely to pose a significant impact due to:
    - a site specific study and modelling which determined the proposal would comply with the *Environmental Protection (Noise) Regulations* 1997 (Noise Regulations) at the nearest noise sensitive receivers;
    - proponent's commitments and operational procedures to implement the assumptions in the noise study;
    - proponent's commitments to management activities as proposed in the Dust Management Plan; and
    - the proponents assessment of visual amenity and management commitment to reduce visual impacts;
- the presence of other statutory processes, including requirements for permit(s) from DoW (*Rights in Water and Irrigation Act 1914*) and DER (EP Act Part V clearing) and consideration of the Application for Planning Approval, by the Shire of Chittering.

In summary, although the proposal raises a number of environmental issues, the EPA considers that the likely environmental effects of the proposal are not so significant as to warrant formal assessment. The EPA is of the view that the potential impacts of the proposal can be adequately managed by the proponent's mitigation and management measures.

It is also noted that other statutory processes can be used to regulate and implement mitigation and management measures including the requirement to have approval to:

- clear native vegetation through a Part V Division 2 Clearing;
- requirement for bed and bank permit from the Department of Water; and
- consideration of the Planning Application by the Shire of Chittering.

1. Environmental Factors

The EPA has identified the following preliminary environmental factors relevant to this proposal:

a) Hydrological processes and Inland waters environmental quality;

b) Flora and vegetation;

c) Terrestrial fauna; and

d) Amenity and Human health.

There were no factors, including the interaction between the environmental factors, that were determined to have significant environmental impacts that would require further formal assessment under Part IV of the EP Act. The EPA considers that the mitigation of the potential effects on the environment can be regulated by other statutory decision-making processes and through the implementation of proponent commitments and best practice measures in accordance with this advice.

2. Relevant Policy and Guidance

The EPA has given consideration to the following relevant published EPA policies and guidelines, noting that other published policies and guidelines pertaining to this proposal were considered but not determined to be relevant:

a. Hydrological processes and Inland waters environmental quality

- Position Statement 4 – *Environmental Protection of Wetlands*, November 2004, Environmental Protection Authority Western Australia (PS 4).
- Guidance Statement 10 – *Level of Assessment for Proposals affecting natural areas within the System 6 region and Swan Coastal Plain portion of the System 1 region,* June 2006, Environmental Protection Authority of Western Australia (GS 10).

b. Flora and vegetation

- Position Statement 2 – *Environmental Protection of Native Vegetation in Western Australia,* December 2000, Environmental Protection Authority Western Australia (PS 2).
- Position Statement 3 - *Terrestrial Biological Surveys as an Element of Biodiversity Protection,* March 2002, Environmental Protection Authority Western Australia (PS 3).
- Guidance Statement 10 – *Level of Assessment for Proposals affecting natural areas within the System 6 region and Swan Coastal Plain portion of the System 1 region,* June 2006, Environmental Protection Authority of Western Australia (GS 10).

c. Terrestrial fauna

- Position Statement 3 - *Terrestrial Biological Surveys as an Element of Biodiversity Protection*, March 2002, Environmental Protection Authority Western Australia (PS 3).

d. Amenity and Human health

- Guidance Statement No.3 - *Separation Distances between Industrial and Sensitive Land Uses*, June 2005, Environmental Protection Authority Western Australia (GS 3).

- Environmental Assessment Guideline 13 - *Consideration of environmental impacts from noise*, September 2014, Environmental Protection Authority Western Australia (EAG 13).
- Guidance Statement 33 – *Environmental Guidance for Planning and Development*, May 2008, Environmental Protection Authority of Western Australia (GS 33).

3. Advice and Recommendations regarding Environmental Issues

a. Hydrological processes and Inland waters environmental quality

The EPA's objective for these factors are:

- *To maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected.*
- *To maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social, are protected.*

The project area is located approximately 175m at the closest point to the Brockman River, a Conservation Category Wetland. It is adjacent to one drainage line and will intercept two other drainage lines, that all flow to the Brockman River. The amended the proposal does not divert the drainage lines into dams and the EPA expects that the Excavation and Management Plan and Water Management Plan (WMP) will be amended accordingly.

A permit will be required for the proposed bridge crossing over the Brockman River.

The EPA expects that a standard minimum 30m setback of the dams from the fringing vegetation of the waterways be applied consistent with *State Planning Policy 2.9 Water Resources* (WAPC, 2006).

The EPA notes that according to the Excavation and Management Plan, which was part of the proposal referred, none of the at risk acid sulphate soil (ASS) conditions exist at the site or near the excavations. Brikmakers regularly samples clays and stored water as part of its normal operations for production quality control and environmental monitoring policy.

Summary

Having regard to the:-

- location of the proposal adjacent to the Brockman River CCW;
- advice from DoW regarding requirements for permit(s) for diversion of any surface water drainage lines and the crossover of the Brockman River, setbacks to drainage lines and additional requirements needed in the WMP; and
- the actions and commitments made by the proponent in the referral documentation (subject to amendments),

the EPA considers that the proposal can meet the EPA's objectives for Hydrological processes and Inland waters environmental quality and that the likely environmental

effects of the proposal are not so significant as to warrant formal assessment, provided:-

- a minimum 30m setback of the dams from the fringing vegetation of the drainage line is provided; and,
- the proposal is implemented in accordance with the Water Management Plan, subject to modification to the satisfaction of the DoW.

b. Flora and vegetation;

The EPA's objective for this factor is to maintain representation, diversity, viability and ecological function at the species, population and community level.

The proposal area is mostly cleared and according to the referral documentation, removal of only scattered *Eucalyptus rudis* and *Corymbia calophylla* will be required.

The Department of Environmental Regulation (DER) have advised that the clearing can be appropriately managed by DER through the clearing permit provisions of the EP Act.

According to the proponent's referral documentation, in addition to planting on the temporary visual and noise screening bunds, some additional plantings of native trees will be retained in tree belts with the majority of the site being returned to pasture.

Summary

Having regard to the:-

- lack of vegetation structure and small amount of clearing required; and
- proponent's commitment to undertake revegetation at closure with pasture and native vegetation,

the EPA considers that the proposal can meet the EPA's objectives for Flora and vegetation and that the likely environmental effects of the proposal are not so significant as to warrant formal assessment provided that the proposal is implemented in accordance with the referral documentation. It is noted that the clearing can be regulated through other statutory processes including under Part V (Clearing) of the EP Act.

c. Terrestrial fauna

The EPA's objective is to maintain representation, diversity, viability and ecological function at the species, population and assemblage level.

The EPA considers the site to have limited habitat value and notes that implementation of the proposal is expected to result in the removal of scattered paddock trees.

According to the risk assessment within the proponents Excavation and Management Plan, based on an initial observation of the trees to be removed, none were likely to contain hollows suitable for Black Cockatoos. Trees will be assessed again and if nesting hollows are found, management will aim to retain the tree and/or provide nesting boxes.

Summary

Having regard to the:-

- the small amount of clearing required; and,
- proponent's commitment to undertake a more thorough investigation for trees with hollows and retain any, where possible,

the EPA considers that the proposal can meet the EPA's objectives for Terrestrial Fauna and that the likely environmental effects of the proposal are not so significant as to warrant formal assessment provided that the proposal is implemented in accordance with the referral documentation. Further, it is noted that impacts to threatened fauna can be considered through other statutory processes including under Part V (Clearing) of the EP Act.

d. Amenity and Human Health (noise, dust and visual)

The EPA's objective for these factors are:

- *To ensure that impacts to amenity are reduced as low as reasonably practicable.*
- *To ensure that human health is not adversely affected.*

The nearest sensitive receptor is located 450m west, with 5 more located approximately 750m to the south and north, of the proposed excavation area. The EPA notes the buffer is marginally less than the minimum buffer distance indicated for clay extraction or processing in GS 3. The EPA also notes this proposal is for extraction only and does not include a processing component.

Noise

The proponent has undertaken a site specific study for noise. The EPA considers the site specific study provided the most appropriate guide to determining the separation distance that should be maintained between the proposal and sensitive land uses. The study determined that the proposal complies with the *Environmental Protection (Noise) Regulations* 1997 (Noise Regulations) at the nearest noise sensitive receivers, on the basis that:-

- noise suppression kits are fitted to the dozer;
- 6.0m high earth bunds are constructed on the west and south boundary of the loading area;
- 5.0m earth bund constructed north of the dam for Stage 1 and 7.5m for Stage 2; and
- trucks travel 25km/h while on the access road.

Dust

The proponent has prepared a Dust Management Plan which includes a risk assessment and commits to minimising dust through site design including planting screening tree belts and operational management actions.

Whilst the management measures proposed will reduce dust, sensitive receptors are located closer than the minimum, and within the range, of the generic separation distance indicated in the EPA's GS 3.

In the absence of a site specific study to support a reduced separation distance but recognising the proposal is for extraction only, the EPA considers that additional measures should be implemented to reduce the risk of nearby sensitive receptors being affected.

Visual

The EPA notes the proponent has undertaken a basic visual impact assessment and has made a number of commitments in the Excavation and Management Plan including staging of the excavation area and rehabilitation to reduce visual impacts.

Summary

Having regard to the:-

- noise assessment which confirms the proposal would comply with Noise Regulations;
- proponents management and operational commitments in the Dust Management Plan; and
- the use of bunds and vegetation and other management commitments to reduce visual impacts;

the EPA considers that the proposal can meet the EPA's objectives for Amenity and that the likely environmental effects of the proposal are not so significant as to warrant further formal assessment provided that the proposal is implemented in accordance with the referral documentation and that impacts to amenity are considered by the Shire of Chittering as part of its assessment of the Application for Planning Approval.

If approved by the Shire of Chittering, conditions requiring additional dust management actions should be included to reduce the risk of nearby sensitive receptors being affected.

Attachment 1

SHAWMAC

CONSULTING CIVIL & TRAFFIC ENGINEERS, RISK MANAGERS.

Project:	Transport Statement, Lot 7 Toy Road Bindoon.
Client:	Brikmakers.
Author:	T Shaw
Signature:	[redacted]
Date:	24th July 2015
Version:	1

1 ST. FLOOR, 908 ALBANY HIGHWAY, EAST VICTORIA PARK WA 6101.
PHONE +61 8 9355 1300
FACSIMILE +61 8 9355 1922
EMAIL admin@shawmac.com.au

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Ver No.	Author	Reviewed by	Date	Issued for	Signature	Date
1	T Shaw	R Garton	27/05/15	Review	[redacted]	27/05/15
2	T Shaw	R Garton	24/07/15	Review	[redacted]	24/07/15

SHAWMAC PTY LTD
ABN 51 828 614 001
PO BOX 937 SOUTH PERTH
WA 6951
T: + 61 8 9355 1300
F: +61 8 9355 1922
E: [redacted]

CONTENTS.

1. Summary.

Shawmac was commissioned to assess the traffic impacts associated with the generation of traffic from a proposed clay excavation operation at Lot 7 Toy Road Bindoon.

The assessment follows the recommended outline contained in the West Australian Planning Commission draft guideline "Transport Statement Guidelines for Developments". Potential traffic flow from the site was estimated by applying the cubic metre rate by the amount of product to be hauled offsite and the vehicle capacity.

Traffic was assigned to the adjacent existing road network and flows used as a basis for assessing traffic impacts associated with the site. Based on the assessment it was shown that the flows predicted can be accommodated within the existing network without unacceptable adverse impacts.

2. Introduction and Background.

2.1. Proponent.

Shawmac was commissioned to assess the traffic impacts associated with the generation of traffic from the proposed clay extraction operation at Lot 7 Toy Road Bindoon.

2.2. Site Location and Land Use.

The site is located as shown on Figure 1 and is within the Shire of Chittering.

Figure 1. Site Location

The study site was previously used for extensive agriculture and cattle grazing in accordance with the Shire of Chittering town planning scheme. Gravel excavation pits are currently in operation on the eastern part of the site. The existing site together with the surrounding area is shown on the aerial photograph, refer Figure 2.

Figure 2. Site Aerial Photograph

2.3. Referenced Information.

In undertaking the study, the information listed below was referenced.

- Austroads Guide to Road Design Part 4A – Unsignalised and signalised intersections.

3. Site Proposal.

3.1. Regional Context.

The site is located within the Shire of Chittering approximately 10km from the Bindoon Townsite and has direct street frontage to Toy Road which connects to Great Northern Highway via the Bindoon – Moora Road.

3.2. Land Use.

It is proposed to develop the site for extractive industry purposes.

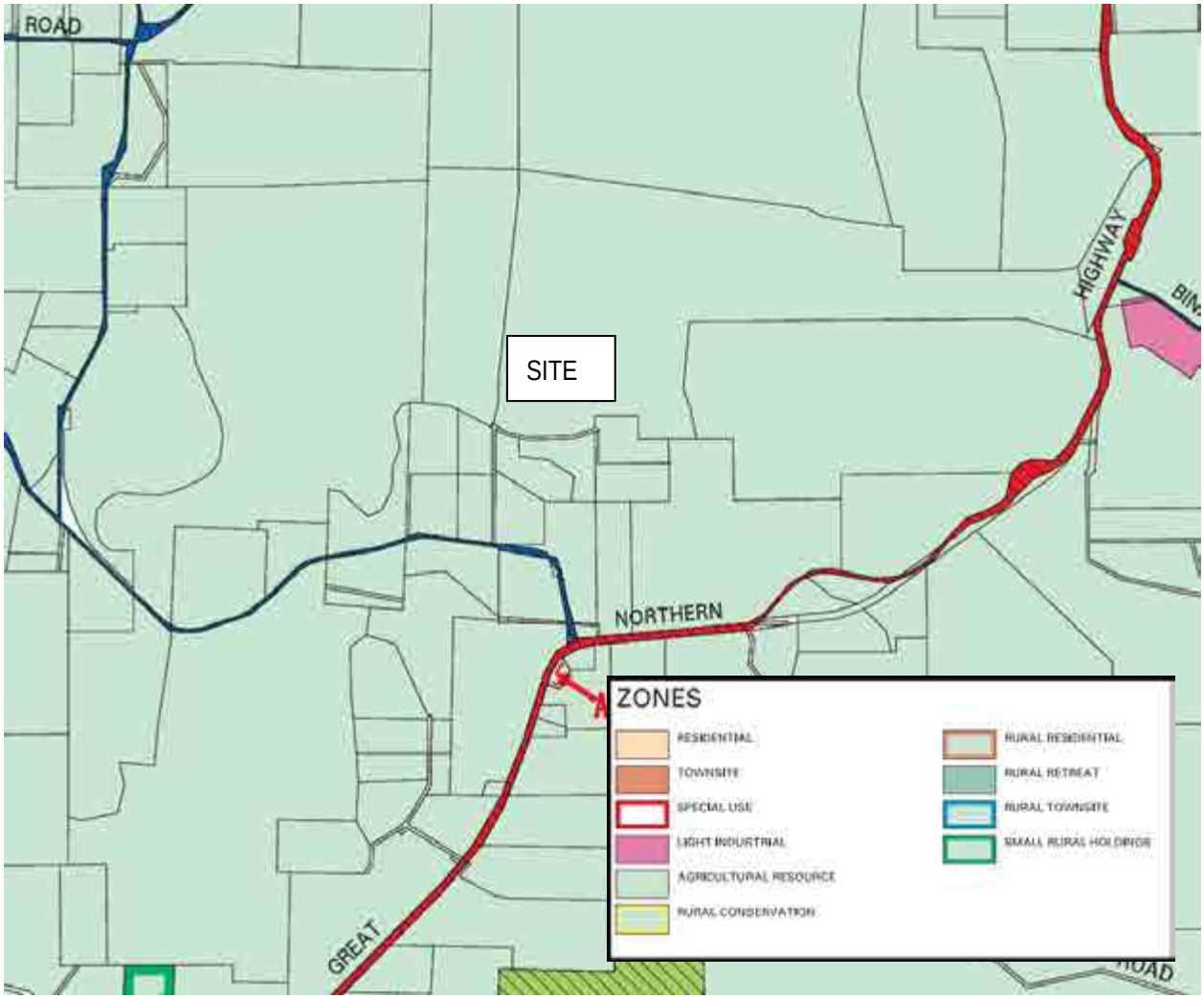

Figure 3. Extract of Shire of Chittering Local Planning Scheme No 6

3.3. Major Attractors and Generators of traffic.

Access to the site is via Toy Road which provides connections to Great Northern Highway via the Bindoon – Moora Road. All movements to and from the site will be to the Perth region to the south.

The site also maintains frontage to Great Northern Highway along its eastern boundary. Great Northern Highway is currently used for access associated with the existing gravel excavation activities on the eastern part of the site. No changes to this operation are proposed as part of this Application.

4. Vehicle movements associated with the proposed clay excavation will only be accessed via Toy Road. Existing Situation.

4.1. Existing Roads.

Toy Road

Toy Road is classified as an access road and is under the care and control of the Shire of Chittering. Toy Road at the site is described as a sealed single carriageway road approximately 7.5m wide with 1m wide gravel shoulders and open roadside drains. Toy Road has an un-posted speed limit.

Traffic count data for Toy Road is not available; however given the traffic catchment it is expected to currently be less than 100 vehicles per day (vpd).

Bindoon – Moora Road

Bindoon - Moora Road is classified as a Primary Distributor Road that has a RAV network 3 status according to the MRWA digital mapping website. It is a State Road under the care and control of Main Roads WA and is described as a sealed single carriageway road approximately 7.0m wide with 1.5m wide gravel shoulders and open roadside drains.

Bindoon - Moora Road has a posted speed limit of 90km/hr.

Traffic count data for Bindoon - Moora Road is shown on Figure 4.

Weekly Volume by Hour

Traffic Flow:	Directional	Road Name:	Bindoon Moora Rd (M002)
Site No:	15995	Location Description:	W of Great Northern Hwy (SLK 0.01)
Date Range:	12 Apr 2005 to 22 Apr 2005	Count Type:	Classification Counts

Average Vehicle Volume

Hour	Mon		Tue		Wed		Thu		Fri		Sat		Sun		Mon - Fri		Mon - Sun	
	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W
0000	0	1	1	0	1	3	1	1	2	3	1	1	2	3	1	2	1	2
0100	0	0	0	1	1	1	1	2	1	2	1	3	1	2	1	1	1	2
0200	0	2	0	0	0	0	1	2	0	3	2	1	0	3	0	1	0	1
0300	0	0	1	0	2	1	2	2	2	2	1	0	1	3	1	1	1	1
0400	0	0	2	0	0	2	1	1	1	2	0	1	0	0	1	1	1	2
0500	4	8	5	9	3	8	5	3	3	4	0	3	0	1	4	6	3	5
0600	14	25	14	14	9	22	7	19	7	16	7	10	4	3	10	19	9	16
0700	17	38	14	28	19	21	18	22	18	18	18	28	5	8	17	25	15	23
0800	17	32	27	26	19	28	27	27	24	25	25	26	14	16	23	26	22	26
0900	26	22	23	22	22	29	27	16	34	40	42	36	14	20	26	26	26	27
1000	23	29	32	32	22	18	29	27	30	28	39	31	26	36	27	27	29	29
1100	28	33	18	25	22	22	28	26	33	37	42	37	37	32	28	29	29	30
1200	26	23	19	24	23	26	24	23	28	35	34	29	40	33	24	26	28	28
1300	19	17	26	26	27	25	30	30	30	33	47	26	23	29	26	26	29	27
1400	26	36	24	29	30	24	31	23	38	40	43	38	36	35	30	30	33	32
1500	26	30	30	24	22	28	30	27	55	36	36	19	41	41	35	29	36	29
1600	22	28	31	29	24	25	36	32	36	43	24	32	48	37	30	31	32	32
1700	16	26	22	26	25	22	29	26	28	26	34	24	30	26	24	26	26	26
1800	18	32	16	27	18	20	23	23	30	20	16	15	16	26	21	24	20	24
1900	8	16	17	13	13	16	13	16	20	23	12	16	12	12	16	16	16	16
2000	6	4	6	10	8	8	7	12	10	11	5	6	5	14	7	9	6	9
2100	3	4	4	4	6	6	7	6	2	2	6	4	4	3	4	5	5	4
2200	4	7	4	6	3	5	2	5	3	6	2	6	4	4	3	6	3	5
2300	2	7	4	4	4	6	4	6	3	3	3	6	1	2	3	6	3	5
Total	299	429	347	363	319	380	386	375	447	467	440	398	368	388	358	401	373	401

Peak Statistics

		Mon		Tue		Wed		Thu		Fri		Sat		Sun		Mon - Fri		Mon - Sun	
		E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W
AM	1/4 Hour	1015	0745	1000	1145	0915	0900	0830	1045	1100	1130	1145	1100	1130	1015	1000	1130	1130	1130
	1/4 Hr Vol	11	12	8	10	8	9	10	9	11	12	14	16	12	14	7	8	8	8
	1/2 Hour	1100	0815	1130	1130	0900	0900	0830	1045	1000	1115	1130	1045	1115	1045	1000	1130	1130	1130
	1/2 Hr Vol	19	20	12	16	14	17	19	19	19	23	27	26	23	24	14	16	16	19
	1 Hour	1145	0745	1145	1115	1130	0845	0830	1015	0930	1115	0915	1045	1115	1015	1130	1130	1130	1100
	1 Hr Vol	28	39	19	26	29	32	33	29	35	40	46	44	45	46	28	29	28	29
	1 Hr Fact	7778	8125	5938	7368	8125	8889	825	8056	9211	8	8846	8875	9375	8214	8073	8938	8851	8889
	2 Hour	1115	0845	1130	1115	1130	0900	0915	1030	0830	1115	1130	0915	1115	1015	1130	1115	1130	1115
	2 Hr Vol	84	72	60	66	52	57	61	55	60	73	88	77	79	70	52	56	57	57
PM	1/4 Hour	1545	1645	1545	1615	1445	1500	1530	1615	1545	1630	1445	1415	1630	1230	1545	1630	1545	1630
	1/4 Hr Vol	11	14	12	10	11	10	11	10	20	14	15	16	20	12	10	8	10	9
	1/2 Hour	1545	1500	1530	1615	1430	1500	1515	1615	1530	1630	1300	1230	1445	1615	1530	1615	1530	1615
	1/2 Hr Vol	19	20	23	19	18	17	21	19	34	26	27	23	29	23	20	17	20	17
	1 Hour	1615	1430	1500	1615	1415	1430	1600	1545	1615	1615	1300	1400	1445	1545	1615	1615	1615	1545
	1 Hr Vol	30	37	38	33	30	30	38	32	55	47	47	38	49	46	37	32	37	32
	1 Hr Fact	6818	7115	8125	8167	8818	7895	9	8	7564	8393	8293	5938	7206	9375	8558	8558	9004	8713
	2 Hour	1400	1415	1500	1645	1300	1345	1500	1615	1415	1530	1300	1230	1445	1430	1515	1500	1445	1445
	2 Hr Vol	52	70	70	60	57	53	69	61	96	81	80	72	97	82	67	60	70	61
Peak	1/2 Hour	0645	0700	0745	0645	0645	0600	0715	0650	0715	0615	0650	0700	0800	0830	0715	0715	0715	0715
	1/2 Hr Vol	257	344	252	268	270	286	336	303	367	374	388	342	339	348	299	309	311	314

Figure 4. Bindoon – Moora Road Count Data

Great Northern Highway (GNH)

GNH is classified as a Primary Distributor and has a RAV network 7 status according to the MRWA digital mapping website. GNH at the site is described as a sealed and marked single carriageway road approximately 7.0m wide with 1.0m wide sealed shoulders and 1.2m wide gravel shoulders and open roadside drains.

GNH has a posted speed limit of 100km/hr.

Traffic count data for GNH is shown on Figure 5.

Weekly Volume by Hour

Traffic Flow:	Directional	Road Name:	Great Northern Hwy (H006)
Site No:	15993	Location Description:	S of Bindoon Moora Rd (SLK 67.52)
Date Range:	12 Apr 2005 to 22 Apr 2005	Count Type:	Classification Counts

Average Vehicle Volume

Hour	Mon		Tue		Wed		Thu		Fri		Sat		Sun		Mon - Fri		Mon - Sun	
	N	S	N	S	N	S	N	S	N	S	N	S	N	S	N	S	N	S
0000	1	3	2	7	5	2	5	6	7	6	9	7	3	5	4	5	5	6
0100	0	3	2	2	4	7	5	6	4	4	6	10	4	3	3	4	4	5
0200	2	0	1	3	1	11	5	6	6	3	6	12	4	2	3	5	3	6
0300	1	3	5	3	4	5	3	3	5	2	0	1	1	2	4	3	3	3
0400	12	9	7	4	8	4	6	4	8	8	10	6	3	1	8	4	8	4
0500	18	10	20	11	16	7	15	11	16	12	15	6	8	6	17	10	15	8
0600	46	15	38	33	47	23	43	17	37	23	30	20	21	6	46	22	40	20
0700	84	35	73	26	62	48	56	48	41	45	59	39	39	18	63	40	59	37
0800	83	44	79	58	70	51	65	78	67	70	80	68	60	39	73	65	71	58
0900	66	54	57	60	63	51	56	71	76	74	97	85	56	53	63	62	67	65
1000	85	52	58	54	73	58	66	63	66	77	87	93	60	67	71	60	75	68
1100	100	52	62	58	67	59	69	64	75	74	102	96	79	86	75	63	79	71
1200	72	60	66	48	65	61	58	69	80	66	80	88	74	93	68	61	71	70
1300	62	43	58	64	48	61	66	66	77	84	83	91	60	70	62	64	66	68
1400	64	52	59	63	66	79	62	80	75	101	87	92	79	107	62	75	69	82
1500	91	73	63	63	56	74	54	86	75	106	62	85	72	122	68	85	58	91
1600	63	67	68	63	58	74	71	94	109	111	67	74	67	85	74	86	72	86
1700	67	61	67	67	56	79	76	82	86	91	57	60	69	63	70	76	68	75
1800	64	51	52	48	50	52	64	54	50	53	36	41	59	52	58	52	54	50
1900	40	30	39	41	34	38	40	41	54	58	41	37	29	26	41	44	40	40
2000	33	22	30	15	38	13	33	27	41	32	16	24	23	12	35	22	31	21
2100	24	8	20	12	20	17	21	23	30	23	13	21	18	15	25	17	22	17
2200	21	12	13	12	12	6	12	14	25	13	10	5	9	10	17	12	16	11
2300	10	11	9	15	14	10	11	13	15	12	7	15	4	6	12	12	10	12
Total	1120	771	960	875	948	893	956	1029	1123	1160	1089	1099	931	982	1021	945	1016	972

Peak Statistics

		Mon		Tue		Wed		Thu		Fri		Sat		Sun		Mon - Fri		Mon - Sun	
		N	S	N	S	N	S	N	S	N	S	N	S	N	S	N	S	N	S
AM	1/4 Hour	1015	0900	1045	1000	1015	1015	0815	0845	0945	1015	0815	1045	1045	1115	1015	1000	1115	1000
	1/4 Hr Vol	55	38	32	30	31	31	30	34	37	33	36	33	27	25	59	37	30	38
	1/2 Hour	0745	1045	1045	0945	0800	1015	1045	0830	0930	1000	0915	0945	1030	1145	1100	1000	1115	1130
	1/2 Hr Vol	57	32	37	37	37	36	36	45	44	42	56	60	50	48	37	33	39	35
	1 Hour	1100	1100	1045	0915	1015	1130	1045	0815	1145	0830	0945	0915	1045	1115	1045	0930	1045	1100
	1 Hr Vol	108	62	72	67	73	65	69	83	82	79	109	105	91	94	72	64	77	66
	1 Hr Fact	.8621	.8611	.8372	.869	.8903	.9286	.9583	.883	.8723	.9405	.7569	.8468	.8426	.84	.931	.9412	.9456	.9387
	2 Hour	1000	1100	1030	0900	1000	1130	1000	0815	1045	0830	0815	1045	1015	1115	1000	0830	1045	1115
	2 Hr Vol	188	122	133	114	139	127	134	158	155	157	197	205	167	185	141	126	147	136
PM	1/4 Hour	1500	1500	1700	1530	1230	1445	1715	1515	1630	1530	1230	1230	1300	1445	1630	1530	1630	1530
	1/4 Hr Vol	28	22	22	25	19	29	24	32	33	36	33	31	24	48	26	25	20	25
	1/2 Hour	1500	1500	1645	1530	1230	1445	1700	1515	1630	1515	1400	1300	1245	1445	1630	1515	1630	1515
	1/2 Hr Vol	55	38	40	48	37	48	44	57	61	59	68	62	43	88	40	47	39	48
	1 Hour	1430	1500	1615	1530	1415	1445	1645	1615	1615	1515	1330	1230	1215	1445	1630	1530	1630	1445
	1 Hr Vol	85	73	77	91	70	88	83	96	111	114	92	85	85	143	75	89	76	93
	1 Hr Fact	.7389	.8295	.8953	.91	.8459	.7544	.9646	.8279	.8536	.8026	.8519	.7681	.8854	.7772	.9096	.8763	.9072	.9187
	2 Hour	1415	1445	1545	1530	1415	1445	1545	1515	1545	1445	1230	1230	1215	1445	1545	1445	1545	1445
	2 Hr Vol	151	140	142	170	126	183	149	189	199	219	174	184	159	238	147	175	144	181
Peak	15 Hour	0615	0700	0730	0745	0630	0730	0715	0730	0715	0715	0615	0730	0730	0900	0645	0730	0700	0730
	15 Hr Vol	904	854	897	899	734	744	759	864	879	964	897	929	827	894	776	794	791	815

Figure 5. GNH Count Data

4.2. Intersections

Bindoon - Moora Road and Great Northern Highway (North)

The intersection of Bindoon - Moora Road and Great Northern Highway consists of a fully channelised T intersection with left and right turn auxiliary lanes as shown on Figure 6 below.

Figure 6. Intersection of GNH and Bindoon - Moora Road

Bindoon - Moora Road and Toy Road

The intersection of Bindoon - Moora Road and Toy Road consists of an unchannelised T intersection as shown on Figure 7 below.

Figure 7. Intersection of Bindoon – Moora Road and Toy Road

4.3. Road Hierarchy and status.

Figure 4 shows the Road Hierarchy and Restricted Access Vehicle categories for the road network adjacent to and around the site. Table 1 below shows the permitted Prime Mover and trailer combinations for the majority of the haul route.

Road Name	Prime Mover and Trailer Combinations	Length	Max permitted mass
Bindoon – Moora Road	(A) PRIME MOVER, SEMI TRAILER TOWING A DOG TRAILER	≤27.5	84
GNH	(A) PRIME MOVER, TOWING SEMI TRAILER AND B DOUBLE (B) B-DOUBLE TOWING A DOG TRAILER	>27.5,≤36.5 >27.5,≤36.5	107.5 107.5

Table 1. Prime Mover and Trailer Combinations

Figure 8. Road Hierarchy

4.4. Road Hierarchy vs Actual Flows

Table 2 details the comparison of flows against the maximum desirable flows under the MRWA Functional Hierarchy criteria.

Location and date of count.		Classification	Desirable Max Traffic Volume (vpd)	Actual Daily Traffic Flows (vpd)
GNH	South of Bindoon - Moora Road	Primary Distributor	35,000 vpd.	1,966 vpd
Bindoon – Moora Road	West of GNH (2006)	Primary Distributor	7,000[1] vpd.	759 vpd
Toy Road	North of Bindoon – Moora Road (Estimated)	Access Road	3,000 vpd.	100 vpd

Table 2. Desirable Maximum Flows vs Actual Flows

The table above indicates that all roads are operating in accordance within their capacity.

5. Changes to Surrounding Transport Networks

There are no known changes to the adjacent network that has the potential to affect the assessment.

[1] Although classed as a Primary Distributor the road functions more as a Local Distributor.

6. Assessment Years

The development is assessed on current network conditions.

7. Time Periods for Assessment

Assessment is based on both daily traffic and peak hour periods.

8. Development Generation and Distribution.

Potential traffic flows from the site were calculated based on the extraction rate and cartage details as advised by Brikmakers and summarised below:

Annual extraction: approx. 75,000 tonnes.

Transport Metrics: 50 tonne loads out (ie two 25 tonne trailer combo).

Number of days operating: approx. 25 days a year.

This equates to about 60 trips per day or 120 vehicle movements.

The distribution of traffic is expected to be exclusively from the south and the impact on adjacent roads is summarised on Table 3.

Location	Daily Traffic (Existing / Predicted)	AM Peak (Existing / Predicted)	PM Peak (Existing / Predicted)
GNH South of Bindoon Moora Road (NB)	1,021 / 1,081 vpd	72 / 78 vph	78 / 84 vph
GNH South of Bindoon Moora Road (SB)	945 / 1,005 vpd	64 / 70 vph	89 / 95 vph
Bindoon – Moora Road east of Toy Road (EB)	358 / 418 vpd	25 / 31 vph	37 / 43 vph
Bindoon – Moora Road east of Toy Road (WB)	401 / 461 vpd	29 / 35 vph	32 / 38 vph
Toy Road north of Bindoon – Moora Road (NB)	100 / 160 vpd	10 / 16 vph	10 / 16 vph
Toy Road north of Bindoon – Moora Road (SB)	100 / 160 vpd	10 / 16 vph	10 / 16 vph

Table 3. Midblock Traffic Prediction Adjacent Network

8.1.1. Impact on Intersections

Turning movements were predicted for both the AM peak and the PM peak periods for the intersection of Bindoon – Moora Road and Toy Road and for Bindoon – Moora Road and Great Northern Highway and are shown on Figures 9 and 10.

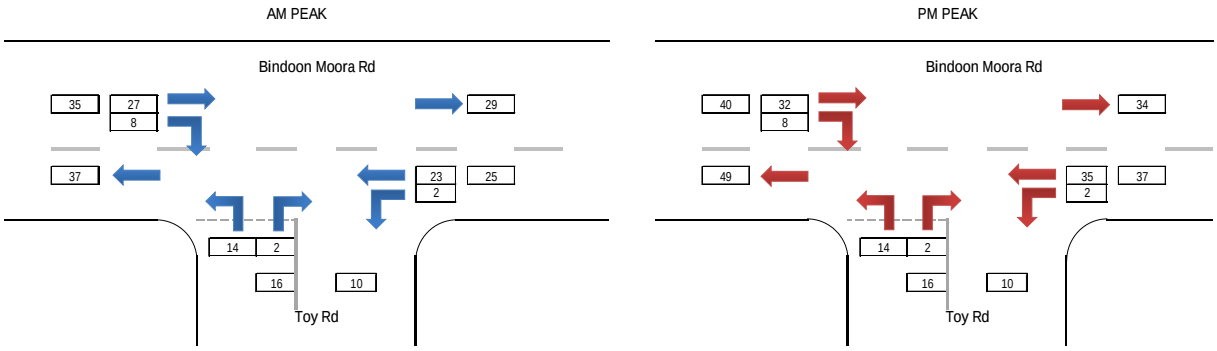

Figure 9. Turning Movements – Toy Road – Bindoon – Moora Road

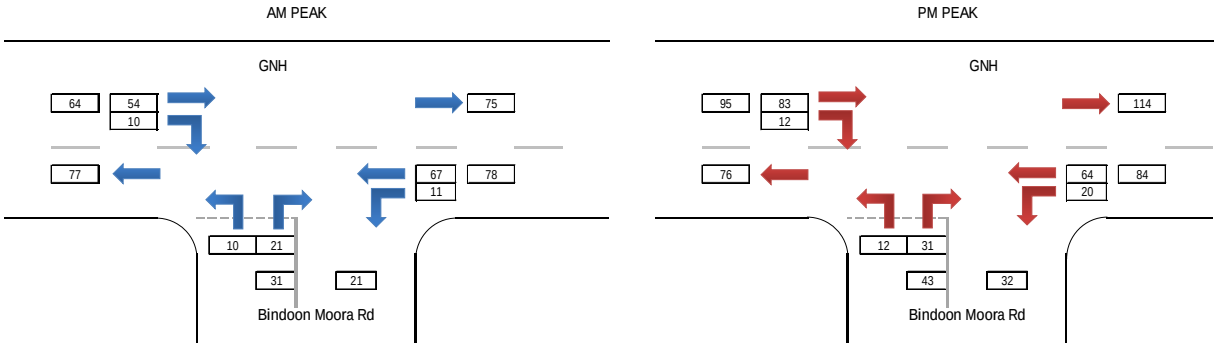

Figure 10. Turning Movements – GNH – Bindoon – Moora Road

The capacity of an intersection is generally evaluated using SIDRA intersection software and warrants for analysis for unsignalised intersections with minor roads are shown in Table 4 which is in an extract of Table 6.1 of *Austroads Guide to Traffic Management Part 3, Traffic Studies and Analysis*. In this instance the warrants are not met for detailed assessment.

Type of Road	Light Cross turning volumes maximum design hour volumes per hour (two way)		
Two- lane major road Cross Road	400 250	500 200	650 100
Four-lane major road Cross road	1000 100	1500 50	2000 25
GNH / Bindoon - Moora Road	180 40		
Toy Road / Bindoon - Moora Road	80 16		

Table 4. Intersection volumes below which capacity analysis is unnecessary

8.2. Access Movements

Access to and from the site will be via a crossover located on Toy Road located approximately 150 metres east of the Toy Road bend as shown on Figure 11.

Figure 11. Propsed Access onto Toy Road

No details are provided for the crossover other than the location and design will be undertaken to ensure that the geometry provides for the intended design vehicle. Given the proximity of the 90 degree bend to the west and the nature of the road to the east of the access point, vehicle speeds along this section of Toy Road are expected to be less than 50 km/h. A desktop review of the crossover location indicates that there is approximately 120m of sight distance to the east and west of the access point. Austroads Part 4A Table 3.2 provides guidance as to Safe Intersection Sight Distance which for a 2 second observation time and a speed of 50 km/hr is 97m.

Given the low number of vehicles using Toy Road and the likely speed at which through traffic would be travelling along Toy Road, the movement of trucks to and from the site is not expected to result in unacceptable levels of risk.

A review of turning movements at the intersection of Toy Road and Bindoon – Moora Road indicates that based on hourly volumes and the application of warrants as described in Austroads "*Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections*" a Basic intersection configuration is warranted; refer Figure 12.

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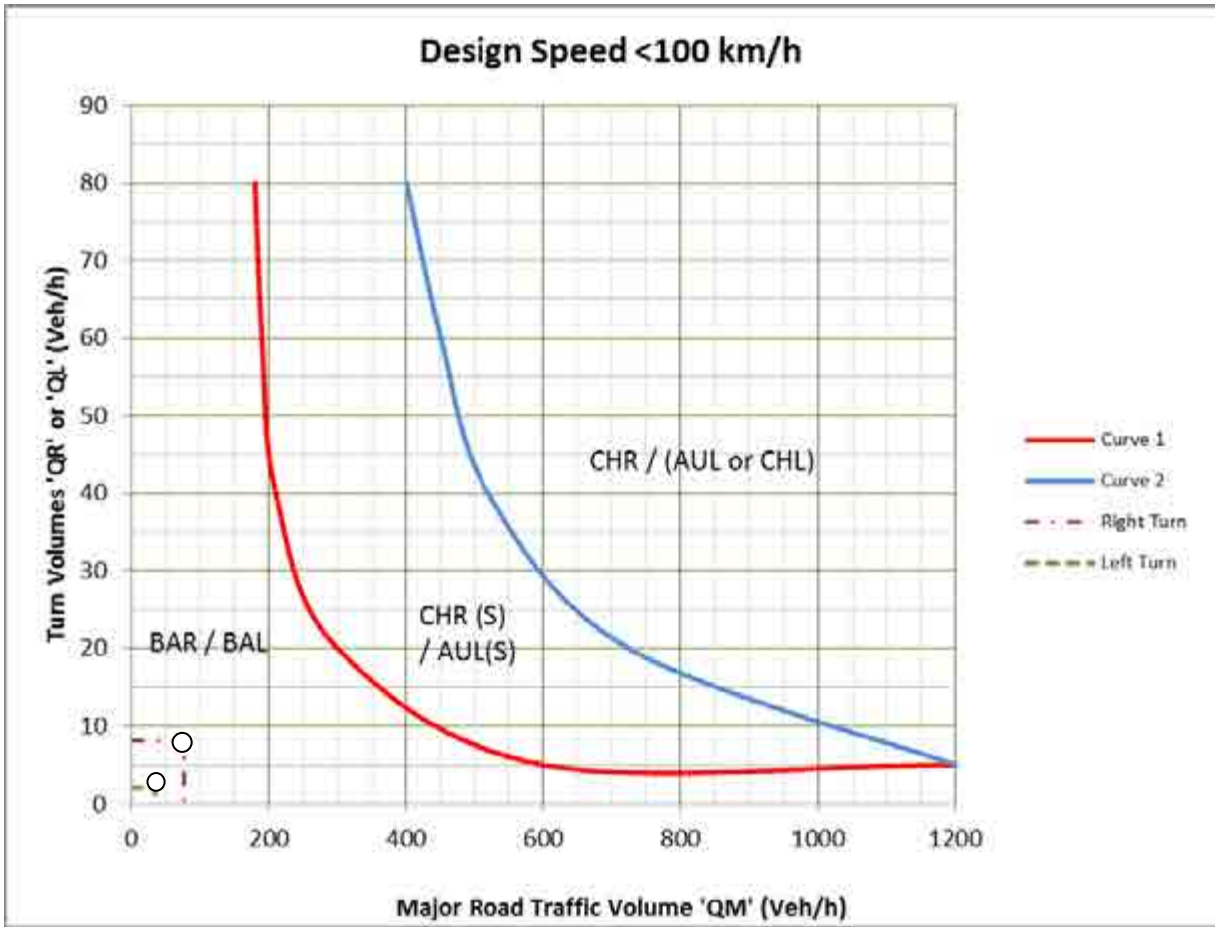

Figure 12. Intersection Warrants

As Toy Road is not a designated RAV route, application will need to be made to the Shire of Chittering in order to have the route designated based on the type of vehicle proposed to be used. This will require consideration of the RAV assessment guidelines. Given the short haul distance, the limited amount of traffic using Toy Road and the width of the current seal, the use by permit vehicles over a short time frame each year (25 days) is considered to be acceptable. Apart from additional signage and modification of the intersection, no upgrade works are considered to be necessary or warranted.

With respect to the intersection, upgrading will be required to provide sufficient width on the Bindoon – Moora Road westbound carriageway to allow for through traffic to safely pass right turning traffic into Toy Road, to accommodate all turns into and out of the intersection lane correct and to accommodate slow moving vehicles turning left onto Bindoon – Moora Road. A conceptual layout of the improvements is shown over on Figure 13.

No amendments or modifications to the intersection of Bindoon – Moora Road and GNH are required.

Figure 13. Toy Road Improvements

9. Conclusions

A review of the traffic impacts associated with the extraction and carting of clay from Lot 7 Toy Road Bindoon indicated the following:

- Under the development scenario, the predicted generation from the site is 60 vehicles per day, based on an extraction rate of 75,000 tonnes per year carted over a 25 day period by heavy haulage vehicles having a 50 tonne payload.
- The carting will result in an additional 120 trips per day which will travel between the site and the Perth region via Toy Road, Bindoon – Moora Road and Great Northern Highway.
- Expected increase in traffic using these roads is predicted to be in the order of 12 movements per hour; 6 of which will be to the site and 6 from the site. This will only occur on 25 days a year.
- The location of the access and egress point on Toy Road is considered to be satisfactory and given the low vehicle numbers on Toy Road and the low speed of traffic using Toy Road, sight distance to and from the access is likely to be adequate. As such, no unacceptable reduction in safety to road users is envisaged.
- The section of Toy Road proposed to be used for haulage is not a RAV classified route; however given the existing seal width, short haul distance to Bindoon – Moora Road and infrequent haulage period accommodation of permit vehicles on the road is considered to be acceptable.
- The intersection of Bindoon – Moora Road and Great Northern Highway is capable of accommodating the additional traffic without requiring upgrading. The intersection of Bindoon – Moora Road and Toy Road requires modification to accommodate the additional heavy haulage traffic.

Agency Submissions			
Submitter	**Comment**	**Proponent Response**	**Shire Officer Response**
Main Roads WA	1. The proponent shall upgrade the existing intersection of Toy Road and Bindoon Moora Road to conform to MRWA standards and requirements to suit the type of vehicle proposed. 2. The proponent must submit an Application for Low Complexity Works along with design drawings and a Traffic Management Plan to MRWA for approval of the intersection upgrade prior to commencement of any works.	Noted. Noted.	Noted. This has been included as an advice note. Noted. This has been included as an advice note.
Department of Environment Regulation	1. A clearing permit (CPS 5843/2) has been granted under section 51E of the *Environmental Protection Act 1986* (EP Act) over Lot 7 Toy Road, Bindoon, allowing the clearing of 7.2 hectares of native vegetation. Clearing is permitted until 1 February 2019. This permit contains weed and dieback, fauna management and revegetation conditions. A copy of the permit is attached for your information. 2. The proposal for clay extraction does not appear to meet the definition of prescribed premises categories within Schedule 1 to the *Environmental Protection Regulations 1987*. I note that the existing gravel extraction is licensed under Division 3, Part V of the EP Act as Category 12 prescribed premises (Screening etc. of material). A copy of this licence (L8748/2013/1) is also attached for your information.	Noted. As there will be no crushing or screening of the clay on site the proposal will not be classified as prescribed premises, and will not require a Licence under Part V of the Environmental Protection Act 1986.	Noted.
Department of Fire and Emergency Services	The Department of Fire and Emergency Services of Western Australia (DFES) advises that the Shire of Chittering are the Authority regarding fire protection matters in this instance and would be expected to apply any condition requiring compliance with the Department of Fire and Emergency Services of Western Australia (DFES) and the Western Australian Planning Commission (WAPC) Planning for Bushfire Fire Protection Guidelines Edition 2 - May 2010 (These Guidelines replace DC 3.7 Fire Planning and Planning for Bush Fire Protection, which were released by the WAPC and DFES in December 2001) and clause 6 of State Planning Policy 3.4 Natural Hazards and Disasters (SPP 3.4).	Noted.	Noted.
Department of Planning	The provisions of the *Shire of Chittering Planning Scheme No. 6* allow for the development of an extractive industry on the site subject to Council approval, under the current Agricultural Resource zone. In considering the proposal, Council would need to be satisfied that the proposal is consistent with the Agricultural Resource zone objects in Part 4 of the scheme, as well as the development requirements for Basic Raw Materials in Part 6 of the scheme. The Department of Planning (DoP) has reviewed the information you provided, including the Excavation Management Plan. The applicant appears to have adequately addressed specifications relating to the excavation area, separation distances from sensitive land uses, buffers, rehabilitation, operation hours, and noise and traffic impacts. As a general observation, it is recommended that if approved, all elements of the proposal which can be measured and quantified be specifically outlined as planning conditions. This would include matters such as hours of operation, site areas, staging, stockpiling etc. This will assist Council with ongoing management and compliance should it be required. Attachment 1	Noted.	Noted.

Agency Submissions			
Submitter	**Comment**	**Proponent Response**	**Shire Officer Response**
	provides an outline of matter that could be incorporated into a planning approval. In regard to your request for clarification: 1. The DoP is not a decision making authority or a referral authority for the proposal. The Shire is not lawfully obliged to incorporate the response for any decision making. 2. The DoP does not have an independent statutory approval or licence to grant in respect of the proposal. 3. If Council resolves to support the proposal, it would be anticipated that a range of matters would be considered when imposing conditions on the planning approval.		
Department of Mines and Petroleum	Although Extractive Industry Licenses fall outside the Mining Act 1978, information on mineral resources, including basic raw materials, is of importance to the Geological Survey of Western Australia (GSWA), a division of the Departments of Mines and Petroleum (DMP). The information is used in our MINEDEX database (http://dmp.wa.gov.au/3970.aspx), which is a source of information for our State-wide resource mapping system (http://www.dmp.wa.gov.au/7113.aspx). The locations and status of basic raw materials extraction site are also valuable inputs to the Geological Survey's resource assessment and land use planning role. Our aim is for the database to be a comprehensive and up-to-date source of information on all mining-related activities throughout the State. It is a database that is used to inform other government agencies, as well as the general public, of the location of mines and mineral resources. You are encouraged to use it whenever researching information on mineral or petroleum resources, and including basic raw materials. A continuing supply of low-cost basic raw material is an important part of maintaining the lifestyle and infrastructure that all Western Australians enjoy. I appreciate the opportunity for the Geological Survey of Western Australia to note this proposal. For future reference it would be appreciated if all matters relating to extractive industry licenses could be addressed to the Executive Director of the Geological Survey of Western Australia.	Noted.	Noted.
Ellen Brockman Integrated Catchment Group	1. The proposal lies within the Special Control Area - Chittering Valley Landform System which protects the Brockman River catchment for its biodiversity and the drainage pattern and the land degradation problem. The excavation site sits within a small area surrounding to the north by large tract of High Value Conservation Area that is part of a local linkage as outlined in the Shire of Chittering Biodiversity Strategy. To the south of the site is the Brockman River designated as "Conservation Category Wetland". The Brockman River is a troubled waterway and extensive revegetation efforts in the upper catchment have managed to maintain the salinity in the	Item 1 of this submission makes reference to the site being located within a Special Control Area (Landscape Protection) under TPS6. The proposed development's compliance with this Special Control Area is addressed under section 4.1.4 of the Development Application Report. Clause 6.2.4 of TPS6 states that the Shire will not support development with the LPSCA which is not related to the zone objectives, or where the proposal involves the removal of any natural vegetation from any ridgeline or the removal or lopping of trees generally.	Noted. It is considered that the applicant has accurately addressed the environmental concerns raised.

Agency Submissions			
Submitter	**Comment**	**Proponent Response**	**Shire Officer Response**
	waterway at a relatively stable level. Salinisation of waterways in this is caused by removal of vegetation and subsequently rising water table (when the vegetation no longer soaks up water). This causes salts to be mobilised in the soils which then enter the waterway. This proposal seeks to remove large trees and divert a drainage line. Drainage lines which will be intersected by the clay pit currently deliver fresh storm water to the Brockman River. This drainage line is to be diverted to one of the dams within the excavation area. These dams will retain the water for dust management within the pit. Therefore, there will be reduction of fresh water entering the Brockman River. As climate change further affects Western Australia this will cause a decline in the health of the waterway. The Re-routing of drainage lines can and will affect the hydrology and unforeseen issues will arise. There are a number of examples in Chittering where this has occurred. Furthermore, the Special Control Area protects the landscape values of the area. This clay pit will be visible from many residences and roads including Great Northern Highway. 2. The Meyer Hydrological Report discusses the East Aquifer which may be impacted by the mine. If this happens "there is potential for contamination to enter the aquifer if surface runoff is allowed to pond over fractures". This is not mentioned in the Excavation and management Plan. Caution would need to be exercised to ensure that this would not happen as the impact on downstream riparian rights, Ginniby Lake and heritage site and on the Chittering and Needoonga Lakes, which are wetlands of national significance, could be substantial. 3. The Excavation and Management Plan states categorically that the site would not have any possibility for acid sulphate soils to be present. The Chittering Valley Land Conservation District Committee would respectfully disagree with this statement based on the evidence from other clay pits in the Darling Scarp Landforms. The stockpiles will be exposed to drying and wetting that can cause the formation of acidic runoff. Nowhere in the report do we see the chemical composition of the clay and if there is the presence of oxidisable sulphurs that will be exposed to the air in the stockpiles. A monitoring protocol needs to be employed to test the water runoff. 4. There is a passing reference to revegetation on bunds for noise attenuation. It is further stated that at mine closure that some of these trees would be removed "leaving 500 trees".	The proposed development is consistent with the objectives of the "Agricultural Resource" Zone under TPS6 as set out in section 4.1.1 of this report and therefore satisfies this requirement of Clause 6.2.4. As noted within section 3.8 of this report, the clearing of approximately twenty (20) trees is required to facilitate the proposed development. These trees are not located on a ridgeline, Clause 6.2.4 of TPS6 states that where the clearing of vegetation is required, the planting of replacement trees may be necessary to ensure that there is no net loss of vegetation not he site. The trees which are required to be removed to facilitate the proposed development will be offset through the planting of trees along the western and southern side of the excavation area as shown in the development proposal plans. A visual assessment of the proposed development has been undertaken and is included in the Excavation and Management Plan. The visual assessment indicated that the majority of the proposed extraction area and associated dams will be hidden from view through the construction of bunds and the planting of trees. Having regard to the above, this Application is considered to satisfy the relevant provisions of the Clause 3.2.4 and is therefore an acceptable land use in the LPSCA. Salinity is discussed at 8.6 of the Water Management Plan. The submitter is correct in that salinity is caused by removal of deep rooted vegetation, but that removal is more significant on deep weathered laterite profiles, rather than shallow soils on steeper sloping sites where the soil moisture is shallow elevated and fresh as found by Meyer Water and Environmental Solutions and do not carry a salt store. The number of trees to be removed is small in comparison to the proposed tree planting and there will be a net increase of deep rooted species within only a few years when the total root and leaf matter of the planted trees catches up to the total root and leaf matter removed. Drainage and watercourses - Meyer Report There will only be a temporary management of the surface water at the end of excavation being directed to dams what will be retained from as farm dams. The main local tributary watercourse in the area lies west of the excavation and is to be protected. The clay pit is not situated on a watercourse as there is no defined bank, but rather a swale that runs up the hill and directs water. This is only drainage area/line that is impacted, as the other parts are subject to sheet pasture flow outside the footprint the drainage lines are all maintained. The amount of ground occupied by the proposal and the area of catchment very small locally and extremely small lines the context of the Brockman River Catchment. The calculations by Myer Water and Environmental Solutions confirm this. Even so the protection of surface water is recognized and any surface water from upslope will be directed past the disturbances and dams to the main local watercourse. In effect the water balances and recharge will be little changed adjacent to the footprint and have no	

Agency Submissions			
Submitter	**Comment**	**Proponent Response**	**Shire Officer Response**
	If this is regarded as a revegetation plan to replace significant paddock trees which will be removed it is very vague. 5. The Excavation and management Report consistently states that the Brockman River will not be impacted but neglects the factor that a substantial bridge will be required to be built across the waterway which is designated "Conservation Category Wetland". There is no evidence of beds and banks permit being obtained from the Department of Water of the Department of Regulations. The report neglects to mention the impact on the removal of riparian vegetation. 6. The Inland Waters Environmental Quality Section of the Excavation Report refers to the Appendix 2 Water management Plan. The Plan discusses monitoring of water in the dams for hydrocarbons and other pollution but does not mention how such contamination will be managed other than to say that there may a possibility of water overflow at the end of winter. It further states that while there may be a possibility of contamination that groundwater monitoring is not required. The argument for this is flawed reasoning. 7. At 5.3 in the Excavation management Plan reference is made to the Meyer Report (2005) stating that the report found that harvesting of water from the pit and stockpile area would not have a significant impact on recharge to the Brockman River. The Meyer report dealt only with groundwater- not runoff water. All fresh water entering the river is important. 8. There is no recognition of water erosion potential if the dams overflow. The slope is significant and in a situation where a rainfall event occurs there are no plans other than contour/interception banks based on the normal agricultural standards. Normal agricultural standards contour banks would deal with rain over large area - the pit would concentrate the water into a smaller area and when this overflow the potential for erosion would be high. 9. The resource extraction is 50,000 to 100,000 tonnes per year over the life of the project which is stated as 10 to 20 years. This equates to between half a million tonnes and two million tonnes of clay stockpiled and removed from site. It is stated in the excavation and management Plan that "at the end of excavation a total of 9ha will be lowered by 0 to 12 meters…" this will substantially alter the landform of the site and will make rehabilitation of the whole area difficult and entirely alter the hydrology of the slope. 10. This property is not indicated in the TPS6 as Basic Raw Materials and extraction of clay should not permitted. Thank you for the opportunity to comment on this report. There are a number of inconsistencies in the report and other aspects such as amenity of the area and impact of dust on residences has not been addresses in this response but is considered important.	significant or measurable impact on the Brockman River or pasture areas that flood in winter. The wet pasture areas receive their main water from surface and superficial groundwater flows from different local catchments to the east and from flood flows, both of which are unaffected. This can be seen in the Water Management Plan where the drainage lines are maintained as will be the storm flows, which are the main flows to the Brockman River. There will be no re-routing of the drainage lines apart from on the footprint area itself to ensure that water from disturbed areas is retained. It should be noted that during excavation the recharge to surface water would increase. After rehabilitation of the land the greatest change to recharge will be the planting of additional rehabilitation of the land the greatest change to recharge will be the planting of additional trees which will reduce the surface water flows. Refer to the Water Management Plan. The "East Aquifer" described in the Meyer Hydrogeological assessment related to small and minor seepages flowing along in the fractured rock downslope from the east of the pit. Such water does not currently flow to the Ginniby Chittering or other lake areas but seeps to the drainage line west of the excavation area and the soils to the south. The flows are seasonal and the soils dry out in summer. The cut off will only occur during the excavation where that water will be directed to the sediment trapping facilities with additional surface water generated from excavation to a temporary hard surface. On restoration of sire and return to pasture the flow will be returned to the system. Meyer assesses the water affected as 1000-15000kl which is the equivalent to the water commonly used by a rural living dwelling. Revegetation The reference to the planted trees as being 500 planted are outlined in the various management plans and shown on the figures. They will be planted and it is assumed that this will be required as a condition of the approval. Acidic conditions of the clay The geology can be seen on any geological mapping for the local and Muchea areas such as Geological Survey of Western Australia mapping. The nature of the clay and potential acidity is discussed in 8.7 of the Water Management Plan. The clay types and geology are totally unrelated. As discussed there the other clay pits referred to are those of the Muchea sedimentary clays. The Muchea sedimentary clays are carbonaceous at depth, below the water table and carry sulphides when permanently saturated. They can produce acidic conditions when the material below the water table is exposed to the atmosphere by deep excavation from below the water table or lowering of the water table by pumping plantations or drying climate. Exposure allows the sulphides	

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		and carbon to oxidise and the sedimentary clays change from grey black to white with minor iron oxide weathering products. The schists/clays on site are metamorphic, originating from altered igneous rocks and metamorphism of rocks of the Chittering Metamorphic Belt. The mineralogy can be readily identified in the hand specimen. These rocks do not contain sulphides; they are elevated on a hill, and are not permanently saturated as they dry out in winter. They form red clays and soils and are highly oxidised. The clays carry on site no acid risk and are geologically and geomorphologically unrelated to the sedimentary Muchea clays. Even so water from the disturbance area is to be retained on site and is to be monitored twice per year. It is noted that the Muchea clays are excavated and managed by limiting the depth of excavation, normal testing of the clays and adjusting the resource extraction limits. It is noted that the Muchea clays are excavated and managed by limiting the depth of excavation, normal testing of the clays and adjusting the resource extraction limits. Water erosion Water erosion potential from the dams is mitigated by protected outlets nominated in the text and figures such as Figure 2W in the Water Management Plan. Alteration of the hydrology of the site The excavation area will be lowered by 2-12metres. The hydrogeology is seasonal superficial aquifer running down slope in the base of the soils and top of the basement rock where the rock is fractured. At depth the rock is tight and would be expected to be an aquiclude or aquitard. On rehabilitation the overburden will be placed on the basement rock followed by topsoil, replicating the pre-excavated condition. There will be no significant change to the hydrogeology. Dust A dust management plan is provided which assessed the dusk risk proposes management measures. Basic Raw Material Resource The local basic raw material mapping only shows pits operating at the time of production. This is a newly identified resource, consistent with SPP 2.4 and SPP 2.5, which require the identification of Basic Raw Material resources in local authority planning documentation.	
Department of Health	The DOH has no objection to the development application provided the operation of the development is in accordance with adopted management plans.	Noted.	Noted.

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Department of Water	The DoW note that the existing crossing over the Brockman River will need to be upgraded.	Noted.	Noted.
Public Submissions			
Resident 1	We are writing to object strongly to Brikmakers" Application for Development Approval for an Extractive Industry for clay at Lot 7 Toy Road. We Purchased the property in 2007 as a lifestyle retreat in our retirement years. We believed we paid a significant premium for the property over the agricultural value because of the ambience and quality of life we expected to enjoy in the Shire. To this time that has proven to be true, with our children and grandchildren enjoying the property, and, conversely, we having quality time with our families. Recent events such as the threat of possible Extractive Industry has thrown a pall over the whole area and significantly changed our perception and has added significant stress to our ownership of the property. This has significant financial ramifications for the Shire: with the area being less attractive property values are going to significantly fall, affecting the rateable values in the area. Said simply, with the current threats on many fronts happening in the Shire we simply would not buy in the area in this climate. Since we moved in we have seen the quality of the Brockman River, which runs through the corner of our property, significantly deteriorate as measured by salinity. While I do not know why this has happened it is my understanding that the creek has been flowing pretty much forever (in white settlement terms) and the fact that it deteriorated over just a few years would indicate some sort of intervention. The effect of the Clay Pit on water quality is difficult to gauge but decision on water quality disturbance should be taken on the cautious side: it is simply too important to gamble with such a valuable resource. As a final comment: We strongly object to the application. However, should it go ahead we strongly insist that any promises made by the applicant such as noise, dust, water, road traffic. Etc be supported by irrefutable guarantees, and those guarantees take the form of rescinding of the Application. That condition should be firm, clearly stated, and unequivocal. It is far easy to make claims for all these matters which subsequently are proven to be untrue and the residents suffer the consequences. If the claims are true and prove to be correct the Company will have no reason to not accept the conditions of rescinding. Conversely, if they do object then it will be a clear indication that they do not actually believe their own claims. Our detailed grounds of objection are as follows: 1. Planning Grounds	The submitter refers to an "Attached Schedule" however that attached schedule has not been provided to the Applicant. Can the Shire please provide a copy. In relation to the use of Toy Road for access, the submitter makes reference to the Shire's Local Planning Policy No. 10 which identifies a preference for direct access to Brand or Great Northern Highway. This is a preference but not a requirement. The submitter's comment that the option of having direct access to Great Northern Highway has been dismissed by the Applicant on the basis that it would be convenient and expensive is incorrect. In this case, the Clay Resource is located in the eastern part of the site and is not directly accessible to Great Northern Highway which is positioned some 3.5km away. The site's topography between the proposed excavation area and Great Northern Highway is significantly undulating and would necessitate extensive site works and the removal of topography and the impact, in our view, would be significantly great from an amenity perspective than the proposed accessed arrangements. In relation to the submitter's comments regarding vehicle movements and the impact of these vehicle movements on Toy Road, the following is noted. The proposed access arrangements have been assessed by Shawmac. The assessment identifies that Toy Road is designed to accommodate a desirable maximum traffic volume of 3,000 vehicles a day [refer Table 2 of the Traffic Assessment]. Actual daily traffic flows are understood to be around 100 vehicles a day. In this regard, there is sufficient capacity in the design of Toy Road to accommodate additional vehicle movements. The statement made in the Excavation & Management Plan, Project Summary pages 4-5 is incorrect and reference should be made to Section 9.0 of the Traffic Assessment. A maximum of 12 vehicle movements per hour are proposed on the 25 operating days per year not 20. This equates to 6 vehicle movements into site and 6 vehicle movements out of the site. The excavation area will only operate 25 days per year meaning that there will be no additional vehicle movements on Toy Road for the remaining 340 days of the year. The submitter's comment that the increase in traffic will degrade the immediate natural environment is not substantiated by any evidence. Given Toy Road is designed to accommodate up to 3,000 vehicles per day but is currently only accommodating 100 vehicle movements a day, there is clearly sufficient capacity to accommodate the proposed development and this is the conclusion reached in the Traffic Assessment. In relation to the submitter's comment that the proposed vehicle movements will have a significant adverse impact on the living environment of residents, the submitter does not explain how the increase in vehicle movements will	Noted and agreed. Noted. The Shire of Chittering's Local Law for Extractive Industries requires a per tonne financial comparison to help ensure the road is kept. It is considered that 12 movements per day over 25 days annually will not detrimentally impact the road or surrounding landowner's amenity. Noted, as per the applicants response.

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	Approval of the Application would be in clear breach of many objectives and rules in Town Planning Scheme No 6 and the Shire's Basic Raw Materials Local Planning Policy No. 10. The Application contains pages of claims stating that the Application complies with TPS6, BRM LPP 10 and numerous are local and state planning policies and rules. Many of the statements are false and misleading and the truth is the opposite of what is stated. One of the most repeated misleading statements is that the operation will occupy only 3.8% of the Site (Lot 7) - this is repeated at least 7 times in the Application and is false. The attached Schedule of Objections sets out our detailed objections and lists how the Application fails to satisfy the criteria in TPS6, BRM LPP NO 10, and the Shire must reject the application. 2. Use of Toy Road We strongly object to the use of Toy Road as the access route for the proposed Extractive Industry. As stated in the attached Schedule, Clause 5.4 of the BRM LPP No 10 states in paragraph (a) (vii) that Council prefers extractive industries that "have direct access to Brand of Great Northern Highway". The Application dismisses the option of having access across Lot 7 to Great Northern Highway because it would be inconvenient and expensive for Brikmakers. This is not a valid reason to avoid compliance with BRM LPP No 10 at the expense of ratepayers and road safety. Toy Road is a cul-de-sac. It is a quiet gravel road servicing the 11 small farms zoned Agricultural Resource that were approved by the Shire in a "Landscape Protection Special Control Area" under TPS6, with their outlook northwards across seasonal Ginniby wetlands towards the sweeping Bindoon Hill escarpment. The Application states that when transporting clay, the operation will generate "10 laden trucks per hour" (See Excavation & Management Plan, Project Summary pages 4-5 under TRANSPORT). Add in 10 empty tucks presenting for loading, this means that the residents of Toy Road experience 20 truck movements per hour, 11 hours per day, 6 days per week during loading, which is 2 roads train every 3 minutes. This will degrade the immediate natural environment along Toy Road and have a significant adverse impact on the living environment of residents... Brikmakers' claim that it will only transport material 25-30 days per year is not credible. The Application states that they wish to "ensure a continuous supply of clay throughout the year" with excavation (and loading) taking place during the drier months and transportation continuing dying the wetter months. This means the impact will be all year round. Clause 5.16 (a) of TPS6 which states that Extractive Industries may only be permitted "where they will not adversely affect living environments...." would be breached if the Application is granted and the use of Toy Road permitted. In addition, it will create unacceptable safety risks for local traffic	have a "significant adverse" effect. Given the proposed excavation activities will only operate for 25 days of the year, it is difficult to understand how the activity will result in a "significant adverse" impact. It is difficult to respond to this comment when the basis of the submitter's concerns is not clearly understood. Should Council resolve to approve the application a condition will be imposed on approval limiting the operating period to 25 days a year as set out in the Application. The Applicant will be required to comply with all approval conditions. Failure to comply with these conditions could result in legal action by the Shire. In relation to the submitter's comment regarding safety risks on Toy Road, we note that this issue is addressed in the Traffic Report [see sections 8.1.1 and 8.2) The traffic report concludes at Section 9.0 that the location of access and egress point on Toy Road is satisfactory and that no unacceptable reduction in safety to road users is envisaged.	Noted, as per applicants response.

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Submitter	**Comment**	**Proponent Response**	**Shire Officer Response**
	on Toy Road and Bindoon-Moora Road. The living environment of the properties in Toy Road would be destroyed if Council permits the use of Toy Road as an industrial haulage route for the proposed clay operation. Council must reject the Application and the use of Toy Road on this ground alone. 3. Environmental Issues We strongly object to the Application on the grounds of that it presents extreme environmental risks to the natural environment around Toy Road, including the real risk of acidification of the Ginniby wetlands and the Bindoon River with potential downstream impacts on Lakes Neerdonga and Chittering and the Brockman River. Acidification presents a seriously risk to agriculture both at the site and downstream of the site. Brikmakers has been thinking about this clay pit for over 10 years. Chittering Landcare has informed residents that they told the same officers of Brikmakers 10 years ago that this was an absolutely unacceptable location for a clay pit and that the environmental risks are simply too great in this sensitive area. The Application and supporting documents are deficient, almost flippant, in relation to environmental risks such as acid sulphate soils, land clearing, dieback, the impact on sensitive wetland and Carnaby's cockatoos. In particular: a. The high risk of acid sulphate soils resulting from major excavation, construction of bunds and stockpiling of exposed clay over a period of 10-20 years in a location of high surface water run-off and salinity is not taken seriously in the Application. In fact the Application incorrectly states that acid sulphate soils are not arise in this elevated location. Landcare will confirm that this statement is FALSE. b. The hydrological report by Meyer Water and Environmental Solutions is based on testing done more than 10 years ago. It is therefore out of date and irrelevant. c. No fauna and flora survey has been conducted because Brikmakers decided it wasn't needed. Brikmakers' paltry assessment of environmental values is unacceptable. There needs to be a proper flora and fauna survey conducted taking into account Carnaby's sightings and the prolific birdlife in and around the Ginniby wetland. d. The Application is inconsistent about what kind of mature trees are to be removed. This kind of sloppiness is unacceptable. No mature Marri trees (Corymbia calophylla) should be cleared from the Site as they are critical to Carnaby's and to land and river health. We urge Council to reject the Application as it fails to comply with the several objectives of TPS6 and it must be rejected in any event due to its failure to comply with the basic requirements for buffers in BRM LPP10. If the Council decides not to reject the Application we urge the Council to:	Landform research has considered this concern and advises that there is no potential for acidification of any waterways as a result of the proposed development. The clay is schist, highly oxidated and does not contain sulphides. There is no potential for water from disturbed areas to become acidified as there is no source of acids. All water from disturbed areas is to be retained on site and stormwater flows will bypass the disturbed areas. Surface water from non-disturbed areas will be directed around the disturbance to storage.	Noted. To further address the concerns raised around environmental impact from this proposal, the Shire of Chittering undertook A S38 referral to the Environmental Protection Authority (EPA) which resulted in no significant concerns being raised by the EPA. In addition to this the applicant confirms there is no risk of Acid Sulphate due to the location of the clay portion to be excavated. It's therefore considered the environmental concerns have been addressed.

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Submitter	**Comment**	**Proponent Response**	**Shire Officer Response**
	A. Require Brickmakers to provide a flora and fauna survey of the Site, a current hydrological report and other information in which the Application is deficient; and B. Refer the proposal to the EPA under S38 of the EP Act for environmental assessment with the support of residents and Chittering Landcare.		
Resident 2	We purchased the quiet, peaceful location, with uninterrupted clear views of the rolling Bindoon Hills. Our view will become a barren mine site. The proposed clay pit will see heavy vehicle movement potentially creating dust and noise within 500 metres of our property. We believe the amount of traffic on Toy Road will pose a safety risk to our children. The proposed pit will devalue the property significantly. We believe our rural, residential road will become an industrial area.	The proposed development plan incorporates strategically placed bunds to provide screening of the proposed operations from surrounding roads and adjoining properties, and in doing so, assists in protecting the landform and landscape values of the district. A visual assessment of the proposed development has been undertaken and is included in the excavation and management plan. The visual assessment indicates that the majority of the proposed extraction area and associated dams will be hidden from view through the construction of bunding and the planting of vegetation. It is also important to note that the excavation activities are time limited by virtue of the fact that there is a finite amount of clay resources available at the site. Once the resource has been exhausted, the site will be rehabilitated. A Dust Management Plan has been prepared as part of the Application and is included in the Site & Excavation Management Plan (see Appendix 1). The Dust Management Plan outlines a range of measures proposed by the Applicant to manage dust generated on the site. It is expected that if approved, the Shire will impose a condition requiring compliance with the Dust Management Plan. In relation to dust generated by vehicle movements on Toy Road, it is noted that Toy Road (where it is proposed to be accessed by vehicles associated with the proposed development) is currently bituminised. In relation to the submitter's comment regarding safety risks on Toy Road, we note that this issue is addressed in the traffic report [see sections 8.1.1 and 8.2). The traffic report concludes at Section 9.0 that the location of the access and egress point on Toy Road is satisfactory and that no unacceptable reduction in safety to road users is envisaged.	Noted, as per the applicants comments dust and visual implications would be managed through conditions.
	Our detailed grounds of objection are as follows: 1. Planning Grounds. Approval of the Application would be in clear breach of many objectives and rules in Town Planning Scheme No. 6 and the Shire's Basic Raw Materials Local Planning Policy No. 10. The Application contains pages of claims stating that the Application complies with TPS6, BRM LPP No 10 and numerous other local and state planning policies and rules. Many of the statements are false and misleading and the truth is the opposite of what is stated. One of the most repeated misleading statements is that the operation will occupy only 3.8% of the Site (Lot 7) - this is repeated at least 7 times in the Application and is false.	This submitter's comment is identical to the comment made by Submitter 1. In response to the comments, we note that the Application has been assessed in relation to all applicable provisions contained in the Shire's TPS6 and local planning policy framework in addition to relevant State government documents. Section 4.0 of the Development Application report addresses each of the planning provisions (both local and state). As demonstrated within Section 4.0, the proposed development satisfies all relevant town planning requirements. The submitter states that many of the statements are false and misleading but only makes reference to one statement of concern which relates to the proportionate area of the proposed development. The site measures 338.59ha in area. The proposed excavation area measures 9ha in area which represents less than 3.8% of the total site area. The submitter's comment in this regard is incorrect.	Noted.

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	The attached Schedule of Objections sets out our detailed objections and lists how the Application fails to satisfy the criteria in TPS6, BRM LPP No. 10. and other local laws and policies. As the Application does not meet the objectives of TPS6 in the relevant zoning and breaches numerous other rules and principles in TPS6 and BRM LPP 10, the Shire must reject the application. 2. Use of Toy Road We strongly object to the use of Toy Road as the access route for the proposed Extractive Industry. As stated in the attached Schedule, Clause 5.4 of the BRM LPP No 10 states in paragraph (a)(vii) that Council prefers extractive industries that "have direct access to Brand of Great Northern Highway". The Application dismisses the option of having access across Lot 7 to Great Northern Highway because it would be inconvenient and expensive for Brikmakers. This is not a valid reason to avoid compliance with BRM LPP No 10 at the expense of ratepayers and road safety. Toy Road is a cul-de-sac. It is a quiet gravel road servicing the 11 small farms zoned Agricultural Resource that were approved by the Shire in a "Landscape Protection Special Control Area" under TPS6, with their outlook northwards across seasonal Ginniby wetlands towards the sweeping Bindoon Hill escarpment. The Application states that when transporting clay, the operation will generate "10 laden trucks per hour" (See Excavation & Management Plan, Project Summary pages 4-5 under TRANSPORT). Add in 10 empty tucks presenting for loading, this means that the residents of Toy Road experience 20 truck movements per hour, 11 hours per day, 6 days per week during loading, which is 2 road train every 3 minutes. This will degrade the immediate natural environment along Toy Road and have a significant adverse impact on the living environment of residents... Brikmakers' claim that it will only transport material 25-30 days per year is not credible. The Application states that they wish to "ensure a continuous supply of clay throughout the year" with excavation (and loading) taking place during the drier months and transportation continuing dying the wetter months. This means the impact will be all year round. Clause 5.16 (a) of TPS6 which states that Extractive Industries may only be permitted "where they will not adversely affect living environments...." would be breached if the Application is granted and the use of Toy Road permitted. In addition, it will create unacceptable safety risks for local traffic on Toy Road and Bindoon-Moora Road. The living environment of the properties in Toy Road would be destroyed if Council permits the use of Toy Road as an industrial haulage route for the proposed clay operation. Council must reject the Application and the use of Toy Road on this ground alone. 3. Environmental Issues We strongly object to the Application on the grounds of that it presents	This submitter's comment is identical to the comment made by Submitter 1. Please refer to the Applicant's response above.	Due to the topography of the site the applicant cannot access the site from Great Northern Highway. As per comments above.

Agency Submissions			
Submitter	**Comment**	**Proponent Response**	**Shire Officer Response**
	extreme environmental risks to the natural environment around Toy Road, including the real risk of acidification of the Ginniby wetlands and the Bindoon River with potential downstream impacts on Lakes Neerdonga and Chittering and the Brockman River. Acidification presents a seriously risk to agriculture both at the site and downstream of the site. Brikmakers has been thinking about this clay pit for over 10 years. Chittering Landcare has informed residents that they told the same officers of Brikmakers 10 years ago that this was an absolutely unacceptable location for a clay pit and that the environmental risks are simply too great in this sensitive area. The Application and supporting documents are deficient, almost flippant, in relation to environmental risks such as acid sulphate soils, land clearing, dieback, the impact on sensitive wetland and Carnaby's cockatoos. In particular: a. The high risk of acid sulphate soils resulting from major excavation, construction of bunds and stockpiling of exposed clay over a period of 10-20 years in a location of high surface water run-off and salinity is not taken seriously in the Application. In fact the Application incorrectly states that acid sulphate soils are not arise in this elevated location. Landcare will confirm that this statement is FALSE. b. The hydrological report by Meyer Water and Environmental Solutions is based on testing done more than 10 years ago. It is therefore out of date and irrelevant. c. No fauna and flora survey has been conducted because Brikmakers decided it wasn't needed. Brikmakers' paltry assessment of environmental values is unacceptable. There needs to be a proper flora and fauna survey conducted taking into account Carnaby's sightings and the prolific birdlife in and around the Ginniby wetland. d. The Application is inconsistent about what kind of mature trees are to be removed. This kind of sloppiness is unacceptable. No mature Marri trees (Corymbia calophylla) should be cleared from the Site as they are critical to Carnaby's and to land and river health. We urge Council to reject the Application as it fails to comply with the several objectives of TPS6 and it must be rejected in any event due to its failure to comply with the basic requirements for buffers in BRM LPP10. If the Council decides not to reject the Application we urge the Council to: A. Require Brickmakers to provide a flora and fauna survey of the Site, a current hydrological report and other information in which the Application is deficient; and		

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	B. Refer the proposal to the EPA under S38 of the EP Act for environmental assessment with the support of residents and Chittering Landcare.		
Resident 3	We purchased our 39HA land in 1998 for its magnificent outlook and location close to wetlands, the Brockman River located across the road, its proximity to the town centre and the fact it's only an hour and fifteen minute drive from Perth GPO. The property is also surrounded by similar size beautiful properties around Mooliabeenee. We have spent considerable moneys to build a beautiful large home plus infrastructure including al large shed and three large water tanks in order to sustain livestock and the many fruit trees and olive trees that we have planted. Our property is located within 3-4km from Toy Road. If such industry is allowed to take place it will adversely affect the unique wetlands and birdlife in the area, compromises road safety and the quality of the groundwater in the area as well as affecting the value of our property. This extractive industry does not fit into this pristine area of Chittering and the Council will forever be remembered as being responsible for destroying this unique environment by all future generation if they allowed it to proceed.	The clay is a required commodity that provides for the making of red bricks and adds plasticity when blended. Clays such as this are not common near Perth and this is the closest available such clay to the Metropolitan brick works. Brikmakers understands the nature of the site and its location on the northern side of the Brockman River valley and has therefore strived to identify and tligate - reduce potential environmental impacts. The clay excavation is a temporary land use that will be returned to pasture and trees at the end of excavation, as have other clay puts around the perimeter of Perth and in Perth. The proposed clay excavation complies with the EPA generic guidelines. Studies have been undertaken to demonstrate that any potential impacts can be managed at the closest dwellings and therefore at further distances. Hydrogeological principles and assessments show that groundwater cannot be impacted past the seepages at the base of the slope at the Brockman River and that the quality will not be impacted even at a small local level in the vicinity of the excavation. Extensive water management is proposed to manage surface water and other environmental factors. The separation distance from the submitter's landholding, 3-4 kilometres, is well above the distances to the closest dwellings and well in excess of the EPA Generic Buffer Guidelines. In relation to the submitter's comments that the "extractive industry does not fit into this pristine area of Chittering", the following is noted. Extractive industry is a discretionary land use in the Agricultural Resource zone under TPS6. It is therefore a use that is capable of approval. The proposed development has been assessed against the provisions at Clause 5.16 of TPS6in relation to Basic Raw Materials. As outlined in section 4.1.3 of the Development Application report, the proposed development satisfies the requirements of Clause 5.16 of TPS6 and is therefore an appropriate use for the site. The site is currently being used for Gravel Excavation and in this regard it is noted that the area is already accommodating land uses of the nature proposed. The clay is required for brick making to provide a source of plastic clay that makes red bricks. The clay is required for blending with other clays to enable better extrusion and production. On the other hand such clay/schist is not common and any deposits close to the main production centres are required for the housing industry. Brickmakers proposed to utilise this source of schist/clay and have designed the operations to minimise the impact on the local community.	Noted. In addition to the applicants response the application and its supporting technical reports were assessed against Section 10.2 of Town Planning Scheme No. 6 which you will see detailed in the report to Council. Whilst it is acknowledged that this would be a new land use on Toy Road, it is considered that the environmental and amenity risk can be managed through the management plan submitted as part of this application. Should approval of this application be granted it would be subject to conditions required compliance with the management plan.

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	Our detailed grounds of objection are as follows: 1. Planning Grounds. Approval of the Application would be in clear breach of many objectives and rules in Town Planning Scheme No. 6 and the Shire's Basic Raw Materials Local Planning Policy No. 10. The Application contains pages of claims stating that the Application complies with TPS6, BRM LPP No 10 and numerous other local and state planning policies and rules. Many of the statements are false and misleading and the truth is the opposite of what is stated. One of the most repeated misleading statements is that the operation will occupy only 3.8% of the Site (Lot 7) - this is repeated at least 7 times in the Application and is false. The attached Schedule of Objections sets out our detailed objections and lists how the Application fails to satisfy the criteria in TPS6, BRM LPP No. 10. and other local laws and policies. As the Application does not meet the objectives of TPS6 in the relevant zoning and breaches numerous other rules and principles in TPS6 and BRM LPP 10, the Shire must reject the application. 2. Use of Toy Road We strongly object to the use of Toy Road as the access route for the proposed Extractive Industry. As stated in the attached Schedule, Clause 5.4 of the BRM LPP No 10 states in paragraph (a)(vii) that Council prefers extractive industries that "have direct access to Brand of Great Northern Highway". The Application dismisses the option of having access across Lot 7 to Great Northern Highway because it would be inconvenient and expensive for Brikmakers. This is not a valid reason to avoid compliance with BRM LPP No 10 at the expense of ratepayers and road safety. Toy Road is a cul-de-sac. It is a quiet gravel road servicing the 11 small farms zoned Agricultural Resource that were approved by the Shire in a "Landscape Protection Special Control Area" under TPS6, with their outlook northwards across seasonal Ginniby wetlands towards the sweeping Bindoon Hill escarpment. The Application states that when transporting clay, the operation will generate "10 laden trucks per hour" (See Excavation & Management Plan, Project Summary pages 4-5 under TRANSPORT). Add in 10 empty tucks presenting for loading, this means that the residents of Toy Road experience 20 truck movements per hour, 11 hours per day, 6 days per week during loading, which is 2 road train every 3 minutes. This will degrade the immediate natural environment along Toy Road and have a significant adverse impact on the living environment of residents... Brikmakers' claim that it will only transport material 25-30 days per year is not credible. The Application states that they wish to "ensure a continuous supply of clay throughout the year" with excavation (and loading) taking	This submitter's comment is identical to the comment made by Submitters 1 and 2. Please refer to the applicant's response above.	As per comments above.

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	place during the drier months and transportation continuing dying the wetter months. This means the impact will be all year round. Clause 5.16 (a) of TPS6 which states that Extractive Industries may only be permitted "where they will not adversely affect living environments...." would be breached if the Application is granted and the use of Toy Road permitted. In addition, it will create unacceptable safety risks for local traffic on Toy Road and Bindoon-Moora Road. The living environment of the properties in Toy Road would be destroyed if Council permits the use of Toy Road as an industrial haulage route for the proposed clay operation. Council must reject the Application and the use of Toy Road on this ground alone. 3. Environmental Issues We strongly object to the Application on the grounds of that it presents extreme environmental risks to the natural environment around Toy Road, including the real risk of acidification of the Ginniby wetlands and the Bindoon River with potential downstream impacts on Lakes Neerdonga and Chittering and the Brockman River. Acidification presents a seriously risk to agriculture both at the site and downstream of the site. Brikmakers has been thinking about this clay pit for over 10 years. Chittering Landcare has informed residents that they told the same officers of Brikmakers 10 years ago that this was an absolutely unacceptable location for a clay pit and that the environmental risks are simply too great in this sensitive area. The Application and supporting documents are deficient, almost flippant, in relation to environmental risks such as acid sulphate soils, land clearing, dieback, the impact on sensitive wetland and Carnaby's cockatoos. In particular: a. The high risk of acid sulphate soils resulting from major excavation, construction of bunds and stockpiling of exposed clay over a period of 10-20 years in a location of high surface water run-off and salinity is not taken seriously in the Application. In fact the Application incorrectly states that acid sulphate soils are not arise in this elevated location. Landcare will confirm that this statement is FALSE. b. The hydrological report by Meyer Water and Environmental Solutions is based on testing done more than 10 years ago. It is therefore out of date and irrelevant. c. No fauna and flora survey has been conducted because Brikmakers decided it wasn't needed. Brikmakers' paltry assessment of environmental values is unacceptable. There needs to be a proper flora and fauna survey conducted taking into account Carnaby's sightings and the prolific birdlife in and around the Ginniby wetland. d. The Application is inconsistent about what kind of mature trees are to be		

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	removed. This kind of sloppiness is unacceptable. No mature Marri trees (Corymbia calophylla) should be cleared from the Site as they are critical to Carnaby's and to land and river health. We urge Council to reject the Application as it fails to comply with the several objectives of TPS6 and it must be rejected in any event due to its failure to comply with the basic requirements for buffers in BRM LPP10. If the Council decides not to reject the Application we urge the Council to: A. Require Brickmakers to provide a flora and fauna survey of the Site, a current hydrological report and other information in which the Application is deficient; and B. Refer the proposal to the EPA under S38 of the EP Act for environmental assessment with the support of residents and Chittering Landcare.		
Resident 4	Our lot abuts to the north and the shire has sterilised a substantial portion of our farm by designating that portion as a buffer zone to support the ever increasing gravel extraction permitted on the Northern part of Lot 7. We want no more industrialisation of our farm. To grant this application would require another buffer zone on our land and we reject this entirely. Despite all the expert opinions, and all the safeguards, I can still wipe yellow dust from our roof at the end of each summer, since the gravel put opened, brought here by the easterly winds blowing from Lot 7. Luckily I know that this dust that discolours our drinking water doesn't exist as the same experts that support this new application have said so from the safety of their desks. We will get clary dust blowing over our house and sandalwood crops from the southerly winds if this application proceeds. Please see the discussion below about buffer distances. We plant sandalwood trees as our farming business. Trees do not thrive if they are assailed by dust. Fine dust travels a long way. (See below) Our business is already held back from Lot 7 dust. We want no more. The noise from this operation at our house a mere 800 metres away will be unbearable. (I recommend you to the three 'Wattleup' decisions made by SAT 2011, SAT 2014, and SAT 2014(later). In reading these decisions you will find references to the following: That a decision making body should always adopt the precautionary principle in deciding a matter: namely if you can't be certain of a result then say no. That Alcoa adopted world's best practice to try to prevent fine dust escaping from their pit but conceded that it still escaped. That a scientist confirmed that breathing fine dust was dangerous to health. That an expert gave evidence that fine dust could easily be wind borne for kilometres.	Landform Research has considered this query and advises that the distance to the adjoining land to the north is significant. The distance to the adjoining land to the north is significant as shown on Figure 2 at a distance of just over 800 metres. The dwellings are located on the plateau beyond the brow of the plateau with trees present in portion of the buffer. The presence of trees, the and the location of the brow of the plateau all relate to a reduced potential for impacts to travel in that situation as evidenced by the methodology used by the South Australian EPA (See Section 5.2.1 of the Excavation Management Plan) For clay excavation the EPA suggests a generic buffer of 500 - 1000 metres for clay excavation, being the distance at which studies may be required. The relevant studies of noise and dust have been completed. These show negligible to low risk, and for noise compliance and with the Noise Regulations. The proposed clay excavation is at the lower end of clay excavation based on size of the operation and the operational times. The buffer therefore complies with all guidelines. The Acoustic Assessment demonstrates compliance with the Noise Regulations and the dust management plan provides for compliance with the various Government guidance. A noise assessment of the proposed development has been undertaken by Lloyd George Acoustics and is included in the Site and Excavation Management Plan (refer Appendix 3). The Assessment concludes that the proposed development will comply with the Noise Regulations at all noise sensitive receivers once the proposed mitigation measures are put in place. Should Council resolved to approve the application a condition will be imposed on the approval requiring that the noise mitigation measures contained in the Noise Assessment are implemented and maintained. Failure to comply with approval conditions could result in legal action being taken by the Shire. Landform Research advises that the Acoustic report demonstrates that the noise from the operations will	Noted. Any concerns regarding the operation of the gravel pit are subject to a separate process. You are welcome to contact the Shire should you have concerns regarding the gravel put on site. Whilst it is acknowledged that fine dust is difficult to managed, should the applicant obtain approval it is subjection to management plans and conditions of approval pertaining to dust management which it would be required to adhere to. In relation to buffer distances this should not impact your farming practices only sensitive land use such as residences. The Noise Management Plan is considered to suffice. Should be noted that vehicle movements outside the site are already subject to (regulations)

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	I will put together a brief paper on this subject if you wish) Both the Planning Application and the Excavation Management Plan refer constantly for the support of their statements to the supporting documentation. For this reason I have carefully considered the Supporting Documents: 6.2 through to 6.5 of the Application for Planning Approval which is the first part of this application. These documents are also listed as Appendices and included in the Excavation Management Plan that is the second document for consideration by the shire, but are in a different order. Dust is 1 and Water is 2 in that document, (the other way around in the first document) and there is further appendix called Visual impact. I hope the counsellors can follow all this, but remember the application is designed so that council will find it hard to read or follow it, as my criticism of those documents will show. 11. FALSE. The risk analysis contained in this report is based on winds recorded at Pearce airport and are not relevant to the Bindoon hills, which is acknowledged in the report. There are recent wind recordings for the hills by Davis' weather stations available but they have not been used and would probably not produce the 'right answers' for Brikmakers. Only one of the 10 summary paragraphs might be correct: 'Access will be from Toy Road." In fact this also is FALSE as it would require the shire's consent which consent could not be given in the knowledge of the shires obligations under its own rules and policies. The writer, whose land will be seriously affected by this proposal, wishes to address council on the complete Dust management plan in due course. Appendix No. 2 Water Management Plan A. It is extremely significant that the author in his conclusions, has IGNORED and GLOSSED OVER all of the cautionary matters contained in the actual studies of the area in question and detailed in the list on page 4 of the report. B. It is also significant that the investigation by the retained Hydrologist, Gary MEYER, IS OVER 10 years old. Council must prefer the honest views of Land Care and Rosanna Hindmarsh over this vague and self-serving document. Summary (un-numbered page after the cover page) un-numbered dots. Dot 1. This statement is FALSE AND MISLEADING. This amazing fresh water system, if it now tends towards brackish, is only so because of manmade intervention driven by greed. This statement is intended to invite the reader to think that more intervention, which will worsen the quality of the water, no longer matters. Dot 2. FALSE	comply with the noise regulations. Extensive dust management is proposed and complies with Government Guidelines and best practice mining. The operations must comply with the Mines Safety and Inspection Act overseen by the Department of Mines and Petroleum which is responsible for worker health and safety. By managing worker health and safety with respect to dust, the management of offsite dust risk is also managed. The submitter's comment that the proposed excavation area measures 50ha in area is incorrect. The proposed excavation area measures 9ha as shown on the development proposal plans and documented in the reports. In relation to bullet point 2, Landform Research advises that the extraction of clay is not classified as heavy industrial use. The area is shown on the Figures related to the proposal. Clay does not carry a health risk: kaolin clay is used for medicines. In relation to bullet point 3, the Queensland Primary Industry Guidelines are the criteria used across Australia including by the Health Department of Western Australia. The proposal complies with both sets of Guidelines. In relation to bullet point 5, the submitter's comments relate to Clause 6(1) of the Shire's Extractive Industries Local Law 2014. The provisions of this Clause were discussed with Mr Brendan Jeans from the Shire on 10 July 2015. Mr Jeans advised that the Shire does have discretion to approve a variation to the setback to the 500m setback provided that appropriate dust and noise mitigation measures are in place. In relation to bullet point 6, Landform Research advises that the Department of Mines and Petroleum will inspect the site through the Mines Safety and Inspection Act 1998. All quarries must be registered under the Act and operate under the Act through the SRS and Project Management Systems of the Department of Mines and Petroleum. The buffers are as stated. In relation to bullet point 7 we do not understand the concerns of the submitter. The concerns noted by residents were taken into consideration during the design process and the excavation area reduced as a result. Landform Research advises that the wind directions were modified on the mapping to reflect the interpreted directions based on the landform. It is not clear from the submitter's comment, what information is suggested as being false. The information presented is determined from on-site investigations and operating clay excavations by qualified, experienced persons. In relation to bullet point 1, Landform Research advises that the Brockman River is already brackish as a result of land clearing and agricultural practices over all of the catchment.	Noted. Should Council approve the application the applicant would be bound by the requirements of the approved plans. Noted. Should the application be approved access would be granted via Toy Road as due to topographical reasons and restricted Main Roads WA access could not be achieved via Great Northern Highway. Whilst it is acknowledged that there are sensitive water bodies in proximity to this proposal, the water management plan clearly demonstrates there will be no major impact on the Brockman River Catchment. Extractive Industries are temporary in nature. This proposal is subject to a rehabilitation plan which will be required to be adhered to once the resource is exhausted or when the land use ceases.

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	Dot 3. FALSE Dot 4. FALSE AND MISLEADING. Not 'some water' but SUBSTANTIAL WATER. This departure from the facts is intended to mislead the reader. Dot 5 and 6. FALSE AND MISLEADING. The flood that causes the creation of Lake Ginnerby happens regularly in the proposed area. Stevens knows this and has tried to degrade this beautiful site by his fatuous and pompous words that follow: "...the status of the name is unclear" Dot 7. MISLEADING. Stevens must add the words: 'until crossing is put in at which time the water will no longer be free flowing' to avoid again misleading his readers. Dot 8. Probably correct. Well done. However, Stevens should have added (to properly inform the reader) the words: "where the mine is well positioned to ensure that all water runoff from the put and workings are best able to enter the river system". This cannot go ahead. There is numerous reference in this report indicating that land clearance causes salinity. The first proposed action to be taken by the applicant is to clear trees. The writer, whose land will be seriously affected, wishes to address council on the complete Water management plan in due course. Appendix No. 3. Noise Assessment. Noise prediction from tables and theoretical analysis is fraught with difficulties. The only real way to establish what, acoustically, will occur is to make a live experiment on site. Drop onto the proposed pit site the PC 450 Excavator (big), two CAT740 Haul Trucks (bigger), the Komatsu D375 Bulldozer (huge) the Komatsu WA FEL (even bigger) and a handful of 50 ton trucks: put them in gear, hit the throttle and then cup your ear and listen. They wouldn't dare. The experiment comes AFTER the licence is granted and by then it is too late. The locality is finished as a place for peaceful living and rural pursuits as dictated by the shire's zoning. The shire should insist on this trial as a precursor to the consideration of this enormous project. It would be very easy for BGC to organize. The best way to appreciate whether you believe Lloyd Georges promises is to look at Table 5-1 on Page 12 where it shows each predicted decibel level of each piece of equipment as heard in neighbouring property 450 metres to the west. But what do those numbers mean? Well look at the last page A4 showing, and headed: Typical Noise Levels. This shows us that will only hear a noise from all those engines that is only slightly more than if he were seated in a library, and much less than that of ordinary conversations in a	The submitter's comments in relation to bullet points 2 and 3 are not supported by any evidence and in this regard it is not possible to respond to the suggestion that the statements contained in the Water Management Plan are false. The flow in the location of the crossing and Lot 7 is within the main channel apart from flood flows. The river bed was straightened at the location of the proposal and the river crossing as shown on the photography, aerial photography and local knowledge. The fourth dot point relates to the amount of water. Irrespective of the wording, none of those flows will be changed with respect to the proposal. Dot points 5 and 6 appear to be correct based on aerial photography, river patterns and flows. This also related to Dot point 8. The river is free flowing at the crossing and will continue to be so with the normal flows confined to the main channel. It is only during flood times that the flows will move outside the main channel and these are discussed in the Water Management Plan and figures attached to that plan. Comments on salinity are provided earlier within this response to submissions. It is noted that the disturbance area lies 200 metres from the Brockman River, all surface water from disturbed areas is to be retained or detained with a bypass for fresh surface storm water and that the Brockman River flows on Lot 7 for over 1 km downstream of the crossing and in this regard it is not possible to respond to the suggestion that the statements contained in the Water Management Plan are false. Landform Research has considered the submitter's comments and notes that projects such as this are assessed on modelled noise studies using actual measurements from operating mobile plant. The modelling has been shown to be accurate and relate well to operational conditions. The same modelling is used widely across many countries. There is no other way of assessing a project prior to its commencement. An additional set of measurements can be made at the commencement of operations to check for compliance after commencement.	Should Council grant approval for this use a Noise Management condition will be imposed requiring the landowner to adhere to noise management plans and they as requested to adhere to the Noise Regulations, should the landowner not comply with these requirements they would be at risk of legal action.

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	room. (Between 32 and 40 decibels) Can anyone actually believe this? How can people write this rubbish? Do they believe it? The fact is they don't, but if they get their fee, and Brikmakers gets its pit, then it doesn't matter what happens to the land and the neighbours. The shire needs to get its own professional opinion or, preferably, make them trial the equipment. The writer, whose land will be seriously affected, wishes to address council on the complete Noise Assessment in due course. Appendix No. 4 Visual Management. This is not a report, just a number of plans and pictures. There are some words relating to the visibility of the operation on pages 32, 33, and 34 of the Excavation and Management Plan. The key words provided are on page 32: "visual impact can occur. Such as by the operation being set too high in the landscape, by being too close to neighbours and by insufficient visual protection" The site has all these characteristics but the next two pages are given over to a persuasion that these factors don't really matter if the applicant plants some new trees on top of clay mounds that are over 7.5 meters high. This is a mount about the height of a two storey building with a tree stuck on top. This, it is suggested, is as visually amenable as the now green valley of pasture. Do they think we are stupid? Obviously they do. To prove this one only has to look at Figure 3S, the last of the plans. It suggests that the pits can only be seen from a small area around the site. This is FALSE. If our house, a few meters to the north of the pits can be seen about 14 kilometres South on great northern highway, then these huge pits will stand out like dogs balls from there too. Appendix No. 5. Transport Statement by 'Shawmac'. Shown to be prepared by T. Shaw and reviewed by R. Garton, at the start of the report, there seems to be a promise of a degree professionalism not yet seen in these appendices. Sadly it does not eventuate. The traffic data is hopelessly old (more than 10 years) and cannot be relied on. It will be necessary to update these counts or find recent ones already recorded. The traffic engineers involved do not WARN or comment on this indicating that they are partisan in their approach. This is further demonstrated by other parts of the report; Page 5. 'the site was previously used for extensive agriculture and cattle	The Noise Assessment will be reviewed by the Shire of Chittering's Technical Officers as part of its assessment of the proposed development. If the Shire's Technical Officers have any issues, queries or concerns with the Noise Assessment, please contact our office immediately. The mapping identifies wide areas to the west south and east from which the put may be visible. The figures also present sightlines. The pit can only be located where the clay resource is located, in this case that is higher up the valley side which makes visual protection more difficult, especially from a distance. As distance increases the percentage of disturbance relative to the rest of the landscape reduces. That is the disturbed area is a smaller proportion of the landscape. Earth bunding planted with taller tree species is proposed to be used to screen the operations. It will take some time for the trees to grown but the bunding will assist for the stockpile area and the lower parts of the pit. The first tag is lower in the landscape. Stage 2 will be moved into after some years, giving as much time as possible for the tree bells to grow. In both stages the most visible area will be the upslope edge of the pit. This will be excavated early in each stage, the resource pushed down and that portion of the pit revegetated as soon as possible which should assist in reducing potential visual impacts as indicated in Figures 15 and 25. Shawmac have considered the submitter's comments and advised as follows: Any change in traffic volumes between 2005 and 2015 on the Bindoon - Moora Road is not expected to be significant. Traffic volumes recorded along the road between 2005 -and 2015 has been considered and general indicate a consistent level of traffic over the 10 year period. However, it should be noted that counts north of Wells Glover Road as reported by MRWA remained unchanged over a three year period and there is no evidence to suggest that significant increases have occurred. Nonetheless, if traffic had grown continuously from 2005 to now at an annual rate of 2% the increase in traffic would be in the order of 166 vpd or 16 vph. This is not significant and would not change report outcomes. A review of the turning warrants at the intersection modifications over and above those indicated in the report.	The Shire employees expert officers to provide advice and guidance on all proposal within the Shire of Chittering, this application was referred to the Shire's Principal Environment Health Officer who advised the Noise Management Plan proved suffice for what it proposed. The Executive Manager Development Services and Executive Manager Technical Services undertook a site visit, where it was determined that the proposed extraction area was appropriately located on site to reduce visual impact from Toy Road & surrounding properties as it is proposed on a low lying area of the site. In addition to this, the approval would be subject to a rehabilitation plan and bond which requires the land to be reinstated to a similar standard to pre extraction. Noted. Noted.

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	grazing'. The use of the word 'previously' is DELIBERATELY MISLEADING. Grazing is still the use and should remain so. Page 8. The existing roads, Toy and Bindoon/Moora are said to be 'described as etc.' indicating that NO VISIT was made to enable this report. Page 13, Fig 7 does not show the bends in the Bindoon Moora rd. East and West and close to the intersection where Shawmac proposes that fully laden trucks with two trailers nearly 28 meters long will grind up the hill in Toy road into a part of Bindoon /Moora where there are two BLIND corners. This is a very DANGEROUS road situation and very unprofessional of Mr. Shaw to CONCEAL it. Page 14, Para 4.4. The use of the word 'Desirable" in this context is obviously road speak known to road engineers etc. However, to the poor bloody farmer it suggests that everyone would be quite comfortable if Toy Rd. had a traffic volume of 3,000 vehicles a day. (and don't complain until it exceeds that) Also note that the so called Actual Daily Traffic Flows (100) for Toy road are not actual. They are a Shawmac guess which suddenly and MISLEADINGLY become actual in that table. Now see Page 15, Para 8. Not content to distort the probable Toy road traffic by guessing it is 100 per day, Shawmac now doubles that figure by saying in table three that the traffic on toy road now is 100 v.p.d. BOTH WAYS! i.e. 200 total. This allows the figures to look better as the 60 truck movements both ways looks less against the DOUBLED GUESS of 100 v.p.d. both ways. If the original guess was correct, which it can't be, then the new truck movements more than doubles the traffic loading on that road and not with cars, but with monsters. If the real traffic movement is reasonably assessed then I believe that the trucks will triple the traffic flow. This DISTORTION in the report is unprofessional and dishonest. Page17 figure 11. The text states that there is: 'approximately 120m. of sight distance to the East and West' from the proposed entry from Lot 7 onto Toy road. This can be seen to be false by scaling off the figure and by visiting the sight. The access is blind both ways at no more than 50 meters and accordingly is not workable using Austroads references. It is quite contrary to Shawmacs statement of there being "no unacceptable level of risk'. This will MISLEAD the public and the Council. The Shawmac report is misleading and unacceptable.	Overall, volumes on all roads are low and significant spare capacity exists on all roads and intersections. In relation to the comment at page 8, we can confirm that a site visit was undertaken in conjunction with a representative from Brickmakers. Shawmac have considered the submitter's comments and advised as follows: In relation to Figure 7, this figure is intended to show the current intersection geometry. There is no deliberate attempt to conceal any aspect of the existing road layout. The bend to the west is located about 480 metres from the Toy Road intersection and bend to the east, about 320metres. In relation to paragraph 44, desirable maximum flows are quoted from the MRWA Functional Road Hierarchy document which is recognised by the industry and most if not all Local Authorities State wide. There is no suggestion that Toy Road would have a volume of 3,000 vehicles per day. The Toy Road volumes are listed in the table under the heading of "Actual". They are clearly indicated as being estimated in the Toy Road column of the table. The document clearing indicates that the flows are estimated based on the likely traffic catchment - they are not "guessed". In relation to the submitter's comments regarding page 15, it is confirmed that there is a mistake in table 3 in as much as the combined daily traffic (100vpd) was incorrectly included as "by direction" traffic. This serves to overstate the total daily and hourly traffic in Toy Road. The overstated traffic flow does not serve to make the figured look better as the impact associated with any traffic assessment is based on the absolute number of vehicles and not the percentage increases in vehicle numbers. The error in reporting does not alter the findings. In relation to Figure 11, sight distance that can be realised from the proposed access point is considered to be as indicated in the traffic report. This was confirmed with the site visit and from aerial photographs.	
Resident 5	I have visited the Toy Road area several times over the past few years and have spoken to and met Toy Road residents to discuss the Application over the past 12 months. I have also met with Rosanna Hindmarsh to find out her views on the environmental issues arising from the Application. From this I have gained a fairly detailed understanding of the background and history of this location, the amenity of the area and its environmental significance.	The submitter states that the proposed development "would contravene significant zoning objectives and principles in TPS 6" but does not explain what objectives and principles would be contravened. In response to the comment, we note that the Application has been assessed in relation to all applicable provisions contained in the Shire's TPS6 and local planning policy framework in addition to relevant State	Noted

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	As a member of the Chittering Mining Advisory Group and a concerned resident with a small farm zoned Agricultural Resource I am lodging a strong Objection to the Application. The Application is deficient in many aspects and cursory in its handling of the very significant social and environmental impacts in this sensitive location. However, the substantive objection is that the approval of the Application would contravene significant zoning objectives and principles in TPS6, and would ignore clear limits in BRM LPP10 regarding buffers. The details of the Objection are set out below in this letter and in the attachments. I have assisted the residents directly affected by the Application in preparing their objections. However, each resident has specific reasons that underpin his/her objection and these should be considered individually. Our detailed grounds of objection are as follows: 1. Planning Grounds. Approval of the Application would be in clear breach of many objectives and rules in Town Planning Scheme No. 6 and the Shire's Basic Raw Materials Local Planning Policy No. 10. The Application contains pages of claims stating that the Application complies with TPS6, BRM LPP No 10 and numerous other local and state planning policies and rules. Many of the statements are false and misleading and the truth is the opposite of what is stated. One of the most repeated misleading statements is that the operation will occupy only 3.8% of the Site (Lot 7) - this is repeated at least 7 times in the Application and is false. The attached Schedule of Objections sets out our detailed objections and lists how the Application fails to satisfy the criteria in TPS6, BRM LPP No. 10. and other local laws and policies. As the Application does not meet the objectives of TPS6 in the relevant zoning and breaches numerous other rules and principles in TPS6 and BRM LPP 10, the Shire must reject the application. 2. Use of Toy Road We strongly object to the use of Toy Road as the access route for the proposed Extractive Industry. As stated in the attached Schedule, Clause 5.4 of the BRM LPP No 10 states in paragraph (a)(vii) that Council prefers extractive industries that "have direct access to Brand of Great Northern Highway". The Application dismisses the option of having access across Lot 7 to Great Northern Highway because it would be inconvenient and expensive for Brikmakers. This is not a valid reason to avoid compliance with BRM LPP No 10 at the expense of ratepayers and road safety. Toy Road is a cul-de-sac. It is a quiet gravel road servicing the 11 small farms zoned Agricultural Resource that were approved by the Shire in a "Landscape Protection Special Control Area" under TPS6, with their outlook northwards across seasonal Ginniby wetlands towards the sweeping Bindoon Hill	government documents. Section 4.0 of the Development Application report addresses each of the planning provisions (both local and State). As demonstrated within Section 4.0, the proposed development satisfies all relevant town planning requirements. The Shire's Planning Department has not, to date, raised any concerns in relation to the proposed development's suitability from a town planning perspective; we ask that these concerns be brought to our attention immediately. The submitter's comment is identical to the comments made by Submitter's above. Please refer to the Applicant's response above.	Noted.

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	escarpment. The Application states that when transporting clay, the operation will generate "10 laden trucks per hour" (See Excavation & Management Plan, Project Summary pages 4-5 under TRANSPORT). Add in 10 empty tucks presenting for loading, this means that the residents of Toy Road experience 20 truck movements per hour, 11 hours per day, 6 days per week during loading, which is 2 road train every 3 minutes. This will degrade the immediate natural environment along Toy Road and have a significant adverse impact on the living environment of residents... Brikmakers' claim that it will only transport material 25-30 days per year is not credible. The Application states that they wish to "ensure a continuous supply of clay throughout the year" with excavation (and loading) taking place during the drier months and transportation continuing dying the wetter months. This means the impact will be all year round. Clause 5.16 (a) of TPS6 which states that Extractive Industries may only be permitted "where they will not adversely affect living environments...." would be breached if the Application is granted and the use of Toy Road permitted. In addition, it will create unacceptable safety risks for local traffic on Toy Road and Bindoon-Moora Road. The living environment of the properties in Toy Road would be destroyed if Council permits the use of Toy Road as an industrial haulage route for the proposed clay operation. Council must reject the Application and the use of Toy Road on this ground alone. 3. Environmental Issues We strongly object to the Application on the grounds of that it presents extreme environmental risks to the natural environment around Toy Road, including the real risk of acidification of the Ginniby wetlands and the Bindoon River with potential downstream impacts on Lakes Neerdonga and Chittering and the Brockman River. Acidification presents a seriously risk to agriculture both at the site and downstream of the site. Brikmakers has been thinking about this clay pit for over 10 years. Chittering Landcare has informed residents that they told the same officers of Brikmakers 10 years ago that this was an absolutely unacceptable location for a clay pit and that the environmental risks are simply too great in this sensitive area. The Application and supporting documents are deficient, almost flippant, in relation to environmental risks such as acid sulphate soils, land clearing, dieback, the impact on sensitive wetland and Carnaby's cockatoos. In particular: a. The high risk of acid sulphate soils resulting from major excavation, construction of bunds and stockpiling of exposed clay over a period of 10-20 years in a location of high surface water run-off and salinity is not taken seriously in the Application. In fact the Application incorrectly states that		

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	acid sulphate soils are not arise in this elevated location. Landcare will confirm that this statement is FALSE. b. The hydrological report by Meyer Water and Environmental Solutions is based on testing done more than 10 years ago. It is therefore out of date and irrelevant. c. No fauna and flora survey has been conducted because Brikmakers decided it wasn't needed. Brikmakers' paltry assessment of environmental values is unacceptable. There needs to be a proper flora and fauna survey conducted taking into account Carnaby's sightings and the prolific birdlife in and around the Ginniby wetland. d. The Application is inconsistent about what kind of mature trees are to be removed. This kind of sloppiness is unacceptable. No mature Marri trees (Corymbia calophylla) should be cleared from the Site as they are critical to Carnaby's and to land and river health. We urge Council to reject the Application as it fails to comply with the several objectives of TPS6 and it must be rejected in any event due to its failure to comply with the basic requirements for buffers in BRM LPP10. If the Council decides not to reject the Application we urge the Council to: A. Require Brickmakers to provide a flora and fauna survey of the Site, a current hydrological report and other information in which the Application is deficient; and B. Refer the proposal to the EPA under S38 of the EP Act for environmental assessment with the support of residents and Chittering Landcare.	The submitter states that the proposed development "fails to comply with several objectives of TPS6" but does not advise what these objectives are or why the proposed development does not comply with them. It is noted however, that the Application has been assessed in relation to all applicable provisions contained in the Shire's TPS6 and local planning policy framework in addition to relevant State government documents. Section 4.0 of the Development Application report addresses each of the planning provisions (both local and State). As demonstrated within Section 4.0, the proposed development satisfies all relevant town planning requirements. The Shire's Planning Department has not, to date, raised any concerns with the Applicant in relation to the proposed development's compliance with its local planning framework. If the Shire maintains any concerns in relation to the proposed development's suitability from a town planning perspective, we ask that these concerns be brought to our attention immediately.	As per comments and the officer's comments the application is considered to suffice in according with TPS6 and policy requirements. In addition to this, the Shire did refer the complete application and supporting documents to the Environmental Protection Authority through a S38 and it advises there were no environmental concerns.
Resident 6	We are writing to voice our disapproval of the Planning Application for an extractive industry on Lot 7 Toy Road, Bindoon, where the applicant proposes to extract and cart clay from this site. Our concerns are in relation to the truck movements in and out of Toy Road. Our School Bus Contracts alone have 9 bus movements past the intersection of Toy Road and Bindoon- Moora Road, each school day of the year. We are aware of at least two other contractors who also use this route each school day. Below we list our concerns. 1. Fully-laden trucks failing to stop before they pull out from Toy Road, onto Bindoon- Moora Road. It is essential that a STOP sign be installed at the end of Toy Road, not a Give Way sign as stated in Figurel3 of "The Applicant's" submission.	The submitter's suggestion of a 'Stop Sign' being erected at the intersection of Toy Road and Bindoon-Moora is reasonable and the applicant has no objection to this. Shawmac have considered the balance of the submitter's comments and advise as follows: The modification to the intersection will consider turning paths and provide sufficient pavement to ensure turns are made lane correct. The Traffic report recognises this and indicates that upgrading will be required to provide sufficient width on the Bindoon-Moora Road westbound carriageway to allow for through traffic to safely pass right turning traffic into Toy Road, to accommodate all turns into and out of the intersection land correct and to accommodate slow moving vehicles turning left onto Bindoon-Moora Road. The Traffic Report indicates that as Toy Road is not a dedicated permit vehicle rout, application will need to be made to the Shire for approval.	Noted. It is considered that the applicant has adequately addressed most of the traffic considerations. The traffic impact assessment has determined the proposed heavy vehicle movements will not cause risk to local user's safety as there are a number of management measures such as signage, adjoining landowner notification and access modifications proposed to help ensure safety. As the applicant is proposing restricted access vehicles they would be required to apply and obtain approval for a RAV 2 network to allow this size vehicle on Toy Road, this application would also is assessed by MRWA to ensure compliance.

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	2. Long trucks pulling out of Toy Road and needing to go on the wrong side of the road when turning east onto Bindoon-Moora Road. 3. Vehicles travelling east along Bindoon-Moora Road at 90 kmph, having just come over a crest, faced with a slow-moving long vehicle, turning right (across their lane), into Toy Road or turning left out of Toy Road. Both are extremely dangerous situations. 4. A full extra lane for west-bound traffic on Bindoon-Moora Road for vehicles travelling in a westerly direction to safely pass the haulage trucks waiting to turn right into Toy Road is part of the submission. This is absolutely essential for the safety of all road users, due to the proximity of a bad bend. 5. Possible brake failure or driver inexperience, resulting in fully-laden trucks being unable to stop at the bottom of the hill at the intersection of Toy Road and Bindoon- Moora Road. 6. Considering vehicles over 21.5metres long are not permitted (and should not be permitted) to travel along Wells Glover Road, how can it be that vehicles 27.5 metres long can be allowed to travel along Toy Road? 7. All the costs of work undertaken by the Main Roads Department or The Shire of Chittering should be paid for by "The Applicant". Not one cent should come from Tax Payers/Rate Payers. 8. We would like to voice our disagreement with what is stated on page 7 of their Environmental Risk Table. Under the heading of Environmental Factor - Human Health Amenity: Environmental Objective-Transport routes and operations are designed to minimise local impacts: Environmental Components to Consider - Transport on local, and regional roads or school bus routes, under the heading of Environmental Risk, subheading Innate Risk - Unmanaged, they list the risk as LOW & under the subheading Risk When Managed as also LOW. Under the Proposed Management heading the reason they give for the risk receiving a rating of low is - Truck movements are to be 25 to 30 days per year. In conclusion, the safety of all road users is our major concern and the complete safety of the school children we transport each day, is paramount. In the application, it repeatedly states that certain things are acceptable because it is only for 25 -30 days a year. To us, this is a totally unacceptable way to think as it only takes one truck to hit a bus full of school of children. In our Safety Management Plan, the Risk Assessment we would place on this Operation should it go ahead without changes and many safety features in place first, would be HIGH. We wish for this letter to be read out at Council and a copy given to all councillors well before any decisions are made on this application, so that each and every councillor has ample time to familiarise themselves with all		

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	aspects of this proposal.		
Resident 7	We are writing to object strongly to Brikmakers' Application for Development Approval for an Extractive Industry for clay at Lot 7 Toy Road. We believe that this application will impact on the quality of the underground water in the area. Our farm only uses bore water for irrigation and we believe that an extractive industry would have a detrimental, damaging and permanent effect on the quality of underground water. We also object to allowing trucks to use Toy Road for transportation of clay. It would deteriorate the quality of the road and also cause noise and dust in the area. The gate to the clay pit is also planned to be directly in front of our property and we would be adversely impacted because of its location. We also believe that having an extractive industry in our agricultural area would have an adverse effect on the value of our property. Our detailed grounds of objection are as follows: 1. Planning Grounds. Approval of the Application would be in clear breach of many objectives and rules in Town Planning Scheme No. 6 and the Shire's Basic Raw Materials Local Planning Policy No. 10. The Application contains pages of claims stating that the Application complies with TPS6, BRM LPP No 10 and numerous other local and state planning policies and rules. Many of the statements are false and misleading and the truth is the opposite of what is stated. One of the most repeated misleading statements is that the operation will occupy only 3.8% of the Site (Lot 7) - this is repeated at least 7 times in the Application and is false. The attached Schedule of Objections sets out our detailed objections and lists how the Application fails to satisfy the criteria in TPS6, BRM LPP No. 10. and other local laws and policies. As the Application does not meet the objectives of TPS6 in the relevant zoning and breaches numerous other rules and principles in TPS6 and BRM LPP 10, the Shire must reject the application. 2. Use of Toy Road We strongly object to the use of Toy Road as the access route for the proposed Extractive Industry. As stated in the attached Schedule, Clause 5.4 of the BRM LPP No 10 states in paragraph (a)(vii) that Council prefers extractive industries that "have direct access to Brand of Great Northern Highway". The Application dismisses the option of having access across Lot 7 to Great Northern Highway because it would be inconvenient and expensive for Brikmakers. This is not a valid reason to avoid compliance with BRM LPP No 10 at the expense of ratepayers and road safety.	The submitter's comment is identical to the comments made by Submitter's above. Please refer to the Applicant's response above. The proposed development has been assessed in relation to the Shire's Local Planning Policy 10 and is considered to comply with the objectives of the policy (refer to section 4.2.1 of the Town Planning Report). Landform Research has considered the submitter's comments in relation to flora and fauna and advises that flora assessments were conducted as explained in the submitted documentation. Fauna was also considered based on habitat and significant species such as black cockatoos. Many more trees will be planted than are required to be removed. A clearing permit will be applied for and the vegetation will again be considered in that process. Fauna was also considered based on habitat and significant species such as black cockatoos and will also form part of the assessment required for a clearing permit. In relation to the submitter's comments suggesting that the hydro geological reporting is deficient, we disagree with this statement and are of the view that the reporting remains valid and was assessed to see if it was valid. In relation to the submitters comment that the proposal should be referred to the EPA for assessment, please note our earlier response to this matter.	Noted

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	Toy Road is a cul-de-sac. It is a quiet gravel road servicing the 11 small farms zoned Agricultural Resource that were approved by the Shire in a "Landscape Protection Special Control Area" under TPS6, with their outlook northwards across seasonal Ginniby wetlands towards the sweeping Bindoon Hill escarpment. The Application states that when transporting clay, the operation will generate "10 laden trucks per hour" (See Excavation & Management Plan, Project Summary pages 4-5 under TRANSPORT). Add in 10 empty tucks presenting for loading, this means that the residents of Toy Road experience 20 truck movements per hour, 11 hours per day, 6 days per week during loading, which is 2 road train every 3 minutes. This will degrade the immediate natural environment along Toy Road and have a significant adverse impact on the living environment of residents... Brikmakers' claim that it will only transport material 25-30 days per year is not credible. The Application states that they wish to "ensure a continuous supply of clay throughout the year" with excavation (and loading) taking place during the drier months and transportation continuing dying the wetter months. This means the impact will be all year round. Clause 5.16 (a) of TPS6 which states that Extractive Industries may only be permitted "where they will not adversely affect living environments...." would be breached if the Application is granted and the use of Toy Road permitted. In addition, it will create unacceptable safety risks for local traffic on Toy Road and Bindoon-Moora Road. The living environment of the properties in Toy Road would be destroyed if Council permits the use of Toy Road as an industrial haulage route for the proposed clay operation. Council must reject the Application and the use of Toy Road on this ground alone. 3. Environmental Issues We strongly object to the Application on the grounds of that it presents extreme environmental risks to the natural environment around Toy Road, including the real risk of acidification of the Ginniby wetlands and the Bindoon River with potential downstream impacts on Lakes Neerdonga and Chittering and the Brockman River. Acidification presents a seriously risk to agriculture both at the site and downstream of the site. Brikmakers has been thinking about this clay pit for over 10 years. Chittering Landcare has informed residents that they told the same officers of Brikmakers 10 years ago that this was an absolutely unacceptable location for a clay pit and that the environmental risks are simply too great in this sensitive area. The Application and supporting documents are deficient, almost flippant, in relation to environmental risks such as acid sulphate soils, land clearing, dieback, the impact on sensitive wetland and Carnaby's cockatoos. In particular:		

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	a. The high risk of acid sulphate soils resulting from major excavation, construction of bunds and stockpiling of exposed clay over a period of 10-20 years in a location of high surface water run-off and salinity is not taken seriously in the Application. In fact the Application incorrectly states that acid sulphate soils are not arise in this elevated location. Landcare will confirm that this statement is FALSE. b. The hydrological report by Meyer Water and Environmental Solutions is based on testing done more than 10 years ago. It is therefore out of date and irrelevant. c. No fauna and flora survey has been conducted because Brikmakers decided it wasn't needed. Brikmakers' paltry assessment of environmental values is unacceptable. There needs to be a proper flora and fauna survey conducted taking into account Carnaby's sightings and the prolific birdlife in and around the Ginniby wetland. d. The Application is inconsistent about what kind of mature trees are to be removed. This kind of sloppiness is unacceptable. No mature Marri trees (Corymbia calophylla) should be cleared from the Site as they are critical to Carnaby's and to land and river health. We urge Council to reject the Application as it fails to comply with the several objectives of TPS6 and it must be rejected in any event due to its failure to comply with the basic requirements for buffers in BRM LPP10. If the Council decides not to reject the Application we urge the Council to: A. Require Brickmakers to provide a flora and fauna survey of the Site, a current hydrological report and other information in which the Application is deficient; and B. Refer the proposal to the EPA under S38 of the EP Act for environmental assessment with the support of residents and Chittering Landcare.		
Resident 8	We strongly object to the proposal to extract clay at Lot 7 Toy Road, Bindoon (Proposal) as set out in the Application for Planning Approval by Rowe Group on behalf of Brikmakers (Application) because it will affect the viability of our agriculture based livelihood, our lifestyle and our safety and that of our visitors when accessing our property. If permitted to proceed, the Proposal will: • significantly reduce the amenity and rural character of the region; • expose existing residents to unacceptable dust emissions during construction and operations; • expose existing residents to unacceptable noise emissions, associated with both the extractive industry at the site and the frequent use by heavy haulage vehicles of a quiet, local access road (Toy Road), affecting local amenity; • limit safe access and egress to properties accessible via Toy Road;	In relation to amenity and rural character, the following is noted. Extractive Industry is a discretionary land used in the "Agricultural Resource" Zone under TPS6. It is therefore a use that is capable of approval. The site is currently being used for Gravel Excavation and in this regard is noted that the area is already accommodating land uses of the nature proposed. The Applicant intends to implement a range of noise, dust, traffic and visual mitigation measures such as restricted operating times, bunding and revegetation in order to minimise the disruption to local amenity. It is also important to note that the proposed excavation activities are time limited in the sense that the resource is finite. Once the clay resource has been removed, the site will be rehabilitated. In relation to dust, it is noted that the Applicant has prepared a Dust Management Plan as part of the Application. Should Council resolve to approve the application. A condition will be imposed on the approval requiring compliance with the Dust Management Plan.	Noted. Further to the applicant's response, key considerations such as impact on amenity and any possible dust and noise impact have been taken into consideration. The application has been designed to reduce any possible impact and surrounding land owners. Shire Officers also have concerns around the use of Toy Road for this proposal; any use will need to be strictly maintained through conditions of the Planning Approval. As an 'A' Use within the Scheme, Extractive Industries are considered an ancillary use for farm land properties, based on it compiling with relevant legislation.

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	• increase safety hazards along an already hazardous section of the Bindoon-Moora Road; and • significantly increase movement of heavy haulage vehicles in the locality and through the Bindoon township by up to (or exceeding) 120 vehicles per day. The reasons for our concerns are: Dust, Noise and Amenity The Proposal is located in close proximity (within 1km of haul road which is part of the Proposal) to 10 residences in an elevated location. The applicant has sought to mitigate unacceptable noise, dust and visual amenity by proposing to construct massive earth bunds and rely on screening by mature trees, which it proposes to plant on and surrounding the bunds. However, noise, dust and visual amenity will be affected during the earthworks required to construct such an extensive structure. The Application acknowledges that some excavation will still be visible after the bund and mature vegetation is established due to the gradient of the land on which the Proposal is situated (the footprint of the Proposal rises from 135 AMD to 190 AMD at the top of the excavation). Therefore, will not be entirely effective in managing noise, dust and visual amenity. Further, any trees planted by the applicant, particularly on the top of the earth bund will not reach sufficient height and maturity to provide the benefits relied upon by the applicant during the proposed term of the planning approval (10 years). The Proposal also includes the construction and use of an unsealed haul road (approximately 800m), between the stock piles and Toy Road and is considered to be part of the Proposal. The haul road will be used by up to 120 heavy haulage vehicles and additional other vehicles on most days. This will be located within close proximity to residences and will be visible from public roads and other properties across the valley. There is no proposal to screen the haul road with vegetation and it will not be not be adequately screened by existing vegetation. The haul road will further contribute to noise, dust and loss of amenity.	Failure to comply with a condition of Planning Approval may result in legal action being taken by the Shire. The same scenario applies to compliance with the mitigation measures contained in the Noise Assessment. IN relation to traffic, it is noted that a Traffic Assessment has been undertaken and that this Assessment demonstrates that the proposed development will have an acceptable impact on Toy Road in relation to matters such as road capacity and safety. All the issues raised by the objector formed part of the matters that were considered when assessing the potential impacts of the proposal. The potential impacts were identified and then the pit and operations designed to minimise the risk of any impacts. The reporting documents the design best suited to minimising impacts on the local community. Clay such as this is unique and is required to make red bricks and to increase the plasticity of the clay brick making. Bricks are used for the wider community. Unfortunately such clay is uncommon and the locations where it occurs must be used as a source of clay. The proposed development has been designed to minimise impacts such as dust and noise but some impacts, such as visibility, will still occur given the nature of the operation. Mitigation measures such as bunding and tree planting are proposed to reduce the extent of visibility.	Noted. The application proposes to upgrade the first 50 metered portion of the track to a bitumised standard to help with dust impact mitigation. It is acknowledged that portions of this proposal can be seen from other sites. However, it is considered that the identified area is low lying and proposed to be adequately screened from Toy Road and some of the surrounding properties.
	Our detailed grounds of objection are as follows: 1. Planning Grounds. Approval of the Application would be in clear breach of many objectives and rules in Town Planning Scheme No. 6 and the Shire's Basic Raw Materials Local Planning Policy No. 10. The Application contains pages of claims stating that the Application complies with TPS6, BRM LPP No 10 and numerous other local and state planning policies and rules. Many of the statements are false and misleading and the truth is the opposite of what is stated. One of the most repeated misleading statements is that the operation will occupy only 3.8% of the Site (Lot 7) - this is repeated at least 7 times in the Application and is false. The attached Schedule of Objections sets out our detailed objections and	The submitters comment is identical to comments made by submitters above. Please refer to the Applicant's previous responses. In relation to the submitter's comments in relation to watercourses, Landform Research advises that the water management operations proposed as part of development have been designed to manage on-site and off-site water. There does not appear to be any potential for impacts on wetlands and no impacts on water flows in the catchment apart from small drainage lines on the site itself. In relation to the submitter's comments regarding the proposed development's compliance with TPS6, local planning policies and local law, these matters are addressed in Section 4.0 of the Town Planning Report. The Submitter's comment that	

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	lists how the Application fails to satisfy the criteria in TPS6, BRM LPP No. 10. and other local laws and policies. As the Application does not meet the objectives of TPS6 in the relevant zoning and breaches numerous other rules and principles in TPS6 and BRM LPP 10, the Shire must reject the application. Use of Toy Road Toy Road is a quiet, local cul de sac, established to service and used by the residents of small rural landholdings. The Proposal to use Toy Road as a haul road for approximately 120 heavy haulage vehicle movements (described as prime mover and trailer combinations) in a day would completely destroy local amenity. It would also limit safe access to and egress from our property. The applicant has direct access to Great Northern Highway from Lot 7 and has provided no justification for refusing to explore options to use it. As members of Chittering Landcare, we are also concerned about the disregard shown in the Application for the conservation of the watercourses and wetlands associated with the Brockman River, which passes through Lot 7, and impacts on native flora and fauna. We are concerned that the Proposal, if implemented, would have a significant effect on the environment and should be independently assessed. The Proposal is inconsistent with the aims of the Shire of (Shire) Chittering Town Planning Scheme No. 6 District Zoning Scheme (TPS 6) and its provisions, the Shire's Local Planning Policies (LPPs) and the Extractive Industries Local Law 2014, adopted by the Shire under the Local Government Act 1995 (WA) (Local Law), among other government policies. Further, there is insufficient credible information supporting the Application to enable the Shire to make a fully informed decision.	"there is insufficient credible information supporting the Application to enable the Shire to make a fully informed decision" is not agreed. The Shire has not requested any additional information or advised the Applicant of any shortcomings in relation to the information/documentation provided. The submitters comment is identical to comments made by submitters above. Please refer to the Applicant's previous responses. In relation to the submitter's comments in relation to watercourses, Landform Research advises that the water management operations proposed as part of development have been designed to manage on-site and off-site water. There does not appear to be any potential for impacts on wetlands and no impacts on water flows in the catchment apart from small drainage lines on the site itself. In relation to the submitter's comments regarding the proposed development's compliance with TPS6, local planning policies and local law, these matters are addressed in Section 4.0 of the Town Planning Report. The Submitter's comment that "there is insufficient credible information supporting the Application to enable the Shire to make a fully informed decision" is not agreed. The Shire has not requested any additional information or advised the Applicant of any shortcomings in relation to the information/documentation provided.	Noted.
	For reasons outlined in this submission, the Application does not provide any credible reasons to support the Shire exercising its discretion to approve the Application in a manner that would be contrary to orderly and proper planning and inconsistent with the TPS 6 and LPPs. We submit that the Shire should refuse to grant approval for the Application. We further submit that the Application does not provide the Shire with sufficient information to enable the Shire to manage the risks associated with the Proposal through the setting of conditions in a planning approval.	The Submitter's comment that the Application "does not provide any credible reasons to support the Shire in exercising its discretion" is not agreed. All town planning matters requiring the exercise of discretion is addressed in the Town Planning Report. The Shire has not requested any additional information or advised that Applicant of any issues or concerns in relation to the information provided.	Noted. Officers would not recommend approval for a proposal that is likely to have a detrimental impact on surrounding agricultural land uses, therefore, Whilst your concerns are acknowledged, it is considered the applicant has adequately addressed planning considerations as part of this application.
	We own Part Lot 7 Toy Road, which is approximately 10 hectares. To distinguish it from Lot 7 the subject of the Application, our property has two residences at 5 and 17 Toy Road. Although our property is located on the corner of Bindoon - Moora Road and Toy Road, the only access and egress to these residences is from Toy Road. When we purchased our property, approximately 18 years ago, it had an existing house at 5 Toy Road and a rundown orange orchard. Over the years we have developed an olive grove, and market our "Ginniby Rise Extra Virgin Olive Oil", and we breed alpacas and fat lambs. We also keep chickens and	Lot 7 is under the ownership of a single entity. The submitter's comment that he/she owns part of Lot 7 is not substantiated. The balance of the submitter's comments is noted.	Noted. The Shire has under taken extensive investigations into land ownership of Lot 7, it is considered that Mr. Jonathon Dwyer is the sole landowner of Lot 7 with Mr. Alexander Payne having portion mineral rights over a section of the site. The upgrading of this section of road is considered necessary to help reduce impact on roads and surrounding property.

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	grow fruit and vegetables for personal use. Our Ginniby Rise Extra Virgin Olive Oil is a registered food business under the Food Act 2008 (WA). We sell olive oil from local shops in Bindoon, annually at the Bindoon Agriculture Show, through the Chittering Tourist Bureau, and to the public from our property. We built our house at 17 Toy Road 6 years ago and live permanently in that house. We lease our house at 5 Toy Road to tenants, and it is currently tenanted. Our house is located approximately 1.3km from the proposed stockpile and 1km from the proposed southern dam under the Proposal and is approximately 50m from Toy Road. If the applicant seals only the first 50 - 60m of its access road adjoining Toy Road as proposed in the Application, our house would be located approximately 550m from the beginning of the unsealed section of the access road. The tenanted house at 5 Toy Road is approximately 30m from the intersection of Toy Road and Bindoon -Moora Road and about 750m from the unsealed section of the proposed access road within Lot 7. We moved to the Bindoon area to take advantage of the rural lifestyle during our semi retirement. We are members of Chittering Landcare, the committee for the Bindoon Agricultural Society, and the Bindoon Men's Shed. Our family, including our grandchildren, regularly visit us from Perth. One of our daughters and her partner has recently bought a rural property within the Bindoon locality and are building a house there. They also hope to become active members of the Bindoon community and raise their 18 month old son in the Bindoon locality from the end of this year Clause 10.2 of TPS 6 sets out the matters to which the Shire must have due regard in considering an application for planning approval, to the extent that the matters are relevant to the use or development the subject of the application. These matters have been recently re-stated in the deemed provisions for local planning schemes under the Planning and Development (Local Planning Schemes) Regulations 2015 (WA), gazetted on 25 August 2015. Although many of the matters listed under clause 10.2 are likely to the relevant to the Application because of its location in an environmentally sensitive area, proximity to several existing small rural properties, the proposed use of a local access road for frequent use by heavy haulage vehicles and proposed frequency of heavy haulage vehicles travelling through the Bindoon township, the following matters are particularly relevant: • The aims and provisions of TPS 6; • The requirements of orderly and proper planning; • Approved State planning policy; • The Shire's local planning policy; • The compatibility of the development with its setting including the	As previously mentioned, the proposed development has been assessed against the provisions of TPS6, the Shire's local planning framework and relevant Shire government documents. As outlined in the Town Planning Report (refer Section 4.0) the proposed development is considered appropriate having regard to these documents. If the Shire has any specific concerns in relation to the proposed development's compliance with TPS6, the local planning framework or State government documents or considers that these documents have not been adequately addressed in the Town Planning Report, please advise the Applicant.	Noted. The Shire officers have specifically addressed Section 10.2 in the Officers comments section of the report. Overall the operation is considered low scale enough to manage many of the proposed impacts on surrounding property.

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	relationship of the development on adjoining land or on other land in the locality; • The amenity of the locality including the following - o Environmental impacts of the development; o The character of the locality; o Social impacts of the development; • The likely effect of the development on the natural environment or water resources; The adequacy of - o The proposed means of access to and egress from the site; o Arrangements for the loading, unloading, manoeuvring and parking of vehicles; • The amount of traffic likely to be generated by the development, particularly in relation to the capacity of the road system in the locality and the probable effect on traffic flow and safety; • The impact of the development on the community as a whole notwithstanding the impact of the development on particular individuals. Each of these matters must be considered by the Shire in determining whether to grant planning approval for the Application. Our comments on each of these matters are outlined in more detail below. 3.1 Aims and Provisions of TPS 6 3.1.1 Maintain Rural Lifestyle The aims of TPS 6 are set out in clause 1.6. One of the stated aims is to maintain the rural lifestyle as part of the community structure and wellbeing. The landholdings on and in the vicinity of Toy Road maintain a strong rural lifestyle and amenity, which should be protected. Unless the applicant can establish adequate management of noise and dust during development and throughout operations, which has not been established under the Application, the rural lifestyle of the locality is jeopardised. Further, the proposed use of heavy haulage vehicles on Toy Road, particularly at average frequencies of 1 heavy haulage vehicle every 3-5 minutes (depending on which part of the Application is accepted), is wholly inconsistent with maintaining a rural lifestyle. 3.1.2 Agricultural Resource Zone The Application notes that Lot 7 is located within the Agricultural Resource zone under TPS 6. Extractive industry is not permitted within the Agricultural Resource zone without the Shire granting planning approval after considering the relevant matters set out in clause 10.2 of TPS 6. Clause 4.2.5 of TPS 6 sets out the objectives of the Agricultural Resource zone, which are primarily relevant in determining whether a use not specifically mentioned in the zoning table is consistent with the objectives of the zone. As Lot 7 is also located within a Special Control Area - Landscape Protection Area, clause 6.2.4 provides that the Shire will not support land uses which are not related to the general objectives of the zone. In any event, it is only an objective of the zone to allow for the extraction of basic raw materials where it is environmentally and socially acceptable. We submit that the Application does not establish that the Proposal is environmentally acceptable because inadequate and inaccurate supporting	As previously mentioned, the proposed development has been assessed against the provisions of TPS6, the Shire's local planning framework and relevant State Government documents. As outlined in the Town Planning Report (refer Section 4.0) the proposed development is considered appropriate having regard to these documents. If the Shire has any specific concerns in relation to the proposed development's compliance with TPS6, the local planning framework or State government documents or considers that these documents have not been adequately addressed in the Town Planning Report, please advise the Applicant. The Applicant has prepared Dust and Noise Management plans are part of the Application for Planning Approval. These Management Plans outline a series of mitigation measures that will be implemented and maintained by the Applicant for the life of the project. If Council resolves to approve the application, conditions will be imposed requiring compliance with the mitigation measures outlined in these Management Plans. Failure to comply with additional conditions could result in legal action being taken by the Shire. In relation to the submitter's comments regarding vehicle movements, it is noted that excavation activities will only be undertaken for 25 days a year. Furthermore, the Traffic Assessment notes that Toy Road has a design capacity of 3,000 vehicles for day. The road is currently accommodating some 100 vehicles per day and in this regard has sufficient capacity to accommodate the proposed development. The proposed development has been assessed against the objectives of the "Agricultural Resource" zone (see Section 4.1.1 of the Town Planning Report.) and the Special Control Are - Landscape Protection Area provisions (see Section 4.1.4 of the Town Planning Report.)	Noted. Extractive Industries are a discretionary use within the Agricultural Resource zone because they can be seen as a part of rural lifestyle. Community well-being is always a strong consideration for Local Governments. However, if the applicant addressed all planning considerations for the proposal planning approval will be granted. Noted. As specified Extractive Industries are considered as appropriate ancillary activities on Agricultural Resource zone lots should they comply with the relevant planning requirements. Environmental concerns regarding this site have been taken very seriously and on behalf of the community the Shire of Chittering undertook a S38 Environmental Protection Authority Referral. This did not return with any major environmental concerns regarding this proposal.

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	studies were undertaken. The Proposal certainly is not socially acceptable as evidenced by the history of objections from local residents. 3.1.3 Basic Raw Materials Clause 5.16 (Basic Raw Materials) sets out provisions which are relevant to the Shire's consideration of the Application. The Shire cannot approve the Application unless it is satisfied that it will not adversely affect living environments, the landscape quality or contribute to land degradation problems. We submit that the Proposal, if implemented, would adversely affect: • living environments in the locality through dust and noise emissions and frequent use by heavy haulage vehicles (approximately 120 per day) on local roads and through the Bindoon town site; • the landscape quality in the region by conducting excavation and associated land disturbance over an area of 20 to 30 hectares within an elevated location widely visible throughout the Bindoon locality. The Shire should also consider the potential for land degradation through erosion, modifications of natural water flows, the construction of an earth bund of approximately 1 km in length and up to 7.5m high, including land degradation down steam of the Proposal on the Brockman River. We also submit that the Shire should consider the effects of its own buffer requirements as set our under clause 5.16 and within its LPPs on the existing agricultural land users in the vicinity of the Proposal if it were to grant planning approval. The Shire cannot disregard its policies on buffers intended to protect existing land users by approving the Application and subsequently impose restrictions on those land users to protect the extractive industry as required under clause 5.16. The site of the Proposal is not a basic raw materials precinct. 3.1.4 Special Control Area - Landscape Protection Lot 7 is located within a Landscape Protection Area. We submit that in determining the Application, the Shire must consider whether the Proposal is consistent with the purposes of the Landscape Protection Area. Relevantly, the purposes are: • To secure the area from development that would detract from the landscape value of the rural environment; • To conserve and enhance the character of the significant landscape area; • To ensure that land use and developments are compatible with the landscape values. Further, clause 6.2.4 of the TPS 6 indicates that the Shire will not support applications for planning approvals that detrimentally affect visual amenity of the agriculture character and undulating landforms. We submit that the extensive land disturbance associated with the Proposal,	The proposed development has been assessed against the provisions of TPS6 in relation to Basic Raw Materials (see Section 4.1.3 of the Town Planning Report) The proposed development has been assessed against the objectives and provisions of the Special Control Area - Landscape Protection Area provisions (see Section 4.1.4 of the Town Planning Report).	Noted. Should the Application be approved many conditions have and will be required to be adhered to as a part of this application. This includes a rehabilitation plan, and bond to ensure the land is returned to a reasonable state. There is also noise and dust management plans that are required to be adhered to following the land use (planning approval) process there is a secondary move technical process of obtaining an Extractive Industry license through the Shire of Chittering's Local Law this will also manage any possible impacts from this land use. Noted. It is considered that the proposed Extractive Industry will not have a detrimental impact on the Special Control Area due to its setting and siting at the lower section of the site.

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	including the construction of massive earth bunds, in an elevated location visible from several public roads is fundamentally contrary to the purposes of this Special Control Area and cannot be supported by the Shire. Further, the Shire should place no weight on claims in the Application that the Proposal will be hidden from view though the planting of tress because the trees are unlikely to grow to a height that would provide effective screening during the 10 year term of a planning approval. 3.2 ORDERLY AND PROPER PLANNING The Shire has identified basic raw materials within its boundaries, prepared policies to guide the development of extractive industry and has a Special Control Area - Basic Raw Materials designation to identify and protect relevant resources and ensure that the land use restrictions that may apply in those areas are transparent. The development of properties to the north of the Bindoon townsite near the intersection of Bindoon - Moora Road and Great Northern Highway has occurred in a relatively orderly and planned manner. Most of the properties serviced by Toy Road and the other local roads are of a similar size and are used for similar agricultural or rural lifestyle pursuits. It is contrary to principles of orderly and proper planning for applications for planning approvals to be used to effectively change the land use in an ad hoc manner of one of the largest parcels of land in the area (334 hectares). If it were appropriate for Lot 7 to have extractive industry as its primary productive use, this should be determined through proper planning and consultation to ensure that it could occur in a manner that is consistent with other land uses in the area and principles of sustainability. Key requirements should include the use of a dedicated road which intersects with the Great Northern Highway and extensive re-vegetation with native species of all cleared and degraded areas, including the Brockman River and associated wetlands. 3.3 STATE AND LOCAL PLANNING POLICIES Although there are several LPPs and State Planning Policies that are relevant to the Proposal, we have limited our comment to Local Planning Policy No. 10 Basic Raw Materials and Extractive Industries (LPP 10) and the Western Australian Planning Commission Statement of Planning Policy No. 2.4 Basic Raw Materials (SPP 2.4). We have also commented on the relationship between LPP 10 and the Shire of Chittering Extractive Industries Local Law 2014, made under the Local Government Act 1995 (WA) and gazetted on 24 October 2014 (Local Law). 3.3.1 LPP 10 (Basic Raw Materials and Extractive Industries) In determining the Application, the Shire must have regard to LPP 10. Although LPP 10 does not fetter the Shire's discretion, the Shire must have clear justification for deviating from its published statements of policy.	As previously mentioned, the use class "Extractive Industry" is a discretionary land use in the "Agricultural Resource" zone and is therefore capable of approval subject to compliance with the provisions of TPS6. As outlined in the Town Planning Report, the proposed development satisfies the relevant provisions of TPS6 and therefore warrants approval. The Submitter's comment that the proposed use is “ad hoc” and not suitable by virtue of its size is irrelevant when considering the planning merits of the proposed development. Noted. The proposed development's compliance with Local Planning Policy 10 is addressed within the Town Planning Report (see Section 4.2.1) For the reasons, outlined in section 4.2.1 the proposed development satisfies the objectives and requirements of Local Planning Policy No. 10.	Noted. There is no intention of the Shire to change land use of Lot 7 and over industrialise the site. As you may be aware regarding previous decisions made by the Shire for 'Appropriate' land uses on this site. Extractive Industries are a temporary land use which ultimately will rehabilitate the land to a similar state prior to extraction. Noted. No comments about relation to Local Planning Policy No. 10.

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	Clause 5.4(a) states the Shire's preferences for extractive industry within the region. Although a proposal may not have to meet all of the Shire's preferences to obtain Shire support, the Application meets none of the preferences. The deviations from the Shire's published preferences are set out below. Shire's Preference for Extractive Industry Proposal located south of Bindoon townsite Proposal does not involve prime agricultural land Proposal caters for basic raw material needs within the Shire Proposal situated within areas identified in WAPCSPP (2.4) Proposal is more than 1000m from the nearest house Proposal does not require the management of acid sulphate soils Proposal has direct access to Brand or Great Northern Highway Brikmakers Application Proposal located north of Bindoon townsite Site is currently used for pasture and cattle grazing and is surrounded by agricultural/horticultural land uses All material is to be transported outside the Shire to South Guildford. Bricks sold in Perth and, according to Application, exported. Location of Proposal is not identified in SPP 2.4 Nearest house located 450m from excavation pits, 300m from closest dam and 450m from unsealed heavy haulage vehicle access road. Number of houses within 1000m of: • Excavation pits and stockpile area: 7 houses	The proposed development's compliance with Local Planning Policy 10 is addressed within the Town Planning Report (See Section 4.2.1) . For the reasons outlined in Section 4.2.1 the proposed development satisfies the objectives and requirements of Local Planning Policy No. 10.	The Local Planning Policy No. 10 identifies that clay resource extraction will move to the north of Bindoon.
	• All land disturbed for proposal, including unsealed heavy haulage vehicle access road: 10 houses (including both houses on our property) Application does not confirm whether management is required because no studies were undertaken. Although Lot 7 has access to Great Northern Highway, the Application specifically states that access will not be used. No reasonable explanation was provided. Instead, the Application proposes access to Great Northern Highway via two other roads.	The Shire's Local Planning Policy No. 10 identifies a preference for direct access to Brand or Great Northern Highway. This is a preference but not a requirement. In this case, the Clay Resource is located in the eastern part of the site and is not directly accessible to Great Northern Highway which is positioned some 3.5km away. The site's topography between the proposed excavation area and Great Northern Highway is significantly undulating (refer to attached contour plan) and would necessitate extensive site works and the removal of vegetation. These works would be highly visible within the local area due to the site's topography and the impact, in our view, would be significantly greater from an amenity perspective than the proposed access arrangements.	The Landowner has limited access of Great Northern Highway for its Gravel Extraction. Due to topographical reasons this clay pit can only be accessed via Toy Road.
	We submit that there no valid reasons were provided in the Application to support any decision by the Shire to disregard all of its stated preferences for extractive industry under the LPP 10 and approve the Application. Clause 5.4(b) states the circumstances in which the Shire will not approve extractive industries. Although there are others which may be relevant and should be considered by the Shire, the key provision relevant to the Application is: "... Council will not approve extractive industries that... are situated within 500m of the nearest house"	The submitter's comment that "there are no valid reasons provided in the Application to support any decision by the Shire" is not agreed for the reasons set out in the Town Planning Report.	As specified previously the nearest residence (45m) is occupied by the landowner and it has granted consent from this proposal. In addition to this, should Council grant its approval the use would be bound by relevant noise and dust management plans which would make conditions approval.

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	Even if the meaning of "extractive industries" were limited to the excavation pits, there is one house, which is acknowledged by the Application, located 450m from the proposed excavation pits. Further, we submit that in the context of approving a planning approval for which noise and dust emissions are relevant, the reference to "extractive industries" applies to all development required to allow the extractive industry use of land, especially those developments that contribute to noise and dust emissions. This includes the stockpile and the length of the unsealed haul road. Applying this definition, the closest house is located approximately 250m from the first stretch of the proposed unsealed haul road. This house is located to the west of Toy Road near the point at which Toy Road turns east. Although the Shire's policies cannot fetter the exercise of its discretion, The Shire is bound to take its policies into account in making decisions and would need a very strong justification to support any decision to approve the Application in the face of a clear policy statement that it will not approve such an application. 3.3.2 SPP 2.4- Basic Raw Materials The Shire must also take into account SPP 2.4 in determining the Application. Most of the identified relevant considerations are consistent with the other relevant considerations under TPP 6 and the LPPs. However, we specifically draw the Shire's attention to the following. The Shire should consider: • The effect of vehicular traffic, noise, dust and vibration on the amenity of the surrounding area having regard to existing and future uses; and • The availability and suitability of road access. We submit that the Application doesn't address or attempt to manage the effect of vehicular traffic on the amenity of the surrounding area, particularly for the residents of Toy Road. The Application does not address the impacts on amenity of adding 120 heavy haulage vehicles per day to a quiet local access road. Further, SPP 2.4 states that applications should demonstrate that sensitive land uses (residences) within 1000m of the proposal will not be adversely affected by the extractive industry operations. As outlined above, we submit that the proposal includes all development proposed for the extractive industry land use, including bunds, dams, stockpiles, and the haul road. The Application does not demonstrate (or even address) that the 10 residences within 1000m of the proposal will not be affected by: • Noise, dust and visual amenity associated with the construction of an earth bund of approximately 1km in length and up to 7.5m high; • Noise, dust and visual amenity during the period (which may extend for the	The proposed development has been assessed in relation to the WAPC's (SPP 2.4 see Section 4.5.2 of the Town Planning Report.). In relation to the submitter's comment that the "Application does not address or attempt to manage the effect of vehicle traffic on the amenity of the surrounding area, particularly for the residents of Toy Road" is not agreed. A Traffic Assessment has been undertaken which demonstrated that the proposed access arrangements are acceptable having regard to matters such as road design capacity and safety. The excavation activities will be conducted for only 25 days a year. The increase in vehicle movements for these 25 days is acceptable having regard to the findings of the Traffic Assessment. The submitter's comment that the "Application does not demonstrate (or even address) that the 10 residences within 1,000m of the proposal will not be affected by noise, dust and visual amenity..." is incorrect. The Applicant has prepared Noise and Dust Management Plans and has undertaken a visual amenity assessment. These documents outline measures proposed by the Applicant to ensure minimum disturbance to residents in proximity to the site.	Noted. SPP2.4 has been considered as part of this application.

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	entire 10 year term of the planning approval) before vegetation is sufficiently established to provide an adequate screen; • Noise, dust and visual amenity associated with approximately 1 km of unsealed haul road, for which no additional screening by vegetation is proposed. 3.3.3 Relationship Between LPP10 and Local Law The Local Law prescribes the licensing requirements for extractive industry within the Shire once planning approval of the use of land for extractive industry purposes has been granted. Clause 6.1 of the Local Law provides that, subject to any licence conditions imposed by the Shire, a person must not excavate within 500m of any adjoining residence unless approved by Council and adjoining neighbours in writing. Unlike LPPs, which guide the Shire's decision making processes, Local Laws are subsidiary legislation and compliance with their provisions is not discretionary. Therefore, despite the location of a residence within 500m of the Proposal and provided the Shire exercises its discretion properly, the Shire has discretion to: • approve the Application (for planning approval); • grant an extractive industry licence; • grant its approval for the purposes of clause 6.1 (e) of the Local Law. However, a person is still prohibited from excavating within 500m of and adjoining residence unless the written approval of adjoining neighbours is also obtained. We are aware that the owner of the relevant adjoining residence has already objected to the approval of the Application. 3.4 COMPATIBILITY, AMENITY AND IMPACT ON COMMUNITY AS A WHOLE Other relevant matters for consideration of the Shire in determining the Application are: • the compatibility of the development with its setting including the relationship of the development to development on adjoining land or on other land in the locality including, but not limited to, the likely effect of the height, bulk, scale, orientation and appearance of the development; • the amenity of the locality including the following Environmental impacts of the development; o the character of the locality; o the social impacts of the development. We strongly submit that extractive industry of the scale and at the proposed location outlined in the Proposal is manifestly incompatible with the rural character of the adjoining small landholdings. The footprint of the Proposal is greater than our entire property and most of the other properties in the area. The Proposal is located on a steep gradient in an elevated location and, as such, will affect the visual amenity of the locality. As a result of the	Please refer to previous comments made above in respect to the Shire's Local Law for Extractive Industries. The 500 metre limitation was discussed with Mr. Brendan Jeans, Senior Planning Officer at the Shire of Chittering, on 10 July 2015. Mr. Jeans advised that, notwithstanding the language used in the Clause, the Shire does have discretion to approve an application for extractive industry which is located within 500m setback requirements provided that the appropriate dust and noise mitigation methods are proposed. In respect to the compatibility of the use with its setting and relationship with adjoining land it is considered that the proposal is acceptable. The amenity concerns are addressed within the Application for Planning Approval made and within this response to submissions. Therefore, it is the Applicant's view that amenity will not be substantially compromised by the proposed development. It should be noted in respect to the scale of the proposed, the excavation is to occur in stages and thus minimises the "footprint" on the landscape. As detailed earlier within this response to submissions screen landscaping is proposed to reduce visual impact on the locality. In respect to vehicular movements the excavation activities will be conducted for only 25 days a year. The increase in vehicle movements for these 25 days is acceptable having regard to the findings of the Traffic Assessment.	Noted. The occupier of the dwelling located 450m away from the pit is the landowner and has granted its consent to the pit. Noted. It is acknowledged there will be some impact from the proposed Extractive Industry. However it is considered the application adequately addresses most of these concerns. The concerns for Toy Road users are acknowledged. The applicant has provided a traffic impact assessment which confirms there is minimal safety or road impact from this proposal. In addition to this, should Council grant approval it would be subject to a condition requiring a road contribution.

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	location, the Application proposes to manage visual amenity (and dust and noise emissions) by constructing massive earth bunds which will, of themselves, despoil the natural landforms that contribute to the character of the locality. However, one of the primary threats to the amenity of the area arises through the proposed route for heavy haulage vehicles along Toy Road. The consistent size of properties and agricultural/horticultural pursuits of the landowners have created a small community around Toy Road and environs. The character of this community and the tourists and visitors it attracts would be completely destroyed were it to be dissected by a stream of heavy haulage vehicles. The TPS 6 also outlines as a relevant consideration the impact of the development on the community as whole notwithstanding the impact of the development on particular individuals. We acknowledge that the Proposal, if implemented, will have greater impact on the owners and occupiers of adjacent properties and those properties with access and egress limited to Toy Road. However, we submit it will also have detrimental impacts on the broader Bindoon community without any commensurate community benefits. The broader Bindoon community will be significantly affected by the movement through the Bindoon townsite of an additional 120 heavy haulage vehicles each day during campaigns by the applicant. However, as the extracted materials will not be processed or used within the Shire, we cannot see real benefit to the local community of the Proposal. 3.5 EFFECT ON ENVIRONMENT We submit that the Shire cannot adequately assess the likely effect of the Proposal on the natural environment or water resources because the applicant has not substantiated its opinions on environmental impacts with studies, assessments or analysis. Despite the concerns raised by Chittering Landcare and others over the years, the Application states that acid sulphate soils are not a risk at the proposed site without conducting any studies. A consultant merely visited the site on occasion. Despite the location of the Proposal between native vegetation to the north and the Brockman River and wetland to the south no fauna and flora surveys were conducted and the Application is unclear about the nature of mature tress it proposes to remove. The Application completely disregards any impacts it may have on the Brockman River and wetlands. The hydrological report supporting the Application was based on testing done 10 years ago. We submit that proper studies should be done to confirm that the diversion of water into large dams constructed in the proposed location will not detrimentally affect recharge of the Brockman River and groundwater. The Application does not propose to seal the haul road in the vicinity of the	The excavation activities will be conducted for only 25 days a year. The increase in vehicle movements for these 25 days is acceptable having regard to the findings of the Traffic Assessment. The submission does not detail how the traffic movement will have a detrimental impact on the Bindoon Community. These matters were addressed in response to other submitter comments above, in relation to acid sulphate soils, flora and fauna, and the hydro geological report. As previously stated, and documented in the Excavation and Management Plan, there will be no impact on wetlands, the Brockman River or groundwater.	It is acknowledged that this proposal would impact residences of Toy Road during operations, However it is concerned that there will not be a 'Greater' impact from this proposal on the larger Bindoon Community. As mentioned above, all relevant Environmental Agencies were contacted regarding this proposal. In addition to this a S38 referral was submitted to the Environmental Protection Authority on behalf of the community. The S38 response did not return with any environmental concerns from this proposal.

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	Brockman River and wetlands. Further, although the Proposal requires the applicant to construct a causeway over the Brockman River and wetlands for heavy haulage vehicle access, there is no mention of any discussions with the Department of Water to confirm whether its proposal is likely to be acceptable or require a bed and banks permit under the Rights in Water and Irrigation Act 1914 (WA).		
	3.6 ADEQUACY OF ACCESS AND EGRESS A further relevant consideration that the Shire must address is the adequacy of the proposed means of access to and egress from the site. The applicant's chosen access route requires it to build a causeway over the Brockman River and wetlands. The access point lies within about 75m of a blind bend in Toy Road. We also re-state our continuing concerns about the use of Toy Road as access and egress for heavy haulage vehicles from the perspective of noise and visual amenity, degradation of the location environment and safety. We submit that the Application does not establish adequate means of access and egress to the proposed site without addressing the impacts of each of the matters outlined above and assessing options for direct access onto Great Northern Highway.	The issue of access to the site is addressed previously in this response to submissions.	As per previous comments Toy Road is the only possible access to this site.
	3.7 TRAFFIC The Shire must consider the amount of traffic likely to be generated by the Proposal, particularly in relation to the capacity of the road system in the locality and the probable effect on traffic flow and safety. The Application and the Traffic Statement supporting the Application are completely deficient in addressing these matters.	The Traffic Statement quantifies the traffic expected to be generated by the carting of clay and relates this to the capacity of the road network.	Noted. It is acknowledged that there would be an increased impact from the heavy vehicle usage of Toy Road should this application be approved. However, the traffic impact assessment details that Toy Road is acceptable to be used for this purpose. In addition to this a number of conditions pertaining to road maintenance and management of truck movement impact have been recommended to Council to help mitigate impacts on local and surrounding users.
	Further, none of the concerns we previously raised in our letter dated 14 July 2014 recording the outcomes of the only communication we have had with the applicant have been addressed. We submit that the Shire cannot rely on the information provided in the Application to consider the capacity of the road system in the locality, effects on traffic flow or safety.	See comments above.	
	The Traffic Statement incorrectly states that "as Toy Road is not a designated RAV route, application will need to be made to the Shire of Chittering in order to have the route designated based on the type of vehicle proposed to be used." In fact, Restricted Access Vehicle (RAV) routes are designated after assessment by Main Roads and gazetted. The endorsement of the Shire would be required.	Normal proactive is for the asset owner (the Shire) to request MRWA to undertake the assessment. The Shire can condition approval to cover the use of RAVs.	
	As Main Roads' guidelines for assessment of Standard Restricted Vehicle Access Routes are readily available, the Shire could reasonably expect some discussion in the Application about whether Toy Road meets those guidelines before it is asked to grant approval for the Application, which cannot proceed unless Toy Road is designated for use of RAVs.	RAV assessments are not typically carried out as part of the Traffic Statements. The Traffic Statement clearly identifies that Toy Road would need to be assessed and inherent in that assessment. The Shire can condition approval to cover the use of RAVs.	
	The Traffic Statement concludes that given the short haul distance, the limited amount of traffic using Toy Road and the width of the current seal,	The conclusion is an opinion based on experience and personal assessment. It does not suggest that the decision is an opinion based on	

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	the use by RAVs over 25 days per year is acceptable. Most of these factors are irrelevant to the designation of a road for RAV use and we query whether it is based on accurate information. For example, we measure the width of Toy Road to be 7m, not 7.5m as suggested	experience and personal assessment. It does not suggest that the decision regarding the use of RAVs on Toy Road should be made on the basis of opinion. It is clearly indicated that an assessment by MRWA will be required. That assessment is independent and carried out by the approving authority and as such is unlikely to be influence by an opinion voice in the Traffic Statement.	
	3.7.1 Volume of Traffic and Traffic Flow It is not possible to assess the volume of traffic probable effects on traffic flow based on the information in the Application. The Application states that the Proposal requires operations for 11 hours per day from Monday to Saturday, transportation will only occur between 25 and 30 days per year and the operations will generate 10 laden trucks per hour, with 120 vehicle movements per day. The Application does not indicate the likely flow of heavy haulage vehicles in any day during operations or explain how the applicant will load 10 heavy haulage vehicles per hour using the limited equipment it claims will be on site. The applicant's claim that it will only transport between 25 and 30 days per year is inconsistent with its statement that it requires a continuous supply of clay throughout the year and to achieve this both excavation and loading will occur during the drier months and transportation loaded from the stockpile will occur during the wetter months when excavation is more difficult. It is also inconsistent with the upper limits of its proposed resource extraction of 100,000 tonnes per year using 50 tonne loads, through two 25 tonne load truck and trailer combinations. Further, the Transport Statement was based on transportation occurring on 25 days only and predicts increase in traffic to be in the order of 12 movements per hour (6 laden heavy haulage vehicles), which is inconsistent with the truck movements stated in the Application.	Traffic flow is based on the following: 75,000 tonnes per year over 25 days = 3,000 tonnes per day. Using 50 tonne trucks this equates to 60 trips per day; that is 60 movements to the site and 60 movements from the site. On an 11 hour day this equates to between 5 and 6 movements each way every hour. It is assumed that the applicant will have appropriate plant onsite to facilitate the loading of trucks. 75,000 is the expected rate of extraction and cartage per year.	Noted.
	3.7.2 Safety Despite the applicant knowing that road safety is a significant concern of the local residents, the Application and Traffic Statement addresses safety of the proposed route in a cursory manner. As the Application did not include any relevant road accident data, we contacted Main Roads and attach that information in Annexure A. The Shire will note that it refers to the recent fatality on Bindoon - Moora Road between Toy Road and the Great Northern Highway. The Application does not address the current uses of roads within the proposed route, including the use of the route by the School Bus. The Shire previously constructed a bus stop in the road reserve of the Bindoon - Moora Road at the end of Toy Road for the School Bus (this stop is not currently in use). The Application does not address the limitations on residents of Toy Road safely accessing and egressing their properties if heavy haulage vehicles were	Safety is not treated in a cursory manner. Crash records were reviewed and indicated that for the 5 year period to December 2014, crash history was as below: - Toy Road - no reported crashes. - Toy Road - Bindoon Moora Road Intersection - no reported crashes. - Bindoon Moora Road (GNH to Toy Road) - 2 reported crashes. - Bindoon Moora Road - GNH Intersection - 1 reported crash. Both crashes on Bindoon Moora Road were single vehicle crashes involving southbound vehicles leaving the road. The crash history does not indicate an atypical pattern or suggest that the additional traffic would increase the risk to a level that was considered to be unacceptable. See comments above. Bindoon-Moora Road is configured with dedicated left turn and right turn lanes on the approach to Great Northern Highway, Great Northern Highway has dedicated left turn and right turn lanes into Bindoon-Moora	Noted. The applicant has supplied a report detailing that the proposed additional traffic can be safely incorporated into the existing road network. Whilst it is understood that local safety is a concern, the Shire considers the proposal has accurately addressed this for the purpose of this application.

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	introduced to Toy Road. Our crossovers from Toy Road are located on the decline of a small crest, which would limit line of sight as we leave our property. The Traffic Statement makes a number of errors, which are relevant to safe use of the proposed route. The statement that there is an auxiliary lane for vehicles turning right from Bindoon - Moora Rad into the Great Northern Highway is incorrect. Therefore, the conclusions made in the Traffic Statement about that intersection are manifestly incorrect. The lack of the auxiliary lane will increase the risk of accidents. Further the Bindoon - Moora Road includes a steep incline approaching the Great Northern Highway and a blind bend approaching the bridge across the Brockman River approximately 150m from the Great Northern Highway, which are likely to contribute to increased accident risk and are not adequately addressed by the Traffic Statement.	Road.	
Resident 9	I have been a resident in Bindoon for fifty three years, the last thirty three years being the owner of property on Toy Road. My husband (deceased) and I operated the property as a citrus orchard as well as living there in our retirement. Our property is on the hill directly opposite and facing the property in question. The valley is peaceful with only the river and its native wild-life providing serenity along with a view of this beautiful valley. There is no through traffic (only residential traffic), commercial enterprise or highway noise. The running of this type of industry will create noise and dust problems as well as being a visible eyesore. We solely survive on the ground water which is pumped from the bore on the river plain. The water quality will be drastically affected by this industry. This is a very significant reason for the objection of the use of this land for this proposal and request and demand that the Shire of Chittering does not approve this industrial activity. The whole environment in this region will be significantly impacted upon. As well as the effect of this industry on the way of and standard of life in Toy Road and surrounding areas there will be a detrimental impact on the real estate values of adjoining properties.	Water will not be impacted outside Lot 7 or at the Brockman River. Hydro geological principles determine that groundwater will not flow under the Brockman River and there can be no impacts to water on this property which appears to be located south of the Brockman River. As outlined in the documentation and above, the proposal has been designed to comply with all Government Guidelines and to minimise local and wider impacts. Noise and dust problems have been previously addressed with this response to submissions. The effect of the proposal on real estate values is not a valid planning consideration.	Your concerns are noted and were considerations made by the Officer during the assessment of this application. It has been confirmed by a number of specialist authorities that the local water supply will not be detrimentally impacted by this proposal. Dust would be managed in accordance with the dust management plan which would make part of the approval. Property value does not make part of planning consideration.
Resident 10	4 years ago we applied for a building permit to build our home on this property but were refused permission, as our chosen site was too close to the gravel pit at 7 Toy Road. We had already outlaid a considerable amount of money for architectural plans. During the following years we have endured endless amounts of dust and noise as the gravel pit has been allowed to extend. The conditions under which this gravel pit was to operate have never been enforced properly and we have been the ones to raise the issues that affect us and others time and time again. We now find out there is an application to establish clay pit which is less than 700 metres from our property. How could all this be allowed to happen in a very beautiful and picturesque part of our state? This proposed clay pit site will create noise, dust and be blight on the attractive landscape as we look West from our property. Water run-off from the site will contaminate the nearby Ginniby Lakes and have effect on the flora and fauna in and around the area. Toy Road is not a suitable road for continuous movement of trucks with the	The matter of enforcement in respect to the operation of the gravel pit lies with the Shire of Chittering. The operation of the gravel pit and compliance with conditions of Planning Approval is a separate matter to this proposal. It is understood that the gravel pit has been in operation since the year 2000, before the Building Permit to construct a house was lodged. The matters of buffers, visual amenity, water quality, noise and dust are addressed in the Application for Planning Approval and throughout the response to these submissions. Property values are not a relevant planning consideration.	Noted. Should you have concerns regarding the operating gravel industry please contact the shire separately to this process as this application is for the Clay pit only. Whilst it is understood the pit will impact the surrounding properties whilst operating, it is considered the management plans adequately address the possible risks identified in your submission.

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	added factors of noise and dust for the nearby landowners. Our idyllic retirement property will be affected by both a gravel pit and now the added intrusion of a clay pit with machinery noise, truck movement and dust. It is fast becoming what you could call an ugly industrial site. With a gravel pit already on our doorstep and now the proposed introduction of a clay pit in the area it will greatly devalue our property and those around us.		
Resident 11	We purchased the property 25 years ago as a quiet and peaceful rural escape to raise our family in a country lifestyle. Over the years we developed a thriving horticultural business growing citrus, stone fruit, both wine and dried grapes along with a rural tourist attraction mainly with inbound visitors from Southern Asia. Our location is to the southern side of the proposed extractive industry falling well inside the 1000 metre separation boundary. Our home is in an elevated position approximately 25 meters above the valley floor and the Brockman River giving unimpeded viewing above the tree tops to the proposed extractive site which no amount of bunding will ever screen. Our property has been developed and maintained in pristine condition to enhance its sale value if we have to move on in retirement. Verbal estimates from realtors have indicated that any such industry in such close proximity could decrease the property value by up to $200,000 and severely limit the number of prospective purchasers. The other factors that are of concern regarding this proposed extractive industry are; - Increased dust. We already have a fine dust problem from the approved gravel extraction areas on the North Eastern end of Lot 7 approximately is 2 to 2.5 km away from our home. This proposal is only 800metres from our property. - Increased traffic. Toy road is a no through road and has a very steep and sharp hill approaching from the Bindoon Moora Road. To even contemplate approval for 60 or possibly 120 road train (100 tonne) movements a day (section 3.3 & 3.4 on the planning application) would be unwise. Council already has a no road train movement restrictions on other local roads (Wells Glover Road for example). - Increased noise. Because of the valley location of this site noise travels along the valley in clarity. The noise from the vehicle safety warning beepers & engine noise will be clearly audible. An existing example is when council has their road maintenance crew on patrol all movements from the grader, water cart and vehicles are heard. This noise level will be most disturbing from operation within the pit and stockpile as will the fully laden trucks carting 100 tonne of product climbing the Toy Road hill and then have to reduce speed for the entry onto the Bindoon Moora Road. - Water pollution. All property owners in proximity to this proposal rely on groundwater for their business or home use. The big question is whether this proposal will cause any reduction of available water or increased water contamination. Either would be disastrous. The Brockman River flows at the	Matters of a financial nature are not relevant to the assessment of the planning merits of the Application. The matter of dust generated from the gravel extraction area cannot be addressed as part of this Application for Planning Approval. The matter of dust is addressed in the Application for Planning Approval and through this response to submissions. Matters relating to trafficked are addressed within the application for planning approval and in this response to submissions. The matter of noise and water quality has been addressed in the Application for Planning Approval, and this response to submissions.	Noted. Possible devaluation of property is not a valid concern in accordance with Section 10.2 TPS6. Your concerns are noted. Please refer to previous officers comments regarding to Dust and Noise. Noted. Should this application be approved it would be required to adhere to the Noise Regulations and Noise Management Plan submitted as part of this application. The application details that there will be no adverse impact on the watercourse, the applicant is bound by its application which forms part of the approval, and should this application be approved.

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Submitter	**Comment**	**Proponent Response**	**Shire Officer Response**
	bottom of the site and any rupture or seepage of the sediment dams would greatly affect this waterway. We object totally for any approval of this application on all our mentioned concerns. We invite council or any councillors the opportunity to visit our residence and the location to inspect firsthand how this proposal just does not fit in this peaceful rural environment.		
Resident 12	We will be moving to Bindoon by the end of this year. We have built our dream house and were attracted to Bindoon by the beautiful countryside, rural aspects and decided it was a perfect place to bring up our 18 month old son - in a friendly, safe, rural community. We have read about Lot 7 Toy Road and the proposed Clay Pit and are shocked that such a proposal could even be considered. The application, which has no consideration for any aspect of the local community, indicates there will be 120 truck movements per day going along Gt Northern Highway through Bindoon. How outrageous! This will increase dramatically the danger to children and others crossing Gt Northern Highway, Bindoon. It was bad enough on Show Day to see the elderly and families with young children trying to cross the Highway with the enormous trucks driving through. The road is bad enough; this will only make it worse! We are 100% objecting to such a proposal!.	The submission is noted. Matters relating to traffic are addressed in this application for planning approval and this response to submissions.	Noted. The Traffic Impact Assessment confirms that the proposal will not create safety issues. Unfortunately as the Shire has a national highway through the middle of it, it is a rural area there will always be trucks.
Resident 13	As our property is adjacent to 7 Toy Road, and the proposal also shows how close to our boundary the extraction will be, I must say the my wife and I are totally and utterly 100% opposed to this development. The reasons are many fold, but to summarise: this is a rural area with small farms and small holdings where people currently enjoy a quiet and peaceful lifestyle. This would disappear along with the value of our property overnight should the proposed development as outlined go ahead.	The matters of amenity have been addressed in the Application for Planning Approval and this response to submissions. It is considered that mitigation measures proposed will ameliorate potential.	Noted.
Resident 14	The digital certificate of title is Volume 2230 Folio 363. Unfortunately, the new digital titles system does not show the full description of ownership for mineral titles. It is therefore necessary to go back to the pre digital Certificate of Title. For your convenience, I attach a copy of the original certificate of title that issued to our late mother being Certificate of Title Volume 445 Folio 15A. A copy of this title is still held at Landgate. You will note that the interest in land is described as the proprietor of one undivided half share of an estate in fee simple [subject to…] in all minerals [other than mineral oil ... and save an except gold, silver and other precious metals reserved to the Crown] in all that piece of land coloured yellow on the map hereon containing eight hundred and thirty six acres two roods and eighteen perches or thereabouts. etc. (my underlining) Mr Jonathon James Dwyer claimed that our title in the minerals had been extinguished by adverse possession. That claim failed. See Payne v Dwyer 46 WAR 128. I attach a publically available summery of the case by Cassandra Hay of Gilbert + Tolin for Council's convenience. The pre-existing interest in the land as described in the paragraph above has not changed.		The issues surrounding landownership have been investigated extensively; in addition to the applicant providing legal advice (attached to the report) the Shire of Chittering also obtained separate legal advice regarding this. The advice received stipulates that whilst you have an estate in retain mines & minerals this is a hereditament and does not result you in being an 'owner' for the purpose of the Planning and Development Act 2005. further clarification and comment regarding this can be found in the Officers Comments section of the report.

Agency Submissions			
Submitter	**Comment**	**Proponent Response**	**Shire Officer Response**
	As previously advised, I am of the view that any decision to grant approval of an Application for Development outside of the Shire's powers conferred by law (in this case the Regulations) would make that decision invalid.		

*Note: Comments are as per original submission received by the Shire. Submission comments have not been edited unless for the purposes of confidentiality where necessary.

ROWEGROUP

Perth Office
L3, 369 Newcastle Street
Northbridge 6003
Western Australia

p: +618 9221 1991
f: +618 9221 1919
info@rowegroup.com.au
rowegroup.com.au

Job Ref: 8330
23 June 2016

Chief Executive Officer
Shire Chittering
PO Box 70
BINDOON WA 6502

Attention: Ms Bronwyn Southee: Executive Manager Development Services

Dear Ms Southee

Further Submission Amenity Considerations
Extractive Industry: Lot 7 Toy Road Bindoon

Thank you for the opportunity to provide a further submission on matter of amenity in respect to the above-mentioned proposal.

It is understood that there are specific amenity concerns arising from vehicular movements associated with the carting of clay resource from the subject site.

In respect to truck movements associated with the proposal we note the following:

- Carting of materials is likely to occur over a period of 25 days per year.
- The carting period of 25 days per year will not be for a period of successive days. Carting will be intermittent.
- Carting of materials will not occur on Sunday's or public holidays.
- Carting to Bindoon-Moora Road on Toy Road will be for only a distance of approximately 850 metres.

It is proposed to cart of materials from the site over a period of 25 days, which equates to a period of less than one month per year. This limitation on carting reduces the potential impact of carting on the amenity of the locality. In addition, it is further noted that the actual extraction of the resource is also not a continuous operation rather it is undertaken over a period of two to four months per year.

ROWEGROUP

To further assist in address concerns regarding cartage of materials ''offsite'' a Transportation Noise Assessment has been prepared and is provided in Attachment 1.

The Noise Assessment uses State Planning Policy 5.4 Road and Rail Transport and Freight Consideration in Land Use Planning as a guide to noise levels. SPP5.4 is used as address transport noise from major transport corridors including primary freight routes. SPP5.4 does is not intended to specifically apply to the proposal however the provisions of the policy are utilised as a guide to noise generation and potential impact on sensitive uses, in this instance residential dwellings in proximity to Toy Road.

The Noise Assessment concludes that noise impacts are unlikely to be significant.

Having regard to the Noise Assessment it is concluded that whilst noise will be generated from cartage movements the noise is within acceptable levels as set out within SPP5.4. Moreover, such noise will only be experienced for a limited intermittent period throughout the year as already detailed within this advice.

It is accepted in a rural environmental that the extraction of basic raw materials is a possible land use outcome. In this regard, it is noted that the subject site has been identified since at least 2002 as a basic raw material extraction site and more recently in 2012 as part of the review of the Shire's Local Planning Strategy. Given this, there is an expectation that resources will be extracted from the subject site.

Amenity matters such as dust, noise and visual amenity have been addressed in detail within the Application for Planning Approval, and response to submissions. Moreover, the Environmental Protection Authority (EPA) have reviewed the proposal and consider that the overall environmental impact of the proposal is not so significant as to require assessment by the EPA and setting of formal conditions. It is further noted that no appeals to the EPA's decision to ''not assess'' the proposal were made.

The EPA specifically considered the matter of amenity. This included a review of noise, dust and visual considerations. The EPA concluded that:

... the EPA considers that the proposal can meet the EPA's objectives for Amenity and that the likely environmental effects of the proposal are not so significant as to warrant further formal assessment...

Having regard to above, and advice previously provided, it is considered that the proposal is acceptable from an amenity perspective.

We trust this advice is of further assistance.

ROWEGROUP

Should you require any further information or clarification in relation to this matter, please contact Aaron Lohman on [redacted].

Yours faithfully,

[redacted]

Aaron Lohman
Rowe Group

CC: Client

ROWEGROUP

Attachment One

Transport Acoustic Assessment

Lloyd George Acoustics
PO Box 717
Hillarys WA 6923
T: 9300 4188 F:9300 4199
E: daniel@lgacoustics.com.au W: www.lgacoustics.com.au

Transportation Noise Assessment

Truck Movements Associated with the Proposed Clay Extraction Pit Lot 7, Toy Road, Bindoon

Reference: 14052815-01D

Prepared for:
BGC Brikmakers

Report: 14052815-01D

Lloyd George Acoustics Pty Ltd

ABN: 79 125 812 544

PO Box 717
Hillarys WA 6923

T: 9300 4188 / 9401 7770
F: 9300 4199

Contacts	Daniel Lloyd	Terry George	Matt Moyle	Olivier Mallié
E:	daniel@lgacoustics.com.au	terry@lgacoustics.com.au	matt@lgacoustics.com.au	olivier@lgacoustics.com.au
M:	0439 032 844	0400 414 197	0412 611 330	0439 987 455

Prepared By:	Daniel Lloyd [redacted]
Position:	Project Director
Verified	Terry George [redacted]
Date:	24 June 2016

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Appendices

1 INTRODUCTION

Lloyd George Acoustics was commissioned by BGC Brikmakers to assess the noise impact associated with additional truck movements on Toy Road as they travel to and from a proposed clay extraction pit to be located on part of Lot 7 on Pan 7148, Toy Road, Bindoon, WA 6502 (the Site). The closest noise sensitive receivers to Toy Road are shown in *Figure 1-1*.

Figure 1-1 Project Locality and Sensitive Receivers

Potential traffic flows from the Site were calculated based on the extraction rate and cartage details as advised by BGC Brikmakers. This information, contained within the Traffic Impact Assessment prepared by Shawmac Consultants (*Transport Statement, Lot 7 Toy Road Bindoon 25 July 2015*), is summarised below:

- Annual extraction - approx. 75,000 tonnes;
- Transport Metrics - 50 tonne loads out (i.e. two 25 tonne trailer combo);
- Number of days operating - approx. 25 days a year;

The above equates to about 60 trips per day or 120 vehicle movements.

2 CRITERIA

In assessing the impact to noise sensitive receivers from vehicles on public roads, the relevant criteria is contained within the *State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning* (hereafter referred to as the Policy) produced by the Western Australian Planning Commission (WAPC). This policy is used extensively in Western Australia for the assessment of noise from transport corridors.

The objectives in the Policy are to:

- Protect people from unreasonable levels of transport noise by establishing a standardised set of criteria to be used in the assessment of proposals;
- Protect major transport corridors and freight operations from incompatible urban encroachment;
- Encourage best practice design and construction standards for new development proposals and new or redevelopment transport infrastructure proposals;
- Facilitate the development and operation of an efficient freight network; and
- Facilitate the strategic co-location of freight handling facilities.

The Policy's outdoor noise criteria are shown below in *Table 2-1*. These criteria apply at ground floor level of a noise sensitive premises, 1-metre from a habitable facade. These outdoor noise criteria where developed to ensure an acceptable internal noise level assuming typical house facades.

Table 2-1 Outdoor Noise Criteria

Period	Target	Limit
Day (6am to 10pm)	55 dB $L_{Aeq(Day)}$	60 dB $L_{Aeq(Day)}$
Night (10pm to 6am)	50 dB $L_{Aeq(Night)}$	55 dB $L_{Aeq(Night)}$

Note: The 5 dB difference between the target and limit is referred to as the margin.

While the application of these noise criteria are developed for new or modified infrastructure projects and not specifically relevant to increases in traffic volumes, they do provide a basis in which noise impacts from transportation noise sources can be assessed.

3 METHODOLOGY

Computer modelling has been used to predict the noise levels from vehicles on Toy Road and Bindoon-Moora Road. The software used was *SoundPLAN 7.4* incorporating the *Calculation of Road Traffic Noise* (CoRTN) algorithms, modified to reflect Australian conditions. The modifications include an adjustment of –1.7 dB based on the findings of *An Evaluation of the U.K. DoE Traffic Noise Prediction*; Australian Road Research Board, Report 122 ARRB – NAASRA Planning Group 1982.

The CoRTN algorithms are used extensively in Western Australia to predict the noise from road traffic and is the model specified by Main Roads Western Australia for their projects. In calculating the traffic noise at a particular location, the CoRTN algorithms take into consideration the vehicle

speed, the percentage of heavy vehicles (Austroads Class 3 or greater – See *Appendix A*), the type of road surface, gradient in the road (uphill or downhill), barrier effects from either changes in ground levels or barriers and the type of ground between the road and the receiver (whether hard or soft).

Predictions are made at heights of 1.4 metres above ground floor level and at 1.0 metre from an assumed building façade. This is the standard location used by Main Roads Western Australia.

Various input data are included in the modelling and are discussed below.

- Topographical data was based on that contained within *Google Earth*. This is commonly used when survey data is not readily available. The topographical data is used to calculate the road gradients and whether there are hills or valleys between the road and the receiver. Where vehicles travel uphill the model assumes an increase in traffic noise levels. The amount of variation in the noise level depends on the road gradient.

- The ground type between the road and the receiver is assumed to be grass (acoustically soft), which is typical for rural environments.

- The road surface is assumed to be 14mm chip seal. This road surface is typical for rural roads and is the noisiest surface.

- The vehicle speed on Toy Road is assumed to be 60 km/h and on Bindoon-Moora Road 90 km/h. The model assumes that the higher the speed, the greater the noise emission. While it is expected the trucks on Toy Road would travel slower than this, especially when travelling loaded uphill and when approaching intersections, the posted speed is required to be used in the modelling. It has been found in a number of studies that the slower speeds at intersections (less noise) can be counteracted by the increases in noise from gear changing and acceleration, therefore a constant speed throughout the road length is required to be used.

- The existing traffic volumes are assumed to be 50 veh/day on Toy Road. This is considered to be a conservative approach as the Shawmac traffic impact assessment assumed the number of vehicles using Toy Road to be below 100 veh/day. By using a low traffic volume, the existing traffic noise is predicted to be lower and the change in noise level will be greater. The percentage of heavy vehicles on Toy Road is assumed to be 5%.

- The existing vehicle numbers on the Bindoon-Moora Road is 759 veh/day (based on the Shawmac report, which used Main Roads WA data) with a percentage of heavy vehicles assumed to be 15%.

- The additional vehicle numbers during times when the trucks are operating to and from the Site is assumed to be 120 veh/day. This consists of 60 vehicles into the site and 60 vehicles out of the site. As these additional vehicles are trucks, the percentage of heavy vehicles is set to 100%. It is assumed that the additional trucks on Bindoon-Moora Road are travelling from the Great Northern Highway to Toy Road.

4 RESULTS

The predicted external $L_{Aeq\ (Day)}$ noise levels assuming no trucks are operating from the site is shown in *Figure 4-1.* It can be seen that with existing traffic volumes, the noise from road traffic is relatively low with $L_{Aeq\ (Day)}$ values of 53 dB at location A, 44 dB at locations B and C and 33 dB at location D.

During the proposed trucking campaign, where 120 truck movements are expected, the noise levels are predicted to increase to $L_{Aeq\ (Day)}$ 54 dB at location A, $L_{Aeq\ (Day)}$ 48 dB at location B, $L_{Aeq\ (Day)}$ 45 dB at location C and $L_{Aeq\ (Day)}$ 44 dB at Location D. This is illustrated in *Figure 4-2*. As set out in the Application for Planning Approval, it is noted that such noise will be experienced over a 25 day cartage period per year.

Therefore, an increase of 1 dB is expected for location A, 4 dB at location B, 1 dB at location C and 11 dB for location D. Notwithstanding these increases, the predicted noise levels are below the Policy *target* criterion.

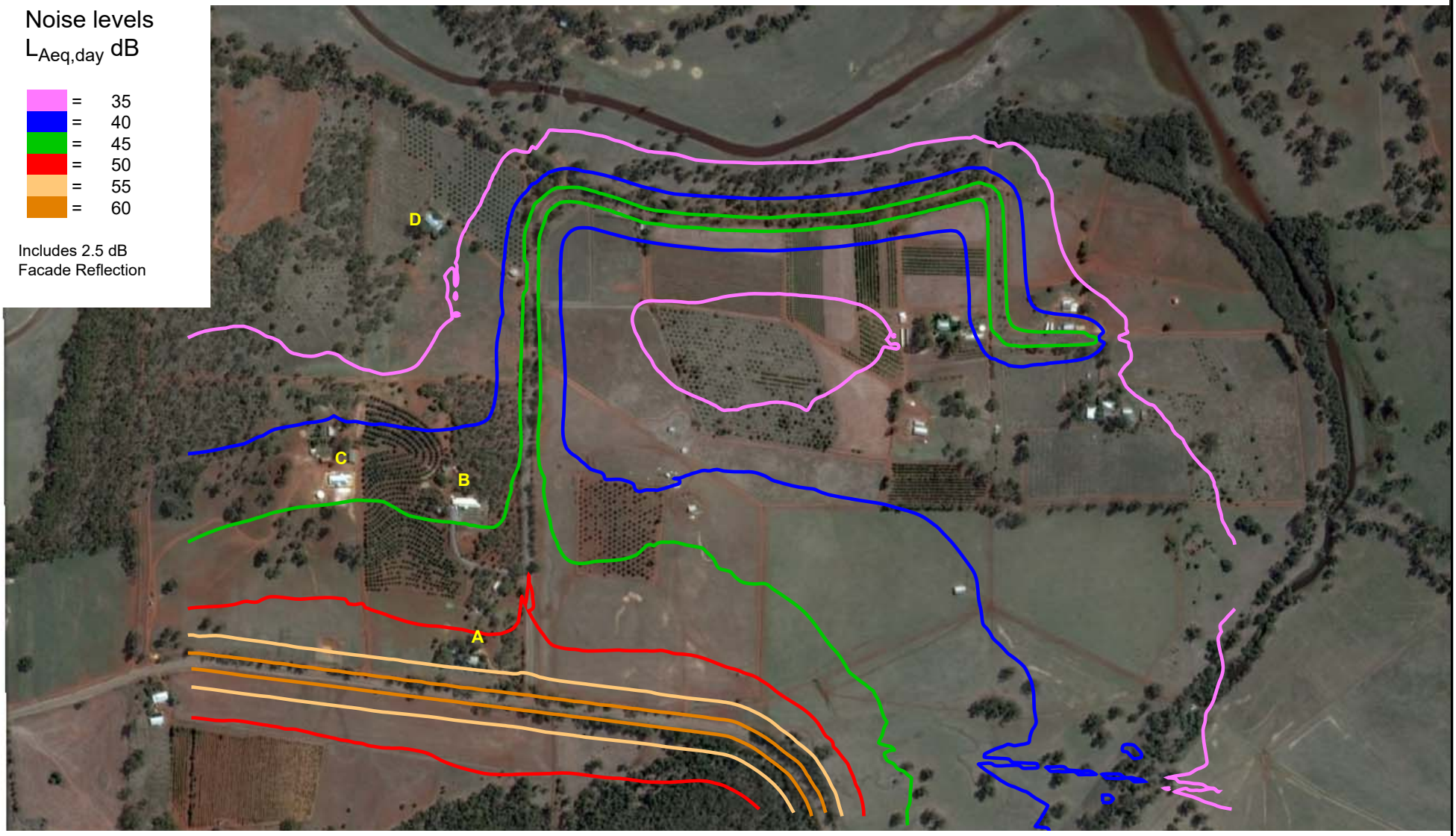
The noise impact from transportation noise can also be assessed using the maximum pass-by level. While it is more common to assess the noise from freight trains, particularly at night, using this method, it could be extended to truck noise. In calculating the maximum level, a truck having a sound power level of 113 dB(A) was used. This sound power level assumes a typical Kenworth truck travelling at 60 km/h. By comparison, this is twice as loud as a truck travelling at a speed of 20 km/h or less on flat ground.

The predicted pass-by noise level, which occurs for a very short period of time, from a typical truck passing while on Toy Road is L_{Amax} 66 dB at locations A and B, L_{Amax} 52 dB at location C and L_{Amax} 57 dB at location D. Existing truck pass-by levels from trucks on the Bindoon-Moora Road is predicted to be L_{Amax} 68 dB at location A and L_{Amax} 51 dB at locations B and C. Location D is unlikely to be affected by existing truck noise to any significant degree. A level of L_{Amax} 66 dB is similar to that of closing a car door.

Generally, a pass-by criterion of L_{Amax} 80 dB is considered acceptable, however, a criterion L_{Amax} 75 dB can be used for low-noise environments. It can be seen that the predicted pass-by levels at all locations from trucks on Toy Road are below these criteria.

Clay Extraction Pit - Lot 7 Toy Road, Bindoon
$L_{Aeq(Day)}$ Traffic Noise Levels - No Truck Movements

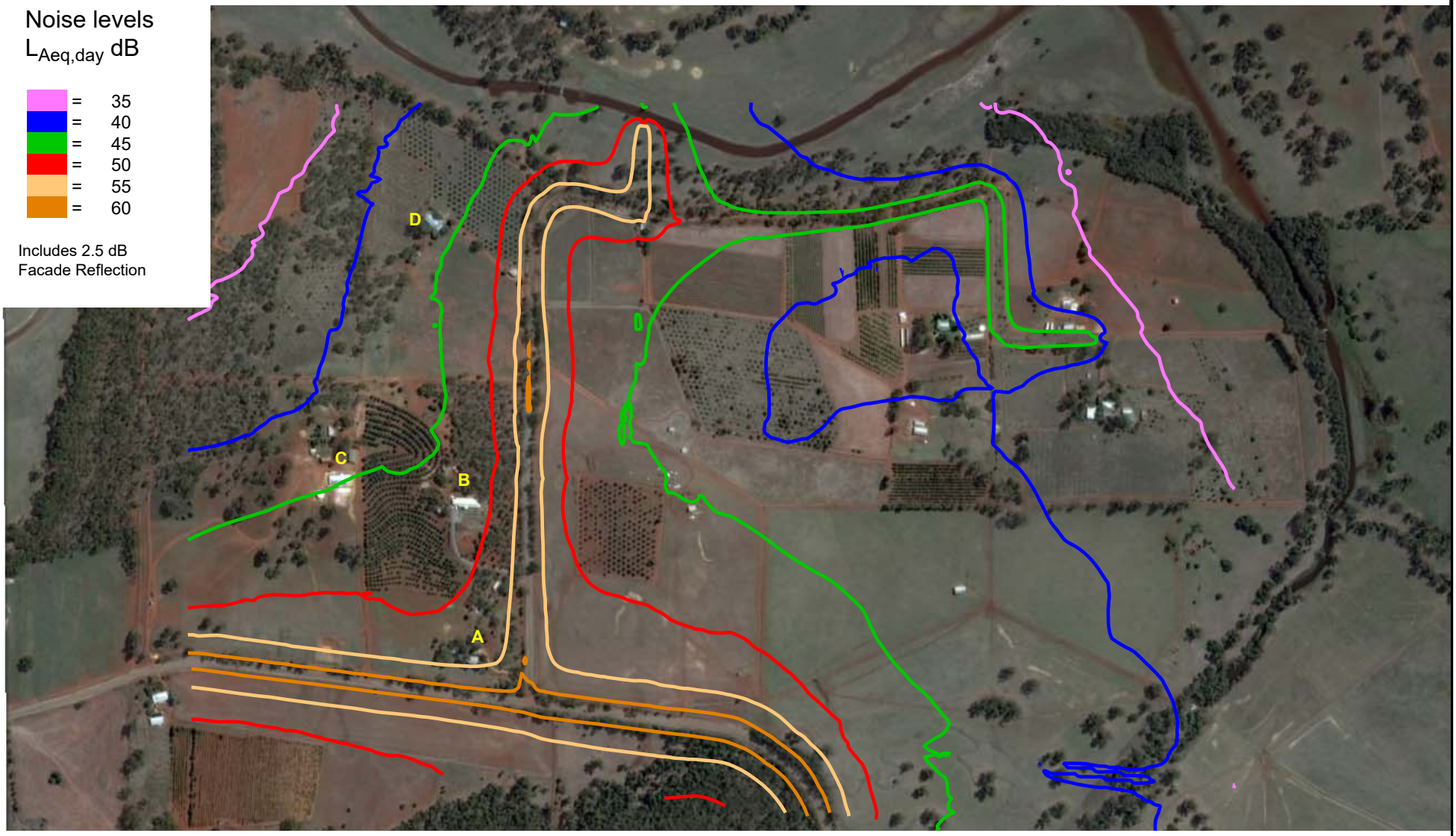
Figure 4-1



Lloyd George Acoustics
by Daniel Lloyd
daniel@lgacoustics.com.au
(08) 9300 4188

Clay Extraction Pit - Lot 7 Toy Road, Bindoon
$L_{Aeq(Day)}$ Traffic Noise Levels - With Truck Movements

Figure 4-2



Lloyd George Acoustics
by Daniel Lloyd
daniel@lgacoustics.com.au
(08) 9300 4188

5 DISCUSSION

The results of this assessment show that during times when trucks are carting materials from the Site, the associated external noise levels are significantly below the day period *Target* criterion contained within the *State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning* and below the maximum noise levels that are commonly used to assess noise impacts from transportation sources. Having regard to the calculated noise levels and that trucks will only be carting materials for 25 days a year, it is considered unlikely that truck movement will generate a significant noise impact.

Appendix A

Terminology

The following is an explanation of the terminology used throughout this report.

Decibel (dB)
The decibel is the unit that describes the sound pressure and sound power levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

A-Weighting
An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A dB.

Sound Power Level (L_w)
Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. This is similar to a 1kW electric heater always radiating 1kW of heat. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure levels at known distances. Noise modelling incorporates source sound power levels as part of the input data.

Sound Pressure Level (L_p)
The sound pressure level of a noise source is dependent upon its surroundings, being influenced by distance, ground absorption, topography, meteorological conditions etc and is what the human ear actually hears. Using the electric heater analogy above, the heat will vary depending upon where the heater is located, just as the sound pressure level will vary depending on the surroundings. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.

L_{ASlow}
This is the noise level in decibels, obtained using the A frequency weighting and the S time weighting as specified in AS1259.1-1990. Unless assessing modulation, all measurements use the slow time weighting characteristic.

L_{AFast}
This is the noise level in decibels, obtained using the A frequency weighting and the F time weighting as specified in AS1259.1-1990. This is used when assessing the presence of modulation only.

L_{APeak}
This is the maximum reading in decibels using the A frequency weighting and P time weighting AS1259.1-1990.

L_{Amax}
An L_{Amax} level is the maximum A-weighted noise level during a particular measurement.

L_{A1}
An L_{A1} level is the A-weighted noise level which is exceeded for one percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

L_{A10}
An L_{A10} level is the A-weighted noise level which is exceeded for 10 percent of the measurement period and is considered to represent the "*intrusive*" noise level.

L_{Aeq}
The equivalent steady state A-weighted sound level ("equal energy") in decibels which, in a specified time period, contains the same acoustic energy as the time-varying level during the same period. It is considered to represent the "average" noise level.

L_{A90}
An L_{A90} level is the A-weighted noise level which is exceeded for 90 percent of the measurement period and is considered to represent the "*background*" noise level.

One-Third-Octave Band
Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20 000 Hz inclusive.

L_{Amax} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded at any time.

L_{A1} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 1% of the representative assessment period.

L_{A10} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 10% of the representative assessment period.

Tonal Noise
A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is:

the presence in the noise emission of tonal characteristics where the difference between -

(a) the A-weighted sound pressure level in any one-third octave band; and

(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

This is relatively common in most noise sources.

Modulating Noise
A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is:

a variation in the emission of noise that —

(a) is more than 3 dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band;

(b) is present for at least 10% of the representative.

Impulsive Noise

An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness is:

a variation in the emission of a noise where the difference between $L_{A\ peak}$ and $L_{A\ Max\ slow}$ is more than 15 dB when determined for a single representative event;

Major Road

Is a road with an estimated average daily traffic count of more than 15,000 vehicles.

Secondary / Minor Road

Is a road with an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

Influencing Factor (IF)

$$= \frac{1}{10}(\%\ \text{Type A}_{100} + \%\ \text{Type A}_{450}) + \frac{1}{20}(\%\ \text{Type B}_{100} + \%\ \text{Type B}_{450})$$

where:

$\%\ \text{Type A}_{100}$ = the percentage of industrial land within a100m radius of the premises receiving the noise

$\%\ \text{TypeA}_{450}$ = the percentage of industrial land within a 450m radius of the premises receiving the noise

$\%\ \text{Type B}_{100}$ = the percentage of commercial land within a100m radius of the premises receiving the noise

$\%\ \text{TypeB}_{450}$ = the percentage of commercial land within a 450m radius of the premises receiving the noise

+ Traffic Factor (maximum of 6 dB)

= 2 for each secondary road within 100m

= 2 for each major road within 450m

= 6 for each major road within 100m

Representative Assessment Period

Means a period of time not less than 15 minutes, and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.

Background Noise

Background noise or residual noise is the noise level from sources other than the source of concern. When measuring environmental noise, residual sound is often a problem. One reason is that regulations often require that the noise from different types of sources be dealt with separately. This separation, e.g. of traffic noise from industrial noise, is often difficult to accomplish in practice. Another reason is that the measurements are normally carried out outdoors. Wind-induced noise, directly on the microphone and indirectly on trees, buildings, etc., may also affect the result. The character of these noise sources can make it difficult or even impossible to carry out any corrections.

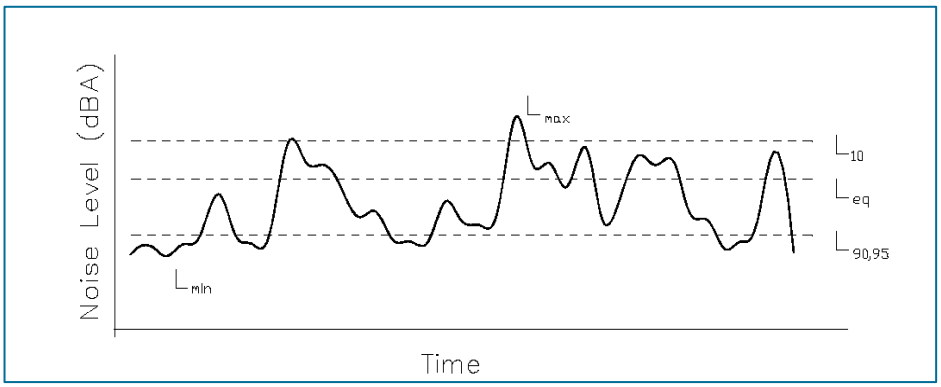
Ambient Noise

Means the level of noise from all sources, including background noise from near and far and the source of interest.

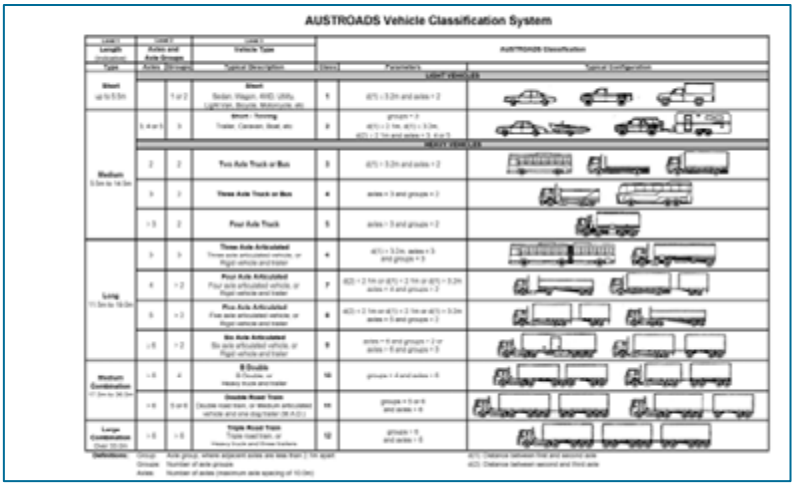
Specific Noise

Relates to the component of the ambient noise that is of interest. This can be referred to as the noise of concern or the noise of interest.

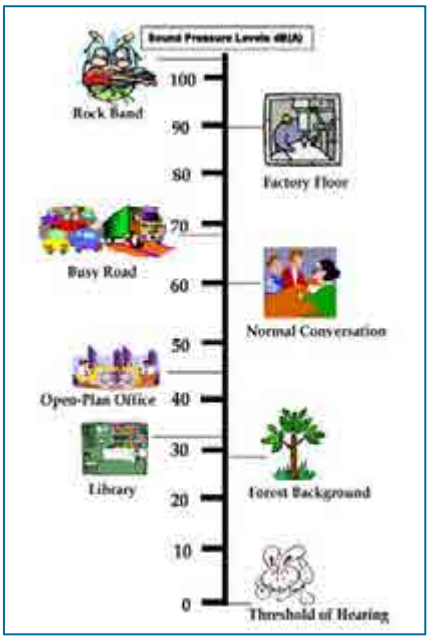
Chart of Noise Level Descriptors



Austroads Vehicle Class



Typical Noise Levels



Solomon Brothers

Barristers, Solicitors, Attorneys

Level 15, 197 St George's Terrace, Perth WA 6000 PO Box 7055, Cloisters Square WA 6850
Telephone: + (618) 9282 5888 Facsimile: + (618) 9282 5855

18 November 2015

Our Ref: CSW/7398671
Enquiries: Chris Williams
Email: cwilliams@solbros.com.au
Direct Line: [redacted]

Joc Dwyer
[redacted]

By Email: [redacted]

Dear Joc

CLAY EXTRACTION – APPLICATION FOR PLANNING APPROVAL

We refer to the query that the shire of Chittering made of Claire Richards of Rowe Group concerning the land owners who have to sign the application for planning approval.

In our opinion, you are the only person who must sign the application form. This is for the following reasons:

1. You are the sole proprietor of the property with the street address 75 Toy Road, Bindoon, and more particularly described as Lot 7 on Plan 7148 (being the subject of Certificates of Title Volume 388 Folio 18A and Volume 445 Folio 17A). The land is subject to two separate certificates of title as a result of the two certificates having been obtained by previous owners (Mr & Mrs Payne) in or around the middle of 1970: *Payne v Dwyer* [2013] WASC 271; (2013) 46 WAR 128 at [13].

2. Your ownership of the land is subject to some exceptions with respect to the ownership of some minerals and resources:

   2.1. firstly, all gold, silver and other precious metals were reserved to the Crown;

   2.2. secondly, metals, minerals, gems and mineral oil located in and upon part of the land (as specified in Transfer 9123/1913) were reserved to a previous owner of the land; and

   2.3. thirdly, an undivided half share in all other minerals. This reservation is the subject of a separate certificate of title (Volume 2230 Folio 363). The undivided half share in those minerals is now owned by Alexander Leslie Payne and Razor Holdings Pty Ltd.

3. Subject only to these reservations of ownership of minerals, your ownership of the land means that you own everything on or below the surface of the and: *Commonwealth v New South Wales* (1923) 33 CLR 1 at 23.

4. The fact that you even own a half share in minerals (other than gold, silver and other precious metals which are reserved to the Crown and the metals, minerals, gems and mineral oil that were excepted and reserved by Transfer 9123/1913) is, in itself, unusual. Since 1 January 1899, all new grants of freehold title in Western Australia reserved to the Crown ownership of all minerals on or below the surface of the land. Consequently, in respect of the great majority of freehold land in Western Australia, all minerals are owned by the Crown.

5. For the purpose of your application for planning approval (pursuant to clause 9.1 of the *Shire of Chittering Town Planning Scheme No. 6* ("the Scheme")), you are the owner of the land in respect of which the approval is sought. The fact that there are other parties which collectively own an undivided half share in rights to minerals (excluding gold, silver and other precious metals, and excluding the metals, minerals, gems and mineral oil excepted and reserved by Transfer 9123/1913) does not detract from the fact that you are the owner of the land. Similarly, the fact that the Crown owns all minerals situated on or beneath land the title to which was granted after 1 January 1899 does not mean that the Crown is a part owner of such land who must sign an application for planning approval.

Yours faithfully

[redacted]

EXCAVATION and MANAGEMENT PLAN
PROPOSED CLAY PIT

Lot 7, Toy Road, Bindoon

August 2015

BRIKMAKERS

Contact

Operations Manager

Brikmakers Pty Ltd
260 Kalamunda Road
South Guildford WA

PO Box 1257 Midland WA, 6936
Phone 08 6313 1000

Prepared by

Lindsay Stephens BSc , MSc, MAGS, MEIANZ, FIQA
LANDFORM RESEARCH

Landform Research
Land Systems - Quarries - Environment
ABN 29 841 445 694

SUMMARY

This document has been prepared by Landform Research on behalf of Brikmakers in support of an Application for Planning Approval to the Shire of Chittering for approval to to develop and use portion of Lot 7 Toy Road, Bindoon for the purposes of clay excavation. The document contains specific information about the proposed development and its intended operations and includes an assessment of relevant environmental matters such as noise, dust, water management and other matters contained in the *EPA Guidance Statement 33, Environmental Guidance for Planning and Development 2005*.

Lot 7 is classified as a Primary Basic Raw Materials Area (Gravel Extraction Resource) under the Draft Shire of Chittering Local Planning Strategy.

Even though Lot 7 is identified as a Gravel Extraction Area, under the Local Planning Strategy, a clay resource has been identified and is now proposed to be extracted.

An area of clay comprising 9 hectares is proposed to be excavated with a stockpile area of 4 hectares for support. Excavation is to be undertaken on a south facing valley side in the central part of Lot 7 near the western boundary. Excavation of gravel has been conducted on the eastern portion of Lot 7 for fifteen years.

Details of the proposed excavation were circulated to the adjoining property owners through either a meeting in person or telephone contact. As a result of the consultation, the size and operations of the project have been scaled back. The main issues raised during consultation related to transport along Toy Road, dust, acid sulfate soils, visual impacts, general amenity and noise, in addition to a water body that forms on the Brockman River in winter. All the issues raised have been considered and have been addressed in the management plan.

Hours of operation are not proposed to change and will be restricted to 7.00 am to 6.00 pm Monday to Saturday with no work on Sundays and public holidays.

Clay will be excavated intermittently throughout the year (generally over a period of between two and four months), and stockpiled for use at other times of the year. Transportation of the resource off site is to occur between 25 and 30 days per year

A variety of excavation methods will be used depending on the configuration of the pit, the complexity of blending and the weather conditions. At various times excavators and loaders may be used to excavate, load or form stockpiles. Much of the excavated clays will be loaded directly into road trucks for haulage to the South Guildford factory. The balance of excavated material will be stockpiled using dump trucks for later use.

The distances between the closest dwellings and the proposed disturbance area are over 800 metres to the north behind the crest of the plateau ridge, and 750 metres to the south. A dwelling is located approximately 450 metres to the west that is currently rented by the landholder of Lot 7. This dwelling is located within the recommended 500 metre buffer distance, however it is noted that the Shire still has the ability to approve the Application at the slightly reduced distance.

Lloyd George Acoustic completed a Noise Assessment and found that the proposed operations will comply with the Environmental Protection (Noise) Regulations 1997.

A Water Management Plan has been prepared including a Hydrogeological Study completed by Meyer Water and Environmental Solutions and a Dust Management Plan has been produced to assess the dust risk and procedures to be used to mitigate potential offsite impacts.

A Visual impact assessment of the proposed development has also been undertaken.

The Acoustic Study and the Dust Management Plan demonstrate that any potential impacts from the proposed development can comply with the required Regulations, and Guidances subject to mitigation measures being put in place.

The site will be reformed to pasture and two farm dams. Trees will be planted on the steeper north eastern slopes that are created as a result of excavation. Slopes will be left in compliance with the *Mines Safety and Inspection Act 1994*.

A ten year Development Approval and Extractive Industries Licence is sought.

Project Summary

ASPECT	PROPOSAL CHARACTERISTIC
EXCAVATION	
Total area of excavation	• 9 hectares (approx.) • 4 ha stockpile area. • 2 by 1 ha water storage dams.
Resource extraction	• Clay 50 000 – 100 000 tonnes per year conducted in campaigns of 2 – 4 months.
Operational time	• Intermittent and restricted to campaigns • Excavation of 2 – 4 months at a time.
Total estimated resource	• > 1 million tonnes
Life of project	• 10 to 20 years depending on rates of excavation.
Area cleared	• Total of approximately 20 scattered trees to be cleared in stages. • Note that these trees will be replaced by tree belts, screening trees and trees located on rehabilitated slopes.
Area mined per year	• To access clay at the base of the pit and to provide for the various grades of clay excavation will commence with cuts of about 2 - 4ha each. Each stage is approximately 4.5 hectares. When moving to Stage 2 Stage 1 will be in the process of rehabilitation.
Dewatering requirements	• None • Water collecting in the pit will be directed to detention basins and the constructed dam from which there is not anticipated to be any overflow in normal years because of water use and stormwater diversion. • A bypass water diversion system is proposed when rainfall and stormwater lead to the potential for overflow of the dams.
Maximum depth of excavations	• 10 - 12 metres in benches depending on resource and grade.
PROCESSING	

Resources	• The clay will be stockpiled in grades and types but will not be processed on site.
Water requirements	• Minimal: for dust suppression only. The access road from Lot 7 will be sealed for the first 60 metres
Water supply source	• Constructed dams.
INFRASTRUCTURE	
Total area of plant and stock	• Located within or adjacent to excavated area.
Area of settling ponds	• 0.5 hectare in addition to the proposed dams.
Fuel storage	• Proposed to be mobile refuelling with no onsite fuel storage.
TRANSPORT	
Truck movements	• Variable, in campaigns. • When transporting up to 3 000 tonnes per day clay will be transported, generally in truck and trailer combination. That is around 10 laden trucks per hour on 25 days to 30 days per year.
Access	• Toy Road and Bindoon - Mogumber Road, both of which are sealed.
WORKFORCE	
Construction	• 2 – 6 persons
Operation	• 2 – 6 persons
Hours of operation	• Hours of operation, will be 7.00 am to 6.00 pm Monday to Saturday inclusive, excluding Sundays and public holidays.

MANAGEMENT OF THE OPERATIONS

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

Safety Management

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

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

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

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

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

Environmental Management

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

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

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

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

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

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

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

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

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

Environmental Factor	Environmental Objective	Environmental Components to Consider	Proposed Management	References	Environment Risk	
					Innate Risk - Unmanaged	Risk when Managed
LAND						
FLORA and VEGETATION	To maintain representation, diversity, viability and ecological function at the species, population and community level.	Vegetation communities and/or biodiversity	The site is cleared with scattered trees and is currently used for grazing. Approximately 20 Eucalypt trees, (*Eucalyptus rudis, Corymbia calophylla*) will be required to be cleared. Approximately 500 local trees will be planted. The difference is related to the planting of trees on the screening bunds which will be placed across the disturbed areas at the end of excavation.	2.6 Flora 5.1 Biodiversity Management Plan	Low	Low
		Threatened Communities	None present		NA	
		Priority Communities	None present		NA	
		Threatened Communities	None present		NA	
		Priority Communities	None present			
		Weeds	A weed management program is in proposed and in place for the rural landuses on Lot 7.	5.1.3 Weed Management Plan	Low	Low
		Dieback disease	Dieback management procedures are proposed.	5.1.2 Dieback Management Plan	Low	Low
		Fragmentation of communities, biodiversity and ecological linkages.	No further fragmentation will occur. The excavation area lies near but outside the areas of significant vegetation (8.20) identified in the Shire of Chittering Local Biodiversity Strategy.		Low	Low
Landforms	To maintain the variety, integrity, ecological functions and environmental values of landforms and soils.	Alteration to local landform and regional geomorphology	The site is located on a slope that will remain at the end of excavation. A total of 9 hectares will be lowered by 0 – 12 metres. The rehabilitated surface will be compatible with the local geomorphology. The operations have been designed to the standards and methodology of Department of Planning, 2007, *Visual Landscape Planning in Western Australia (DoP 2007).*	5.2.2 Aesthetics Appendix 4 5.4 Closure and Rehabilitation Figures 7, 8	Low	Low
		Final land surface and end use	The end use is to pasture with local native vegetation on the steep eastern slopes formed during excavation. The site lies within the Special Control Area 6.2, Landscape Protection (Shire of Chittering). The operation has been designed to comply	5.4 Closure and Rehabilitation Figures 7, 8	Low to Moderate	Low

			with the policy and minimise visual impact. The site lies within the Agricultural Resource Zone. The proposal is to maintain the agricultural values and enhance them with the creation of the two dams which will increase the capability of the land.			
		Visual impacts	Only 9 ha will be impacted by the pit. There will be no alteration to the ridge and no daylight out as only the slope of the ridge will be slightly modified. The use of bunds and tree planting are to be used to minimise visual impact from local dwellings, Toy Road and the wider area.	5.2.2 Aesthetics Appendix 4 5.4 Closure and Rehabilitation Figures 7, 8	Low	Low
		Erosion and degradation of the final land surface	The excavation operations are designed to minimise erosion and dust. Contour and cut off drains are proposed to reduced water flows and minimise erosion potential.	5.4 Closure and Rehabilitation Attached Dust Management Plan Appendix 1	Low	Low
		Karst features	There is no karst. The geological environment is the Chittering Metamorphic belts of igneous and metamorphic rocks. There is little natural outcrop on site as the resource is weathered rock and clay subsoils.	2.2 Geology and Geomorphology	NA	
Subterranean Fauna	To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.	Isolated population of subterranean fauna	See above. There is no karst or potential for significant subterranean fauna. The site is tight hard rock grading to clay and soils.		Nil	
		Fragmentation of subterranean communities	See above		Nil	
		Reduction in diversity of subterranean fauna	See above		Nil	
		Continued habitat for subterranean fauna and their ecological functions	See above. The reformed soils will be similar to those pre-excavation.		Nil	Nil
Terrestrial Environment Quality	To maintain the quality of land and soils so that the environment values, both ecological and social, are protected.	Short and long term impact on soils and ecological values	Then end use will sloping pasture and native vegetation. Soils will be reformed to a sustainable structure. In the longer term there will be no change to the agricultural values of the site. The presence of two farm dams will increase the water supply for agriculture.	5.4 Closure and Rehabilitation Figures 7, 8	Low to moderate	Low
		Presence of essential or	Then end use will sloping pasture and native	5.4 Closure and	Low to	Low

		desirable land uses	vegetation. Soils will be reformed to a sustainable structure. See above.	Rehabilitation Figures 7, 8	moderate	
		Presence of high agricultural or community values.	The agricultural values currently on site are low due to steeper slopes. The soils are sloping loam soils that are suitable for grazing and that land use will be available at the end of operations. The site lies within the Agricultural Resource Zone. The proposal is to maintain the agricultural values and enhance them with the creation of the two dams, which will increase the capability of the land.	5.4 Closure and Rehabilitation	Low to moderate	Low
		Exposure of acid sulfate or acidic conditions	There is no evidence of acid sulfate conditions. The site is elevated in oxidised loam and clay. The excavations are not within the Muchea beds, there are no sulfides peat or other deleterious materials that could form acid sulfate soils.	2.3 Soils Appendix 2 Water Management Plan	NA	
Terrestrial Fauna	To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.	Fauna communities and/or biodiversity	The site is pasture to be returned to pasture and native vegetation.	2.7 Fauna 5.1 Biodiversity Management Plan	Low	Low
		Threatened Fauna Communities	See above		Nil	
		Priority Fauna Communities	See above		Nil	
		Threatened Fauna Species	The only potential impacts are Black Cockatoos. Approximately 20 Eucalypt trees, (*Eucalyptus rudis, Corymbia calophylla*) will be required to be cleared. Approximately local trees will be planted. The difference is related to the planting of trees on the screening bunds which will be placed across the disturbed areas at the end of excavation. The trees will be assessed for Black cockatoo habitat of nesting hollows but from initial observations hollows are either not present or unlikely. If nesting hollows are found the trees will be assessed to determine the best management to minimise any potential impact such as		Low	Low

			retaining the tree, saving and providing additional nesting facilities			
		Priority fauna species	There are unlikely to be any Priority species to be impacted because the site is small in a regional context and is currently pasture.		Nil	Low
WATER						
Hydrological Processes	To maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected.	Ecological functions of watercourses	The small watercourse that runs along the west of the disturbance areas is to be retained and all seepages within the creek protected. Meyer Water and Environmental Solutions found the proposed pit will not significantly change the recharge of local water bodies. All water from disturbed areas will be retained on site. A bypass water diversion system is proposed when rainfall and stormwater lead to the potential for overflow of the dams. The Brockman River will not be impacted or altered.	Appendix 2 Water Management Plan Figures 7, 8	Low	Low
		Groundwater, use, changes to recharge, alterations to flow paths or water loss.	The water management proposed will not lead to any significant changes to recharge, the water tables and groundwater.	Appendix 2 Water Management Plan Figures 7, 8	Low	Low
		Alteration to or impact on wetlands and water bodies	Also see above. The Brockman River is listed as a Conservation Category Wetland, but will not be impacted. The main wetlands are associated with the Brockman River. The wetland species lie downstream outside Lot 7 and 1 km downstream. The channel of the Brockman River was "trained" and cleared some decades ago by the previous landholder of Lot 7. The areas that are subject to water logging and pooling of the Brockman River during times of higher flow are downstream away from the causeway crossing. The water crossing and causeway is designed to not impact on water flows in the Brockman River or flood patterns of the river.	Appendix 2 Water Management Plan Figures 7, 8, 9A and 9B	Low	Low
		Impact from or changes to flooding regimes	There will be no changes to the Brockman River or flow paths. The updated crossing is located and will be	Appendix 2 Water Management Plan Figures 3W, 4W and 5W	Low	Low

			designed to not impact on normal or flood flows			
Inland Waters Environmental Quality	To maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social, are protected.	Hydrocarbons, fuels and other chemicals	Extensive fuel and hydrocarbon management programs are proposed.	Appendix 2 Water Management Plan	Low to moderate	Low
		Surface water quality	All water is retained on site in the dam on site prior to release. The volume of the dam is large compared to the water from disturbed areas and provides for effective sediment settlement. A bypass system is proposed to ensure that all water from disturbed areas are retained and clean surface water is diverted to the local watercourse.	Appendix 2 Water Management Plan	Low to moderate	Low
		Groundwater quality	Extensive fuel and hydrocarbon management programs are proposed.	Appendix 2 Water Management Plan	Low	Low
		Water quality during and after development	See above	Appendix 2 Water Management Plan	Low	Low
AIR						
Air Quality	To maintain air quality for the protection of the environment and human health and amenity.	Offsite dust impact - local amenity	The operations comply with the EPA generic buffers, the Department of Health Guidelines and Queensland Primary Industries Guidelines. A Dust Management Plan is in proposed. Buffers to dwellings are the three closest dwellings are 450, 750 and 800 metres. The closest dwelling is occupied by the landowner of Lot 7. No visible dust will cross the boundary from excavation or other on site operations.	5.2.4 Dust Management Appendix 1 Dust Management Plan 5.2.1 Surrounding Landuses and Buffers	Low	Low
		Dust emissions - on site personnel health or quality of life	Clay excavation must comply with the *Mines Safety and Inspection Act* for Health and Safety. Officers from the DMP will regularly inspect the site and the site must be registered under the DMP SRS system. Maintenance of the onsite air quality also maintains offsite quality.	5.2.4 Dust Management Appendix 1 Dust Management Plan 4.7 Safety	Moderate to low for worker impact. Low for local amenity impact.	Low
		Offsite noise emissions and compliance with the *Environmental Protection (Noise) Regulations 1997*	Noise levels will comply with *Environmental Protection (Noise) Regulations 1997.* Lloyd George Acoustics completed a noise assessment and found the proposed operations will comply with the regulations.	5.2.3 Noise Management Appendix 3	Low to moderate	Low

		Noise levels - personnel health and safety	The operations are designed to minimise on site noise and the potential for offsite noise. Clay excavation must comply with the *Mines Safety and Inspection Act* for Health and Safety. Officers from the DMP will regularly inspect the site and the site must be registered under the DMP SRS system.	5.2.3 Noise Management Appendix 3 4.7 Safety	Moderate to high for worker impact. Moderate for local amenity	Low
		Emissions of gases and other materials potentially adverse to human health	There are no gaseous or other potential harmful emissions from the operations apart from normal heavy equipment. New mobile plant will be used with particulate filters and other pollution reduction systems	Appendix 1 Dust Management Plan	Low	Low
		Blasting and comply with the *Environmental Protection (Noise) Regulations 1997* and guidelines for ground vibration	There is no blasting.		NA	
		Greenhouse emissions	The operations are designed to minimise fuel use and transport routes by maximise efficiency and reducing fuel consumption. The use of larger trucks and trailers are more efficient in fuel use per tonne of clay moved. Road transport will occur on 25 to 30 days per year. This is the closest deposit of this type of clay to the brick production site.	Appendix 1 Dust Management Plan. 1.4 Description of the Resource.	Low	Low
Heritage and Conservation	To ensure that historical and cultural associations are not adversely affected.	Aboriginal heritage sites	There are no known aboriginal sites on the DAA database. A commitment is made to stop and assess any site if uncovered. Any heritage sites uncovered during operations will be independently assessed and managed through communication with the community, Government and traditional owners.	2.8 Aboriginal Sites	Low	Low
		European heritage sites	None known on Lot 7. There was an old flour mill and associated dwellings over 1 km downstream outside Lot 7, that will not be impacted by the proposed clay extraction.		Low	Low
		Conservation and other Heritage sites	There are no known heritage sites. The Brockman River is listed as a Conservation Category Wetland, but will not be		Low	Low

			impacted.			
Human Health Amenity	To ensure that human health is not adversely affected.	Human health onsite and offsite	Clay excavation must comply with the *Mines Safety and Inspection Act* for Health and Safety. Officers from the DMP will regularly inspect the site and the site must be registered under the DMP SRS system. See Air Quality above.	5.2.4 Dust Management Appendix 1 Dust Management Plan 5.2.1 Surrounding Landuses and Buffers	Moderate to high for worker impact. Moderate for local amenity	Low
	Transport routes and operations are designed to minimise local impacts	Transport on local, and regional roads or school bus routes.	Transport is along bitumen roads. Truck movements are to be 25 to 30 days per year. The first 50 metres of the access road is to be sealed.	4.3 Staging and Timing 4.5 Equipment (Loading and Transport)	Low	Low
	Local Amenity	The operations have been designed to provide sufficient buffers and visual protection.	The operations comply with the EPA generic buffers, the Department of Health Guidelines and Queensland Primary Industries Guidelines. Buffers to the three closest dwellings are 450, 750 and 800 metres. The closest dwelling is occupied by the landowner of Lot 7. The operations are located at distances at which potential impacts can be contained on Lot 7. Contact has been made with the local residents to outline the proposal and found out the main community concerns. In response to the initial community concerns Brikmakers reduced the size of the proposed clay excavation The operations are designed to minimise visual, transport and other potential impact.	Appendix 6 Public Consultation	Low	Low
INTEGRATING FACTORS						
Offsets	To counterbalance any significant residual environmental impacts or uncertainty through the application of offsets	Provision of offsets to mitigate significant short and long term impacts	The proposed operations are relatively small. The site is cleared with scattered trees and is currently used for grazing. Approximately 20 Eucalypt trees, (*Eucalyptus rudis, Corymbia calophylla*) will be required to be cleared. Approximately local trees will be planted. The difference is related to the planting of trees on the screening bunds which will be placed across the disturbed areas at the end of	Not required	NA	

			excavation. At the end of excavation about 500 trees will remain because some planted on the screening bunds will require removal to enable the overburden to be placed across the disturbed areas.			
Rehabilitation and Closure	To ensure that premises are closed, decommissioned and rehabilitated in an ecologically sustainable manner, consistent with agreed outcomes and land uses, and without unacceptable liability to the State	Progressive and final removal of infrastructure, roads, hardstand, non natural materials	The site is located in pasture with minor number of trees and will be returned to pasture and native vegetation. All infrastructure associated with excavation will be removed and rehabilitated.	5.4 Closure and Rehabilitation	Moderate	Low
		Deleterious or polluting materials	Brikmakers will remove all materials and plant associated with their operations at the end of excavation. Apart from fuels, excavation only uses natural materials. The only materials excavated will be natural soil and rock. There will be no processing of these materials on site.	5.4 Closure and Rehabilitation	Moderate	Low
		Contaminated materials	There are to be no contaminating materials apart from fuel and lubricants. Commitments are made to do this. Contingencies are in place.	Appendix 2 Water Management Plan	Low to moderate	Low
		Sustainable long term end use	See Landforms above. The land will be reformed to a form stable in the long term and compatible with the local environment and suitable for continued agricultural use. Two agricultural dams will be retained to enhance the capability of the land for future agricultural purposes	5.4 Closure and Rehabilitation	Low	Low
		Soils reconstruction	The operations are small. The site is located in pasture with minor number of trees and will be returned to pasture and native vegetation. The end use will be sloping pasture and native vegetation. Soils will be reformed to a sustainable structure suitable for long term agricultural activities such as grazing	5.4 Closure and Rehabilitation Figures 7 and 8	Low	Low
		Weeds and dieback	Managed during excavation and then taken over by the normal farm operations. Weed management is proposed.	5.1.3 Weed Management	Low	Low
		Unexpected or short term closure	Commitments are made to unexpected or short term closure.	5.4.3 Closure Considerations -	Low	Low

			The clay is a required resource by Brickmakers and therefore continuous operation are likely and proposed.	Commitments		
		Success and monitoring of rehabilitation	This is proposed. The proposed operations are relatively small. The site is cleared with scattered trees and is currently used for grazing. Approximately 20 Eucalypt trees, (*Eucalyptus rudis, Corymbia calophylla*) will be required to be cleared. Approximately local trees will be planted. The difference is related to the planting of trees on the screening bunds which will be placed across the disturbed areas at the end of excavation. At the end of excavation about 500 trees will remain because some planted on the screening bunds will require removal to enable the overburden to be placed across the disturbed areas.	5.4 Closure and Rehabilitation	Low - moderate	Low

OTHER FACTORS	Objective	Components to Consider	Proposed Management	References	Innate Risk - Unmanaged	Risk when Managed
Resource Requirements	Basic Raw Materials are required for continued use by the community and for future developments.	Community requirements for the resource, distribution and availability	Clays of this type are unique and rare. They red plastic clays used for blending and red brick manufacture. The clays are unique, in being sheared old dolerite dykes and sills. The shearing has changed the rocks to schists which in turn weather more rapidly and deeply than other rocks and form deeper zones of weathered rock and clay. All closer similar clays have either been exhausted or have been worked for many years by other companies. There is a significant transport and cost penalty in using clay from Lot 7 but there is no alternative. An extensive drilling program has been completed by Brikmakers across the resource and wider area to depths where the holes encountered hard resource or basement. The drill holes which ranged up to 20 metres enabled the collection of a substantial number of samples that were tested for suitability for brickmaking.	1.4 Description of the Resource.	NA	Low
Planning Compliance	Compliance with Government Policy, planning zones and policies.	Government policy, planning zones and policies.	See the documentation prepared by Greg Rowe and Associates. The project is designed to comply with State and Local Planning requirements. Lot 7 is zoned "Rural' under the Shire of Chittering Town Planning Scheme - Number 7. Western Australian Planning Commission policies such as SPP 2.4 require the protection and taking of basic raw materials prior to sterilisation. The proposed clay excavation complies with Shire of Chittering Local Policies and Local Law for Extractive Industries. The proposal will be conditioned by the Shire of Chittering with a defined disturbance footprint.	See the documentation prepared by Greg Rowe and Associates.	Moderate	Low

Community Consultation	To provide a community consultation process commensurate with the size nature and time line of the project.	Community consultation	Community consultation will be handled by community input within the application and assessment phases. Direct community consultation has already been undertaken with the nearby residents. Contact numbers will be displayed at the entrance. An "Open Door Policy" is used to enable ongoing dialogue between the operator and the community. The operations are located at distances at which potential impacts can be contained on Lot 7. Buffers to dwellings are the three closest dwellings are 450, 750 and 800 metres. The closest dwelling is retained by the landowner of Lot 7. Contact has been made with the local residents to outline the proposal and determined the main community concerns. In response to the initial community concerns Brikmakers reduced the size of the proposed clay excavation The operations are designed to minimise visual, transport and other potential impact.	3.1 Public Consultation Appendix 5 Public Consultation	Low	Low
		Complaints procedure	A complaints procedure is proposed.	See attached Dust Management Plan Appendix 1	Low	Low
Safety	To ensure that the project provides high levels of safety to on site personnel and the community	On site safety	Clay excavation must comply with the *Mines Safety and Inspection Act* for Health and Safety. Officers from the DMP will regularly inspect the site and the site must be registered under the DMP SRS system. The operations are required to be registered under the DMP SRS system. Brikmakers propose extensive and fire and safety management systems	4.0 Project Description 4.7 Safety	Low	Low
		Off site safety	The site is fenced and installed with locked gates. A traffic study has been conducted by Shawmac and found the existing road network to be adequate.	4.8 Safety 4.3 Staging and Timing	Low	Low

			Only 25 to 30 days transport per year will be required. See above			
Geotechnical Integrity	To ensure that all ground and geological materials is safe commensurate with the operations and final land surface.	Safety of the operational and final land surfaces will be	The operations are designed to comply and operate to the *Mines Safety and Inspection Act 1994.* All faces will be safe and not subject to subsidence, slippage or other adverse conditions during or following excavation.	4.2 Excavation Methods – Geotechnical Stability	Low	Low
		Compliance with the *Mines Safety and Inspection Act 1994.*	Brikmakers is committed to complying with the relevant Acts and Regulations. The pit is regularly inspected by officers from the DMP Safety Division.	4.0 Project Description 4.7 Safety	Low	Low
		Extreme weather events	The site is internally draining with large capacity to retain water. And bypass clean stormwater as required in heavy rainfall events. The operational and final surfaces and features are designed to be not affected by extreme climate events. No impact from climate change is likely in the pit or to the pit or rehabilitated surface. The location is underlain at shallow depth by relatively fresh basement rocks at are stable and is not readily eroded. The farm dams and contour diversion channels will be retained at the end of excavation to raise the agricultural capability of the land.	5.4 Closure and Rehabilitation 4.2 Excavation Methods	Low	Low

EXCAVATION MANAGEMENT PLAN, LOT 7, TOY ROAD, BINDOON

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FIGURES

APPENDICES

1.0 INTRODUCTION

1.1 Background and Proposal

This proposal is to extract clay progressively over 10 years from an area of approximately 9 hectares within the western portion of Lot 7, depending on market demand.

Gravel has been extracted from the eastern portion of Lot 7 for 15 years.

The natural clay resource is considered to be extremely valuable due to its quality and proximity to brick manufacturing facilities.

This Excavation and Management Plan has been prepared addressing the factors raised in *EPA Guidance Statement 33, Environmental Guidance for Planning and Development 2005*.

The main body of the text describes the existing physical environment, the proposed methods of excavation, Closure and Rehabilitation planning. Attached are a Dust Management Plan, Water Management Plan, Noise Assessment, Visual Assessment and documentation of the Public Consultation in addition to a number of Figures.

1.2 Proponent

The proponent is Brikmakers a large clay brick manufacturer based in South Guildford, supplying to the Perth Metropolitan area and Regional markets. Contact details are;

Brikmakers Pty Ltd
260, Kalamunda Road, South Guildford, WA, 6056
PO Box 1257, Midland WA, 6936

Phone 6313 1000

1.3 Location and Ownership

Lot 7 is located off Bindoon – Moora Road, 5 km north from Bindoon townsite.

The land is owned by

Mr J Dwyer.
71 Toy Road, Bindoon

Phone 0427 962 031

This application for an excavation licence specifically relates to Lot 7 shown in the following table.

LOT	VOLUME	FOLIO
Lot 7	445	17A
Lot 7	388	18A

1.4 Description of the Resource

Onsite Resource

A red burning plastic clay resource has been identified in the western part of Lot 7 on an area of pasture. Such clays are required by all brick making companies to blend with other clays for extrusion and to manufacture red bricks.

Red burning clays are typically more plastic and are able to be more readily extruded, the method used to manufacture modern bricks. They are also typically lower in free quartz and are therefore less abrasive during processing. The two main types of red burning clay are the alluvial types and the weathered schist – amphibolite which is present on Lot 7. In addition to being more plastic red burning clays often shrink more on firing. Of the two main types, the weathered schist – amphibolite shrinks less than alluvial clays which ensures a more consistent fired brick.

Therefore red burning clays are used for the manufacture of a wide range of modern bricks either used in their own right or blended with other clays.

Of all the clays used for brickmaking the weathered schist – amphibolite type of clay occurring on Lot 7, is the most essential.

On the other hand these types of clays are less common and very restricted geologically. The type of clay only occurs adjacent to the Darling Fault in geological situations where the rock has been sheared which enables the rock to weather sufficiently to be able to be extracted and crushed.

Like all clays, the further from the processing plant the greater the cost of transport. Brick making companies therefore try to source clay from as close to the manufacturing plant as possible.

Clays of this type have been extracted closer to the processing plant in the past with most known deposits already exhausted. Midland Brick have one deposit closer to their Middle Swan Works and Austral use the only available source of Proterozoic shale at south Cardup. No other resources are available.

Brikmakers have searched extensively for this type of clay closer to their plant at South Guildford, but have been unable to find any an alternate source that has not been exhausted or is not used by another operator. It should be noted that a number of deposits have been sterilised by urbanisation.

This is the closest source of this type of clay to Brikmaker's plant and even though there is a significant transport and cost penalty in using clay from Lot 7, there is no alternative.

An extensive drilling program has been completed by Brikmakers across the resource and wider area to depths where the holes encountered hard resource or basement. The drill holes which ranged up to 20 metres enabled the collection of a substantial number of samples that were tested for suitability for brickmaking.

The clays are unique, in being sheared old dolerite dykes and sills. The shearing has changed the rocks to schists which in turn weather more rapidly and deeply than other rocks and form deeper zones of weathered rock and clay.

The weathered material extends to depths in excess of 12 metres depending on the rock type and location. The depth to be excavated in a particular location depends on the size of the resource at depth, access to the base of the pit versus the costs of excavation and the amount of sub-grade material, but is proposed to be 10 to 12 metres below surface, shallowing towards the edges of the resource.

The clays are restricted by the depth of overburden, increasing hardness with depth changes in grainsize, composition and distribution of the parent rock type.

Based on the drilling the clay resource occurs at elevations ranging from 155 – 190 metres AHD See Figures 7 and 8.

Clay testing by Brikmakers shows low salt content, averaging 200 ppm, which is normal or lower than other soils in the Chittering area.

1 to 2 metres of overburden is present above the clay resource.

The Hydrogeological report in Appendix 2 shows the location of drill holes conducted across the resource, although the staging and pit footprint is now reduced and the staging reversed.

The clay has been identified as a red burning schist and amphibolite of altered dolerite which is a relatively plastic clay that is highly suitable for brickmaking in its own right and an excellent and required material for blending with other clays to produce a consistent clay for extrusion and brick manufacture.

The quarry represents a strategically located resource used to produce bricks for the local market. The site will provide raw materials for the construction industry, and ensure that the Basic Raw Materials on site are utilised prior to sterilisation from new sensitive land uses, in line with State Planning Policies No 2.4 Basic Raw Materials and 2.5 Agricultural and Rural Land Use Planning.

Therefore the pit is a particularly valuable community resource for the Metropolitan and Regional area because it will provide a resource of clay for use in the construction industry, located on private land in a situation removed from pressure of sterilisation

It is also not common to identify a clay resource on the same piece of land as an existing approved gravel excavation and it makes sense to consolidate and maximise the use of the resources.

The gravel resource on Lot 7 is already classified as resource area CH17 in State Planning Policy 2.4 Basic Raw Materials. Currently the Geological Survey of Western Australia is updating mapping of the Basic Raw Materials of the Perth and near metropolitan areas.

The gravel excavation on Lot 7 is recognised as a Gravel Resource in the Shire of Chittering Local Planning Strategy 2001 to 2015.

Blending and loading from stockpiles will form a normal part of production.

Regional Resource Information

The documentation produced by the Chamber of Commerce and Industry, 1995 and 1996 and 2008 provides a good summary of the clay resources and the need for their development. (See References below).

The Chamber of Commerce and Industry noted the need to protect Basic Raw Materials prior to sterilisation by encroaching development in its comprehensive research of the Basic Raw Materials of Perth and the Outer Metropolitan Area, 2008, and also listed the area as a clay resource area.

A number of other documents provide information on the importance of the clay resources and the issues that apply to construction materials in terms of protection and use.

Research on the clay resources and the issues involved can be found in the following;

- Abeysinghe P B, 2002, Bentonite, Attapulgite and Common Clays in Western Australia, Geological Survey of Western Australia, Mineral Resources Bulletin 20.
- Western Australian Planning Commission, State 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, 1996 - 2008.
- Gozzard, 2007, Geology and Landforms of the Perth Region, Geological Survey of Western Australia.
- Geological Survey of Western Australia, 2012, Updated mapping of Basic Raw Materials (in draft).

1.5 Aims of the Proposal

The aims can be summarised as:

- Provide a long term supply of brick making materials for local and export brick making.
- Extract red burning schist and amphibolite from the site.

- Preserve and progressively utilise all the valuable clay resource prior to sterilisation by competing land uses.

- Provide clay resources for blending with other clays.

- Excavate clay from locations close to the works site at South Guildford, which will assist in reducing transport distances and help keep prices lower for the consumer.

- Comply with State Planning Policy No 2.5, Agricultural and Rural Land Use Planning, and SPP 2.4, Basic Raw Materials, which state that basic raw materials should be taken prior to sterilisation of the area by development.

2.0 EXISTING ENVIRONMENT

2.1 Climate

The climate of the area is classified as Mediterranean, with dry hot summers and cool wet winters.

Climatic data is recorded at Bullsbrook, (Pearce RAAF), 37 km to the south. Precipitation is 688 mm per annum, of which 89% falls in the months April to October inclusive. At Swan Research Station evaporation exceeds rainfall in all but the four wettest months, and the situation at Bullsbrook can be expected to be similar.

Average maximum temperatures at Bullsbrook reach 33.3 degrees Celsius for the hottest months, January and February, but fall to 17.6 degrees Celsius in July. Average minima for the coldest month August, is 8.2 degrees Celsius.

The climate data for Bullsbrook shows that the predominant summer winds are from the east at 9.00 am and from the south west at 3.00 pm.

In summer wind blows from the east 70% of the time at 9.00 am and from the west/south west for 60% of the time at 15.00 pm. Summer wind speeds tend to be 6 to 10 km/hour at 9.00 am and between 11 and 20 km/hour at 15.00 pm.

The winter wind directions are more even, but there is a slight predominance from the east at 9.00 am and south west at 15.00 pm. The average speeds are between 1 to 10 km/hour. Wind roses are attached in the Dust Management Plan, Appendix 1.

The wind roses for Pearce show that there is a pronounced easterly wind at 9.00 am on summer mornings, but this has to be balanced by the afternoon winds which blow from the south west at 3.00 pm. The data collected at Pearce has to be viewed with caution and can only be used as a general indication for this site and must be subject to interpretation.

Pearce lies at the base of the Darling-Gingin Scarp and is subject to strong katabatic winds on summer mornings. The Scarp is immediately east of Pearce and produces the easterly spike at 9.00 am. This causes the windshear at Pearce and Perth Airport.

The issue of katabatic effects is well explained in Mitchell, K, 1979, *The Effect of the Darling Scarp on Easterly Air Flow,* Geowest No 15 University of Western Australia. Katabatic effects result from the variations in air temperature, topographic effects and the air flow from the Darling Plateau down to the base of the Darling Scarp. The winds are significantly affected and directed by landform. The 100 metres change in elevation is sufficient to significantly produce and deflect katabatic winds. Based on katabatic effects the interpreted flow paths of the wind are east to south east down the slopes to the valley of the Brockman River.

It can be seen that an easterly wind travelling from the plateau to the east towards the west will be deflected down the slope of the Brockman Valley towards the south west and west across the excavation area. The proportion of wind travelling from the excavation area may be reduced or even concentrated by the valley landform, and therefore Pearce summer morning data cannot simply be applied.

2.2 Geology and Geomorphology

The site lies east of the Darling Fault within the Chittering Metamorphic Zone. The Chittering Metamorphic Belt is characterised by schists and granite basement that are intruded by several ages of dolerite dykes of which the older ones have been subjected to regional pressures and are changed to amphibolite.

The resource sits on a south facing valley slope of the dissected edge of a remnant of a lateritic Tertiary erosion surface at an elevation that ranges from 190 metres AHD in the north east, down to 155 metres AHD in the south west.

The land drops away towards the Brockman River in the south.

The schists and amphibolite are part of the Chittering Metamorphic Belt that underlies the whole locality. The schists strike north to north west dipping at a steep angle.

The schists are deeply weathered in part forming brown to red brown loam soils.

Additional geological information is presented in the hydrogeological report prepared by Meyer Water and Environmental Solutions that is attached as Appendix 2. The report shows a contour plan and wider resources of which only the southern portion of the identified areas is proposed to be excavated.

South of the site the land drops to the Brockman River at an elevation of 135 metres AHD. A small floodplain formed from alluvial silts and clays occupies the base of the Brockman River Valley.

2.3 Regolith and Soils

The soil profile is a relatively thin red brown loam that is stony in places and carries a small amount of gravel pisolites shed from upslope.

The subsoils become more clay rich grading to weathered schists and saprock at depths of 5 – 15 metres.

The soil system on the extraction area is classified as Coolakin (Cek) in Smolinski, 1998, Soils of the Chittering Area, South West Forest Region, Western Australia, Department of Agriculture WA. On the valley floor of the Brockman River the soils are incorrectly classified as Norinne (No) a plateau soil. The valley floor is better classified as Murray 4 (My4) or Helena (2H3).

Coolakin – Valleys with narrow valley floors and some rock outcrop. Sandy duplex and gravels are common. This only generally describes the soils on site which are loam and clay based soils.

The reconstructed soils, at the completion of excavation, will be replacement of the red brown topsoils on overburden from the existing subsoil profile on deep ripped schist basement.

2.4 Acid Sulfate

There has been an increased interest in acid sulfate soils since the release of WAPC Planning Bulletin 64. However the interest has at times been over reactive and conditions and risk applied in many areas where there is no geological risk or evidence of acid sulfate. The WAPC mapping does not extend this far east.

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

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

Acid Sulfate Soils can potentially form under reducing conditions when there is a source of carbon and a source of sulfur (normally from sea or saline water). Micro-organisms are thought to play an important role in reducing the sulfates within the sediments to form the iron sulfide. It is a natural phenomena, that can be exacerbated by disturbance.

Potential acid sulfate conditions most commonly form under current or past estuarine conditions, peaty conditions, and may also result from weathering of some geological formations and situations which contain sulfides for example at Muchea where sedimentary shales of Mesozoic age carry sulfides in beds located below the water table.

The soils most at risk are normally saline/estuarine soils, gley soils, peat and some organoferricretes when exposed to the atmosphere.

Acid sulfate only becomes a potential risk when a number of circumstances are present.

- There is rock, soil or regolith present that is carrying sulfides.
- Sulfide carrying materials from below the water table are to be exposed to the atmosphere.
- Excavation below the water table is to be carried out exposing the sulfide carrying materials to oxygen in the atmosphere.
- Dewatering of the sulfide carrying materials is proposed, exposing them to oxygen.

The site has been visited by Lindsay Stephens of Landform Research on a number of occasions, to examine the soils and geology.

None of the at risk acid sulfate conditions exist at this location or near the excavations which are located in oxidised elevated situations.

On this site the geology of the weathered metamorphic schist and amphibolite does not contain disseminated sulfides. Any sulfide minerals that may occur in the unweathered basement rocks has geologically been weathered and the sulphur dissolved within the Tertiary weathering regime. In addition the clay to be extracted is well above the water table in oxidised conditions.

Brikmakers has conducted an extensive drill based exploration program. Samples are collected from each metre of depth and all samples are analysed for a number of parameters including total Carbon, Sulfur and soluble Salts.

During excavation, Brikmakers regularly samples the clays and stored water on site, as part of their production quality control and environmental monitoring policy.

It should be noted that the only at risk sulfur minerals are reduced sulfur, ie sulfide sulfur. Brikmakers sample for both oxidised and reduced sulfur and therefore the sulfur data is normally an overestimation.

Even though the geological conditions preclude acid sulfate conditions on this site, Brikmakers will continue with their ongoing testing for sulfur as part of their normal production procedures.

The pit is to drain to two water storage dams that will ensure sediment settlement during excavation and will form a farm dam at the end of the resource. The water in these dams is to be retained and regularly tested for salinity and pH.

2.5 Hydrogeology and Water Catchments

Surface Water

The site lies to the north of the Brockman River within the Brockman River Catchment.

A number of studies have been conducted on the Brockman River such as;

Ali et al, 2010, *Regional Drainage Evolution for the Avon Basin*, WA, CSIRO.

Beatty, S J, D L Morgan, M Klunzinger and A J Lymbery, 2010, *Aquatic Macrofauna of Ellen Brook and the Brockman River: Fresh Water Refuges in a salinized Catchment*, Murdoch University.

Chittering Landcare, Brockman Snapshot Years 2010 to 2014.

Department of Water 2010, *Setting allocation limits for Brockman River and Marbling Brook*, Report 44.

Hindmarsh R 2003, *Natural Resource Management Plan for the Brockman River Catchment,* Water and Rivers Commission.

Smith M G, 2002, *Groundwater Information and Management Options for the Brockman River Catchment*, Water and Rivers Commission.

The studies aim to provide data and management actions to protect the Brockman River Catchment and the future water quality.

The Chittering Landcare Group is active in monitoring and overseeing management of the Brockman River Catchment.

The Brockman catchment at times is brackish to saline in summer reducing in winter to brackish water. Trends towards increased salinity are due to land clearing within the catchment and changed rainfall regimes. Most of the catchment remains uncleared. There have been some changes to nutrient levels in the river in recent years but in 2014 these did not increase.

The excavation of clay does not have the potential to increase nutrients as none are required but can potentially impact on soil particles in water bodies if not well managed; for example turbidity and salinity. Comprehensive management of onsite water is proposed.

There are minor watercourses near the site, running south to the west of the proposed clay pit and stockpile area. This watercourse will be protected with setbacks and diversion of all water from disturbance areas to detention basins and a large dam.

A small drainage line will be incorporated into the site activity area. The upper portion of this drainage line will be diverted along contour to join a drainage line in the south that drains to the Brockman River.

Most drainage runs as surface runoff from the clay based hills a small amount of recharge will infiltrate the loam and clay soils.

In storm events, when surface water exceeds infiltration, there are diffuse flows to the watercourse. A small portion of this will be diverted by the pit to the water storage dam.

Water for the dust suppression will be drawn from two farm dams to be constructed. See Appendix 2.

Groundwater

The hydrogeology and groundwater is considered in the report of Meyer Water and Environmental Solutions, attached the Water Management Plan.

Meyer Water and Environmental Solutions assessed the water quality and showed the presence of two small seepages. The main seepage lies in the creek line west of the disturbance area. This flows all year round and was found to have a salinity of 490 mg/L in February 2005.

Other testing of water encountered during drilling was less than 470 mg/L. See Meyer Water and Environmental Solutions.

A costean was excavated at hole DW047 shown on the figure attached in Appendix 2. That costean was located where the proposed water storage dam is to be located and represents a perched aquifer. The water quality intersected on 23 February 2005 was 612 mg/L salinity. See Meyer Water and Environmental Solutions.

Drilling by Brikmakers to depths of over 10 metres did not intersect the water table. The bases of the holes were at a lowest elevation of 235 metres AHD. Some drill holes struck granite basement at higher elevations.

Drilling on the floodplain by Brikmakers intersected a superficial sandy aquifer located below 1 – 2 metres of loamy clay. The water was abundant and brackish in quality.

This water is not proposed to be used as it is not required. Calculations on water requirements show that the two dams to be constructed will be able to supply sufficient water for dust suppression and on site activities. See Appendix 2.

2.6 Flora

Apart from several scattered trees, no clearing is proposed because the extraction site is almost totally cleared.

The only vegetation is pasture with a few *Eucalyptus wandoo* trees on the slopes, *Corymbia Eucalyptus calophylla* on the lower slopes outside the excavation area and *Eucalyptus rudis* on drainage lines and associated with the Brockman River.

2.7 Fauna

The amount of fauna is dependant on the amount and quality of the habitat. The clay excavation area of Lot 7 is cleared and subject to cattle grazing.

As no clearing is required no definitive fauna study has been completed for this site.

There is some itinerant fauna associated with the existing trees outside the excavation area and with the Brockman River such as birds that feed on pasture near the River.

This will be discussed in the attached Water Management Plan which will address the issue of fauna associated with the Brockman River.

Even so the protection of habitat has to be balanced against the need for raw materials that the community demands. Hence the location of the clay activities in cleared land and protection of the watercourses.

Little indigenous fauna is to be expected considering the cleared nature of the site.

The constructed dams may provide some water habitat for frogs and some aquatic birds although, as they are continually changing, little life is ever observed.

2.8 Aboriginal Sites

The Department of Aboriginal Affairs database was consulted on 16 July 2015 and no sites are registered for this portion of Lot 7 or nearby. All key watercourses such as the Brockman River have significance to Aboriginal people and its management forms an integral part of this proposal.

As the land has been farmed, cultivated and grazed for many years it is unlikely that archaeological sites will be found.

Should any site be discovered, Brikmakers will cease operations in the immediate area pending an assessment by a recognised independent consultant.

3.0 PUBLIC CONSULTATION

3.1 Social Impacts

Background

Whilst there will be some local changes with regard to the excavation and transport of clay, both the excavation and transport will be limited. Excavation is to be restricted to a period of two to four months and transport is to be conducted on 25 to 30 days per year.

Locally therefore the main potential impacts will be from excavation such as noise, dust and visual, and impacts from transport along Toy Road.

Other potential impacts have been recognised and have been considered within the management plan which has been designed to minimise impacts wherever possible. The potential impacts are addressed in each particular section of this management plan.

Community Liaison

All nearby residents have been contacted by Brikmakers through telephone and face to face meetings in July and August 2014. The issues raised are listed in Appendix 5.

Contact was attempted with the residents of the eleven nearest properties. In all the residents from seven properties were able to be contacted. Most of these plus two other people signed a letter to the Shire of Chittering which is included in Appendix 5.

Most of the residents were contacted in person and provided with an early proposal. As a result of this consultation, the proposal has been reduced in size. This can be seen by comparing the plan in Appendix 5 with the proposed clay pit.

The proposal has been explained and contacts provided. Brikmakers have listened to the concerns of residents and where possible these have been addressed within this proposal.

The main issues raised related to transport along Toy Road, dust, acid sulfate, visual impacts, general amenity and noise, in addition to a water body that forms only during flood that the local people have termed “Lake Ginniby”. A full list of the issues raised is included in the Summary at the front of this document with comments relating to the issues raised.

The letter sent to the Shire of Chittering and included in Appendix 5, was provided to Brikmakers and raised similar issues.

Each resident will be supplied with a copy of this management plan. They will also be contacted by the Shire of Chittering during the application and assessment process during which they will be able to make formal submissions to the process.

A complaints mechanism is proposed.

3.2 Complaints Mechanism

A large sign will be placed at the entrance to Lot 7 from Toy Road, listing the project, and the contact details including a telephone number of Brikmakers.

The following complaints mechanism is proposed.

1. A complaints book will be provided and maintained by the operator.

2. Upon receipt of a complaint Brikmakers will investigate and action the complaint.

3. When a complaint is found to be legitimate, Brikmakers will, where possible, undertake any reasonable actions to mitigate the cause of the complaint and where possible, take reasonable steps to prevent a recurrence of the situation in the future.

4. Details of any complaints, the date and time, means by which the complaint was made, the nature of the complaint, the complainant, investigations and any resulting actions and the reasons, will be recorded in the Complaints Book.

5. The Shire of Chittering will be informed of any complaint or any other report provided to a Government Department within 3 working days.

6. The complaints book will be made available for viewing, or requested details made available to the Shire of Chittering upon request.

4.0 PROJECT DESCRIPTION

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 other environmental factors are addressed under Environmental Management.

Brikmakers is highly experienced in this type of quarrying and has an excellent record in the excavation of basic raw materials.

Excavation will be conducted to the:-

- *Mines Safety and Inspection Act 1994 and Regulations 1995.*

4.1 Project Summary

Summary

ASPECT	PROPOSAL CHARACTERISTIC
EXCAVATION	
Total area of excavation	• 9 hectares (approx.) • 4 ha stockpile area. • 2 by 1 ha water storage dams.
Resource extraction	• Clay 50 000 – 100 000 tonnes per year conducted in campaigns of 2 – 4 months.
Operational time	• Intermittent and restricted to campaigns • Excavation of 2 – 4 months at a time.
Total estimated resource	• > 1 million tonnes
Life of project	• 10 to 20 years depending on rates of excavation.
Area cleared	• Total of approximately 20 scattered trees to be cleared in stages. • Note that these trees will be replaced by tree belts, screening trees and trees located on rehabilitated slopes.
Area mined per year	• To access clay at the base of the pit and to provide for the various grades of clay excavation will commence with cuts of about 2 - 4ha each. Each stage is approximately 4.5 hectares. When moving to Stage 2 Stage 1 will be in the process of rehabilitation.
Dewatering requirements	• None • Water collecting in the pit will be directed to detention basins and the constructed dam from which there is not anticipated to be any overflow in normal years because of water use and stormwater diversion. • A bypass water diversion system is proposed when rainfall and stormwater lead to the potential for overflow of the dams.

Maximum depth of excavations	• 10 - 12 metres in benches depending on resource and grade.
PROCESSING	
Resources	• The clay will be stockpiled in grades and types but will not be processed on site.
Water requirements	• Minimal: for dust suppression only. The access road from Lot 7 will be sealed for the first 60 metres
Water supply source	• Constructed dams.
INFRASTRUCTURE	
Total area of plant and stock	• Located within or adjacent to excavated area.
Area of settling ponds	• 0.5 hectare in addition to the proposed dams.
Fuel storage	• Proposed to be mobile refuelling with no onsite fuel storage.
TRANSPORT	
Truck movements	• Variable, in campaigns. • When transporting up to 3 000 tonnes per day clay will be transported, generally in truck and trailer combination. That is around 10 laden trucks per hour on 25 days to 30 days per year.
Access	• Toy Road and Bindoon - Mogumber Road, both of which are sealed.
WORKFORCE	
Construction	• 2 – 6 persons
Operation	• 2 – 6 persons
Hours of operation	• Hours of operation, will be 7.00 am to 6.00 pm Monday to Saturday inclusive, excluding Sundays and public holidays.

Pit Footprint

The pit will be located as shown on the attached figures. The total area in two stages is 9 hectares.

Overburden will be taken from the pit footprint to be placed to form the screening bunds to be located along the western side of the pit. The bunds are required to be 7.5 metres high for Stage 1 and 5.0 metres high for Stage 2 as determined by Lloyd George Acoustics. Appendix 3.

The formation of the bunds is considered construction noise under the Noise Regulations. Appendix 3.

Screening bunds will be located along the southern and western sides. At the end of excavation the overburdened will be spread across the excavated surface as part of the final rehabilitation process.

4.2 Excavation Methods

Background

- The resource is to be excavated in campaigns.
- Excavation will remove the soil by scraping from the resource and placing along the perimeter to form a small bund of topsoil for later use in rehabilitation.
- A cutoff drain will be constructed upslope to prevent stormwater entering the pit from above.
- Opening the pit will be completed by dozer (Komatsu 375-5 or similar) and 45 tonne excavator (PC 450 or similar).
- The overburden, which averages 1 - 3 metres, will be placed around the perimeter to form a bund along the sides of the excavation to minimise noise transmission from the active working areas. The bunds will generally be located on the lower side of the excavation along the western and southern sides to provide visual and noise screening.
- Two water storage dams will be completed near the proposed stockpile area. This will be used to collect all surface water from the pit and a little disturbed areas during excavation. Some clay removed from the dams will be transported from site as part of the clay resource.
- The excavation of clay will commence as a relatively small pit of about 2 – 4 hectares but will expand to cover most of the footprint to enable all the clay resource to be obtained to depths of up to 12 metres. Benches will be required.
- The faces of the pit will be relatively steep to maximise depth and minimise the excavation footprint. The methods of excavation, used and pit faces will comply with the *Mines Safety and Inspection Act 1994* and the Guidelines produced by DMP for safe excavation of weathered to partially weathered materials.
- The excavation will be undertaken by a combination of mobile plant depending on the nature of the resource as it changes and the progressive alterations to the staging and design of the pit..
- Up to two 40 tonne dump trucks will carry clay from the pit to the stockpile area to the south. Road trucks will also be loaded directly from the face where possible to prevent double handling, but during winter and on some other occasions loading from stockpiles will be required. Loading from the stockpiles will also be needed where clays are to be blended
- Blending and the recovery of clay from the stockpiles will be completed using a rubber tyred loader or excavator loading directly into road trucks for transport to the factory.
- Reforming of the landform will normally be carried out using a bulldozer, but a scraper or excavator may also be used to redistribute topsoil and overburden.

- During excavation the water will collect in the water storage dam, from which it will be used for dust suppression and other activities.

- Vehicles will normally work on the floor of the excavation and work towards the edges of the excavation as much as possible.

- To ensure a continuous supply of clay throughout the year, clay will be excavated in the drier months and stockpiled for use during the wetter months when excavation is more difficult.

- Because of the nature of the excavation rehabilitation is unlikely to be able to be commenced until excavation is complete. However there may be potential to backfill and replant excavated faces as they are progressively completed.

Geotechnical Stability

End Use and Final Contours

- Rehabilitation of the pit and stockpile areas will be to pasture with two farm dams.

- The southern dam will be constructed during the first stages of site preparation and earthworks to ensure that all surface water can be retained on-site during construction and operation.

- The northern dam will be formed in the southern portion of the pit. That dam will be smaller and shallower.

- Experience has shown that dams of this type, in completed clay pits, can be constructed in a manner whereby they will not overflow. This is done by calculating the runoff from the created catchment and ensuring that it is contained.

- The post excavation faces will be formed in weathered rock and soil. They will be lowered to comply with Department of Mines and Petroleum abandonment of quarries under the Mines Safety and Inspection Act 1994.

- On completion, the land surface will be graded down to the dam in the base of the void. The slopes will be made as gentle as possible but because of a lack of overburden will need to be 1 : 3 and may even be 1 : 2 vertical to horizontal, in the steepest section of the pit to the north east where the depth to rock basement will be the least. The existing land surface locally is already steep in places and on the breakaway slopes at 1 : 2, and the reformed land surface will be designed to most closely match those slopes.

- For materials of this type slopes of 1 : 3 vertical to horizontal grading up to 1 : 2 vertical to horizontal for less weathered rock are acceptable. This complies with the DMP Guidelines of 25 degrees or 1 : 2.2 for weathered materials and 1 : 1.1 for unweathered rock. Compare Figures 7 and 8.

Temporary Closure

- If there is a temporary closure of the pit for some time, other than the normal campaign excavations, the excavations will be made safe in compliance with the *Mines Safety and Inspection Act 1994*, and will include maintaining faces in a stable manner, providing fencing above vertical edges of the pit and the use of warning signs.

- During temporary closure the floor and the slopes and will be retained in a manner which enables the continued capture of surface water to a detention basin or dam. This will ensure that any materials generated from erosion of the excavation surfaces will be retained on site.

- Any below grade clay is classed as overburden/interburden will be removed and stockpiled separately adjacent to the excavation areas and used for rehabilitation of the pit.

Processing and Stockpiles

The location of stockpiles is determined by the need to provide maximum screening.

The stockpile area will be located in an area of around 4 hectares on the southern side of the proposed pit. The ground will be cut on the upslope side and formed to produce a relatively level stockpile area.

Large earth bunds 6 metres high will be formed from overburden and located to the west and south of the stockpile area. The bunds are required for noise and visual management. The elevation of the bunds is recommended by Lloyd George Acoustics. Appendix 3.

All surface water runoff from the stockpile areas will be directed to the water storage dams to enable the settling of sediment and to provide for water use.

1. There will be no on-site clay processing. As there will be no crushing, milling, grinding or screening there will be no requirement for a Licence from the Department of Environment Regulation.

2. Clay will be stockpiled for use during the wetter months when excavation is more difficult. Stockpiles are required because there is insufficient space to store all resources at the South Guildford site.

3. The stockpiles are proposed to be located low in the landscape in the south of the operation.

4. Clay is to be recovered from the stockpiles using rubber tyred loaders loading directly to road trucks.

5. The maximum quantity of clay stored in the stockpiles normally represents 6 months' supply from the pit to ensure a continuous supply of resource throughout the year

4.3 Staging and Timing

- It is anticipated that excavation on site will be intermittent with perhaps two campaigns per year of 2 – 4 months duration.

- The proposed pit will have a life of 10 to 20 years depending on market demands for the products.

- It is anticipated that 50 000 – 100 000 tonnes will be removed each year. The amount of material extracted will depend on the nature of the local and export brick markets and public demand for particular colours of bricks but is anticipated to be nearer 50 000 tonnes per annum in the early years rising in later years.

4.4 Hours of Operation

Hours of operation will continue to be the same as those applying to the currently operating pits in the local area being;

7.00 am to 6.00 pm Monday to Saturday inclusive, excluding public holidays.

The flexibility of a six day week operation is seen as necessary to maintain efficiency as other sites need to be excavated by Brikmakers to gain the clays needed.

Restricting Saturday transport will not change the total number of trucks on the road, but will merely concentrate more trucks into a limited time, making the operation less efficient in terms of machinery usage and therefore increasing costs. In all it is calculated that clay will only need to be transported on approximately 25 days per year.

Clay will be excavated during the hours of 7.00 am to 6.00 pm Monday to Saturday. A six day week operation is seen as necessary to maintain efficiency. In addition this regime reduces the brick manufacturing cost by spreading the high capital cost of equipment over the maximum number of working hours/year.

Although clay is transported throughout the year on 25 to 30 days, excavation will be discontinuous, and dependent on the need for particular clay types, and to avoid very wet conditions.

It is more efficient to excavate material for a period of weeks to produce in pit stockpiles from which clay can be transported in the intervening time, as this maximises the use of equipment. In-pit stockpiles, are often placed in windrows along the working benches by the excavators.

The majority of the time there will be no excavation or transport activity on site because stock piles at the South Guildford works site will be utilised.

The existing crossover to Toy Road, will be sealed and secured with lockable gates and will continue to be used for the duration of the project. The location of the crossover will be moved slightly east to provide better and safer transport conditions.

The location of the access road is shown on the attached figures. The first 50 metres will be sealed to prevent dust from being dragged onto Toy Road.

The access road will need to cross the Brockman River near the existing crossing point. The access, crossing and implications for water flow are discussed in the Water Management Plan at Appendix 2.

Lot 7 is fenced. Access to the pit will be controlled by lockable gates. The nature of the pit is such that it is unlikely to pose a significant risk.

Warning signs for trucks will be used to alert road users to the entrance onto Toy Road.

A sign will be installed at the gate with the contacts for complaints and other communications.

4.5 Equipment

During campaigns there may be one to two pieces of the same plant on site to expedite the winning of resource in a defined time, such as two excavators or two scrapers to rehabilitate the land surface. Although the list of plant below is extensive, it will not all be used at one time and is required to comply with the *Environmental Protection Noise Regulations (1997).* The Acoustic Assessment (Appendix 3) found that the proposed operations will comply with the Regulations.

Summary of Equipment

Equipment	Comment
Site office and/or containers	Brikmakers will use transportable site office and facilities.
Toilet system	A serviced portable toilet system is to be used during operational campaigns.
Weighbridge	A weighbridge is not proposed.
Bulldozer	A Komatsu 375-5 or similar dozer will be used to reform the landscape and open various stages of the pit. Apart from land restoration, operates on the floor of the pit.
Excavator	A 45 tonne excavator PC450 or similar will be used to extract clay from the face and low load the trucks in the pit.
Water tanker	An 8 wheel water tanker or similar will be available on site during excavation and transport operations to provide for dust suppression.
Loader	Used to recover clay from stockpiles and load road trucks. A Komatsu WA500 or similar loader will be used for loading and handling products.

Off Highway Dumpers	CAT 740 or similar off highway dumpers work with the excavator to transport resource from the face to the stockpiles.
Drill rig	A contract drill rig that will be used to test the clays to depth if needed.
Fuel Storage	Fuel is not proposed to be stored on site. Vehicles are refuelled from dedicated fuel supply and maintenance trucks.
Maintenance vehicles	Brikmakers has mobile maintenance truck based facilities that access the site as required.

Loading and Transport

Access will be from Toy Road in the south, crossing the Brockman River via the existing causeway which will have to be updated as it is in disrepair in the location shown on the attached figures.

The number of road truck movements will vary throughout the year depending on whether the resource is being transported or not.

Road transport will use a variety of trucks such as semi-trailers or rigid (8) wheeler trucks to a 5 axle dog trailer.

It is anticipated that up to 3 000 tonnes per day will be transported, generally in truck and trailer combination. That is approximately 10 laden trucks per hour.

A water tanker will be on site during operations at dry times of the year. This will draw water from the sediment settlement dam to wet down the access roads, stockpile areas and pit floor as required.

Generally workers will be on site only during excavation or transport of clay. At such times the workforce will vary from 3 to 6 persons in addition to the truck drivers who enter and leave the site.

A traffic study has been conducted by Shawmac and found that the road network is suitable for the proposed number and type of trucks.

4.6 Water Usage

Water used for on site dust suppression is drawn from the proposed storage dam.

It is proposed to excavate two dams for water storage that will accept runoff from the pit and stockpile area. The dams will act as a water source.

The volumes of water, recharge and other aspects are discussed in the Water Management Plan in Appendix 2.

A water tank and standpipe is available for the wetting down roads.

Potable water will be brought to the site as required.

4.7 Safety

Operations

Excavation will be conducted to *Mines Safety and Inspection Act 1994 and Regulations 1995.* Excavation practices, and operations procedures are in compliance with the Act. Health and safety issues are overseen by the Department of Mines and Petroleum.

It is anticipated that the excavation will be up to 10 - 12 plus metres below natural surface with sloping batters. Fences and warning signs required by the Department of Mines and Petroleum will be maintained.

Regular inspections and audits are carried out by officers of the Department of Mines and Petroleum to inspect safety, operational procedures and workplace health such as dust and noise.

Brikmakers 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.

Brikmakers use a Safety Management Plan and a site specific Emergency Response Plan to cover operational procedures, which include workforce induction and training to ensure that all employees involved are made aware of the environmental and safety implications associated with all stages of the on site activities.

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

All vehicles have two way radio capability. No light vehicles will be permitted on site without registering with mobile plant on site.

The site will be registered under the Department of Mines and Petroleum SRS reporting system for mine sites and quarries.

Emergency

The site is within mobile phone contact and all vehicles are equipped with two way radios.

Safety management and operating procedures are proposed and the site will be registered with the Department of Mines and Petroleum Safety Management System through a Project Management Plan.

Fire

Lot 7 is a normal rural property used for grazing. It is installed with firebreaks and other required measures to minimise fire risk.

There is less potential fire risk from quarries than other land uses because quarries clear land and vehicles are restricted to cleared access roads, the pit floor, processing and stockpile areas. The 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 no greater than a rural property.

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

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

A Fire Management Plan will be prepared to meet the requirements of the Shire of Chittering.

Not withstanding that, the fire risk is considered low. There are a number of management actions that can be taken in quarries to minimise fire risk and these are used wherever possible. The actions are 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 Safety Management Plan
- Provide an emergency muster area, communications and worker induction and training
- Maintain the site radio contact procedures
- Provide fire extinguishers to vehicles
- Establish on site water supplies for potential use in extinguishing fire
- Secure the site from unauthorised access
- Maintain fire breaks
- The safety of workers is managed through a Safety Management Plan.

Excavation Safety - Applicable Legislation / Policies

- *Mines Safety and Inspection Act 1994 and Regulations 1995.*

Commitments to Safety Management

- Brikmakers is committed to maintaining a safe working environment.
- A Fire Management Plan will be prepared for the operations.
- Safety Management procedures are implemented prior to commencement.
- All workers are to be provided with site induction and necessary training prior to entering the site.

5.0 ENVIRONMENTAL IMPACTS AND MANAGEMENT

5.1 BIODIVERSITY MANAGEMENT PLAN

5.1.1 Vegetation and Flora

The resource area is cleared apart from several *Eucalyptus wandoo, Corymbia (Eucalyptus calophylla* and *Eucalyptus rudis* trees. *Casuarina obesa* trees occur closer to the Brockman River outside the disturbed areas.

The access road is located in an area of river that does not have trees and it is likely that no trees associated with the Brockman River will require clearing.

Several small trees and *Acacia* may have to be cleared for the relocation of the crossover to Toy Road to provide a safer entrance.

Land Clearing

Even though only minor land clearing is proposed a Clearing Permit from the Department of Environment Regulation through the Environmental Protection (Clearing of Native Vegetation Regulations) 1994, will be applied for.

Fauna

As the site is cleared and already planted to pasture there will be minimal potential impact on fauna.

The main potential impact will be the crossing of the Brockman River. This is considered in the attached Water Management Plan.

Wetlands

There are no wetlands on the resource area.

The Brockman River represents a wetland environment even though it is essentially now a water channel through a pasture area. It is classified as a Conservation Category Wetland.

Many years ago the previous land owner modified the channel in this location, deepening and straightening it. Therefore the habitat quality has been significantly reduced compared to the original condition of the river.

The crossing is described in the Water Management Plan attached as Appendix 2.

Biodiversity - Applicable Legislation / Policies
• *Environmental Protection (Clearing of Native Vegetation Regulations) 1994*
Commitments to Biodiversity Management
• The excavation areas are cleared. • Brikmakers will not impact on the adjoining remnant vegetation by the proposed excavation.

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

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.

On this site, the resource area is cleared and has been used for pasture for many years.

The access roads are hard gravel sourced from on site, with a sealed access road from Toy Road entrance.

However as a matter of good environmental management Brikmakers will use practices that will minimise the introduction of weeds or plant pathogens.

The aim of dieback management during excavation is to minimise the risk of entry of dieback into the site.

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

The other management is to ensure that all excavation equipment and road transport vehicles are clean and free from soil and vegetable matter prior to entering the operations. This is normal practise by Brikmakers who strive for high levels of resource hygiene to minimise any potential for dieback spread.

The following actions will be taken on this site.

- Excavation will be undertaken using practices recommended by DPaW. See *CALM Dieback Hygiene Manual 1992* which is more practical and *CALM (PDaW)Best Practice Guidelines for the Management of Phytophthora cinamomi, draft 2004.* See also *Dieback Working Group 2005, Management of Phytophthora Dieback in Extractive Industries.*

- Vehicles are to be prohibited from entering remnant vegetation, apart from normal travel along made firebreaks.

- The pit will operate in a manner that is internally draining to retain all surface water.

- All vehicles and equipment to be used during land opening or land reinstatement, are clean and free from soil or plant material when arriving at site. This will occur at the previous site or at the Brikmakers works site by using brushing and compressed air.

- Illegally dumped rubbish is to be removed promptly**.**

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

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

- Compliance with the Weed Management Plan, see Section 5.1.3.

Dieback - Applicable Legislation / Policies

- *DPaW (CALM) Dieback Hygiene Manual 1992.*
- *DPaW (CALM) Best Practice Guidelines for the Management of Phytophthora cinamomi, draft 2004.*
- Dieback Working Group 2005, *Management of Phytophthora Dieback in Extractive Industries.*

Commitments to Dieback Management

- Brikmakers will not impact on the adjoining remnant vegetation by the proposed

excavation.

- Brikmakers will maintain the Dieback Management Policy to reduce the spread of *Phytophthora spp*

5.1.3 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.

Weed management is already in place as part of normal farming operations and that practise will be continued. The methods outlined below illustrate the methods that are currently used and will be used.

On this site, the disturbance area is cleared and covered by pasture.

The access roads will be hard gravel sourced from on site with a bitumen seal entrance.

As a matter of good environmental management Brikmakers will use practices that will minimise the introduction of weeds or plant pathogens in line with normal farm management on Lot 7.

Generally if the actions taken for Dieback are applied they will also control weeds.

The management of weeds use the following principles.

- All vehicles and equipment used during site preparation, excavation and closure are to be clean and free from soil or plant material when arriving at site. See Dieback Management Plan.
- Vehicles are prohibited from entering remnant vegetation, apart from normal travel along made firebreaks.
- Illegally dumped rubbish is the major source of weeds and is removed promptly.
- No weed contaminated or suspect soil or plant material is brought onto the site.
- When clearing land or firebreaks vehicles are to work in conjunction with dieback principles and work from areas of better vegetation towards areas of lower quality vegetation.
- Weed management works from least affected areas to most affected, working with the normal pasture management on Lot 7.

- Declared weeds are treated promptly by digging out or spraying, if present, through the normal farm management procedures.

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

- Compliance with the Dieback Management Policy.

Weed - Applicable Legislation / Policies
• *Agriculture and Related Resources Protection Act 1976.*
Commitments to Weed Management
• Brikmakers will use the weed policy to try and prevent the introduction of Declared, Environmental or other weeds to the site. • Brikmakers will work with the landholder to manage weeds on site.

5.2 OFFSITE IMPACTS MANAGEMENT PLAN

5.2.1 Surrounding Landuses and Buffers

- The site lies within the Special Control Area 6.2, Landscape Protection (Shire of Chittering). The operation has been designed to comply with the policy and minimise visual impact.
- Only 9 ha will be impacted.
- The end use is to pasture with local native vegetation on the steep eastern slopes formed during excavation.
- The operations comply with the EPA generic buffers, the Department of Health Guidelines and Queensland Primary Industries Guidelines.
- There will be no alteration to the ridge and no daylight out as only the slope of the ridge will be slightly modified (To daylight out means that the ridge is removed exposing the sky).
- The use of bunds and tree planting are to be used to minimise visual impact from local dwellings, Toy Road and the wider area.
- The site lies within the Agricultural Resource Zone. The proposal is to maintain the agricultural values and enhance them with the creation of the two dams which will increase the capability of the land.
- Where possible the buffer vegetation will be retained to minimise the visual impact.

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

EPA guidance "Separation Distances between Industrial and Sensitive Land Uses", June 2005 lists the generic buffers for sand and limestone pits as 300 - 500 metres depending on the extent of processing. The generic guide for clay extraction is listed as 500 – 1000 metres depending on the scale and processing.

Generic Buffers are defined by EPA 2005 as the buffer distances at which the potential impacts are able to be managed in the absence of site specific studies.

There will be no on site crushing or processing and the excavation and transport will be very limited in operational times. Therefore the extraction of clay on this site and other pits is at the lowest potential impacts and is more similar to sand or between sand and limestone based on the types of mobile plant used and potential impacts.

Limestone is normally excavated by bulldozer and is crushed. Clay is extracted by bulldozer and excavator and does not require crushing, being excavated and either loaded directly onto trucks or stockpiled for later transport.

A generic buffer relates to the distance at which there are unlikely to be any problems without some further investigations and does not mean that smaller buffers are not acceptable, (*EPA Guidance for the Assessment of Environmental Factors No 3 June 2005 Section 4.4.1*).

The EPA of Victoria uses a generic buffer of 200 – 300 metres for extractive industries of this type.

The Shire of Chittering Local Law provides for a 500 metre buffer with some discretion for Council.

The influence of slopes and trees is recognised in the *South Australian EPA Guidelines for Separation Distances, December 2007*. The South Australian EPA Guideline recommends a buffer distance of 300 metres and then for decreases of x 0.68 for significant "hills and valleys" and x 0.85 for "level wooded country". The slope and brow of the hill to the dwelling to the north will reduce the buffer requirement, but for other dwellings, which are similar in elevation or lower, the buffers will not be reduced under the South Australian Guidelines; that is the South Australian buffer Guideline is 300 metres.

Based on the nature of the clay operations, and comparison to other States, a generic buffer of 300 – 500 metres is appropriate in the absence of "site specific studies". All dwellings comply with that buffer distance.

In addition, site specific studies have been conducted for dust, water, noise and visual impacts and demonstrate that the separation distances are acceptable and all potential impacts can be managed at the buffer distances provided.

Lloyd George Acoustics found that the proposed operations will comply with the *Environmental Protection (Noise) Regulations 1997.* The Noise Study recommended that perimeter bunding to the pit and stockpile area of between 5 to 7.5 metres be used and this is proposed. See the Noise study in Appendix 3.

Assessments of the dust risk are considered in Appendix 1.

The issue of appropriate buffers is a matter of the distance and protection measures to prevent impact on adjoining land users. This applies mainly to noise, dust and visual impact, all of which are treated separately. Therefore excavation has been designed in a manner to minimise potential impacts on sensitive premises

Buffer distance and the impact of trees was considered by the Department of Natural Resource in Queensland in a study at Emerald for spray drift and dust. This showed that a tree buffer of 20 metres was sufficient to provide fine particulate management and barrier in the form of spray drift; Primary Industries Standing Committee, 2002, Spray Drift Management, CSIRO Publishing, Report 82. The trees within the flow path will help break up the wind.

Dust is readily stopped by tree belts and distance with which the site complies. Planning Guidelines Separating Agricultural and Residential Land Uses, Department of Natural Resources Queensland 1997 (Pages 65 – 111) and Department of Health WA, 2012, Guidelines for Separation of Agricultural and Residential Land Uses use the same criteria (Pages 112 – 118). Both these sources use the Emerald Study but illustrate the buffer requirements and control afforded by trees for dust.

The Queensland Guidelines predominantly relate to agricultural spray drift, but, based on particle size, also relate to dust.

The Guidelines provide for a buffer of 300 metres for open agricultural land, dropping down to 40 metres where an effective tree belt is in place. The Western Australian Department of Health also uses the same guidelines. Appendix 1. All dwellings comply with a 300 metre buffer distance.

The closest dwelling to the pit is 450 metres to the west. The dwelling is currently lived in by the owner of Lot 7.

The next closest dwellings are 800 metres from the edge of the pit to the north behind the crest of the plateau ridge, and 750 metres to the south.

These distances to all dwellings are well within what is assessed as being an appropriate setback for the proposed development based on the nature of the operation and the site specific studies.

5.2.2 Aesthetics

The pit is located in an elevated position that faces towards the south and as such is visible from the south.

Even though excavation is worked from inside out on the floor of the pit up to 12 metres below natural ground level a portion of the pit will be visible from outside Lot 7.

Section lines of the proposed management are provided in Appendix 4.

Generally visual Impact can occur in a number of circumstances, such as 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.

Guidance on visual impact is contained in Department of Planning, 2007, *Visual Landscape Planning in Western Australia (DoP 2007)*. Guidance can also be found in Forest Commission of Victoria, undated, Landscape Types of Victoria. The operations have been designed to the standards and methodology of Department of Planning, 2007.

Good buffers of >100 metres are proposed to the lot boundaries, well in excess of normal quarry operations.

Visual management has been considered during the design of the pit, the methods of operation and potential visual impacts. The main potential impacts are those that impact on the rural amenity and character of the location.

The proposed clay excavation is shielded by the existing earth bund, existing planted buffers, and setbacks from Toy Road.

Due to the terrain and need to stockpile overburden above ground it is difficult to shield all aspects of the operation from Toy Road, and glimpses are possible. Refer to Figures 1S to 3S in Appendix 4. The area from which the upper portion of the pit may be visible without the presence of trees is shown in Figure 3W in Appendix 4.

The proposed bunding, planted trees and existing trees will provide adequate screening of the excavation.

The following table summarises the operational procedures and commitments towards visual management.

OPERATIONAL PROCEDURES	COMMITMENTS ON ACTIVITIES CONDUCTED ON SITE
• Locate exposed features behind natural barriers and landform.	• The pit will be worked from below natural ground level, using the land surface to provide screening. • The pit will be some 10 – 12 metres deep. • Staging will commence in the south to enable that part of the resource to be rehabilitated first and the stockpile areas and perimeter bunding to be formed.
• Operate from the floor of the pit below natural ground level.	• This is proposed but there will still be some temporary visual impacts.
• Avoid breaks in the skyline due to workings and haul roads.	• The excavation areas are below the high natural ground features. • The active areas are located on the mid to lower slopes landscape behind existing trees and proposed 5 – 7.5 metre bunding and proposed tree planting. • The existing ridgeline will not be altered.
• Place overburden and interburden in positions where they will not be seen or can form screening barriers.	• Vegetated perimeter bunds are to be provided where they can be formed and will provide visual and noise management. • See Figure 6.
• Stage workings and progressive rehabilitation to provide visual protection of later activities.	• The excavation areas are to be worked in two stages from south to north. • See Figure 6.
• Adopt good house keeping practices such as orderly storage and removal of disused equipment or waste.	• Brikmakers maintain a tidy site at all their operations.
• Provide progressive rehabilitation of all completed or disturbed areas.	• The site will be prepared as a void and be progressively rehabilitated to pasture and two farm dams.

• Minimise the amount of ground used at any one time.	• This is to be used wherever possible.
• Install fences and gates which are compatible with the style of the area.	• Fences and locked gates are in place for the farming operations.
• Minimise offsite impacts of night lighting.	• Night operations are not proposed.
• Paint and maintain buildings exposed, plant and equipment with low impact colours.	• No permanent plant will be used. • Any temporary buildings if used are to be located behind vegetation, bunding and landform on the mid to lower slopes near the farm dam and adjacent to the stockpile area.
• Locate roads and access to prevent direct views into the site	• The access road will be located along the alignment of the existing farm access.
• Ensure transport vehicles do not spill material on public roads and ensure prompt cleanup if it occurs.	• Company practices and driver/operator training address the need to minimise spill by ensuring the trucks are not overloaded or material is not left on the outside of trays. • Collection of spills is carried out when reported. • Drivers are instructed to be responsible for their loads.

Buffers and Aesthetics • *State Planning Policy 2.4 – Basic Raw Materials* • *State Industrial Buffer Policy 2004.*
Commitments to Safety Management • Brikmakers is committed to maintaining the existing buffers and vegetation screening.

5.2.3 Noise

General Noise Regulation

Noise can originate from a number of operations and may impact on onsite workers, or travel offsite and impact on external sensitive premises. Both potential noise impacts are addressed by reducing the noise generated from the quarrying operations.

Offsite noise is governed by the *Environmental Protection (Noise) Regulations 1997.*

Occupational noise associated with the quarrying processes falls under the *Mines Safety and Inspection Act 1994 and Regulations 1995*. The management of occupational noise is normally handled by providing all necessary hearing protection, as well as conducting worker inductions, and educational programs for all staff. Regular site audits of quarry and mining operations are normally conducted by the Department of Mines and Petroleum.

The provisions of the *Environmental Protection (Noise) Regulations 1997*, are provided in the Noise Assessment conducted by Lloyd George Acoustics.

Environmental Noise

An environmental noise assessment has been completed by Lloyd George Acoustics and is attached as Appendix 3. The assessment was conservative and is based on a transport regime of 16 trucks per hour rather than the 8 – 10 expected, to simulate worst case scenario.

Lloyd George Acoustics found that the site can comply with the Noise Regulations under all operating conditions when earth bunding of 5 – 7.5 metes high is used along the western and southern sides of the pit/stockpile area. See Appendix 3.

The overburden bunds are used to provide screening from the the nearest dwellings with operations conducted on the floor of the pit and behind the bunds.

Sound travels mostly in a “line of sight” manner. Solid barriers are very effective in attenuating or suppressing sound transmission.

There are a number of management actions that are taken in quarries to minimise noise generation or travel that will be used on site. It should also be noted that not all equipment operates at the same time.

These measures are routinely used by Brikmakers where applicable and as the opportunity presents to minimise noise on site.

Occupational Noise

Occupational noise associated with the quarrying processes falls under the *Mines Safety and Inspection Act 1994 and Regulations 1995*.

The management of occupational noise is normally handled by providing all necessary hearing protection, as well as conducting worker inductions and educational programs for all staff. Regular site audits of quarry and mining operations are normally conducted by the Department of Mines and Petroleum.

As part of its commitment Brikmakers continues to be pro-active with its worker safety awareness;

- by providing all necessary safety equipment such as ear protection,
- identifying sections of the plant where hearing protection is required, as well as,

- conducting induction and educational programs for its staff, and
- using equipment that is in good order and maintained to minimise noise.

The operating noise levels around the site are regularly monitored by independent consultants in accordance with the *Mines Safety and Inspection Act 1994*, and the results communicated to the Department of Mines and Petroleum (DMP). All staff are provided with comprehensive ongoing training on noise protection as part of Brikmakers' commitment to occupational health and safety.

The DMP conducts Occupational Noise Audits at quarries, as part of their supervisory role.

Warning signs are used to identify areas of potential noise.

The flowing table summarises the operational procedures and commitments to noise management.

NORMAL OPERATIONAL PROCEDURES	COMMITMENTS ON ACTIVITIES CONDUCTED ON SITE
• Comply with the *Environmental Protection (Noise) Regulations 1997.*	• Brikmakers will comply with the Regulations.
• Maintain adequate buffers to sensitive premises.	• Apart from the dwelling near the western boundary that is occupied by the owner of Lot 7 the closest sensitive premises to excavation is 800 metres to the north behind the brow of the plateau. • A second dwelling lies 200 metres from the entrance from Toy Road at a distance of 750 metres from the pit and stockpile areas. • Vegetated screening bunds of 5 – 7.5 metres are proposed for the stockpile area and pit to provide noise mitigation to that dwelling. • An acoustic study has been completed by Lloyd George Acoustics who determined that the proposed operations can comply with the Regulations.
• Locate exposed features behind natural barriers and landform.	• The pit will be excavated at a large distance from the dwellings to the south. • The design of the pit is to use the natural landforms and constructed bunds. • The operations have been shown by Lloyd George Acoustics to comply with the Noise Regulations.
• Operate from the floor of the pit below natural ground level.	• This is proposed at elevations of 10 – 12 metres below natural ground elevation.
• Place overburden and interburden dumps into positions where they can form screening barriers.	• Perimeter bunding of 5 – 7.5 metres is proposed to provide maximum noise screening. Appendix 4 and Figure 6.
• Design site operations to maximise the	• See above and in 5.2.1 Surrounding

separation and protection from sensitive premises.	Landuse and Buffers.
• Maintain all plant in good condition with efficient mufflers and noise shielding.	• Brikmakers has modern equipment that is maintained in good condition.
• Maintain haul road and hardstand surfaces in good condition (free of potholes, rills and product spillages) and with suitable grades.	• This is proposed. The existing farm access will be upgraded and maintained to minimise noise generation. • The first part (50 metres) of the access road is to be sealed.
• Implement a site code outlining requirements for operators and drivers.	• Brikmakers has site induction and training for all personnel for all their operations.
• Use equipment that will minimise noise generation.	• The most efficient and environmentally suitable equipment is used.
• Shut down equipment when not in use.	• Brikmakers use this policy to save fuel and maintenance costs in addition to noise minimisation.
• Scheduling activities to minimise the likelihood of noise nuisance.	• Operations are to be in campaigns that are intermittent through the year.
• Fit warning lights, rather than audible sirens or beepers, on mobile equipment wherever possible.	• Lights or low frequency “frog” beepers are to be used rather than high pitched beepers to restrict noise intrusion.
• Use transport routes that minimise community disruption.	• Exit is to Toy Road. • The first part of the access road and the transport route is sealed. • Transport will only occur on 25 to 30 days per year. • Transport on public roads is exempt from the *Environmental Protection (Noise) Regulations 1997.*
• Avoid the use of engine braking on product delivery trucks in built up areas.	• Truck drivers are instructed to minimise the use of engine braking.
• Minimise and conduct at the least disruptive times, non day to day activities such as vegetation, topsoil or overburden stripping on exposed ridgelines.	• Quarrying operations are to be conducted during the approved working hours.
• Provide a complaints recording, investigation, action and reporting procedure.	• A complaints recording and investigation procedure is proposed. • See Section 3.2 Complaints Mechanism.
• Conduct training programs on noise minimisation practices.	• Brikmakers maintains site induction and training for all personnel.
• Provide all workers with efficient noise protection equipment.	• All personal noise protection equipment are provided to staff.

- **Noise Management - Applicable Legislation / Policies**

- *Environmental Protection (Noise) Regulations 1997.*
- *Mines Safety and Inspection Act 1994 and Regulations 1995.*

Commitments to Noise Management

- Brikmakers are committed to minimising noise emissions and will implement the measures outlined above.
- Brikmakers will comply with the *Environmental Protection (Noise) Regulations 1997.*

5.2.4 Dust

A comprehensive Dust Management Plan is provided in Appendix 1. Key points are summarised below.

Excessive dust has the potential to impact on both the workers and the adjoining land.

Dust can originate from a number of operations and may impact on onsite workers, or travel offsite. Potential dust impacts are addressed by reducing the dust generated from the quarrying and transport operations.

Dust emissions fall under the *Guidance for the Assessment of Environmental Factors, EPA, March 2000*. Assessments of the potential dust risk are normally made using the Land development sites and impacts on air quality, *Department of Environmental Protection and Conservation Guidelines, November 1996* and *DEC (DER) in 2008* released a *draft Guideline for the Development and Implementation of a Dust Management Plan.* These documents are still in place but are incorporated into the *DEC 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities.*

This document is not really applicable to excavation and quarries because it is to be used to assess the management required prior to any dust suppression measures being implemented.

Occupational dust associated with the quarrying processes falls under the *Mines Safety and Inspection Act 1994 and Regulations 1995*.

The main potential for dust generation is from the movement of traffic on the access road and within the pit and active areas in summer. The first 50 metres of the access road is to be sealed.

Excavation on site is intermittent with several excavation campaigns through the year per year being typical. Transport of clay from the stockpiles occurs on other days and during excavation.

The closest dwellings are at 750 metres from the operations apart from the owner of Lot 7 who lives at the closest house 170 metres from the western boundary at a distance of 450 metres from the proposed operations.

A water tanker is to be maintained on site during excavation in summer and at other times of the year as required when the risk of generating dust is greater. The water will be used to settle dust on the pit floor and to reduce the dust emanating from any transport on internal access roads as required.

The loads on trucks are covered as required for road transport.

Apart from the initial soil clearing and surface reinstatement, operations will be conducted 10 to 12 metres below natural ground level.

The proposed pit and stockpile operations comply with the EPA generic buffer Guidelines and can be developed in a manner that will not lead to dust impacts on adjoining land users or sensitive premises.

See attached Dust Management Plan in Appendix 1.

Dust Management - Applicable Legislation / Policies

- *Guidance for the Assessment of Environmental Factors, EPA, March 2000.*
- *Land development sites and impacts on air quality, DEP, 1996.*
- Department of Environmental Protection Guidelines, November 1996 and *DEC 2008, A guideline for the development and implementation of a dust management plan.*
- *DEC 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities.*

Commitments to Dust Management

- Brikmakers will take the necessary steps to manage and contain dust by implementing and maintaining the Dust Management Plan (Appendix 1).

- No visible dust is to cross the property boundary as a result of excavation activities.

5.3 WATER MANAGEMENT PLAN

The hydrogeology, management of surface and groundwater in addition to operational procedures to manage water are addressed in the attached Water Management Plan attached as Appendix 2.

A Hydrogeological study was completed by Meyer Water and Environmental Solutions based on field inspections in February 2005. See Appendix 2. Myer Water and Environmental Solutions found that harvesting water from the pit and stockpile area in addition to the use of cutoff drains around the facility will not significantly impact on the recharge to the local drainage lines and the Brockman River.

The Brockman River is normally brackish with salinity increasing in summer through evaporation and decreasing in winter through dilution effects.

Brikmakers use strict practices to ensure that servicing, operations and other site activities protect the on site water quality at all their operations.

A water monitoring program is proposed with water samples collected in Autumn and Spring from water courses in which excess water is directed. It is anticipated that the dams will not overflow as all collected water will be retained for dust suppression.

The watercourse along the west of the proposed clay excavation and stockpile area is to be protected with a setback to minimise potential impact, with all surface water retained and not released to the watercourse.

The small drainage line that arises east of the pit will be intersected by the pit and will be diverted south and west around the stockpile area to the constructed dam.

All water will be retained on site during operations.

The crossing of the Brockman River currently has an old causeway that has fallen into disrepair and is to be repaired to form the access to the proposed operations.

The causeway has been designed to minimise impact from floods on either the access or the Brockman River as described in the Water Management Plan in Appendix 2.

Flooding is considered in the Water Management Plan in Appendix 2. During floods which occur every few years water lays in portion of the Brockman River Valley floor to the east, downstream and well away from the extraction and transport areas. Each winter some water pools on the alluvial flats east from the access crossing for variable times depending on the rainfall pattern. S

The ecological values of the Brockman River have also been considered and protected. Appendix 2. There is not anticipated to be any adverse impacts on water quality or surface flows in the Brockman River.

See the attached Water Management Plan for details. Appendix 2.

Water Management

- *Mines Safety and Inspection Act 1994 and Regulations 1995.*
- *DOW – DMP Water Quality Protection Guidelines for Mining and Mineral Processing.*
    - *Overview*
    - *Minesite water quality monitoring*
    - *Minesite stormwater*
    - *WQPN 28 Mechanical servicing and workshop (2006)*
    - *Mine dewatering*
    - *WQPN Landuse Compatibility in Public Drinking Water Source Areas (2004)*
    - *WQPN 15 Extractive Industries near sensitive water resources. (Not strictly relevant to the site but the methodology is useful).*

Commitments to Water Management

- Brikmakers is committed to complying with the attached Water Management Plan.
- The relevant water protection policies will be complied with.
- There are not anticipated to be any significant impacts on water quality or flows in local water courses or the Brockman River.

5.4 CLOSURE AND REHABILITATION

5.4.1 Land Use Policies

The site is located on Lot 7 Toy Road, Bindoon. An approved gravel excavation has operated nearby on the plateau to the east of the site for fifteen years.

The site lies in the Agriculture Resource Zone and Special Control Area 6.2 Landscape Protection Area.

The rehabilitated land surface will be returned to pasture, two farm dams and tree belts.

5.4.2 End Use

The extraction areas will be returned to pasture as part of an operating farm combined with tree belts and local native vegetation on the steeper slopes.

The two dams will be retained as farm dams to increase the agricultural capacity of Lot 7.

5.4.3 Closure Considerations

The key closure and rehabilitation principle is to ensure that the water quality of the Brockman River Catchment and the agricultural quality of the site is maintained.

The requirements for closure are the commitments to revegetation on closure on and offsets to the clearing of some 20 trees provided by the planting of 500 trees.

The variation is tree numbers is related to some trees planted on screening bunds being removed at the end of excavation as the overburden is used to restore the soils across the excavation and stockpile areas.

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

The post excavation faces will be formed in weathered rock and soil. They will be lowered down to comply with *Department of Mines and Petroleum Abandonment of Quarries.*

For materials of this type slopes of 1 : 3 vertical to horizontal grading up to 1 : 2 vertical to horizontal for less weathered rock. This complies with the DMP Guidelines of 25 degrees or 1 : 2.2 for weathered materials and 1 : 1.1 for unweathered rock.

If there is a temporary closure of the pit, other than the normal campaign beaks, the excavations will be made safe in compliance with the *Mines Safety and Inspection Act 1994*, and will include maintaining faces in a stable manner, providing fencing above vertical edges of the pit and the use of warning signs.

During temporary closure the floor and the slopes will be retained in a manner which enables the capture of surface water in sumps, detention basins and the dams. This will ensure that any materials generated from potential erosion of the excavation surfaces and hardstand will be retained on site.

5.4.4 Rehabilitation Objectives

Rehabilitation will be directed towards the final end land use of pasture.

The steeper north eastern slope will be planted with some trees.

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

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

Appropriate contour banks will be used to control and harvest surface water from the post excavation landform.

Brikmakers involves the site staff in the objectives of land restoration and revegetation to assist in providing an awareness to site ownership and a better rehabilitation outcome.

Completion criteria

- Stable post - excavation landscape, and the minimisation of wind and water erosion.
- Match the final land surfaces and landform to those of the face of the ridge and local area.
- Ensure that the excavated area is stable and to the requirements of the Department of Mines and Petroleum *Abandonment of Quarries* and the *Mines Safety and Inspection Act 1994.*
- Provide for the protection of the local groundwater resource in terms of both quality and quantity.
- Provide two farm dams in the base of the void or nearby to accept all water from the rehabilitated slopes.
- Establish pasture suitable for grazing over the bulk of the rehabilitated disturbed area.
- Achieve weed species at levels not likely to threaten the pasture and land uses.

5.4.5 Site Restoration

Landform Reconstruction and Contouring

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

The final landform will be formed to the final concept plan Figure 8.

The land surface will be left as a sloping land surface to match as closely as possible, the existing landform.

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.

The land surface will be graded down to the dam in the base of the void. The slopes will be made as gentle as possible, but, because of reduced overburden will need to be 1 : 3 and even 1 : 2 vertical to horizontal, on the upslope sides near the ridge. The existing land surface near the breakaway are already steep in small areas at 1 : 2, and the reformed land surface will be designed to most closely match those slopes.

The steeper slopes will increase water harvesting from rainfall events and therefore will add to the productivity of the post excavation land surface by slightly increasing the available water collected in the dams.

Contour/interceptor banks will be constructed on the reformed surfaces to prevent rain from causing excessive soil movement in susceptible areas of the reconstructed land surface.

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

Prior to seeding, the surface will be deep ripped as required.

Topsoil and Overburden Removal - Replacement

Where possible topsoil and overburden will be directly transferred from an area being cleared to an area to be rehabilitated.

Brikmakers will spread any recovered topsoil to increase the total organic carbon fraction, improving soil properties such as resistance to water and wind erosion and moisture retention.

Topsoil will be spread directly from an area being cleared where possible, otherwise reclaimed from a topsoil storage dump. On this site there is likely to be only limited opportunity for the direct transfer of topsoil based on the nature of the excavation.

Overburden, will be used to form screening bunds to provide visual and noise screening to the west of the pit. From there it can be used for the rehabilitation process.

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

Where possible topsoil clearing and excavation will be undertaken in wetter months when soil are moist but not too wet to operate on.

Pre-Planting/Seeding Weed Control

Pre-seeding weed control is only likely to be required where topsoils are used that contain weed species. As the current land use is pasture it is not anticipated that weed control will be other than normal agriculture practice.

As required, weed control will normally only be 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 some plant species but may be required if the weed load is to be reduced.

In May, after the first autumn rains, check for broadleaf weed germination.

The Weed Management Plan will form the basis of weed treatment. Weed management will be integrated with the normal farm practise on site.

Revegetation

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

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

Revegetation of screening bunds will consist of temporary fast growing trees such as Local *Acacia* and *Eucalyptus*. Species recommended are

Eucalyptus marginata
Eucalyptus accedens
Eucalyptus wandoo
Corymbia (Eucalyptus) calophylla
Eucalyptus loxophleba
Eucalyptus rudis
Acacia saligna
Acacia microbotrya
Acacia acuminata
Allocasuarina fraseriana
Allocasuarina huegeliana
Casuarina obesa

Pasture Regeneration

1. Seeds of pasture species are spread during autumn if there is insufficient in the existing topsoil. Seeding is normally undertaken by the land holder or a contractor.

2. However if sufficient seed is not available or does not germinate then additional seed will be added. The establishment of pasture, including the selection of the pasture species is extracted from publications produced by the Department of Agriculture and Food.

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

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

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

6. The amount of fertiliser applied will depend on the species used; for example when planting legumes nitrogen fertiliser is reduced or not used as it inhibits nitrifying bacteria. Also the amount of sulfur, phosphate and trace elements used depends on the species and residual amounts retained in the soil. As a guide 50 kg/ha of superphosphate is likely to be used to assist legume and grass based pasture.

Native Tree Vegetation on the steeper slopes in the North east

7. Any trees for tree belts are to be planted as tube plants in winter, (June to August) installed with 10 g fertiliser tree tablet next to each plant. Prior to planting the ground is deep ripped and the competition from pasture species removed through spraying or mechanical removal.

Fertiliser

1. Fertiliser will be integrated with normal agricultural practice for pasture.

2. Fertiliser will not normally be required for tree planting but if used will be equivalent to a 10 gm fertilizer tablet.

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 on flat or gently sloping loam and gravel sites such as this.

3. The soils are likely to be loamy and slowly permeable. Therefore surface water runoff will normally occur during heavy rainfall events. Even so experience shows that there is minimal non wetting and surface particle movement under such conditions. The final land surface will be formed to be internally draining to retain precipitation.

4. Clay and the associated loam soils are not susceptible to wind erosion.

5. Replacing the cover crops at the first opportunity is the best means of minimising wind erosion.

6. Contour/interceptor banks will be constructed to prevent rain from causing excessive soil movement and to manage surface water erosion risk on loam soils. These will be constructed to normal agricultural standards.

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

Monitoring

1. During late summer an assessment of the success of the pasture 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, to comply with the approvals for the excavations. These are 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 to ensure satisfactory establishment of pasture.

5. In conjunction with the landholder, provide ongoing weed management to identify and treat significant environmental weeds or weeds likely to impact on the rehabilitation.

6. 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

Closure and Revegetation
• *Mines Safety and Inspection Act 1994 and Regulations 1995.* • *Department of Mines and Petroleum Abandonment of Quarries.* • *Shire of Chittering Local Planning Stragtegy.* • *Commitments made in Excavation Management Plan.* • *Conditions placed on the proposal through Planning Consent.* • *Conditions imposed by way of any Clearing Permit.*
Commitments to Closure
• Brikmakers is committed to restore the site to pasture local trees and farm dams.

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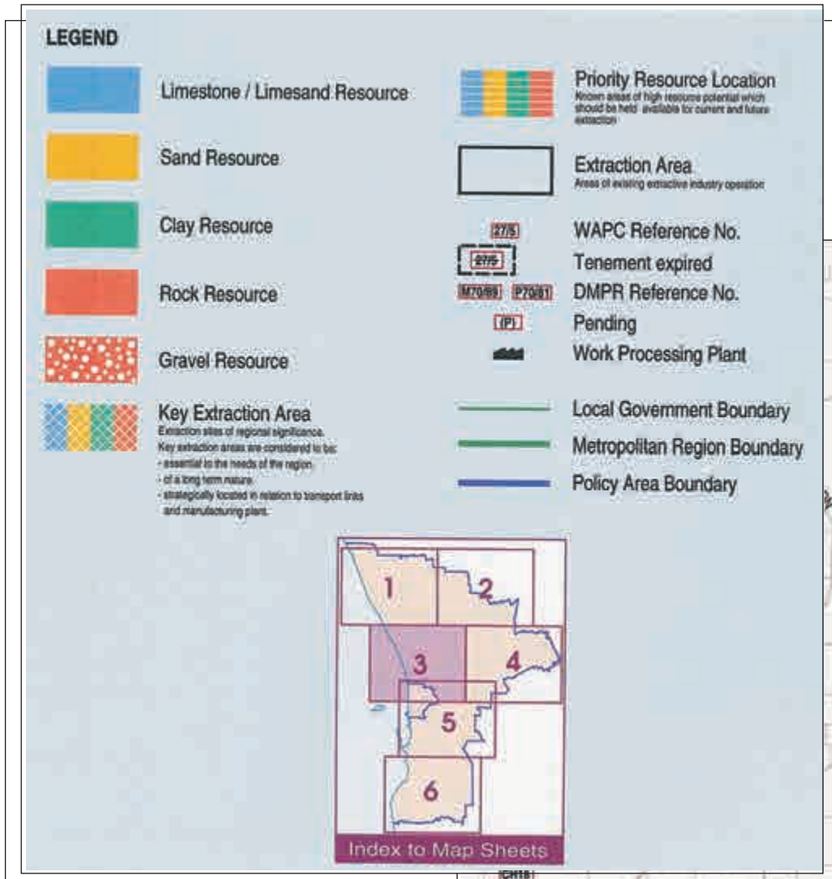
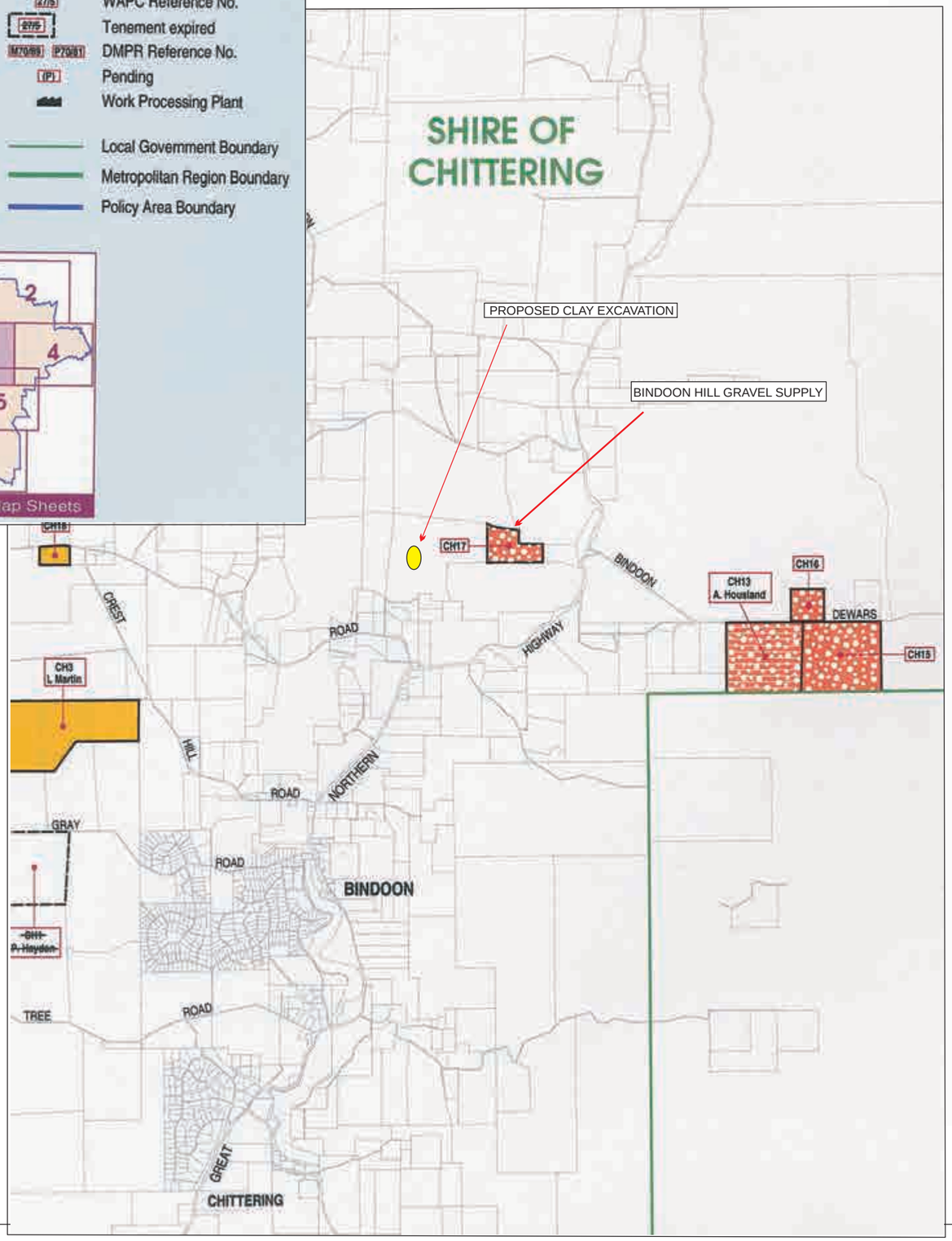
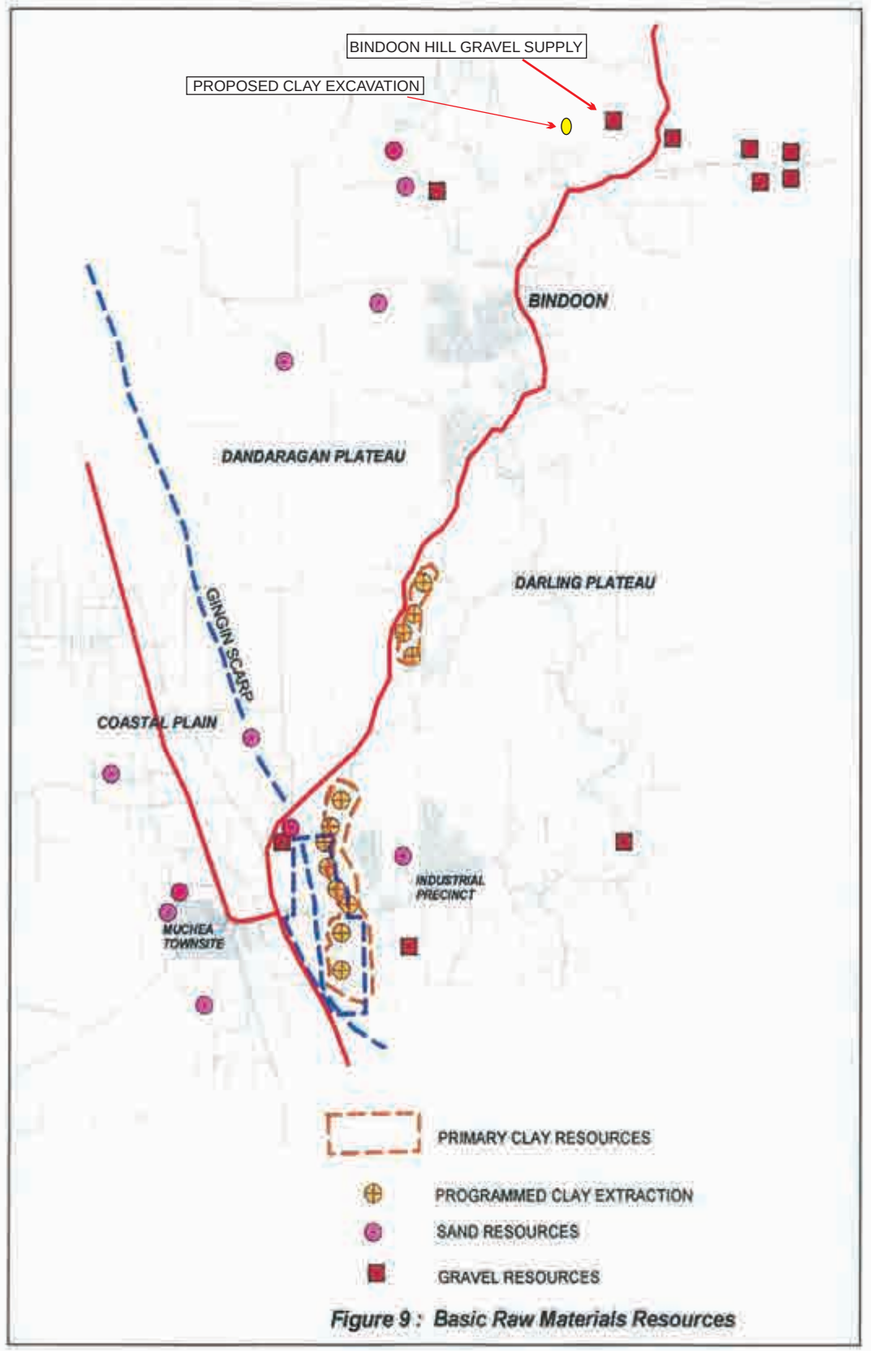


STATE PLANNING POLICY 2.4

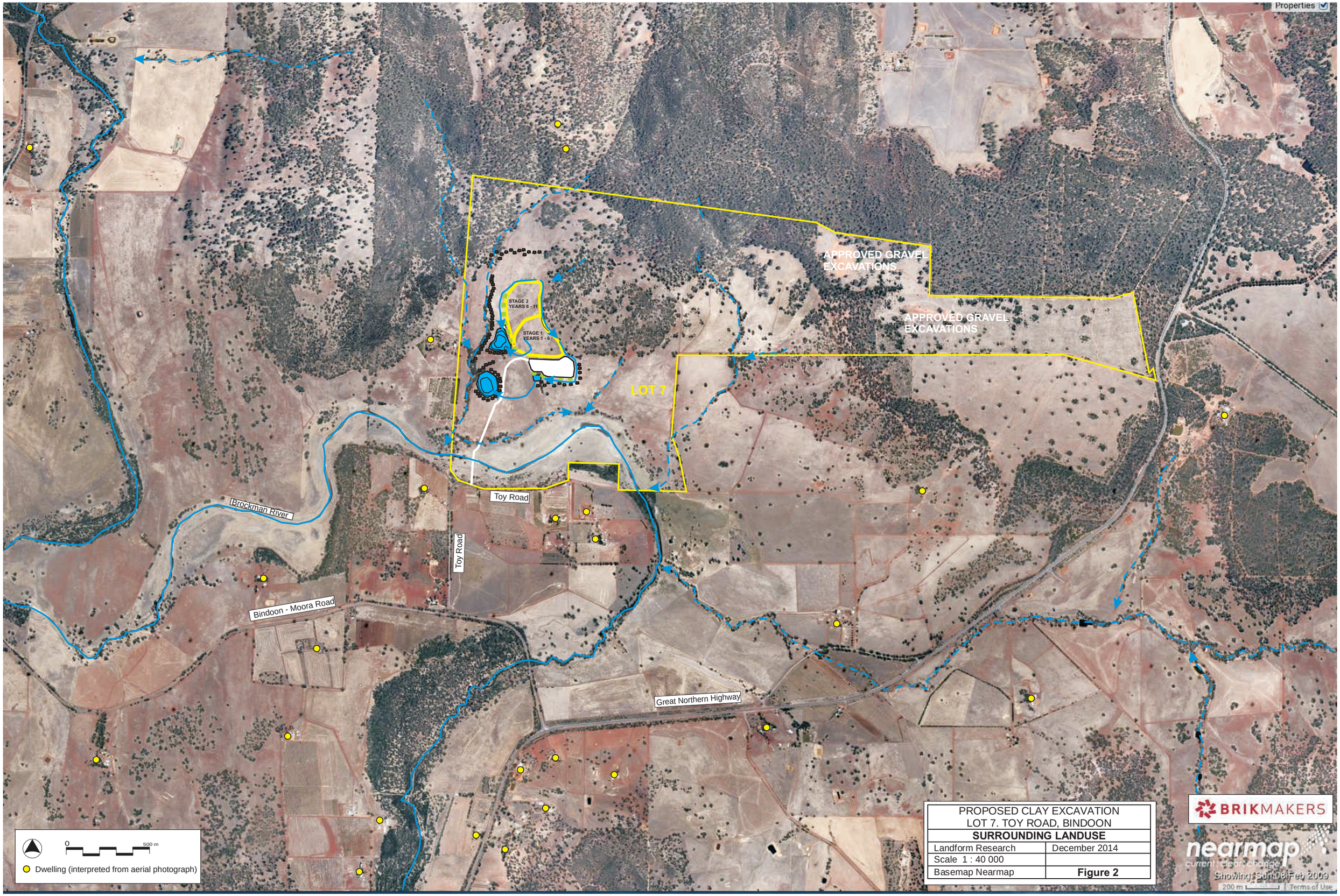


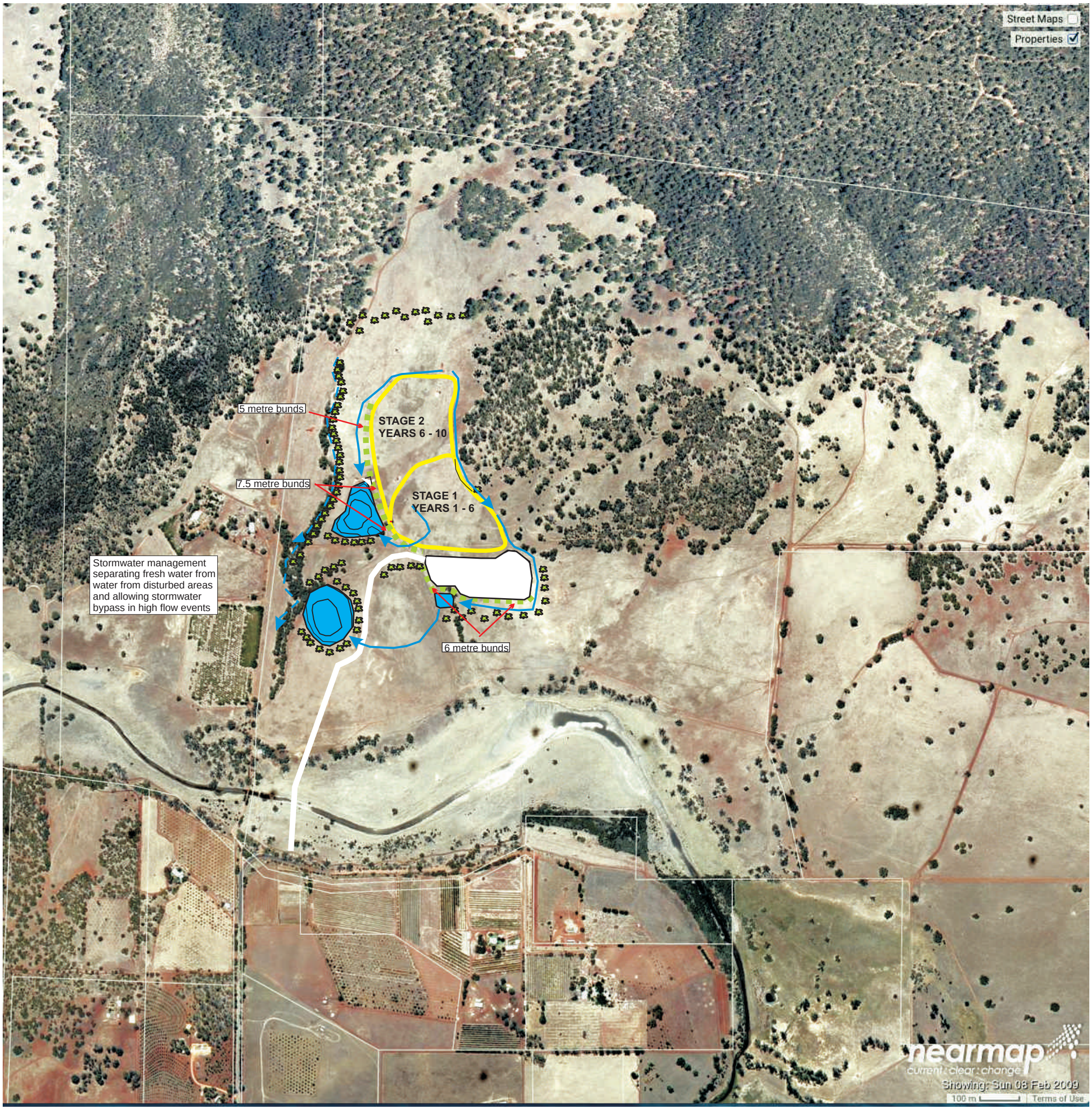


BRIKMAKERS

LOT 7, TOY ROAD
BINDOON

Figure 1


Properties
APPROVED GRAVEL EXCAVATIONS
APPROVED GRAVEL EXCAVATIONS
STAGE 2 YEARS 6 - 11
STAGE 1 YEARS 1 - 6
LOT 7
Toy Road
Toy Road
Brockman River
Bindoon - Moora Road
Great Northern Highway
0
500 m
Dwelling (interpreted from aerial photograph)
PROPOSED CLAY EXCAVATION
LOT 7. TOY ROAD, BINDOON
SURROUNDING LANDUSE
Landform Research
December 2014
Scale 1 : 40 000
Basemap Nearmap
Figure 2
BRIKMAKERS
nearmap
current · clear · change
Showing: Sun 08 Feb 2009
200 m
Terms of Use



0 200m

Bunding recommended for noise and visual management.
Earth bunds 5 - 8 metres high, vegetated with grass and trees and supplemented by tree belts.
Elevation of bunds shown in the noise study (Appendix 3) and on the plan above.

BRIKMAKERS

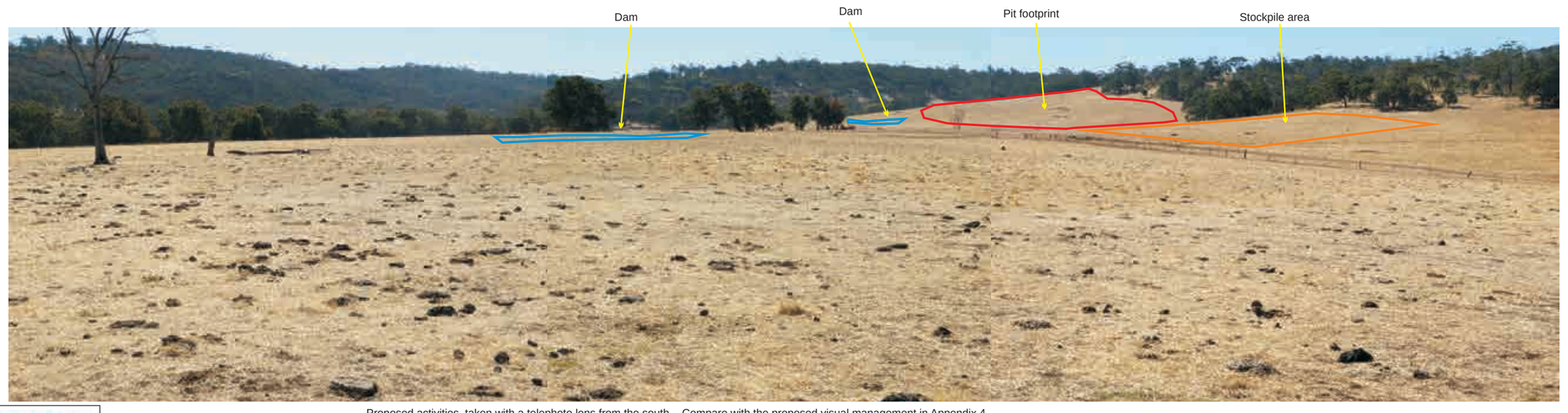
PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
AERIAL PHOTOGRAPH	
Landform Research	December 2014
Scale 1 : 40 000	
Basemap Nearmap	**Figure 3**

View south from the northern edge of the resource

View from the eastern edge of the resource to the dwelling to the west

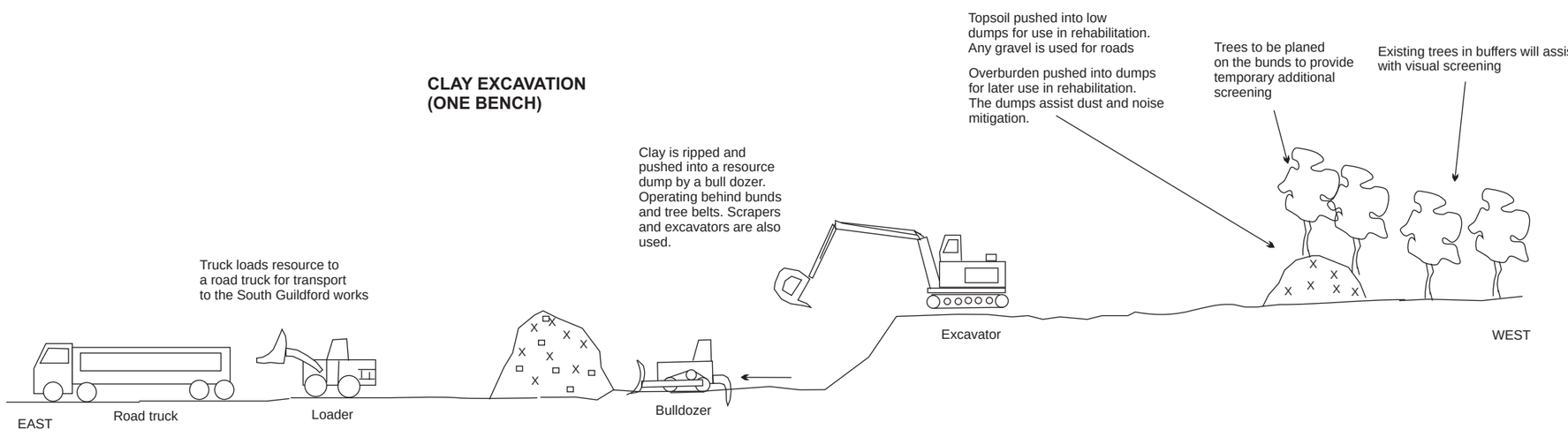
Drill lifting off a hole when investigating the resource

Enlarged image of the proposed footprint,, taken with a telephoto lens from the south - Note that the area is pasture. Compare with the proposed visual management in Appendix 4.



Proposed activities, taken with a telephoto lens from the south - Compare with the proposed visual management in Appendix 4.

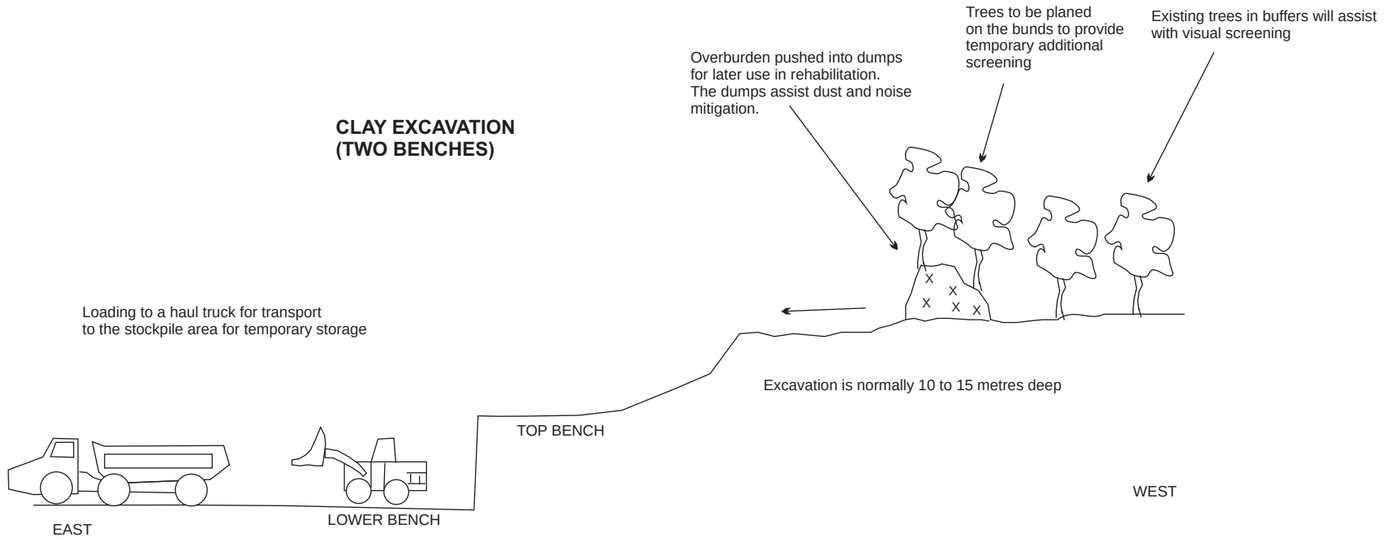
CLAY EXCAVATION (ONE BENCH)



Water truck wetting down access road and clay ahead of loading

Typical excavation when transporting to stockpiles with excavator, bulldozer and two haul trucks

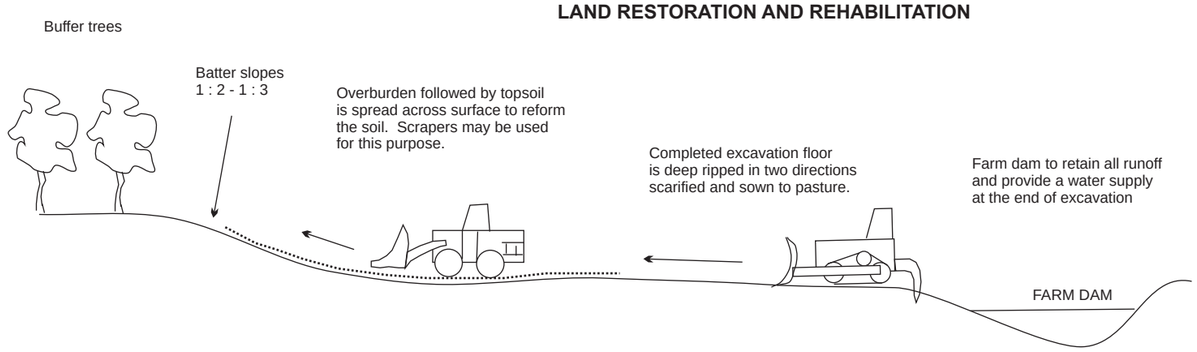
CLAY EXCAVATION (TWO BENCHES)



Excavator loading a haul truck at typical pit

Transportable portable office and grader, typical of what will be used.

LAND RESTORATION AND REHABILITATION

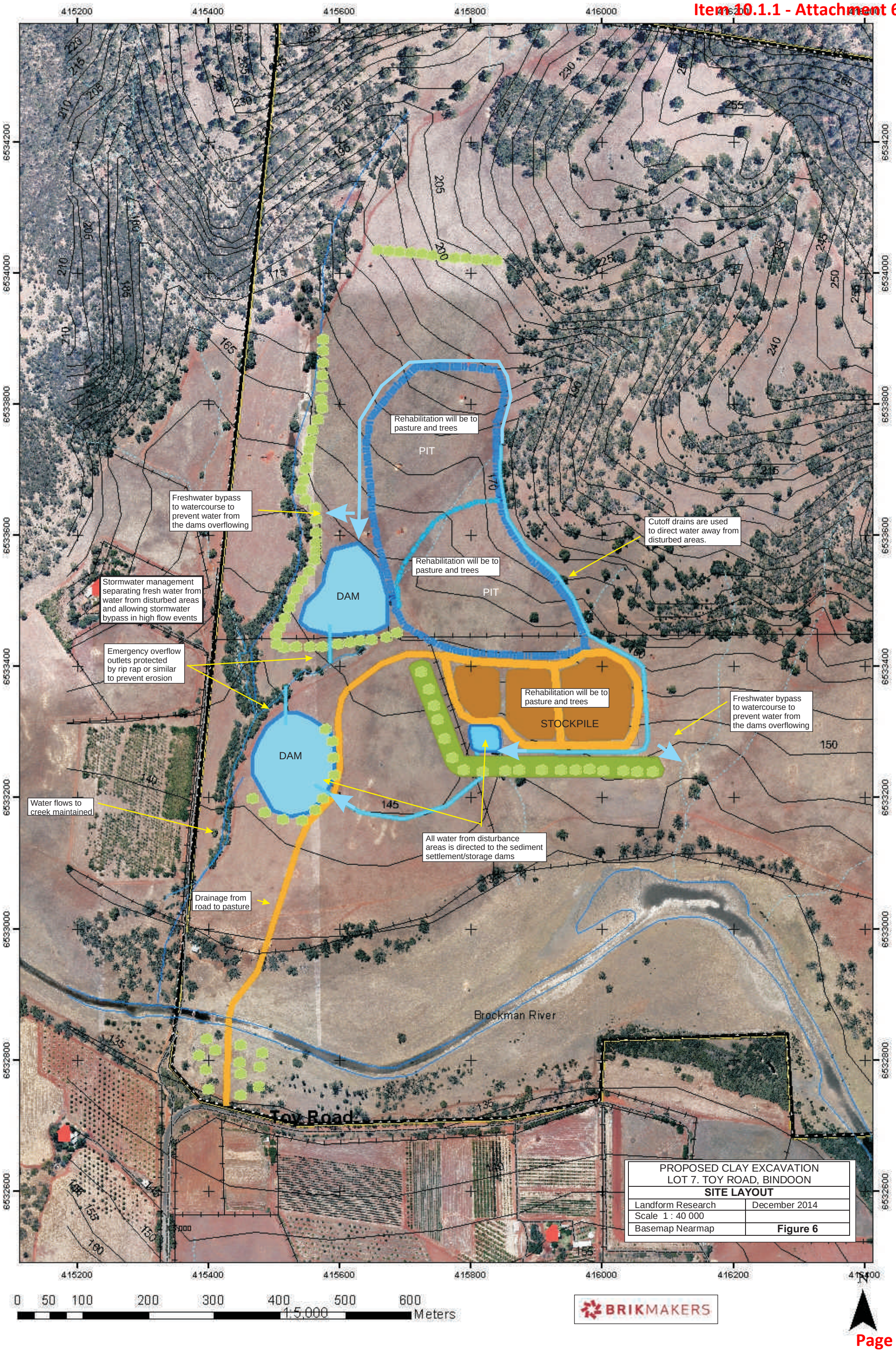


TYPICAL CLAY EXCAVATION

Landform Research

BRIKMAKERS

Figure 5



PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
SITE LAYOUT	
Landform Research	December 2014
Scale 1 : 40 000	
Basemap Nearmap	**Figure 6**

BRIKMAKERS

Freshwater bypass to watercourse to prevent water from the dams overflowing

Stormwater management separating fresh water from water from disturbed areas and allowing stormwater bypass in high flow events

STAGE 2
YEARS 6 - 10

STAGE 1
YEARS 1 - 6

All water from disturbance areas is directed to the sediment settlement/storage dams

Freshwater bypass to watercourse to prevent water from the dams overflowing

5.0 m
7.5 m
6.0 m

190 185 180 175 170 165 160 155 150 145 140

0 80 m

- Pit footprint
- Stockpile area
- Access road
- Water storage/farm dam
- Existing trees and planted tree belts
- Temporary visual and noise screening bund (vegetated) (see plan for elevation of the bunding)g
- Water harvesting cut-off drains
- Existing watercourse

BRIKMAKERS

PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
EXISTING CONTOURS	
Landform Research	December 2014
Scale 1 : 4 000	
Basemap Nearmap	**Figure 7**

Freshwater bypass to watercourse to prevent water from the dams overflowing

Stormwater management separating fresh water from water from disturbed areas and allowing stormwater bypass in high flow events

STAGE 2
YEARS 6 - 10

STAGE 1
YEARS 1 - 6

All water from disturbance areas is directed to the sediment settlement/storage dams

Freshwater bypass to watercourse to prevent water from the dams overflowing

5.0 m
7.5 m
6.0 m

190 185 180 175 170 165 160 155 150 145 140

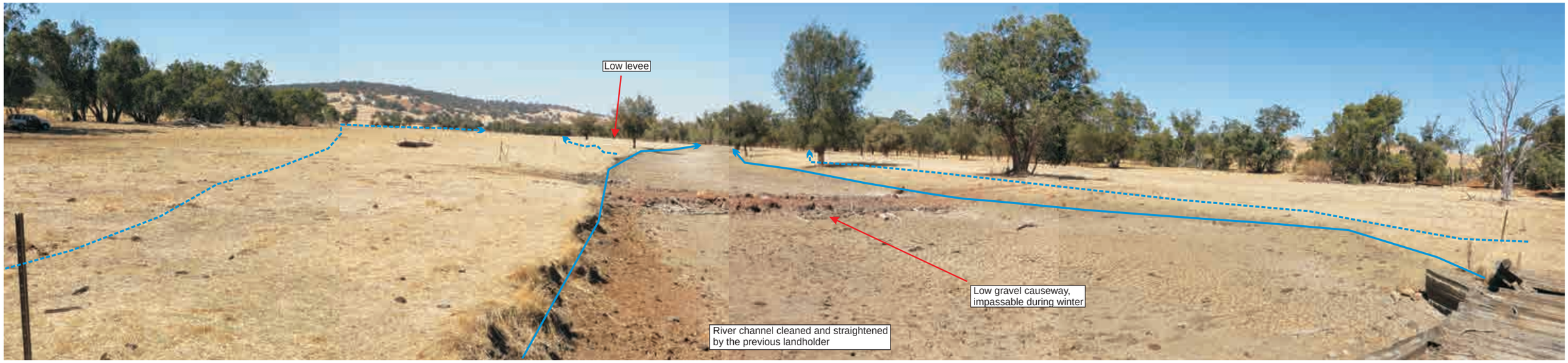
155
145
153 - 154

0 80 m

Pit footprint
Stockpile area
Access road
Water storage/farm dam
Existing trees and planted tree belts
Temporary visual and noise screening bund (vegetated) (See plan for elevation)
Water harvesting cut-off drains
Existing watercourse

BRIKMAKERS

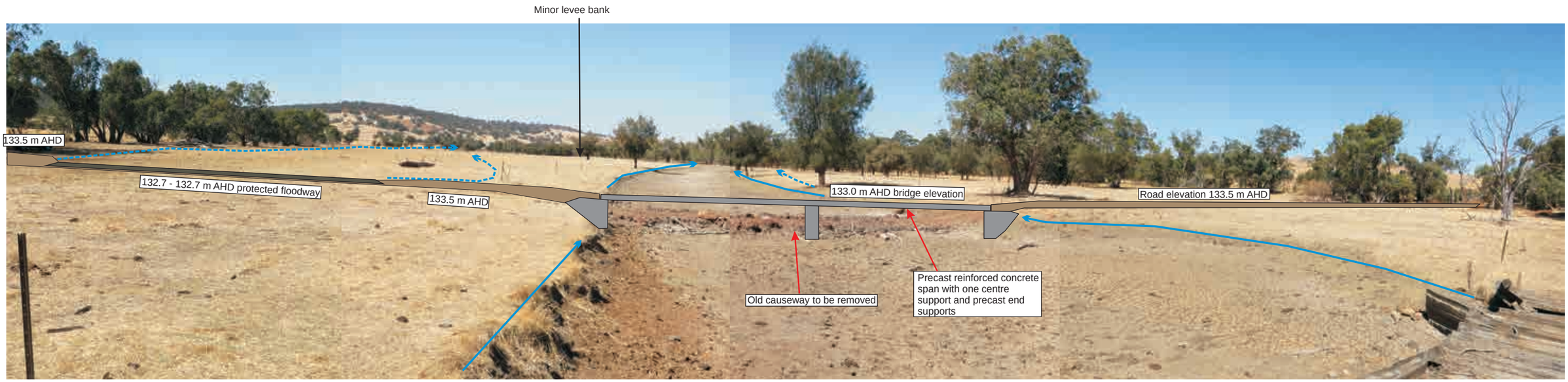
PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
CONCEPT FINAL CONTOURS	
Landform Research	December 2014
Scale 1 : 4 000	
Basemap Nearmap	**Figure 8**



Existing crossing of the Brockman River

Normal winter water flows

Flood flow paths from aerial photography. 0.5 metre contour mapping, local observations and field assessment



Concept proposed upgrade to the crossing of the Brockman River. (NOTE the distortions of elevation and level are caused by the photographic lenses).
Bridge and causeway design to be subject of engineered design and drawings

PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
BROCKMAN RIVER CROSSING	
Landform Research	January 2015
Scale See Plan	
Basemap Landgate	**Figure 9A**

BRIKMAKERS

Normal winter water flows

Flood flow paths from aerial photography. 0.5 metre contour mapping, local observations and field assessment

South western corner of Lot 7 generally above the flood elevations

View south across the flood plan showing the old bridge on Lot 7 that can no longer be used

BRIKMAKERS

PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
BROCKMAN RIVER CROSSING	
Landform Research	January 2015
Scale See Plan	
Basemap Landgate	**Figure 9B**

Appendix 1

DUST MANAGEMENT PLAN

PROPOSED CLAY QUARRY
LOT 7 TOY ROAD, BINDOON

CONTACT DETAILS

Operations Manager

Brikmakers Pty Ltd
260 Kalamunda Road
South Guildford WA

PO Box 1257
WA, 6936
Phone 08 6313 1000

BRIKMAKERS

August 2015

Landform Research

Lindsay Stephens BSc (Geology), MSc (Plant Ecology) 25 Heather Road Roleystone WA 6111
Mem Aus Geomechanics Soc – MEIANZ – FIQA Tel 9397 5145, landform@iinet.net.au

EXECUTIVE SUMMARY

The findings of the Dust Management assessment and management procedures are summarised below.

Summary

- A total of 9 hectares of excavation and stockpile area will be required.
- Access will be from Toy Road.
- Excavation is for clay which carries no known health risks.
- The operations comply with the Department of Health Guidelines and Queensland Primary Industries Guidelines.
- Buffers to are the three closest dwellings are 450, 750 and 800 metres. The closest dwelling is occupied by the landowner of Lot 7.
- Clay excavation must comply with the *Mines Safety and Inspection Act* for Health and Safety.
- Officers from the DMP will regularly inspect the site and the site must be registered under the DMP SRS system.
- Consultation with the residents in Toy Road has already taken place to explain the small and temporary nature of the operations. As a result of the discussions the scale of the project has been reduced. Appendix 5 of the Excavation and Management Plan.
- Assessment using *DEC 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities* shows that the proposed operations have a Negligible Risk for all but the dwelling to the west which has a Low Risk.
- The main risk from dust is the crushing of clay on trafficked areas. Prior to excavation the clay stays moist and when dug from the face is not dusty.
- The clay is stored in stockpiles and being clumped does not pose a dust risk.
- A risk analysis shows a Low Risk for dust impacting offsite.

Management - Commitments

- Extensive Dust Management Procedures are committed to.
- Dust will be treated with water. A water cart will be available on site at all times when there is a dust risk.
- Water will be used to wet down all roads and active areas, as well as stockpiles and/or the excavation face as required to ensure the loading and movement of clay can be completed without significant gust generation.
- A visual monitoring trigger and action plan is proposed. This type of system is used at all quarries and has been found to be the most effective when combined with a complaints and action procedure which is also committed to.
- The Operational Management Actions listed in Section 3.2 Excavation and Management Plan are committed to.

CONTENTS

1.0 Summary of the Proposed Operations

1.1 Site and Proposal

All excavation is to be undertaken on a south facing valley side in the central part of Lot 7 near the western boundary. Excavation of gravel has been conducted on the eastern portion of Lot 7 for some time.

An area of clay comprising 9 hectares is proposed to be excavated with a stockpile area of 4 hectares for support. Excavation is to be undertaken on a south facing valley side in the central part of Lot 7 near the western boundary. Excavation of gravel has been conducted on the eastern portion of Lot 7 for fifteen years.

The clay resource occurs in weathered schist that extends to depth with a resource of 10 - 12 metres, at which depth other issues such as the quality of the resource and the costs of excavation may preclude efficient extraction.

It is anticipated that 50 000 – 100 000 tonnes will be removed each year. The amount of material extracted will depend on the nature of the local and export brick markets and public demand for particular colours of bricks but is anticipated to be nearer 50 000 tonnes per annum in the early years rising in later years.

Excavation will largely occur below natural ground level. Earth bunds of 5 or 7.5 metres in height will be constructed along the south and north of the extraction and stockpile areas and planted with trees.

Hours of operation will be restricted to 7.00 am to 5.00 pm Monday to Saturday with no work on Sundays and public holidays.

Clay will be excavated intermittently throughout the year in a number of campaigns, and stockpiled for use at other times of the year. On the calculated truck movements, clay is proposed to be transported from this site on between 25 and 30 days per year.

A variety of excavation methods are used depending on the configuration of the pit, the complexity of blending and the weather conditions. At various times excavators, loaders may be used to excavate, load or form stockpiles. Much of the excavated clays are loaded directly into road trucks for haulage to the Hazelmere factory. The balance is stockpiled using dump trucks for later use.

See the Excavation and Management Plan for more details.

1.2 Equipment

The excavation methods are detailed in Section 4 of the Excavation and Management Plan.

Summary of Equipment	Comment
Maintenance vehicles	Brikmakers has mobile maintenance truck based facilities that access the site as required.
Bulldozer	A Komatsu 375-5 or similar dozer will be used to reform the landscape and open various stages of the pit. Apart from land restoration, operates on the floor of the pit.
Excavator	A 45 tonne excavator PC450 or similar will be used to extract clay from the face and low load the trucks in the pit.
Water tanker	An 8 wheel water tanker or similar will be available on site during excavation transport operations to provide for dust suppression.
Loader	Used to recover clay from stockpiles and load road trucks. A Komatsu WA500 or similar loader will be used for loading and handling products.
Off Highway Dumpers	CAT 740 or similar off highway dumpers work with the excavator to transport resource from the face to the stockpiles.
Drill rig	Brikmakers has its own drill rig that is used to test the clays to depth. natural ground level where the resource is harder. The site has already been drilled.

Access will be from Toy Road in the south, crossing the Brockman River via the existing causeway, which will have to be updated as it is indisrepair in the location shown on the attached figures in the Excavation and Management Plan.

The number of road truck movements will vary throughout the year depending on whether the resource is being transported or not.

Road transport will use a variety of trucks such as semi-trailers or rigid (8) wheeler trucks to a 5 axle dog trailer.

It is anticipated that up to 3 000 tonnes per day will be transported, generally in truck and trailer combination. That is approximately 10 laden trucks per hour.

At other times there will be no activity on site.

1.3 Climate

Climate data is supplied in 2.1 of the Excavation and Management Plan. It shows that the stronger easterly summer morning winds will move from the east travelling in a south westerly direction down slope across the excavation site to the valley of the Brockman River, generally blowing away from dwellings.

Afternoon sea breezes are from the south to south west, generally blowing away from dwellings to the south.

The wind roses for Pearce are attached as Attachment 2. These show that there is a pronounced easterly wind at 9.00 am on summer mornings, but this has to be balanced by the afternoon winds which blow from the south west at 3.00 pm. The data collected at Pearce has to be viewed with caution and can only be used as a general indication for this site and must be subject to interpretation.

The wind data for Pearce is attached and shown for summer, typified by January, when the risks of dust are greatest and also for the yearly average.

Pearce lies at the base of the Darling- Gingin Scarp and is subject to strong katabatic winds on summer mornings. The Scarp is immediately east of Pearce and produces the easterly spike at 9.00 am. This causes the windshear at Pearce and Perth Airport.

The issue of katabatic effects is well explained in *Mitchell, K, 1979, The Effect of the Darling Scarp on Easterly Air Flow, Geowest No 15 University of Western Australia.* Katabatic effects result from the variations in air temperature, topographic effects and the air flow from the Darling Plateau down to the base of the Darling Scarp. The winds are significantly affected and directed by landform.

It can be seen that an easterly wind travelling from the excavation area towards the west will be deflected down the slope of the Brockman Valley and the associated hills and scarps. The proportion of wind travelling from the excavation area to the dwelling or the sandalwood is reduced, and the Pearce summer morning data cannot simply be applied. The area that appears to be planted to sandalwood lies to the north of the gravel excavations. See Attached Figure showing wind directions.

The 100 metres change in elevation from the plateau to the north east is sufficient to deflect the katabatic winds. Based on katabatic effects the interpreted flow paths of the wind will be from the east and north east channelled west along the valley of the Brockman River away from nearby dwellings to the north, east and south.

The proposed tree belts will assist in reducing local wind speeds in operational areas.

The sea breezes, which are from the south west, blow across the Brockman River valley, being partially reduced by the hills to the south, trees on site and tree belts to be planted. The closest dwelling to the north will be out of line of the afternoon seabreezes.

The influence of slopes and trees is recognised in the *South Australian EPA Guidelines for Separation Distances, December 2007.* The South Australian EPA Guideline recommends a buffer distance of 300 metres and then for decreases of
x 0.68 for significant “hills and valleys” and x 0.85 for “level wooded country”.

Both these factors will reduce the buffer requirements down to 173.4 metres. The EPA of Victoria uses a generic buffer of 200 – 300 metres for extractive industries of this type.

Buffer distance and the impact of trees was considered by the Department of Natural Resource in Queensland in a study at Emerald. This showed that a tree buffer of 20 metres was sufficient to provide fine particulate management and barrier in the form of spray drift; Primary Industries Standing Committee, 2002, Spray Drift Management, CSIRO Publishing, Report 82. The trees within the flow path will help break up the wind.

The weather data therefore shows that for the time of greatest risk from dust, in summer, the prevailing winds and location of the pit will provide significant protection to all surrounding dwellings. The greatest risk is to the dwelling to the west, which the landowner rents and occupies.

2.0 Dust Risk

2.1 Sources of Dust

The main risk from dust is the disturbance of clay on trafficked areas, particularly the pit floor and stockpile areas. Prior to excavation the clay stays moist, and when dug from the face is not dusty.

The clay is stored in stockpiles and, being clumped, does not pose a dust risk.

Disturbance by repeated vehicle movements may cause the clay to develop into a fine "floury" dust, that could have the potential for dust generation.

Treatment by water eliminates the generation of fine dust and keeps the clay aggregated and crusted.

A lesser risk is the gravel access road which will also be treated with water.

The frequency of watering will be adjusted to suit the operating conditions, weather and vehicle movements.

2.2 Occupational Dust Risk

Excessive dust also has the potential to impact on workers if untreated.

Occupational dust associated with the quarrying processes falls under the *Mines Safety and Inspection Act 1994 and Regulations 1995* overseen by the Department of Mines and Petroleum.

The proponent will provide induction and protective equipment for all persons on site.

The DMP require personal dust monitoring to ensure dust levels comply with health risk guidelines.

The dust management procedures used on site will comply with these guidelines.

The management of environmental and occupational dust requires the same techniques and actions. If occupational dust is managed, then there will be minimal risk of dust impacting on the external or onsite environment.

2.3 Environmental Dust Risk

The potential impacts are assessed for the sensitive premises to the west and south, under the worst possible scenario.

The risk in winter will be substantially lower.

- ***Nearby Dwellings***

These are shown in Figure 2 of the Excavation and Management Plan.

- ***Calculation***

Dust emissions fall under the *Guidance for the Assessment of Environmental Factors, EPA, March 2000*. Assessments of the potential dust risk are normally made using the Land development sites and impacts on air quality, *Department of Environmental Protection and Conservation Guidelines, November 1996.* These are still in place but are incorporated into the *DEC 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities.*

The *DEC (DER) in 2008* released a *draft Guideline for the Development and Implementation of a Dust Management Plan.*

The key Environmental Objectives for the operations are;

- Manage the potential for the generation of dust.
- Visually monitor dust levels and take steps to reduce the potential impact of dust on occupational and environmental aspects of the operation and local area.

The category of dust risk is included in *DEC 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities.*

This document is not really applicable to mining because it is to be used to assess the management required prior to any dust suppression measures being implemented. Effective dust management measures are already used on this site.

When making the assessments using the DEC (DER) Guideline there are four key points;

- Only the premises subject to the prevailing winds from the pit are used for the DER Methodology but in the example below all dwellings are used.
- Dust risk is generally only in the dry summer months
- The clay readily crusts and is stabilised. It is only trafficked areas of dry clay and the gravel roads that develop fine dust from the action of wheels.

- The perimeter bunds and vegetation provide effective wind breaks and wind screening.

- Water treatment of the clay is to be used to maintain moisture levels and manage dust risk.

2.4 Calculated Dust Risk Assessment from DEC (DER) 2011

PART A Number	Item	Score	
		With no dust management in place	**With effective management in place**
1	Nuisance potential of the material	High when disturbed and trafficked and untreated – 6	Low with effective water sprays and wetting down - 2
2	Topography and vegetation screening	Medium screening - 6	Medium screening - 6
3	Area of site activities	Trafficked areas are 1 to 5 - 3	Trafficked areas are 1 to 5 - 3
4	Type of work being undertaken	Bulk earthworks - 6	Bulk earthworks - 6
	Summer total without dust measures	21	17

PART B Number	Item	Score (With no dust management in place)	
		Clay excavation	**Loading and stockpiling**
1	Distance to sensitive premises	100 – 500 metres – 12 (1 dwelling) 1 km – 500 m (other dwellings) - 6	100 – 500 metres – 12 (1 dwelling) 1 km – 500 m (other dwellings) - 6
2	Effect of prevailing wind	Dwelling west - Isolated land use affected by one wind direction – 6 (1 dwelling) Not affected (other dwellings) - 1	Dwelling west - Isolated land use affected by one wind direction – 6 (1 dwelling) Not affected (other dwellings) - 1
	Summer total without dust measures	18 or 7	18 or 7

Activity	Calculated Score	Allocated Risk of Dust
Land Clearing and excavation without dust suppression.	147 - 378	Classification 1 - 2 Negligible Risk for all but the dwelling to the west which has a Low Risk. Dust management will be required for pit best practice and worker environment.

With dust suppression	119 - 306	Classification 1 - 2 Negligible Risk for all but the dwelling to the west which has a Low Risk. Dust management will be required for pit best practice and worker environment.

3.0 Dust Management

3.1 Non Operational Management

- ***Screening Tree Belts and Buffers***

Dust particles are readily stopped by tree belts and distance, with which the site complies. Tree belts slow the wind and allow the dust to settle. See *Planning Guidelines Separating Agricultural and Residential Land Uses, Department of Natural Resources Queensland 1997(Pages 65 – 111) and Department of Health WA, 2012, Guidelines for Separation of Agricultural and Residential Land Uses which uses the same criteria (Pages 112 – 118).*

The Queensland Guidelines predominantly relate to agricultural spray drift, but based on particle size also relate to dust.

The Guidelines provide for a buffer of 300 metres for open agricultural land, dropping down to 40 metres where an effective tree belt is in place. The Western Australian Department of Health also uses the same guidelines. The Guidelines are based on field studies and demonstrate the effectiveness of tree belts in providing screening against particulate travel.

There is a discussion of the desirable buffers in Section 5.2.1 Surrounding Landuses and Buffers of the Excavation and Management Plan where all the data, and generic buffer distances from Western Australia and other States, suggest that 300 metres is an effective buffer distance for dust for such an operation.

The excavation has good buffers of over 700 metres to all dwellings apart from the dwelling to the west, which is 450 metres from the excavation area and stockpiles. All dwellings comply with a 300 metre buffer distance.

These distances are within the EPA generic buffer guidelines and Shire of Chittering Guidelines with the exception of the dwelling to the west. The Shire of Chittering Local Law provides some discretion for Council with respect to buffers.

There are some existing trees and further more will be planted.

Earth bunding will be located around the south and west of the active areas and planted with local trees.

3.2 Operational Management

- ***Actions***

There are a number of management actions that are used in quarries to minimise dust generation or travel and these are used wherever possible. These are generic management designed to prompt staff to take action as the opportunity presents, rather than using unchanging dust management procedures.

The actions are used where applicable and as the opportunity presents to minimise dust on this site.

A dedicated water truck is retained on site for the wetting down of roads and other dust suppression activities. In addition the access road is sealed and maintained.

Methods that are available, and will be selected from, are listed below. The most effective by far is the use of water management from a water truck, sprinklers, water canon or other such mechanism.

DESIGN AND SITE

1. Minimising the amount of ground open.
2. Minimising the amount of ground being subject to traffic.
3. Locating access roads away from sensitive premises.
4. Design of the pit to reduce wind speed and potential dust lift off.
5. Maintaining effective setbacks.
6. Constructing perimeter bunds to reduce wind speed.
7. Planting and maintaining tree buffers.
8. Providing wind break fencing generally and on top of bunds as required.
9. Maintaining a secure, fenced site, to prevent illegal access.
10. Rehabilitate and stabilise all completed areas as soon as practicable.
11. Clearing and replacing topsoil and overburden during wetter times; April to October.

OPERATIONS

12. Locate active areas away from windy locations.
13. Locate active areas away from sensitive premises.
14. Working on the floor of the pit.
15. Operate some parts of the pit only when conditions are suitable.
16. Locating mobile plant and stockpiles in sheltered areas.
17. Design staging to minimise dust risk.
18. Conduct higher dust risk operations such as topsoil clearing and placement during more favourable conditions.
19. Shut down equipment that is not required.

ACCESS AND HARDSTAND

20. Constructing the access roads from hard materials that resist dust generation.
21. Maintaining a water truck on site for road and other wetting down.

22. Using a sealant such as a polymer, chemical or emulsified oil or bitumen on the access road to reduce water use.
23. Using sprinklers and water canon on roads, traffic areas and stockpiles.

STOCKPILES

24. Minimise the number of stockpiles.
25. Maintain stockpiles in sheltered areas.
26. Reduce the elevation of stockpiles.
27. Limit the drop height to stockpiles and loading.
28. Locate finer products inside or screened by stockpiles of coarse materials.
29. Locate stockpiles away from sensitive premises.

TRANSPORT

30. Cover all loads.
31. Ensure all trucks are dust free and not carrying pebbles and other materials outside the tray.
32. Choose the best transport routes.
33. Wet down or sweep the cross over and access roads.

HEALTH AND COMMUNITY

34. Maintain air conditioned cabins on all vehicles.
35. Implement a trigger of no visible dust to cross the property boundary from site activities in line with DER Licence and best practice in WA.
36. Implement visual monitoring for all activities.
37. Conduct effective site induction and awareness training for all staff.
38. Training should include observation and mitigation where possible of all dust emissions.
39. Providing a complaints investigation, mitigation and recording procedure.
40. Liaising with the owners/operators of the two nearby sensitive premises.
41. Ceasing operations when conditions are not favourable or when visible dust is crossing the boundary.
42. Obtain the latest weather conditions to increase the awareness of dust risk.
43. Cease operations during adverse weather conditions.
44. Operate during wetter months or when the soils are moist.

Normally the stripping or re-instatement of overburden and topsoil and their subsequent use in rehabilitation will be undertaken during the wetter months if possible.

Completed sections of the quarry are to be stabilised and not subject to traffic as soon as practical to reduce the area of open ground and help reduce wind speed.

In the event of dust management not being able to be achieved, and to minimise impact on adjoining land holders, the dust generating activities will be stopped until conditions improve.

A record of all dust complaints is retained together with the mitigation measures used to reduce the dust impacts.

- ***Management***

ACTIVITY	POSSIBLE RISK SEVERITY and FREQUENCY	COMMITMENTS ON ACTIVITIES CONDUCTED ON SITE	RISK AFTER MANAGEMENT
GENERAL			
Legislation	----	• Brikmakers will comply with the Mines *Safety and Inspection Act 1994 and Regulations 1995*.	----
Buffers	----	• Research and generic buffers in Western Australia and other States show that at 300 metres distance, potential dust impacts are minimal eg Department of Health Guidelines. • The dwelling occupied by the owner of Lot 7 lies at a distance of 450 metres, which complies with the EPA generic buffer guidelines and is just less than the Shire guideline of 500 metres, a buffer over which the Shire has discretion.	----
Footprint and Excavation Screening/ Vegetation	---	• The operations are partially protected by vegetation. • Activities are located behind natural barriers, landform and vegetation where possible. • Vegetated bunds will be formed around the perimeter of the pit. • Additional tree belts are proposed. These will be maintained and replanted as necessary.	----
	---	• Working below natural ground surface is proposed with excavation up to 12 metres below natural ground level behind 5 – 7.5 metre vegetated perimeter bunding. • Benching will be used in deeper locations to maximise efficiency and minimise impacts.	----
	---	• The excavation is designed to provide enhanced landform and constructed dust screening. • See above and Excavation and Management Plan.	----
	----	• The resource is proposed to be excavated in two stages excavating from south to north to maximise screening.	----
	Screening and vegetation	• The existing vegetation and trees provide dust screening. • Existing trees outside the current excavations are in place. • Bunds of 5 to 7.5 metres are to be constructed along the south and west of the operations and planted with trees to provide visual and noise screening. • See figures in the Excavation and Management Plan.	----
MANAGEMENT			
Staff	----	• All mobile plant will have air conditioned closed cabins.	----
Monitoring	----	• A monitoring training and supervision system is proposed. see below “Trigger Conditions”.	----
Trigger	----	• Trigger conditions are used to determine when	----

conditions		additional dust management is required. • Most dust generated from excavation is visible. • The trigger for dust management is the generation of visual dust. • A site supervisor is present at all times when excavation is occurring. At other times if not present the supervisory duties are allocated to a mobile plant operator, who is in the best position to assess dust generation and to direct remediation. • A commitment is made that no visible dust will cross the lot boundaries as a result of activities conducted in the pit. • All on site operators are to be instructed to visually monitor dust, report and treat any visible dust.	
Adverse weather	Low - Uncommon in winter, more common in summer.	• When winds are sufficiently strong, or other weather conditions are unacceptable, to negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved. • This policy is to be implemented and is normal company policy to minimise impact on adjoining land holders.	Low
Equipment failure	Low to moderate - Uncommon	• In the event of dust management not being able to be achieved through equipment failure, operations will cease until full capability is restored.	Low
Training	----	• The proponent will use on site induction and training on dust minimisation to all personnel at all operations.	----
Complaints	----	• A record of all dust complaints is to be maintained together with the mitigation measures to be used to reduce the dust impacts. The records will either be paper or digital and will be available to the Shire for review. • All complaints relating to dust are to be investigated immediately on receipt of a complaint. • Appendix 3 of *Land development sites and impacts on air quality*, Department of Environmental Protection Guidelines, November 1996, will form the basis of the methods on which a complaint on dust is dealt with.	----
EARTHWORKS			
Land Clearing	Low Clearing each stage with a large clearing prior to excavation to provide for stockpile areas	• Minimal clearing is required but topsoil and overburden will require relocation. • Where possible, activities such as vegetation removal or topsoil stripping on exposed ridgelines will be conducted at times when the materials are less likely to become airborne or during suitable wind conditions.	Low
Overburden removal	Low Timing as above	• Minimal clearing is required but topsoil and overburden will require relocation. • Where possible, overburden removal and placement will be completed at times when the materials are less likely to become airborne or during suitable wind conditions.	Low

Land restoration	Once at the end of the pit and where possible progressively during the operation	• Where possible progressive rehabilitation will be undertaken. • Activities such as ripping, overburden and topsoil spreading will be scheduled for times when the materials are less likely to become airborne or during suitable wind conditions. • This will normally occur only when each section of the pit has been completed and no more frequently than once every two years.	Low
EXCAVATION			
Excavation	Low to Moderate - In campaigns	• Excavate from the face using techniques that minimise the crushing of dry matter. • Excavation will normally be completed by excavator and will be intermittent. Other mobile plant may also be required such as a bulldozer or loader. • It has been found that the resource stays relatively moist through summer and that excavation of the raw material does not generate significant amounts of dust. • A water tanker will be maintained on site during excavation in summer when the risk of generating dust is greater. It will also be used to water any of the internal access roads as required. • The movement of topsoil and overburden and the traffic disturbance are the main risks.	Low
Loading at Face or from stockpiles	Low to Moderate - In campaigns	• Products to be loaded are to be moist and the hardstand on which the loading occurs wetted down or moist. • Loading from the face will be intermittent in campaigns. • A water tanker will be maintained on site during excavation in summer when the risk of generating dust is greater. It will also be used to water any of the internal access roads as required.	Very low
Haulage To create stockpiles etc	Moderate to Low - In campaigns	• Maintain haul road and hardstand surfaces in good condition (free of potholes, rills and product spillages) and with suitable grades. • Haul routes are to be made as short as possible. • Dust is more likely to be generated by traffic across the excavated floor and internal access roads. These roads and active areas are regularly watered during dry times to minimise dust lift off.	Low
		• Reduce the length of the internal roads by maximising internal servicing efficiency. • Excavation will normally be carried out on the quarry floor, below the existing land surface. This will lead to a reduction in wind speed on the quarry floor and thus help to prevent the generation of dust.	
		• Speed limits will be imposed on the haul and access roads as normal quarry practice.	

STOCKPILES and PROCESSING			
Hardstand traffic	Moderate	• As noted above most dust is created by traffic on the stockpile area. • Maintain hardstand surfaces in good condition (free of potholes, rills and product spillages) and with suitable grades. • A water truck is to be retained on site when operations are occurring.	Low
Processing	Nil	• There will be no processing of clay on site.	Nil
Mobile and static plant Operation	Low - In campaigns	• The proponent will use modern equipment that is maintained in good condition including the maintenance of dust minimisation measures.	Low
		• Ensure mobile and static plant is provided with dust extraction, shielding or filtration systems or wetting down as appropriate. • Operators are to be instructed to visually monitor dust, report and treat any visible dust. • Dust management and monitoring forms part of the site induction programs.	
Loading and Stockpile Creation	Moderate - In campaigns	• Mobile and static plant are to be shut down when not in use. • Drop heights from loaders and dump trucks are to be limited. • Locate coarser material stockpiles around the perimeter to limit wind impacts on fine materials. • The length of vehicle movements is to be minimised.	Low
TRANSPORT			
Road condition	Moderate	• Maintain access roads in good condition (free of potholes, rills and product spillages). • Treat access roads, hardstand and stockpile transport and loading areas with dust suppression sealant, water or seal coat. • Even though excavation will be intermittent, water treatment of the access roads will be used during all operations. • The main cross over to Toy Road will be sealed with a 50 metre seal.	Low
Road Transport	Very Low	• All loads will be covered. • New trucks often have automatic tarpaulins fitted to cover the clay during transport. • Transport through all public areas will be along bitumen roads.	Very low
		• A site code and induction system is proposed for the quarry.	
		• Road trucks are to be maintained in a clean condition. • Individual contractors are required to do likewise.	
Road Transport	Low	• Avoid spillages on roads and clean up promptly. • Ensure that during loading, product does not become lodged on the sides of trucks from where it can fall off during transport. • Drivers are to inspect trucks prior to leaving site. Any product not correctly located and secured is to be removed prior to exit from the site.	Low

DISCUSSION OF THE TYPES OF DUST

- **Dust Types**

There are a number of key aspects to dust impacts;

- What is the source of particles?
- What is the potential for the particles to be disturbed?
- What is the nature of the particles and how are they likely to behave?
- What types of impacts are the particles likely to have if they move?
- What management actions can be used to mitigate or reduce dust impacts?

Fine particles are a natural part of our environment and are present in soils, pollens, fragments of vegetation and many other sources. It is when the fine particles are excessively disturbed that there becomes concern for the potential impacts, whether they are nuisance or health risks.

The most common form of disturbance is by human impacts. In this local area disturbance of agricultural soils by cultivation and travel along gravel roads have the most potential to expose fine particles to disturbance by machinery and vehicles.

In many situations the fine particles are stablised by vegetation, soil microbial materials and reactions and interactions between particles. Once disturbed however dust can be generated and may continue to be a problem until the fine particles are wetted down or return to a relatively stable condition.

For the proposed excavation of clay the site specific conditions of vehicle movements during excavation, operation at stockpiles and transport are the main risk areas.

The risk of dust assumes no treatment. With effective treatment of dust by water, which is proposed, the risks of onsite, and consequently offsite, dust are minimised.

- **Nature of the Fine Particles**

Dust can originate from a number of operations and may impact on onsite workers, or travel offsite. Potential dust impacts are addressed by reducing the dust generated from the quarrying, processing and transport operations.

The same situation arises for excavation of clay or other materials. There is little generation of dust unless the soil, clay or road surfaces are allowed to dry out and are then disturbed by vehicle movements.

As only natural soil materials will be moved the dust will consist of only natural materials. The exception is any particles generated from the exhausts during transport or operation of machinery.

Most large scale studies of dust have been conducted in the coal mining industry of New South Wales.

The New South Wales Minerals Council Ltd and the New South Wales Government Health Fact Sheet, lists the following components of dust in quarrying and mining.

Fine particles PM <2.5 microns only account for 2 – 5% of the emissions from mining and mainly relate to vehicle emissions.

“Coarse particles” as PM 2.5 – 10 um in diameter account for 55% (50% - 70%) of quarry dust.

Dust particles of >10 um form the nuisance coarser dust that quickly settles. These account for 40% of all emissions from quarries and result from the breaking of rock or disturbance when not controlled by water.

1. PM< 2.5 are invisible and called “fine particles”. They are the main health issue and are caused by vehicle emissions whether they are along roads or on private land from farming vehicles and cars. Vehicle emissions will not occur at night or at other times when the site is not active. The most common form of particulate arises from diesel motors that are not correctly tuned. Increasingly modern vehicles are fitted with better combustion techniques and particulate filters which significantly reduce risk resulting in very large reductions in concentrations of these particles on quarries and minestites in Australia including underground operations.

2. PM <10 are invisible and called “coarse particles”. They can be breathed in, but are removed by alveoli and mucous. *(NSW Health).* This dust may be generated when land is cleared and topsoil disturbed or the site is subject to traffic in summer. This size dust might be fine clay and soil particles that could be expected to occur on site or from any agricultural activity.

3. PM>10 is visible dust and will, based on the resource, be the vast majority of the particles, consisting of fine clay particles or, if limestone or gravel roads are used, crushed road materials. These particles are the same as those generated from any travel on such roads.

4. Coarser particles such as sand may bounce but do not normally bounce above knee height unless by very strong gale force winds. Sand particles are normally >50 microns. DEC 2011 (below) lists particle sizes of >50 um as not normally becoming airborne. That is the sand grains which move by saltation (bouncing) and are retained by the wall of the pit. Sand sized particles are either only a minor component of the clay materials or are not present.

As all sizes of dust are likely to be generated together, there will be visible dust being generated when invisible dust is being formed. Therefore any visible dust present is a good sign and early indicator of a dust risk.

On this site the main dusts will be fine clay particles of the “coarse particle” size and above. The same type of dust is common on rural properties and all rural roads.

- **Health Risks**

The main health risks relate to PM <2.5 which can be breathed in and are less likely to be breathed out. The source of these is predominantly vehicle exhausts, which is most likely to impact on workers on site. In other words it is an occupational health and safety issue controlled under the *Mines Safety and Inspection Act 1994 and Regulations 1995.* Regular assessments are made of all quarries and mine sites by officers from the Department of Mines and Petroleum. If onsite dust is managed for worker safety then offsite dust will also be managed.

As noted above vehicle emissions have improved significantly in the last 20 years through the use of better engine management and filters and consequently the health risk from such vehicles is now regarded as low on and off site in open small operations such as this.

Particles greater than PM 10 microns constitute over 95% of the particles likely to be generated on site without dust mitigation measures.

From the proposed operations, the main component of dust is clay. Clay is predominantly kaolin and smectite. Clay has no known health risk and is even used in some medicines.

WIND PATTERN - EASTERLY WIND

Winds are typically easterly on summer mornings and south west on summer afternoons. Winter winds are more variable.

The only wind data is from Pearce which is subject to strong katabatic influences caused by the Darling Scarp, which gives a stronger easterly component.

Locally the easterly winds will be influenced by the topography which will cause the wind to flow down slope, rather than continuing on a straight easterly path. (Yellow arrows).

The winds are less strong on the plateau and pick up speed flowing down slope due to katabatic effects. The winds get stronger as they flow down slope and across the valley floors, and slow down travelling upslope. They are deflected by landform and slow down across and through trees.

The arrows represent the interpreted flow paths and relative speed of the 9.00 am katabatic winds in summer.

Note that this pattern only occurs on summer mornings. At other the wind is blowing from other directions.

Dwelling
Shed?
Dwelling
Dwelling
MOOLIABEENEE
SWAN
CHITTERING, SHIRE OF
BINDOON
LOT 7
Summer mornings
Dwelling occupied by the applicant
Sea breezes
Current excavations
Dwelling
Dwelling
Dwelling
Dwelling
Dwelling
Dwelling
Dwelling
Dwelling
Dwelling
Dwelling
Shed? Dwelling?
Dwelling
0 400m

Proposed pit and stockpiles
Prevailing summer morning easterly winds
Prevailing winds blowing across the active footprint easterly summer morning winds and afternoon summer sea breezes

BRIKMAKERS

PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
WIND DIRECTIONS	
Landform Research	January 2015
Scale See Plan	
Basemap Landgate	**Figure 1D**

Australian Government
Bureau of Meteorology

Climate statistics for Australian locations

Monthly climate statistics

All years of record

Site information

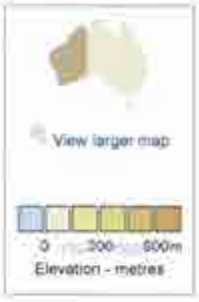
Site name: PEARCE RAAF
Site number: 009053
Latitude: 31.67 °S **Longitude:** 116.02 °E
Elevation: 40 m
Commenced: 1937 **Status:** Open
Latest available data: 25 Mar 2015

Additional information

Additional site information

Nearest alternative sites

1. 009067 UPPER SWAN RESEARCH STATION (9.9km)
2. 009022 GUILDFORD POST OFFICE (26.0km)
3. 009178 GINGIN AERO (26.9km)



View: Main statistics All available | Period: Use all years of data | Text size: Normal Large

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years	
Temperature															
Mean maximum temperature (°C)	32.5	33.3	30.5	26.4	22.0	18.8	17.8	18.4	20.0	23.4	27.2	30.3	25.1	54	1940 2015
Mean minimum temperature (°C)	17.0	17.6	16.0	13.4	10.8	9.4	8.4	8.2	8.8	10.1	12.5	14.5	12.2	54	1940 2015
Rainfall															
Mean rainfall (mm)	7.6	12.2	14.9	34.5	85.3	133.4	134.4	104.2	70.1	36.2	23.7	10.4	677.9	60	1937 2015
Decile 5 (median) rainfall (mm)	1.1	4.4	8.2	31.7	80.6	130.3	135.6	105.5	66.8	33.9	18.8	4.9	646.4	60	1937 2015
Mean number of days of rain ≥ 1 mm	0.7	1.1	1.6	3.5	6.5	8.9	9.8	9.0	6.9	4.4	2.9	1.3	56.7	59	1937 2015
Other daily elements															
Mean daily sunshine (hours)															
Mean number of clear days	8.4	10.4	9.4	5.2	5.2	4.2	4.6	5.4	5.8	6.7	8.0	5.9	81.2	50	1940 2011
Mean number of cloudy days	1.7	2.9	3.8	6.0	7.5	7.9	8.1	8.1	7.4	5.6	5.4	1.9	66.3	50	1940 2011
9 am conditions															
Mean 9am temperature (°C)	24.1	24.0	21.8	18.9	15.6	13.2	12.1	12.7	14.6	17.3	20.5	22.6	18.1	52	1940 2011
Mean 9am relative humidity (%)	48	50	56	64	72	78	78	76	71	61	53	48	63	47	1944 2011
Mean 9am wind speed (km/h)	17.5	17.8	16.3	13.3	11.0	11.2	10.5	11.3	13.0	14.9	16.7	16.7	14.2	44	1940 2011
3 pm conditions															
Mean 3pm temperature (°C)	31.4	31.5	28.7	24.8	20.9	17.7	16.6	17.2	18.9	22.1	25.5	28.4	23.6	50	1940 2011
Mean 3pm relative humidity (%)	30	31	35	43	50	60	61	57	54	46	39	33	45	45	1944 2011
Mean 3pm wind speed (km/h)	20.4	19.0	17.8	15.8	13.9	15.3	15.5	16.6	17.7	18.5	20.5	21.1	17.7	41	1940 2011

red = highest value blue = lowest value

Product IDCJCM0030 Prepared at Thu 26 Mar 2015 02:06:38 AM EST

Monthly statistics are only included if there are more than 10 years of data. The number of years (provided in the 2nd last column of the table) may differ between elements if the observing program at the site changed. More detailed data for individual sites can be obtained by contacting the Bureau.

Related Links

- This page URL: http://www.bom.gov.au/climate/averages/tables/cw_009053.shtml
- About climate averages: http://www.bom.gov.au/climate/cdo/about/about-stats.shtml
- Bureau of Meteorology website http://www.bom.gov.au

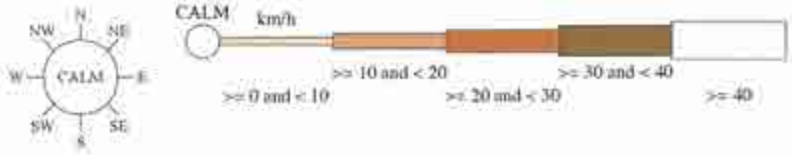
Page created: Thu 26 Mar 2015 02:06:38 AM EST

This page was created at on

EARCE RAAF

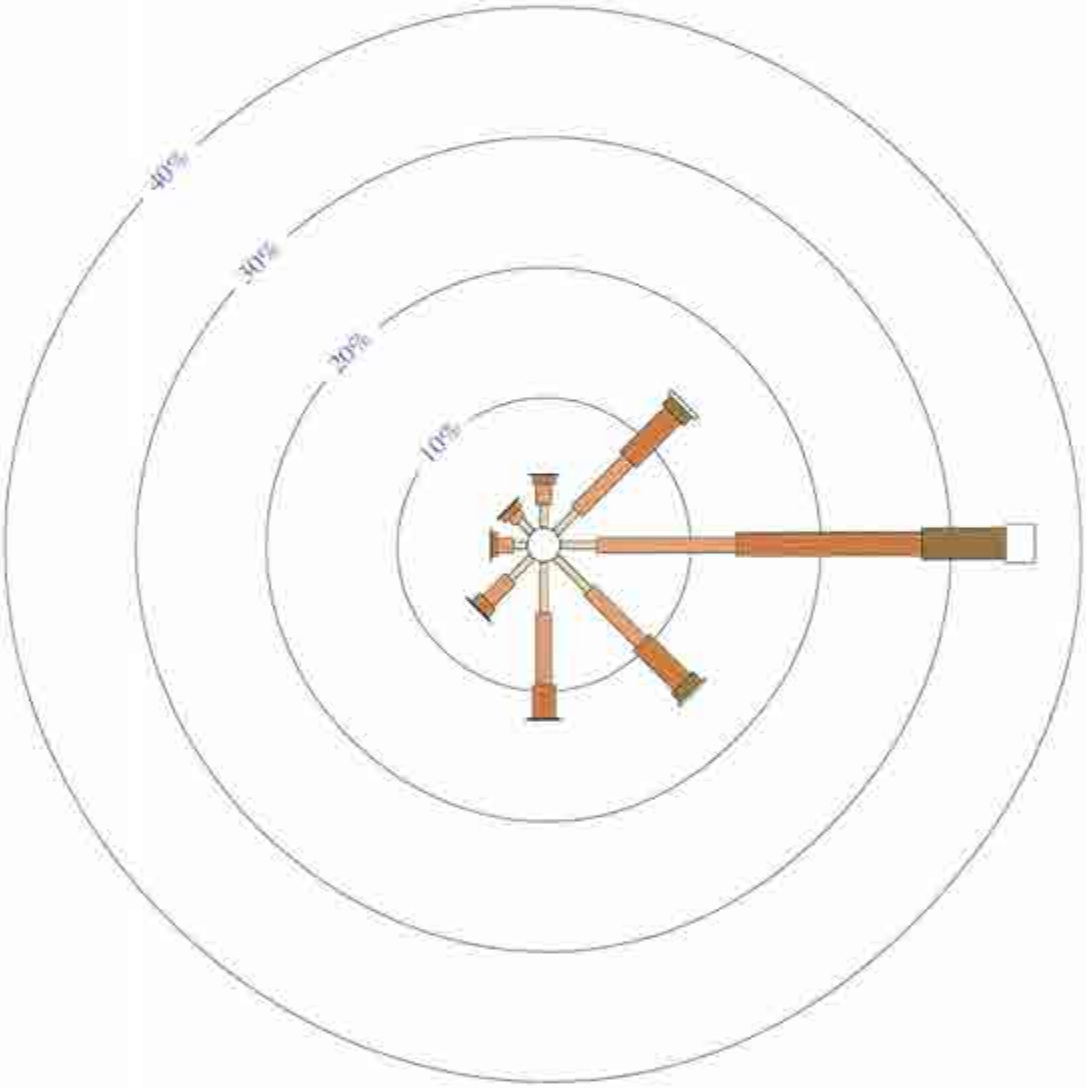
e No: 009053 • Opened Jan 1937 • Still Open • Latitude: -31.6569° • Longitude: 116.0189° • Elevation 40m

n asterisk (*) indicates that calm is less than 0.5%.
ther important info about this analysis is available in the accompanying notes:



9 am Feb
1203 Total Observations

Calm 6%



Some lines selected, refer to attached note for details

EARCE RAAF

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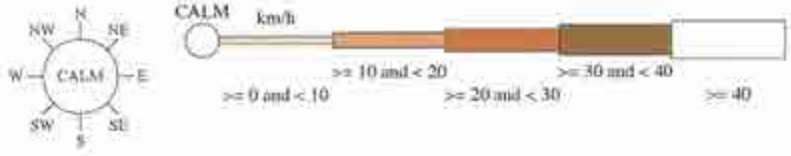
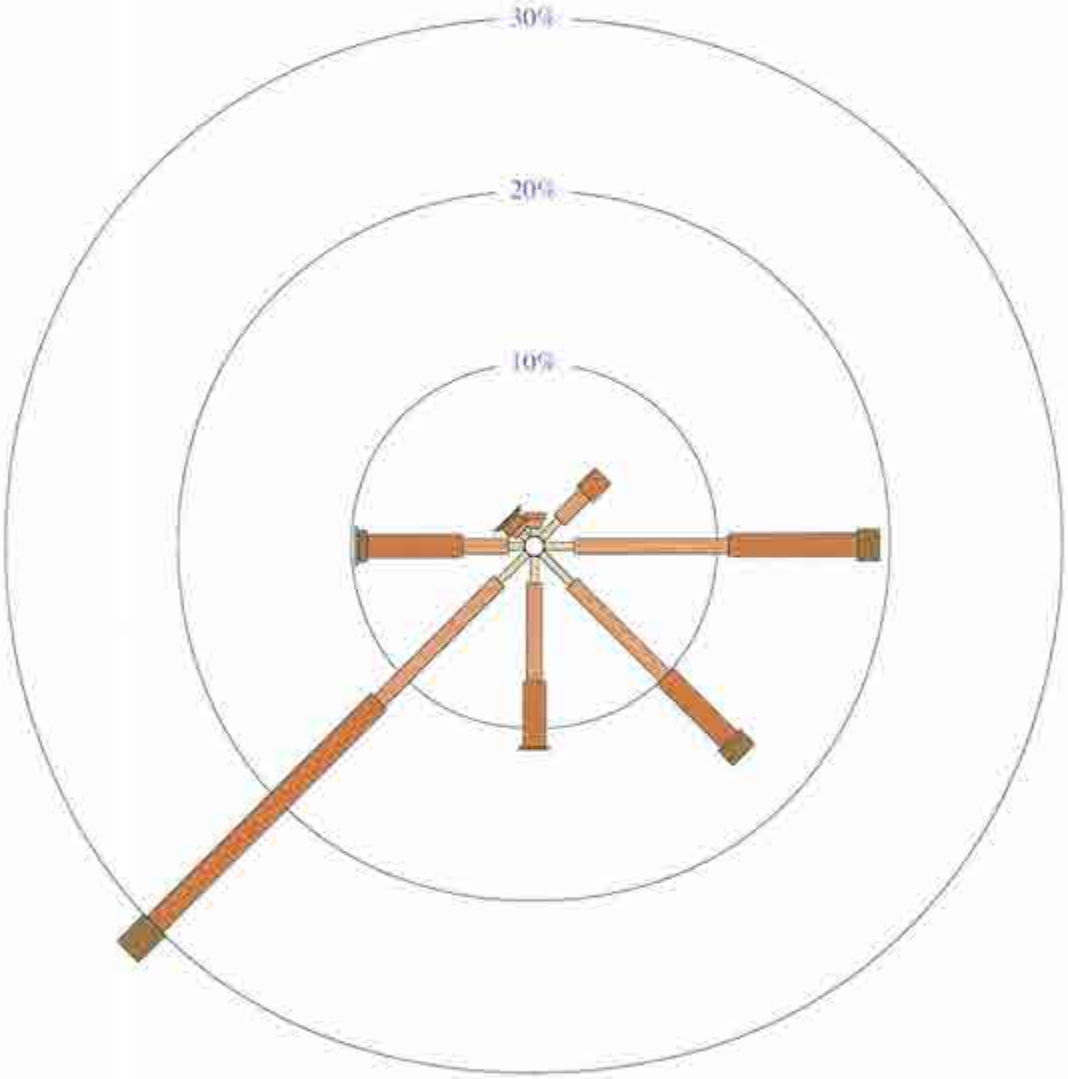


3 pm Feb
1116 Total Observations

Calm 3%



EARCE RAAF

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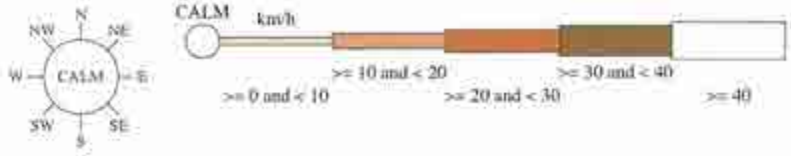
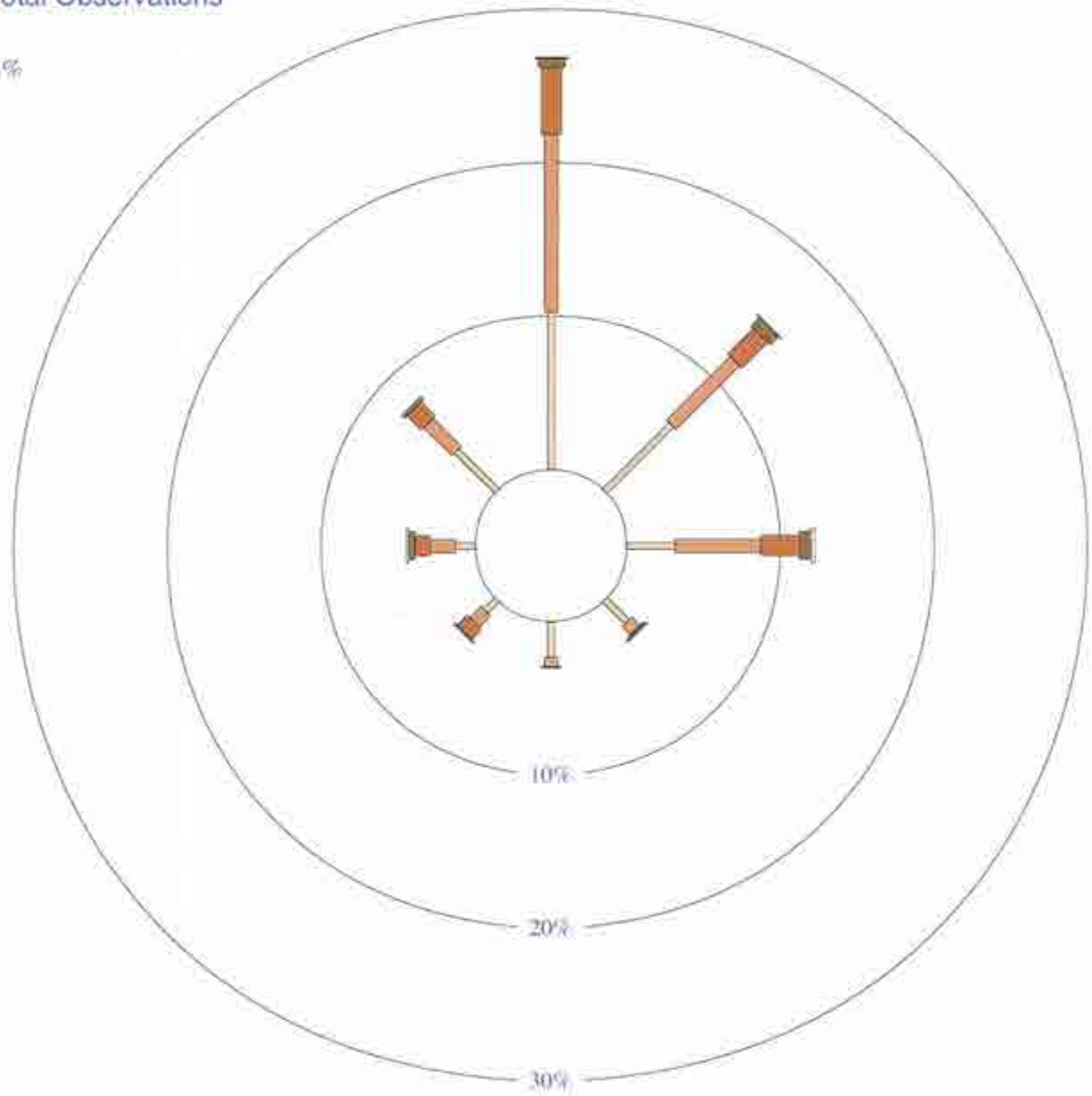


9 am Jul
1428 Total Observations

Calm 25%



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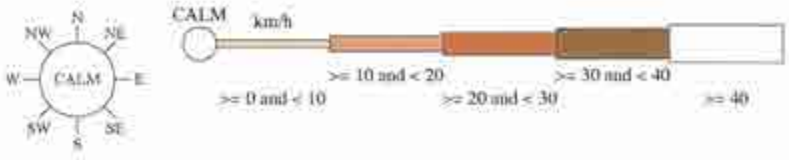
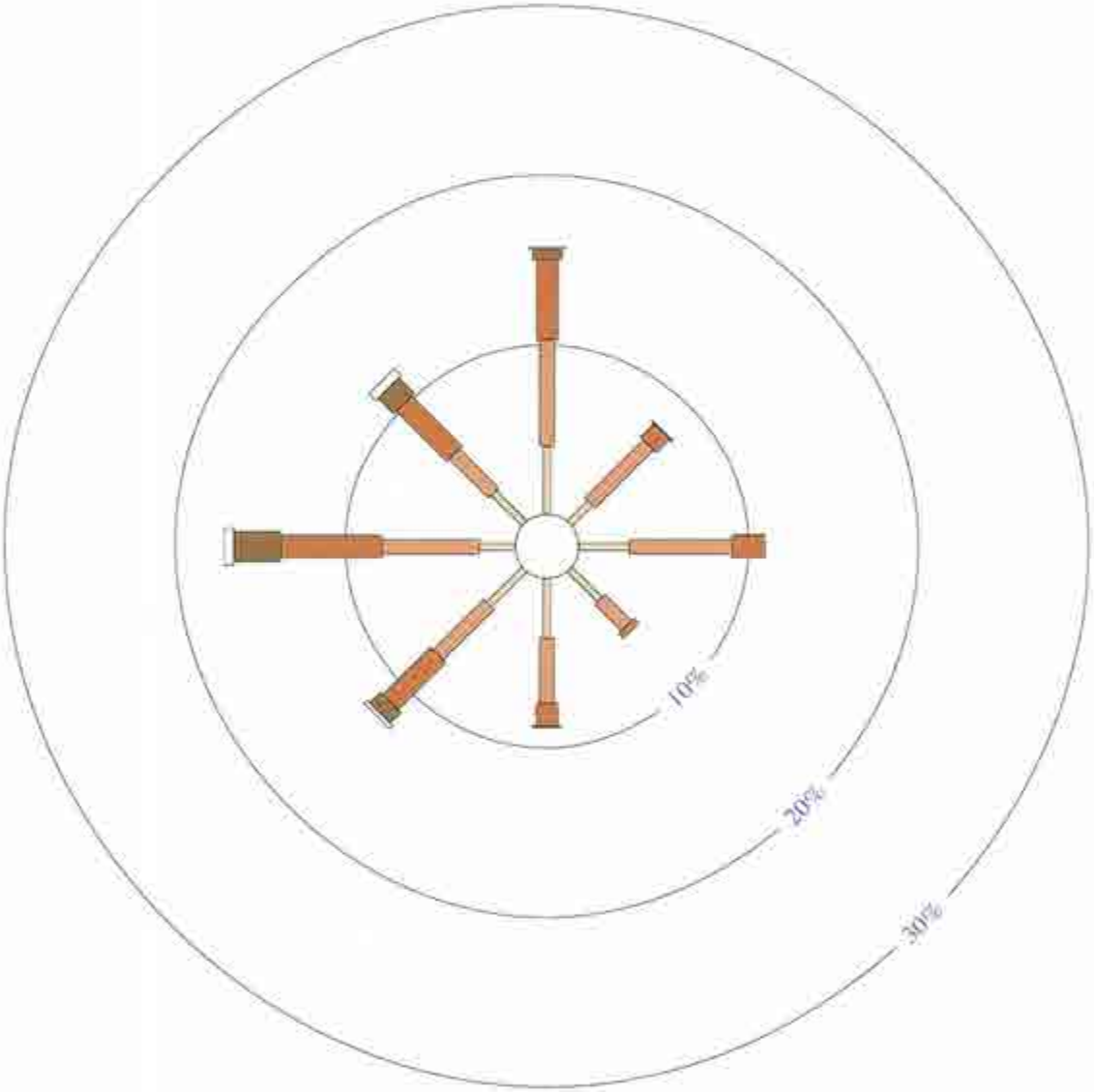


3 pm Jul
1325 Total Observations

Calm 9%



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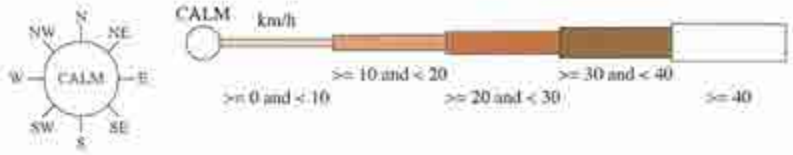
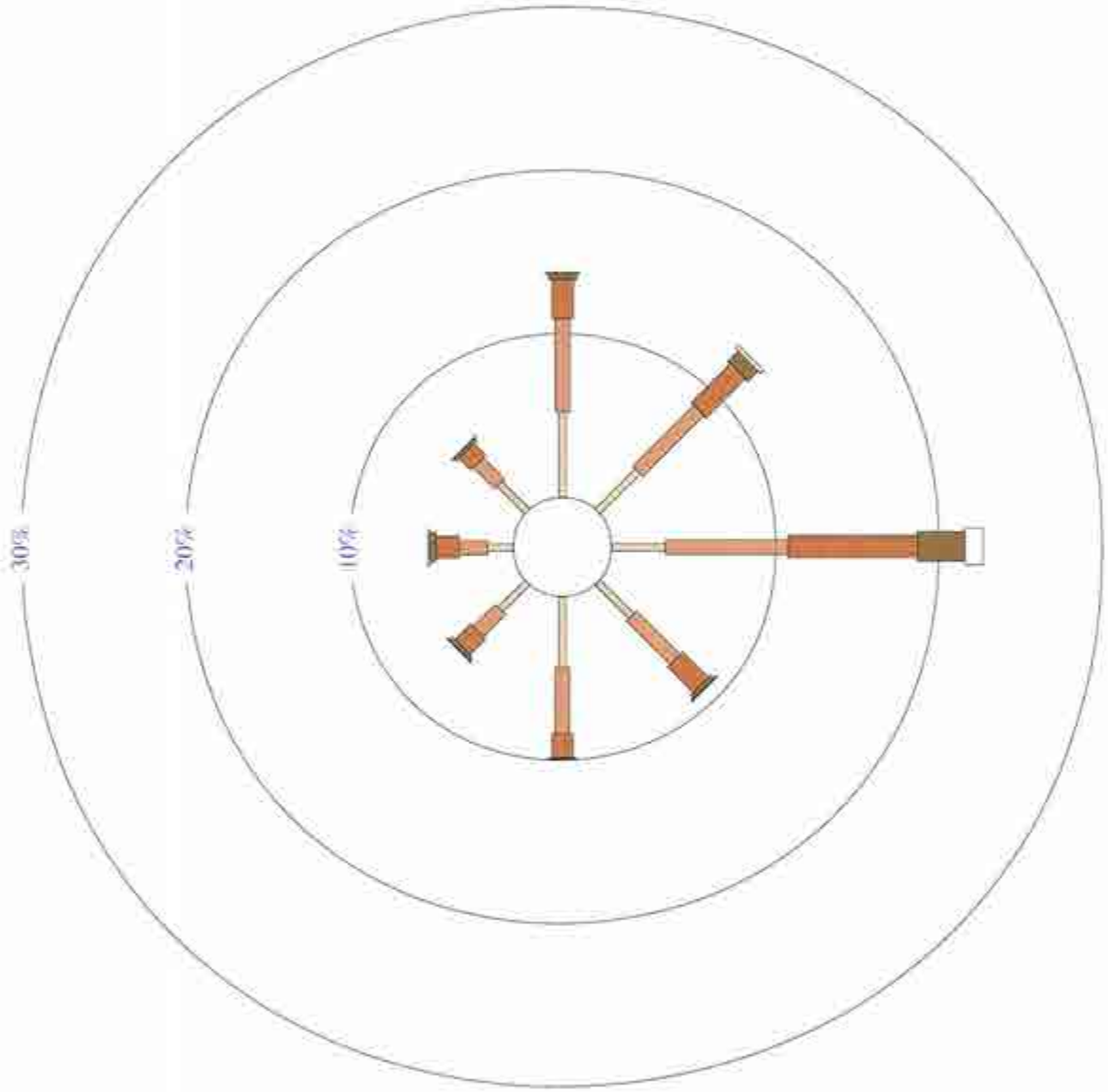


9 am
15689 Total Observations

Calm 15%



EARCE RAAF

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n asterisk (*) indicates that calm is less than 0.5%.
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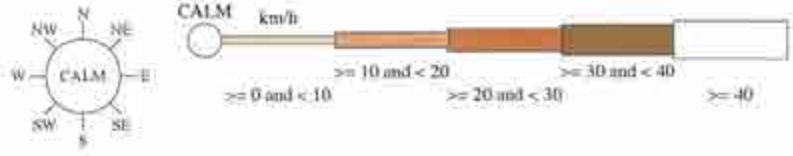
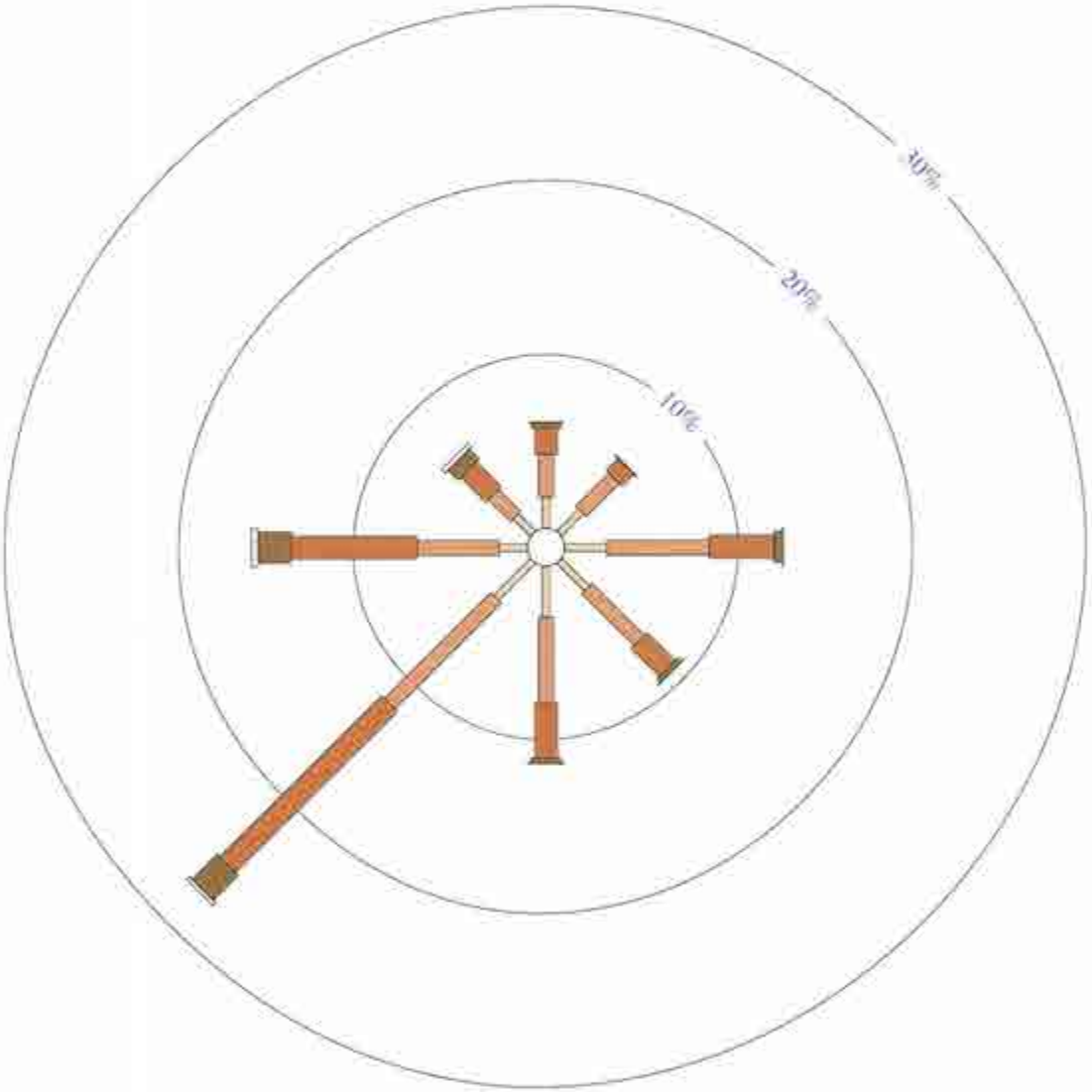


3 pm
14582 Total Observations

Calm 5%



Appendix 2

Water Management Plan
Clay Excavation

Lot 7, Toy Road, Bindoon

Brikmakers Pty Ltd

August 2015

Operations Manager

Brikmakers Pty Ltd
260 Kalamunda Road
South Guildford WA

PO Box 1257 Midland WA, 6936
Phone 08 6313 1000

Prepared by

Lindsay Stephens BSc , MSc, MAGS, MEIANZ, FIQA
LANDFORM RESEARCH

EXECUTIVE SUMMARY

The findings of the water management assessment and management procedures are summarised below and on the attached Figures 9A and 9B, of the Excavation and Management Plan and Figures 1W to 5W of this document.

Summary

- The Brockman River is brackish.
- The flow in most years is confined to the main channel.
- The main channel was trained straightened and deepened many years ago to improve the pasture.
- In winter there is some water flowing from the hills to the north that form wet pasture and surface water north of the bend in the Brockman River.
- The main body of water during floods is located 500 – 1.2 km downstream from the crossing on Lot 7, but temporarily spreading upstream during high floods.
- On Lot 7, a water body forms across pasture most winters, downstream of the access and excavation. This water body has been given the name Lake Ginniby by some local people. The status of the name is unclear.
- The river crossing lies in an area of free flowing water.
- The proposed clay excavation and stockpile area is located 200 metres from where the water body pools, at an elevation approximately 14 metres higher than the water body.

Management - Commitments

In addition to the findings above there are a number of mitigation measures to be used.

- All water from the pit and stockpiles is to be directed to the sediment settlement/storage dams.
- No water from disturbed areas can leave site without passing through the dams with the exception of the access road where runoff will be to pasture which is the normal way rural roads are treated.
- Stormwater cutoff drains are proposed upslope of the proposed pit and disturbance areas to reduce the flows to the disturbance areas. That stormwater is directed to the water storage/settlement dams.
- The bridge is to relace an existing crossing to a standard suitable for use by large farm vehicles and road transport of clay.
- The crossing and bridge have been designed to not change the water flows of the Brockman River during normal and flood flows.
- The stormwater management, bridge and earthworks are designed to have no impact on the flood water body referred to as “Lake Ginniby” by some near neighbours, the flood frequency or extent of flooding of the Brockman River.
- Quarrying is a clean industry permitted in Priority 1 public drinking water catchments.
- Extensive management of fuels, lubricants and other materials is provided.

- There will be no fuel stored on site.
- Tree belts, stormwater channels and bunds will be used to manage water, views, dust and noise.
- There will be no alteration to water flows in the Brockman River through increased sediment, changed water flows or flood regimes.

CONTENTS

HYDROGEOLOGY – WATER MANAGEMENT PLAN

FIGURES

HYDROGEOLOGY - WATER MANAGEMENT PLAN

1.0 Background

A 9 hectare clay pit plus an associated stockpile area is proposed to be located on the western part of Lot 7 Toy Road, Bindoon.

Lot 7 is a large rural property that lies within the catchment of the Brockman River. See Figure 1W.

2.0 Location

Lot 7 is located 5 km north from Bindoon townsite on the northern side of the Brockman River.

3.0 Guidance Documents

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.

Guidance on the quality of water can be found in;

- Western Australian Water Quality Guidelines for Fresh and Marine Waters, EPA Bulletin 711, 1993.
- ANZECC, 1992, Australian Water Quality Guidelines for Fresh and Marine Waters.

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.

Documents specific to the mining and quarrying operations are the DOW – DMP Water Quality Protection Guidelines for Mining and Mineral Processing.

- Overview
- Minesite water quality monitoring
- Minesite stormwater
- WQPN 28 Mechanical servicing and workshop (2006)
- Mine dewatering
- WQPN Landuse Compatibility in Public Drinking Water Source Areas (2004)

- WQPN 15 Extractive Industries near sensitive water resources.

The clay excavation complies with all the documents above. The most relevant document is WQPN 15 *Extractive Industries near sensitive water resources.* The location of the clay and its proposed excavation complies with all Advice and recommendations, of the policy (Numbers 1 – 62).

4.0 Geology and Geomorphology

The site lies east of the Darling Fault within the Chittering Metamorphic Zone. The Chittering Metamorphic Belt is characterised by schists and granite basement that are intruded by several ages of dolerite dykes of which the older ones have been subjected to regional pressures and are changed to amphibolite.

The resource sits on a south facing valley slope of the dissected edge of remnant of a lateritic Tertiary erosion surface at an elevation that ranges from 190 metres AHD in the north east, down to 155 metres AHD in the south west.

The land drops away towards the Brockman River in the south.

The schists and amphibolite are part of the Chittering Metamorphic Belt that underlies the whole locality. The schists strike north to north west dipping at a steep angle.

The schists are deeply weathered in part forming brown to red brown loam soils.

Additional geological information is presented in the hydrogeological report prepared by Meyer Water and Environmental Solutions that is attached. The report shows a contour plan and wider resources of which only the southern portion of the identified areas is proposed to be excavated.

South of the site the land drops to the Brockman River at an elevation of 135 metres AHD. A small floodplain formed from alluvial silts and clays occupies the base of the Brockman River Valley.

A drilling program outlined clay resources in the central north west of Lot 7 with depths ranging up to 10 to 12 metres, shallowing towards the edges.

The clay resource consists of a series of weathered dipping beds of schist and sheared dolerite - diorite that form a number of clay types.

Based on the drilling the clay resource occurs at elevations ranging from 155 – 190 metres AHD See Figures 6,7 and 8 of the Excavation and Management Plan.

5.0 Regolith and Soils

The soil profile is a relatively thin red brown loam that is stony in places and carries a small amount of gravel pisolites shed from upslope.

The subsoils become more clay rich grading to weathered schists and saprock at depths of 1 – 2 metres, variably extending to depths of 20 metres with an average of 10 – 12 metres.

The soil system on the extraction area is classified as Coolakin (Cek) in Smolinski, 1998, Soils of the Chittering Area, South West Forest Region, Western Australia, Department of Agriculture WA. On the valley floor of the Brockman River the soils are incorrectly classified as Norinne (No) a plateau soil. The valley floor is better classified as Murray 4 (My4) or Helena (2H3).

Coolakin – Valleys with narrow valley floors and some rock outcrop. Sandy duplex and gravels are common. This only generally describes the soils on site which are loam and clay based soils.

The reconstructed soils, at the completion of excavation, will be replacement of the red brown topsoils on overburden from the existing subsoil profile on deep ripped schist basement.

6.0 Climate

The climate of the area is classified as Mediterranean, with dry hot summers and cool wet winters.

Climatic data is recorded at Bullsbrook, (Pearce RAAF), 37 km to the south. Precipitation is 688 mm per annum, of which 89% falls in the months April to October inclusive. At Swan Research Station evaporation exceeds rainfall in all but the four wettest months, and the situation at Bullsbrook can be expected to be similar.

Average maximum temperatures at Bullsbrook reach 33.3 degrees Celsius for the hottest months, January and February, but fall to 17.6 degrees Celsius in July. Average minima for the coldest month August, is 8.2 degrees Celsius.

Further data on climate is attached and provided in Section 2.1 of the Excavation and Management Plan.

7.0 Water Source

Water for the proposed operations is to be sourced from dams to be constructed as part of the operation that will remain in place at the end of excavation and be used to supplement farm supplies. Figures 1W and 2W.

The water collecting in the base of the pit will be directed to the water storage dams and used for dust suppression.

Water in clay pits in similar geological situations, such as near Toodyay, is fresh because the water runs quickly across the clay and excavated surface to a dam.

Calculations on this water supply recharge and the management of the supply are considered in Section 8.5 Recharge and Water Supply.

A number of bores are present on Lot 7 that are used for stock purposes and will not be required for dust suppression.

Potable water is to be brought to the site as needed.

8.0 Hydrogeology

8.1 Background

The site lies to the north of the Brockman River within the Brockman River Catchment.

A number of studies have been conducted on the Brockman River such as;

- Ali et al, 2010, *Regional Drainage Evolution for the Avon Basin*, WA, CSIRO.
- Beatty, S J, D L Morgan, M Klunzinger and A J Lymbery, 2010, *Aquatic Macrofauna of Ellen Brook and the Brockman River: Fresh Water Refuges in a salinized Catchment*, Murdoch University.
- Chittering Landcare, Brockman Snapshot Years 2010 to 2014.
- Department of Water 2010, *Setting allocation limits for Brockman River and Marbling Brook*, Report 44.
- Hindmarsh R 2003, *Natural Resource Management Plan for the Brockman River Catchment,* Water and Rivers Commission.
- Smith M G, 2002, *Groundwater Information and Management Options for the Brockman River Catchment*, Water and Rivers Commission.

The studies aim to provide data and management actions to protect the Brockman River Catchment and the future water quality.

The Chittering Landcare Group is active in monitoring and overseeing management of the Brockman River Catchment.

8.2 Surface Water

The Brockman catchment at times is brackish to saline in summer reducing in winter to brackish water. Trends towards increased salinity are due to land clearing within the catchment and changed rainfall regimes. Most of the catchment remains uncleared. There have been some changes to nutrient levels in the river in recent years but in 2014 these did not increase.

Much of the local catchment remains uncleared. Refer to Figure 1W.

There are minor watercourses near the site, running south along the western side of the proposed clay pit and stockpile area. This watercourse and tributaries will be protected with setbacks and diversion of all water from disturbance areas to detention basins and a large dam. A small drainage line will be intersected by activity on site. The upper portion of this drainage line will be diverted along contour to join a drainage line in the south that drains to the Brockman River.

Most drainage runs as surface runoff from the clay based hill and a small amount of recharge will infiltrate the loam and clay soils.

In storm events, when surface water exceeds infiltration, there are diffuse flows to the watercourse. A small portion of this will be diverted by the pit to the water storage dam.

At the end of excavation the site will be rehabilitated, with the water storage dams remaining as farm dams to enhance the agricultural capability of the land.

Trends towards increased salinity are due to land clearing within the catchment and changed rainfall regimes. As the land is already cleared the proposal will not impact on salinity.

See also Section 8.5 Recharge and Water Supply.

8.3 Groundwater

The hydrogeology and groundwater is considered in the report of Meyer Water and Environmental Solutions, attached as Appendix 1. For water quality, see Section 8.6 Salinity (below).

Additional information is provided in *Smith, 2002, Groundwater Information and Management Options for the Brockman River Catchment,* Water and Rivers Commission.

A costean was excavated at hole DW047 shown on the figure attached in The Meyer Report. That costean was located where the proposed water storage dam is to be located and represents a perched aquifer. The water quality intersected on 23 February 2005 was 612 mg/L salinity. Clay testing by Brikmakers shows low salt content, averaging 200 ppm, which is normal for sloping loam soils in a moderate to high rainfall zones and lower than other soils in the Chittering area.

Drilling by Brikmakers to depths of several, to over 10 metres, did not intersect the water table in the drill holes. The base of the holes were at a lowest elevation of 235 metres AHD. Some drill holes struck granite basement at higher elevations.

Drilling on the floodplain by Brikmakers intersected a superficial sandy aquifer located below 1 – 2 metres of loamy clay. The water was abundant and brackish in quality and will not be used.

The base of the proposed excavation is well above the water table.

Smith, 2002, Groundwater Information and Management Options for the Brockman River Catchment, noted that groundwater levels were rising in the Brockman River Catchment. This does not impact on the proposed excavation because the water source is to be harvested surface water.

8.4 Dewatering

Dewatering of the pit is not proposed and is not normally used at other clay pits operated by Brikmakers. All surface water collecting in the pit will drain to a sump near the stockpile area. From there it will drain to the water storage dams.

Maps are attached showing concept design pits during excavation of clay. See Figures 4 – 8 of the Excavation and Management Plan and Figure 2W (attached).

At the end of excavation the pits will be prepared to a landform to ensure that all stormwater will be retained within the water storage dams as a future water source for the farm.

8.5 Recharge and Water Supply

When the farm was first cleared and the vegetation removed the recharge will have increased.

As the pasture is to be returned at the end of excavation, and additional trees are required to be planted as part of the excavation, there will be no changes to the current level of recharge on site as a result of excavation.

The proposed dams are to be located off the main creek line, which will not be impacted, and maintain its environmental flows. Refer to Figure 2W.

The behaviour of the dams during, and at the end of, excavation is considered below.

Both proposed dams have an open area of 1 hectare each. With an anticipated depth grading from 0 metres at the edges to 8 plus metres in the center, the total volume of water available in each dam is about 25 000 cubic metres or kL based on an average depth of 5 metres. That is 50 000 kL water holding capacity for the two dams. Making the dams deeper reduces the percentage of evaporation from the surface as a percentage of water volume and is desirable. The dams will be deepened to perhaps 8 metres in the deepest points, but for the sake of calculations a 5 metre centre depth is used. Figure 2W.

The cut off drains will be located on the upslope side of the pit and stockpile areas to capture and direct water to the storage dam. That catchment has an area of 31.5 ha. The total pits have an area of 9 ha, the stockpile areas about 4 ha and the dams themselves have an area of 2 ha.

Rainfall is 688 mm at Pearce. Considering Lot 7 is further north, but hilly, the rainfall is likely to be similar. However a figure of 600 mm rainfall is chosen to be conservative. For example the annual total at Bindoon in 2014 was 663 mm.

Using data from *Coles and Moore, 1998, Runoff and Water Erosion, Soil Guide, Department of Agriculture and Food, WA*, runoff from Type A Landscape forms is 20% of rainfall for 600 mm. That is equivalent to 120 mm per year for the upslope pasture. For the pit runoff is anticipated to be 40 % or 240 mm per year and for the dams 80 % of rainfall or 480 mm per year will add to the dams.

The following water availability is therefore;

35 ha pasture catchment x 10 000 m^2 x 120/1000 = 42 000 kL per year surface water

9 ha pit and 4 ha hardstand x 10 000 m^2 x 240/1000 = 31 200 kL per year surface water

2 ha water body x 10 000 m^2 x 480/1000 = 9 600 kL per year surface water

The catchment is therefore likely to generate 82 800 kL per year. As the two dams will be designed to hold 50 000 kL the design of the system is such that the water will be captured during excavation and operations and on closure, when the recharge from the pit will reduce back to pasture, there should still be sufficient water to fill the dams.

Evaporation is likely to reduce the dams by 40% however there will be around 50 000 kL water available for dust suppression through summer following a relatively dry year. See the note above relating to deepening the dams to 8 metres at the deepest point to reduce the influence of evaporation. Conservative estimates are used.

Brikmakers estimates that 80 tonnes or kL per day water will be required to suppress dust during the summer months. If water is required for five months of the year (120 working days) the water requirement would be 9 600 kL.

The proposed water collection will therefore produce and retain sufficient water for dust suppression.

During excavation and in wetter years the dams should overflow to assist in maintaining the environmental flows in the Brockman River. At such times the stormwater will be diverted around the dams to direct clean stormwater to the watercourses and ensure that water from the disturbed areas are retained on site. See Figures 2W (attached) and Figures 7 and 8 of the Excavation and Management Plan.

The amount of change to recharge is therefore small and unlikely to lead to any change in the regional water table or water flows in the Brockman River.

The proposed operation complies with all Government Policies and Guidelines.

There will be no alteration to drainage lines, and neither surface water nor ground water will be affected.

8.6 Salinity

Salinity is the main concern of the protection of the Brockman Catchment. The Brockman catchment is brackish, becoming more salty in summer and reducing in winter. Stock are able to drink the water in winter but not in summer.

There are no watercourses on the excavation area, although surface water can flow down a depression/drainage line.

There are no salt or seepages on the resource area and the clay has low salinity.

Meyer Water and Environmental Solutions assessed the water quality and showed the presence of two small seepages. The main seepage lies in the creek line west of the disturbance area. This flows all year round and was found to have a salinity of 490 mg/L in February 2005.

Other testing of water encountered during drilling was less than 470 mg/L. See attached report from Meyer Water and Environmental Solutions.

Clay testing by Brikmakers shows low salt content, averaging 200 ppm, which is normal or lower than other soils in the Chittering area.

A costean was excavated at hole DW047 shown on the figure attached in the Meyer report (attached). That costean was located where the proposed water storage dam is to be located and represents a perched aquifer. The water quality intersected on 23 February 2005 was 612 mg/L salinity. See Meyer Water and Environmental Solutions.

The dam was tested by Meyer Water and Environmental Solutions on 23 February 2005 and found to have water concentrated by evaporation with a salinity of 2157 mg/L. See attached report from Meyer Water and Environmental Solutions.

All water is suitable for stock.

8.7 Acid Sulfate Risk

Acid sulfate only becomes a potential risk when a number of circumstances are present.

- There is rock, soil or regolith present that is carrying sulfides.
- Sulfide carrying materials from below the water table are to be exposed to the atmosphere.
- Excavation below the water table is to be carried out exposing the sulfide carrying materials to oxygen in the atmosphere.
- Dewatering of the sulfide carrying materials is proposed, exposing them to oxygen.

None of these conditions occur on site based on geological mapping of the site during the site inspection, examination of the drill data, examination of the pit and from published information, and none would be expected from this type of geology. The potential acid sulfate within the Muchea area relates to sedimentary shales of Mesozoic age which do not occur in this geological environment or nearby.

On this site the geology of the weathered metamorphic schist and amphibolite does not contain disseminated sulfides. Any sulfide minerals that may occur in the unweathered basement rocks has geologically been weathered and dissolved within the Tertiary weathering regime. In addition the clay to be extracted is well above the water table in oxidised conditions.

Brikmakers has conducted an extensive drill based exploration program. Samples are collected from each metre of depth and all samples are analysed for a number of parameters including total Carbon, Sulfur and soluble Salts

The clay examined on site does not carry any sulfide, or the weathering products of sulfides, from site geological examination of the clays by Brikmakers' geologist and from site examination by Landform Research.

Brikmakers have parameters for sulfur in clay which would burn to sulfur dioxide during brickmaking. They therefore regularly test the clay for sulfur as part of their quality control for firing bricks and the resulting gaseous emissions. Clays which contain any significant sulfur are not used.

Brikmakers have standard management practices in place at all their clay pits if any acid sulfur conditions are detected, because acidic conditions can impact on clay processing and brick making.

On this site the basal geology of the hard rock and regolith are under well oxygenated terrestrial conditions, located high in the landscape, and have no known potential to contain disseminated sulfides. The geological and regolith environment is not conducive to sulfides.

Therefore there is no potential for acid conditions to develop in this ecological or geomorphological situation.

9.0 Protection – Brockman Catchment

9.1 Background

A summary of the Brockman River Catchment can be found in the documents listed in Section 8.0 Hydrogeology, under Background.

9.2 Protection of ground and surface water and the Brockman Catchment

Contour plans at 0.5 metre interval have been generated by Brikmakers for the area upstream and downstream of the access road.

The 0.5 metre contours were produced around the river crossing and operation to enable the design of the access road and crossing. In other areas 5 metre contours are available and are used. The one metre contours enable flood planning and assessment.

- As noted above the project will use water harvested from the on site dams. The water is fresh and will have no impact on salinity through its use for dust suppression.
- The key to protecting the catchment is to ensure that operations, in particular fuel and maintenance, are effectively managed. This is covered below.
- Recharge is calculated to not change significantly.
- The other key management issue is the access road crossing the Brockman River. The proposed crossing is located in the same point as the existing access road.
- The disturbance footprint is designed to be isolated from surface water flows.

- Cut off drains are proposed up slope to direct water away from the disturbance areas to the storage/settlement dams.

- All water from the disturbed areas is directed to the water storage dams. These dams are sized to fill in average winters and to overflow in wet winters through protected overflow outlets. The dams will provide the time for sediment to settle prior to overflow. Refer to Figure 2W.

- There are extensive management procedures proposed for operations that are detailed in the individual sections of this Water Management Plan and are listed in the summary.

As discussed below there will be no alteration to water flows in the Brockman River through increased sediment, changed water flows or flood regimes.

9.3 Access Road

The current access road has a bridge that has deteriorated and is no longer safe. It must be replaced. The bridge and access needs to be capable of taking farm traffic and heavy farming machinery in the long term and quarry road trucks during the life of the excavations. It will therefore have to be designed and constructed to a suitable standard. Refer to Figures 9A and 9B attached from the Excavation and Management Plan.

The access road will be subject of engineering drawings, submitted prior to construction. Geotechnical assessments of the ground receiving the footings will be completed to inform the design of the bridge.

The current flow paths are cut off by the existing road on the southern side of the channel and the same is proposed for the upgraded access road.

The access road is to be formed from Toy Road as a causeway to the channel of the Brockman River where the existing bridge will be replaced. From there a causeway will cross the flood plain to the rising ground where the access road will continue.

The causeway is anticipated to be the minimum elevation to provide a road access. Based on the type of soils of the floodplain that is anticipated to be 300 - 500 mm in elevation above the natural soil. Figures 9A and 9B of the Excavation and Management Plan.

The engineering advice received by Brikmakers and their pre-cast concrete division is that the bridge can be designed with precast concrete spans and abutments and a single centre support. The bridge is designed not to impede the flow of the river during normal winter rainfall, storms or flood events.

The causeway on the northern side of the channel will be 300 – 500 mm lower in elevation

The floodplain south of the main channel is slightly higher than the northern side by around 500 mm. The causeway will consequently be lower.

The main reason for this is to minimise disruption to the natural flows of the Brockman River.

South of the channel the access road is proposed to be 133.5 m AHD. The bridge crossing is anticipated to be a similar elevation.

The main channel is some 15 metres wide at the crossing point. The replacement bridge is proposed to have a cross sectional area of 6 m^2 to allow for normal winter flows with the road surface being 133.0 m AHD.

North of the channel the elevation will reduce to 132.5 to 132.7 m AHD.

9.4 Brockman River Flows and Flooding

Normal winter flows will continue in the main channel flowing under the replaced bridge crossing.

The Brockman River only floods in response to significantly heavy storm events at any time of the year.

The previous owners of Lot 7 “trained” the Brockman River by cutting, deepening and straightening the river channel along Lot 7. This had the effect of allowing the smaller flows to move relatively quickly along the watercourse whilst retaining the existing flood paths of the floods. Figures 9A and 9B of the Excavation and Management Plan.

When the river rises in a small flood the additional water will flow across the access road north of the channel as it does now.

In this location the river runs through pasture covered floodplain wholely on Lot 7 from 150 metres upstream of the crossing to 1.2 km downstream. There are low and narrow alluvial terraces to the south and north although these are mostly narrow and not significant. There are minor natural levee banks particularly on the northern side of the main channel which rise to about 0.5 metres above the existing floodplain.

They affect the minor flood flows downstream of the crossing by directing water to the edges of the flood plain which is typical of river systems such as this. The effect is that during floods the water temporarily flows out of the watercourse particularly to the north and in higher flood south of the main channel, and slows down.

Downstream of Lot 7, over 1.2 km from the crossing, there are more densely vegetated areas typified by *Melaleuca* that slow the flow of the floods raising the water elevation so that it pools on the eastern side of Lot 7. Refer to Figure 5W.

There is no detailed flood data calculations available for this section for the Brockman River, some flood data is available in some other locations from Department of Water Gauging Stations and published data. A Gauging station is located upstream to the north west. Even so there is good field and observational evidence for the location and elevations of the water and flood flows.

The current flow paths and flood paths are based on photographs of the floods, recollections of the landholders, examination of the geomorphological patterns of the river, patterns of pasture and winter water patterns and the location of the Flooded Gums which typically germinate near or at the edge of floods.

It is noted that in a submission to the Shire of Chittering there is mention of a "Ginniby Lake". A photograph provided in that submission (Appendix 5 of the Excavation and Management Plan)) is attached and is labelled as "Lake Ginniby" in the submission, stating that it forms in winter. The "lake" apparently is located almost totally on Lot 7.

The current owner has lived on Lot 7 for a number of years and has been associated with the property for many years and is unaware of the name "Lake Ginniby".

As noted above, the area in the east of Lot 7 does pond with water in flood flows and in winter and appears to be what the local people are referring to as "Lake Ginniby". The water body only forms in time of higher flows and may form as a variable sized body of water that lasts for some days with remnants remaining for a longer time.

In some years the water body will form, dry up and then reform depending on the rainfall pattern. The large bodies of water that form are related to flood events within the Brockman River floods that occur every few years.

In winter surface water flows from the hills to the north form areas of wet pasture and surface water on the northern side of the bend in the Brockman River.

The flooded area on Lot 7 is wholely located on pasture, but does occupy some *Melaleuca* thickets downstream. Apart from the photograph provided by the local residents in their submission (Appendix 5 of the main report) the only aerial photograph showing the water body is from Landgate dated 1981 which is attached as Figure 5W.

The assessments of flood flows are drawn together by Lindsay Stephens of Landform Research who has extensive experience in landform and regolith morphology, backed by field assessments and the 0.5 metre contours. Refer to Figures 9A, 9B of the Excavation and Management Plan and Figures 3W, 4W and 5W of this Water Management Plan.

The use of geomorphology is a highly valid means of determining historical and likely future flood paths and flows.

The size of the flood is determined by providing an historical surface area to the cross section of the flood flow and then using that cross section to determine the likely impact of the construction of the bridge and causeway. This was completed using the geomorphology, ground observations of the flood plain and terracing, aerial photography, lines of *Eucalyptus rudis*, and 0.5 metre contours. The flood levels were then determined. Refer to Figure 4W.

It was not till after the interpretation was made that the site photograph provided in the submission (Appendix 5 of the Excavation and Management Plan) was provided to Brikmakers. The photograph was matched by the trees and the elevation of the water plotted on the plans and photos.

The Landgate aerial photograph dated 1981 also shows the flood extent and from the photo it would appear to have been when the flood was receding. The previous extent of the water body can be interpreted from the aerial photograph. Refer to Figure 4W.

All these lines of evidence are independent and they all provide a very similar footprint for the flood paths. Therefore the data can be viewed with a some level of confidence. Refer to Figures 3W to 5W.

The proposed bridge will not impact on flood flows or the water that pools on the alluvial soils of Lot 7 in winter and during floods.

10.0 Waste Management

10.1 Waste Rock and Tailings Management

There will be no washing of products. Subgrade materials and overburden will be placed around the perimeter to form the screening bunds.

At the end of excavation the bunds will be spread back across the excavated surface for subsoil restoration and landform restoration.

There will be no waste rock or tailings. All materials are natural clays, soils and weathered rock. Subgrade material will be used to backfill the pit batter slopes and for soil restoration.

Al subgrade materials will be stored within the disturbance footprint.

10.2 Unauthorised Access and Illegal Dumping

The potential for rubbish to be dumped relates to unauthorised access to the site. Access is restricted by current farm fencing and locked gates. This is unlikely to be an issue at the pit which is not located near the boundary of Lot 7, but may occur at Toy Road. Fences will be maintained and upgraded as required.

Wastes generated from on site operational activities will be recycled wherever possible and periodically disposed of at an approved landfill site.

Any illegally dumped materials are to be removed promptly to an approved landfill or other suitable site, depending on the nature of the material.

10.3 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 on site. Waste storage containers will be sealed so that rainfall cannot enter, therefore preventing the formation of leachates.

10.4 Wastewater Disposal

As the operations are small scale and intermittent it is proposed to use the on site approved serviced portable toilet facilities when the site is manned.

This complies with *WQPN 15 Extractive Industries near sensitive water resources.*

10.5 Refuelling

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 clay 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 to be cleaned up in accordance with the summarised procedures following.

> *Documents specific to the fuel and maintenance are the DOW – DMP Water Quality Protection Guidelines for Mining and Mineral Processing*
>
> - *Mechanical servicing and workshop facilities*
> - *Above-ground fuel and chemical storage*
> - *WQPN 28 Mechanical servicing and workshop (2006)*
> - *WQPN 15 Extractive Industries near sensitive water resources.*

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

Brikmakers have in place safety and pollution management procedures for all their operations. They also use self contained service and recovery vehicles to undertake minor servicing in the field.

- **Refuelling - Fuel Spill Management Plan**

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.

The operational procedures proposed comply with *WQPN 15 Extractive Industries near sensitive water resources.*

Refuelling will use mobile tankers. There will be no onsite fuel storage. This method is undertaken on most mine and construction sites as well as many farming properties and is the method used on all other Brikmakers pits. Refuelling will occur in the active pit or stockpile area to allow for containment if any spill did occur.

Clays such as this are normally impermeable. Clays usually have permeabilities of 10^{-11} - 10^{-5} cm/sec, (Hirschberg 1993) depending on their nature.

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. Any drips or minor fluid spills will be scooped up with the clay resource and sent to the Hazelmere works site, where they will be burnt with the clay during the firing process.

The only other risk is from a tank rupture, but tanks are designed to manage this eventuality. Soil contaminated by large spills will be removed from the site to an approved disposal area.

- Refuelling will be carried out in accordance with the DOW – DMP Water Quality Protection Guidelines for Mining and Mineral Processing, *Mechanical servicing and workshop facilities, Above-ground fuel and chemical storage* and *WQPN 15 Extractive Industries near sensitive water resources.*

- Soils and hardstand such as those on this site are partially 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.

- The operators of the mobile refuelling facilities (SWP) are trained in re-fuelling duties including the management of any spills.

- Refuelling and lubricating activities are to occur in the base of the pit, and equipment for the containment and cleanup of spills is to be provided. The mobile facilities are equipped with adsorbent mats and products (eg attapulgite) to be used in the event of spills.

- Spillage will 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).

- 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 DER, DOW and Shire of Chittering notified within 24 hours of an incident.

- In the event of a spill or adverse incident, activities will be stopped in that area until the incident is resolved.

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

10.6 Dangerous Goods and Hazardous Substances

There is no transport, storage or handling of hazardous materials involved in clay extraction.

10.7 Servicing and Maintenance

- All major servicing of vehicles will be conducted off site, and maintenance using dedicated trucks with oil and waste recovery systems will be used. This is consistent with *WQPN 15 Extractive Industries near sensitive water resources.*

- 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 in a shed or brought to the site as required.

- Vehicle washdown is not proposed.

- 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.

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

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

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

11.0 Monitoring

Monitoring will concentrate in two areas;

- Supervision and management of the operations.

- Monitoring of surface water in the dams.

Monitoring of groundwater is not considered necessary because all surface water is to be collected and directed to the dams. Any fuel or other spills should show up in that monitoring. See Figures 2W showing the concept operational diagram of the pit operation.

The resource is clay with very low permeabilities and therefore any fuel or other spills may not show up for some years in the groundwater.

The management is therefore essentially the management of surface water.

The dams will form water storage and act as detention basins located outside the excavation area and at the downstream end of the stockpile area as shown in Figure 2W.

The dams will retain all stormwater landing in the pit within the excavation area and allow time for any sediments to settle. There may be limited excess water directed to the dams at the end of winter that will overflow to the creekline. Refer to Figures 1W and 2W.

As this water will be used for dust suppression it will be monitored twice yearly (in spring and autumn) for salinity and hydrocarbons.

Properties

Rehabilitation will be to pasture and trees

All water from disturbance areas is directed to the sediment settlement/storage dams

Cutoff drains are used to direct water away from disturbed areas.

Outlets protected by rip rap or similar to prevent erosion

STAGE 2 YEARS 6 - 11

STAGE 1 YEARS 1 - 6

APPROVED GRAVEL EXCAVATIONS

APPROVED GRAVEL EXCAVATIONS

LOT 7

Toy Road

Toy Road

Brockman River

Bindoon - Moora Road

Great Northern Highway

Stormwater management separating fresh water from water from disturbed areas and allowing stormwater bypass in high flow events

0 500 m

Dwelling (interpreted from aerial photograph)

PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
LOCAL WATER CATCMENTS	
Landform Research	January 2015
Scale See Plan	
Basemap NEARMAP	**Figure 1W**

BRIKMAKERS

nearmap current · clear · change

Showing: Sun 08 Feb 2009

200 m | Terms of Use

Rehabilitation will be to pasture and trees

PIT

Freshwater bypass to watercourse to prevent water from the dams overflowing

Cutoff drains are used to direct water away from disturbed areas.

Rehabilitation will be to pasture and trees

PIT

Stormwater management separating fresh water from water from disturbed areas and allowing stormwater bypass in high flow events

DAM

Emergency overflow outlets protected by rip rap or similar to prevent erosion

Rehabilitation will be to pasture and trees

STOCKPILE

Freshwater bypass to watercourse to prevent water from the dams overflowing

DAM

Water flows to creek maintained

All water from disturbance areas is directed to the sediment settlement/storage dams

Drainage from road to pasture

Brockman River

Toy Road

PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
SITE WATER MANAGEMENT	
Landform Research	January 2015
Scale See Plan	
Basemap Landgate	**Figure 2W**

0 50 100 200 300 400 500 600 Meters

1:5,000

BRIKMAKERS

N

415000 415200 415400 415600 415800

6533200 6533000 6532800

Lower Dam

PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
EXISTING FLOOD FLOW PATHS	
Landform Research	January 2015
Scale See Plan	
Basemap Landgate	**Figure 3W**

- Normal river flow path
- Flood flow paths - main flow
- Flood flow paths
- Extent of flood flows

0 25 50 100 150 Meters 1:3,500

WATER FLOWS
BEFORE DEVELOPMENT

Figure 3W

N

415000 415200 415400 415600 415800

6533200 6533000 6532800

Lower Dam

Toy Road

Bro

PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
FLOW PATHS - BRIDGE CONSTRUCTION	
Landform Research	January 2015
Scale See Plan	
Basemap Landgate	**Figure 4W**

- Normal river flow path
- Flood flow paths - main flow
- Flood flow paths
- Extent of flood flows

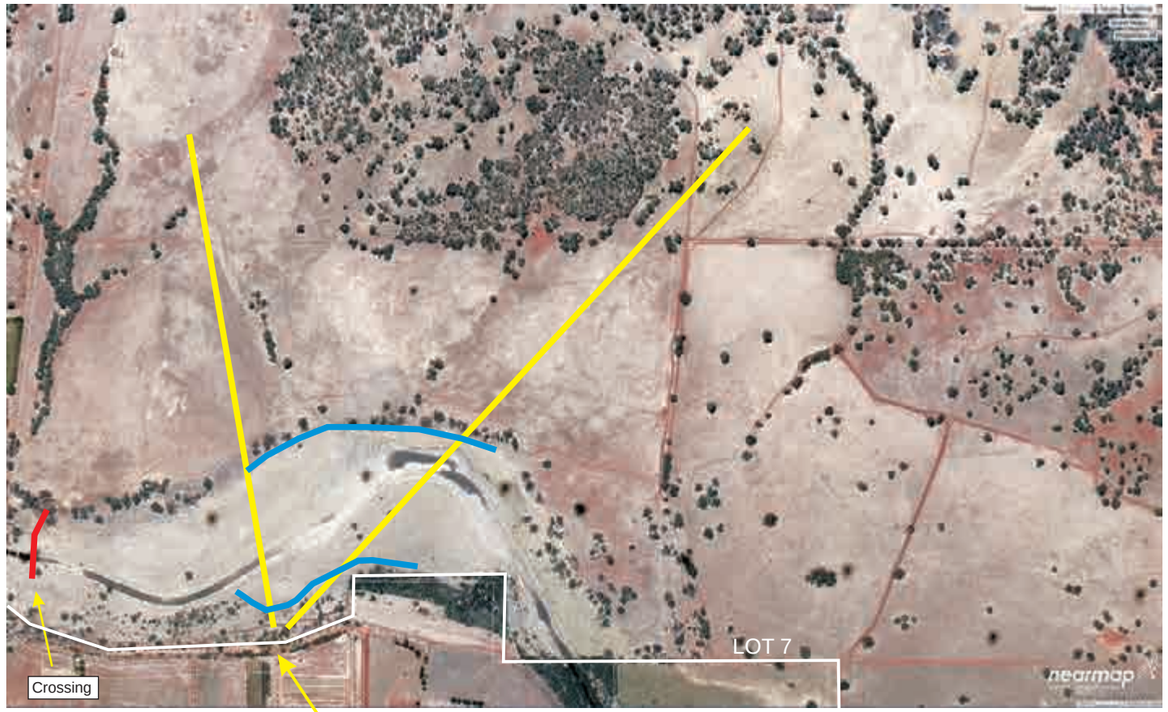
0 25 50 100 150 Meters 1:3,500

WATER FLOWS
AFTER DEVELOPMENT OF CAUSEWAY

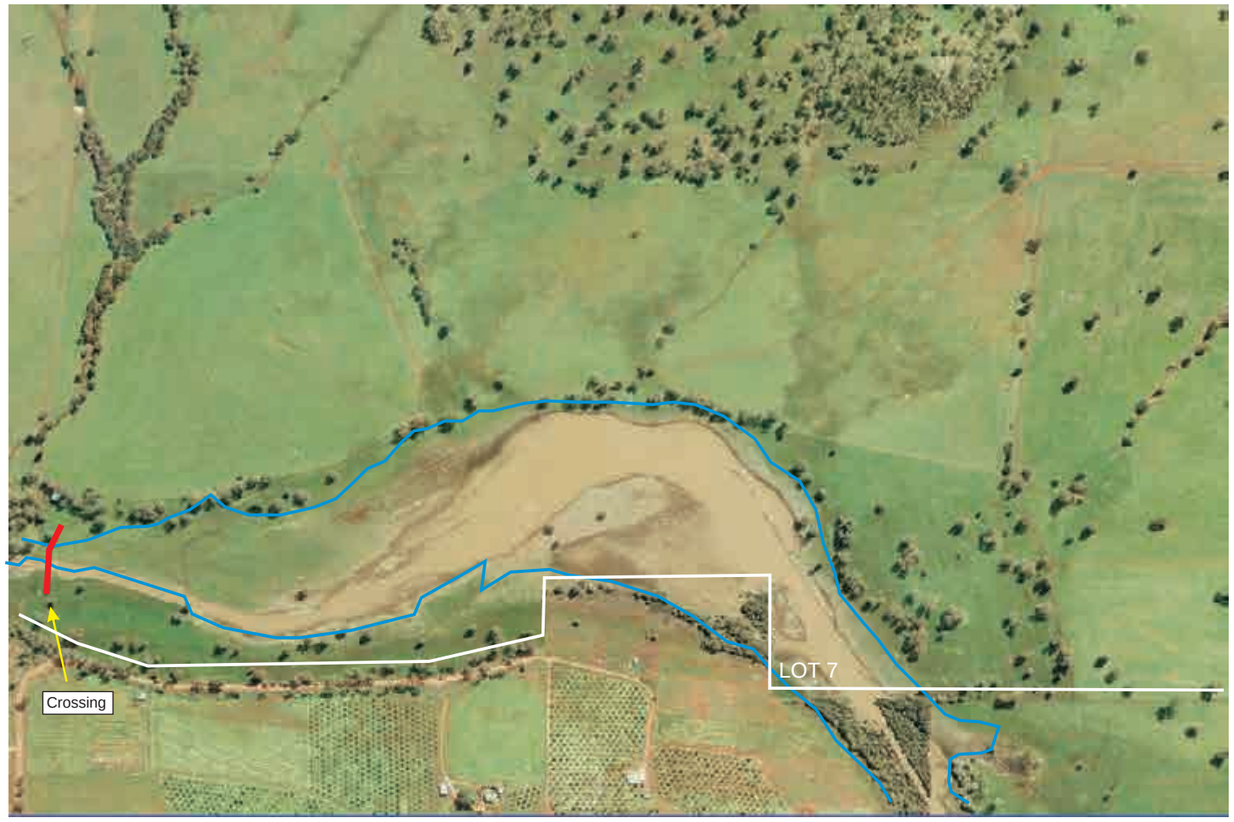
Figure 4W

N

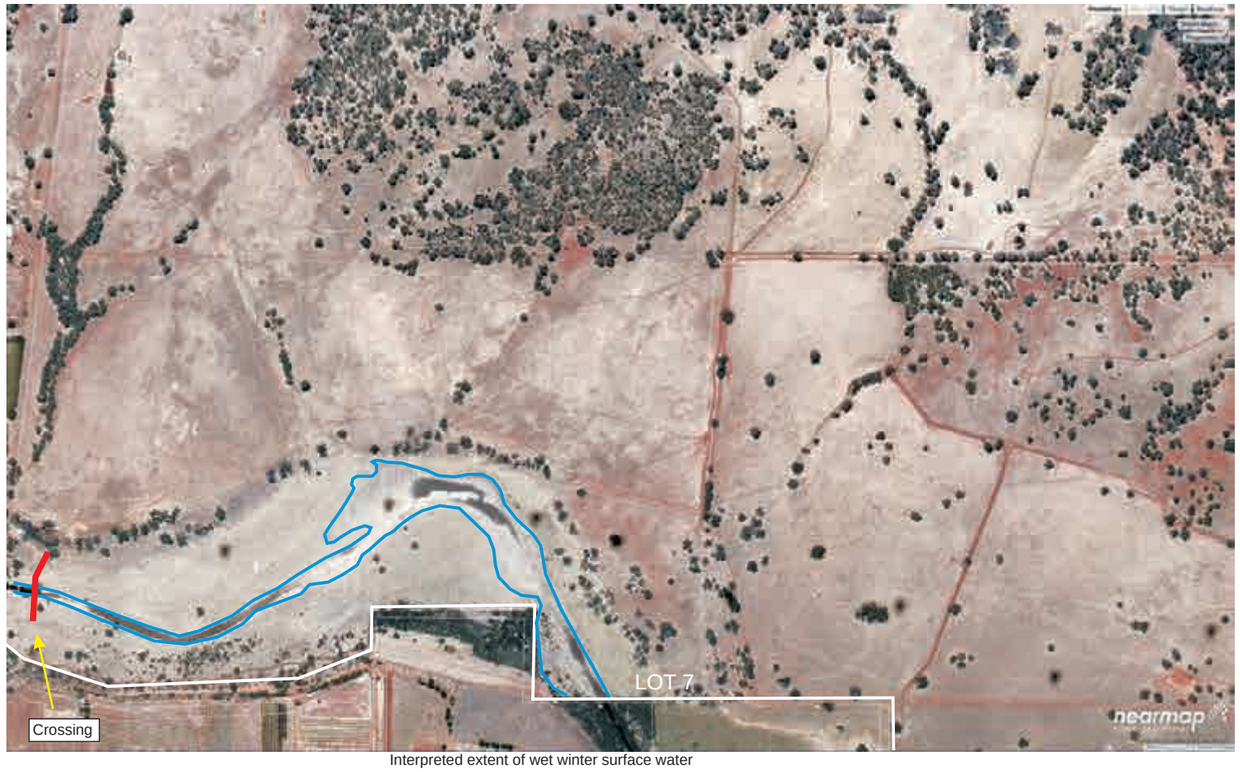
BRIKMAKERS



Interpreted match for flood photo



Interpreted extent of flood (Landgate 1981)



Interpreted extent of wet winter surface water

PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
INTERPRETED FLOOD EXTENT	
Landform Research	January 2015
Scale See Plan	
Basemap Landgate	**Figure 5W**

BRIKMAKERS

Otto-Markham Holdings Pty Ltd (ACN 098 910 019) trading as
MEYER WATER & ENVIRONMENTAL SOLUTIONS

1st March 2005

Nathan Blackwell
BGC Clay Products Pty Ltd
nwb@bgc.com.au

Gary Meyer
Principal Consultant

PO Box 964, Canning Bridge
Applecross WA 6153
Australia

Tel/fax +61 (8) 9474-4233
Mobile 0419-986-457
E-mail meyerfm@arach.net.au

Dear Nathan,

Re: Review of Groundwater Occurrences, Toy Road Clay Deposit

1. Introduction

The Toy Road Clay Deposit is located in the Brockman Valley on the Darling Plateau north of Bindoon. The hydrogeology of the area was investigated during a field visit on the 23rd February 2005. Groundwater was known to occur near the clay deposit due to the presence of two springs in the low topographic areas south of the proposed pit (Attached Plan). This investigation was conducted to determine:

- If there were significant groundwater resources in the proposed clay pit area.
- If the proposed pit could impact groundwater resources or the known springs in the area.
- If there were any other issues associated with the presence of groundwater in the area.

2. Hydrogeological Description

The Toy Road Clay Deposit is located in the Western Fractured Rock Zone of the Brockman River catchment. Groundwater resources are generally limited but are usually good quality.

The clay deposit is located in the weathered zone above a north-south trending Diorite Dyke. Groundwater occurs in the contact zone on either side of the dyke. On the west margin, the contact is coincident with a valley and at the base of the valley there is a permanent spring where groundwater discharges to the surface and is used for stock watering. The aquifers along the contact zone are referred to as Saprolite or Fractured Rock Aquifers depending on their position in the weathered rock profile.

On the east margin of the dyke, groundwater was found during this survey. This eastern aquifer is not defined by a valley like the western aquifer but can be seen partly by outcropping micaceous rocks and granites and possibly by a groundwater soak located some 330m south of the proposed pit and at about 7m lower elevation than the West Spring. The soak is referred to as the East Spring but is generally never more than a patch of wet ground with no observable run-off.. The relationship between this spring and the eastern aquifer is only inferred for several reasons:

- The contact zone of the dyke has not been mapped by drilling south of the pit.
- There is no well defined topographic feature along the contact zone.

- There is some evidence for potential north-easterly orientated structures crossing the contact zone. The soak could be fed from groundwater travelling along one of these cross cutting structures.

Minor groundwater was also observed from below the soil zone and on top of the weathered bedrock. This aquifer is referred to as the Perched Aquifer and the groundwater is essentially recent seasonal rainfall recharge. It will have a lower salinity than groundwater in the two main aquifers.

Land salinisation issues are not known in this area as the soils are generally less saline than those further east.

3. Results from Field Investigations

The field survey was divided into two parts in line with the expected occurrence of the two known aquifers.

West Aquifer

Groundwater was observed in two locations along the western aquifer.

- A natural spring, referred to as the West Spring occurs in a low topographic elevation near the SW corner of the proposed pit. The spring flows all year but flows are generally low near the end of summer. The salinity of the spring water was measured using an electrical conductivity (EC) meter. The value recorded was 720 to 750µS/cm @25°C (470 to 490mg/L TDS[1]) and is therefore fresh and potentially suitable for irrigation. Water in a collector dam downstream from the spring had concentrated by evaporation. The measured EC was 1410µS/cm@25°C. The landholder had observed spring flow rates of about 20L/min.

- A costean had been dug to 6m depth over hole DW47 at a location some 210m south from the spring. The costean had been pumped by the landholder at a rate of approximately 350L/min for 2 hours. Water levels recovered to near, but a lower water level than prior to pumping. This indicates that the costean is fed from groundwater. The water depth on the 23rd February 2005 was 2.4mbgl[2] and the EC measured from a bailed sample was 400µS/cm@25°C (260mg/L TDS). Some surface run-off or preferential inflow from the Perched Aquifer has probably contributed to the lower salinity observed in the costean compared to local spring water. Also some evaporation may have increased the salinity of the spring water sample.

Groundwater was not found in three clay exploration holes that were opened up and dipped. These were:

- JD18. Originally drilled to 6.5m but now blocked at 4.9m.
- JD64. Originally drilled to 7.5m and still open to full depth.
- JD72. Originally drilled to 16.5m but now blocked at 10m.

Groundwater levels are expected below these depths.

[1] Total Dissolved Salts calculated by multiplying EC by a conversion factor of 0.65.
[2] Metres below ground level.

East Aquifer

Groundwater was found in two clay exploration holes opened up for this survey.

- JD49 is located near the north east corner of the proposed pit. Groundwater with EC of 720µS/cm@25°C (470mg/L TDS) was found at 11.6m depth. The hole was open to 13.2m depth and had been originally drilled to 14.5m. The water was inferred to be groundwater as this section of the hole had intersected fractured, weathered Diorite.

- JD76 is located 150m south from JD49. Groundwater with EC of 270µS/cm@25°C (175mg/L TDS) was found at 10.95m depth. The hole was open to 12.1m depth and had been originally drilled to 13.0m. The lower salinity groundwater was inferred to be from the shallow Perched Aquifer and not the main, deeper aquifer.

Hole JD21 is located near the south eastern corner of the proposed pit but no groundwater was present to a depth of 10.6m.

The eastern aquifer is fractured diorite and is located in the saprolite zone just above fresh un-weathered bedrock. The depth of the fresh bedrock was mapped as the point where the drilling rate reduced significantly (drilling refusal).

4. Impact of Proposed Pit on Groundwater

West Aquifer

The water levels in the West Aquifer are below the depths measured in the clay exploration holes. They will also be below the adjacent stream level. The base of the pit at this location is above the expected level of the groundwater and therefore there will be no direct impact of mining on this aquifer. There could however be an indirect impact if surface runoff ponded above the top of the aquifer and infiltrated into the aquifer. This will particularly be a concern if pond water was allowed to deteriorate in quality through evaporation or through geochemical processes such as acidification.

There will be no impact of clay mining on the West Aquifer and associated spring flows provided water is not allowed to pond along the western side of the pit.

East Aquifer

The East Aquifer is located along the eastern edge of the proposed pit. Mining will intersect and drain the East Aquifer if mining is taken to full depth along the eastern edge. The pit can however be redesigned to avoid the aquifer and therefore not have any direct impact on the groundwater. It is however difficult to imagine the pit not intersecting some minor fractures extending into the pit from the main aquifer. Even if the fractures are minor, groundwater will still seep into the pit and cause this aquifer to slowly drain. Grouting of a fractured rock aquifer to prevent this occurring is generally difficult and costly.

If mining intersects the aquifer it will have the following impacts:

- A portion of the groundwater resource will be depleted. The amount of depletion will depend on how deep the fractures within the aquifer are intersected. The amount of depleted groundwater will be less than 100kL/hectare of aquifer for each metre of drop in the groundwater levels (drawdown). The maximum drawdown is expected to be only 3metres. The area of the aquifer is expected to be less than 5 hectares so the loss of resource is in the order of 1000 to 1500kL.

- The Western Spring may dry up if it is located in the same aquifer. This soak is not significant as it does not support any ecological habitats or economic entities.
- The aquifer will be exposed and there will be a potential for contamination to enter the aquifer if surface runoff is allowed to pond over the fractures. The base of the pit should be designed to not allow ponding along the eastern wall.

5. Conclusions and Recommendations

In summary it is expected that there will be a small loss of groundwater resource along the eastern side of the pit. This groundwater resource is small and would only have benefit to the local landholder. An alternate surface water resource can be made available to the landholder. I understand a collection dam along the western creek is proposed for this purpose.

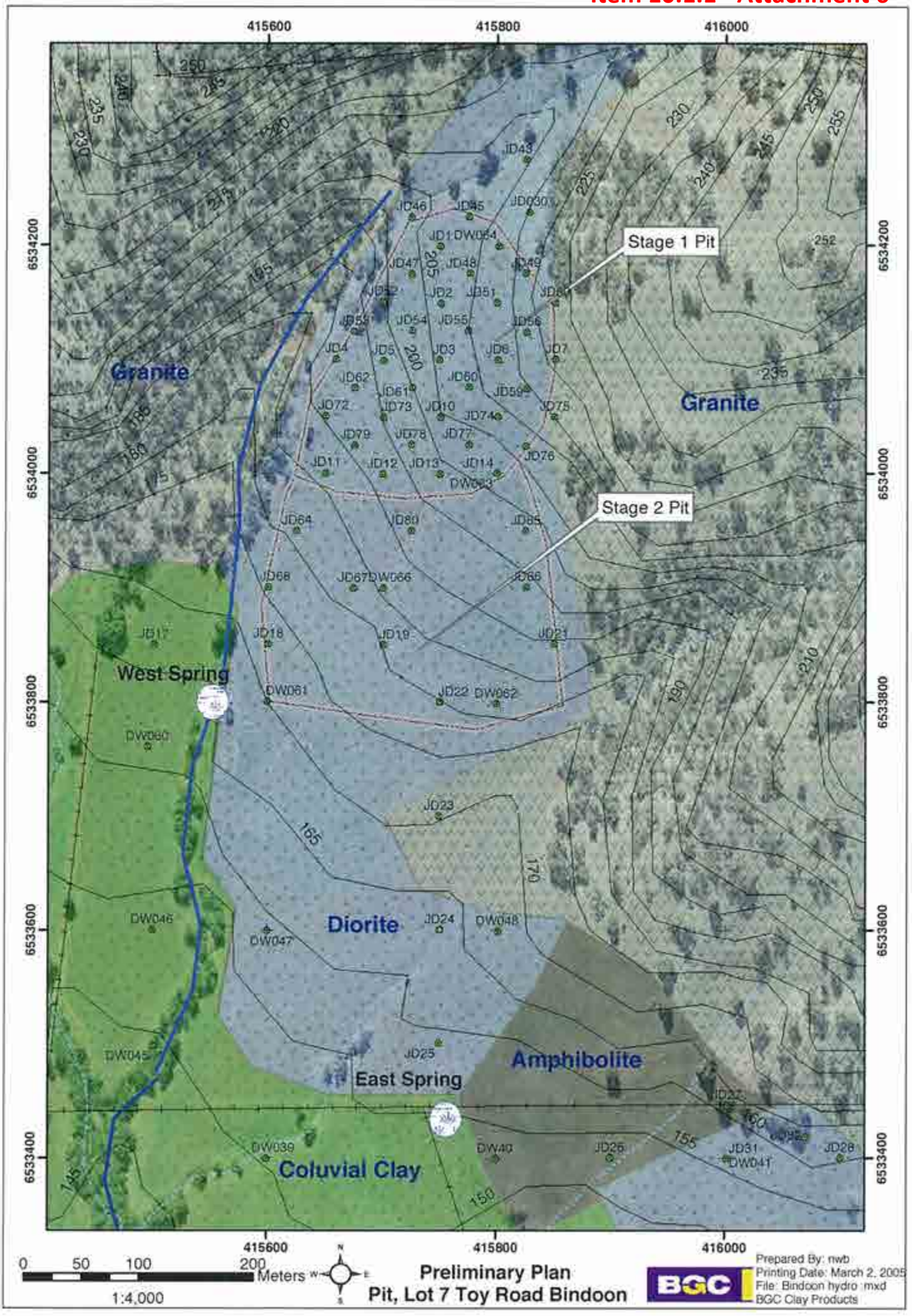
With proper design of the pit floor and control of surface water ponding there are not expected to be any issues associated with contamination of groundwater in the aquifer. It is recommend that surface water not be allowed to pond along the western and eastern margins of the pit where it can infiltrate into the aquifers.

To monitor the impact of mining on the two main aquifers it is recommended that a monitoring bore be drilled into each aquifer near the southern limit of the pit. Groundwater levels and quality can be measured during the course of mining to confirm the predicted impacts.

The lowering of groundwater levels in the eastern aquifer will have a positive impact on the potential for salinisation in this area.

Yours sincerely

Gary Meyer


415600
415800
416000
6534200
6534000
6533800
6533600
6533400
Granite
Granite
Stage 1 Pit
Stage 2 Pit
West Spring
East Spring
Diorite
Amphibolite
Coluvial Clay
JD43
JD46
JD45
JD0301
JD1
DW064
JD47
JD48
JD49
JD52
JD2
JD51
JD8
JD53
JD54
JD55
JD56
JD4
JD5
JD3
JD6
JD7
JD62
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JD12
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DW063
JD64
JD80
JD85
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DW066
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DW062
DW060
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DW046
DW047
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DW048
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JD25
DW039
DW40
JD26
JD31
DW041
JD28
JD27
0
50
100
200
Meters
1:4,000
N
W
E
S
Preliminary Plan
Pit, Lot 7 Toy Road Bindoon
BGC
Prepared By: nwb
Printing Date: March 2, 2005
File: Bindoon hydro .mxd
BGC Clay Products

Appendix 3

Lloyd George Acoustics
PO Box 717
Hillarys WA 6923
T: 9300 4188 F: 9300 4199
E: iamie@lgacoustics.com.au W: www.lgacoustics.com.au

Environmental Noise Assessment

Proposed Clay Extraction Pit
Lot 7, Toy Road, Bindoon

Reference: 14052815-01C

Prepared for:
BGC Brikmakers

Report: 14052815-01C

Lloyd George Acoustics Pty Ltd
ABN: 79 125 812 544

PO Box 717
Hillarys WA 6923

T: 9300 4188 / 9401 7770
F: 9300 4199

Contacts	Daniel Lloyd	Terry George	Mike Cake	Matt Moyle
E:	[redacted]	[redacted]	[redacted]	[redacted]
M:	0439 032 844	0400 414 197	0438 201 071	0412 611 330

Prepared By:	Daniel Lloyd
Position:	Project Director
Verified	Terry George
Date:	4 February 2015

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1 INTRODUCTION

A clay extraction pit is proposed on part of Lot 7 on Pan 7148, Toy Road, Bindoon, WA 6502. The general locality of the proposed pit together with the closest noise sensitive receivers is shown in *Figure 1-1*.

This report has been prepared to assess the likely noise impacts from the pit to sensitive receivers and compares the predicted noise levels against the *Environmental Protection (Noise) Regulations 1997*. *Appendix A* contains a description of some of the terminology used throughout this report.

Figure 1-1 Project Locality and Sensitive Receivers

The excavation will be worked in two stages as shown in *Figure 1-2*. The pit will be managed to ensure that any machinery working on the pit floor will be working behind the pit face and perimeter bunding, where possible, will provide natural noise barriers to the nearest noise sensitive receivers. The pit face will be at least 3m high. Earth bunds will be placed at strategic locations around the site; that is along the west and south of the excavation area.

Figure 1-2 Pit Design and Stages

2 CRITERIA

Environmental noise in Western Australia is governed by the *Environmental Protection Act 1986*, through the *Environmental Protection (Noise) Regulations 1997* (the Regulations).

Regulation 7 defines the prescribed standard for noise emissions as follows:

"7. (1) Noise emitted from any premises or public place when received at other premises –

(a) Must not cause or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and

(b) Must be free of –

i. Tonality;

ii. Impulsiveness; and

iii. Modulation".

A "...noise emission is taken to *significantly contribute to* a level of noise if the noise emission exceeds a value which is 5 dB below the assigned level..."

Tonality, impulsiveness and modulation are defined in Regulation 9. Noise is to be taken to be free of these characteristics if:

(a) The characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission; and

(b) The noise emission complies with the standard after the adjustments of *Table 2-1* are made to the noise emission as measured at the point of reception.

Table 2-1 Adjustments for Intrusive Characteristics

Tonality	Modulation	Impulsiveness
+ 5dB	+ 5dB	+ 10dB

Note: The above are cumulative to a maximum of 15dB.

The relevant baseline assigned levels (prescribed standards) are specified in Regulation 8 and are shown in *Table 2-2*.

As it is proposed to only operate the pit between 7.00 am and 7.00 pm Mondays to Saturdays and therefore only the "Day" assigned levels apply. In addition, due to the nature of the works, in that there is no rock breaking or other impact sounds, it would be the L_{A10} level that would dictate compliance or otherwise with the criteria.

Table 2-2 Baseline Assigned Noise Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive use	0700 to 1900 hours Monday to Saturday (Day)	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays (Sunday)	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days (Evening)	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	35 + influencing factor	45 + influencing factor	55 + influencing factor
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80

Due to the rural nature of the surrounding land, we have assumed the influencing factor at all sensitive premises to be 0 dB. Therefore it is the baseline assigned noise levels of *Table 2-2* that apply.

The noise from road trucks while on the access road to the pit would need to comply with the assigned levels, however, once they are on Toy Road, the Regulations would not apply to this noise source.

Construction noise associated with the development of the dams, pit access road, loading area and earth bunds are not required to comply with the assigned levels and are addressed through Regulation 13. It is assumed that these noise requirements will be detailed in the construction noise and vibration management plan that would be prepared for the proposal.

3 METHODOLOGY

Computer modelling has been used to predict the noise levels, under worst-case conditions, to each of the receiver locations. The software used was *SoundPLAN 7.3* with the CONCAWE algorithms selected as they include the influence of wind and atmospheric stability. Input data required in the model are:

- Meteorological Information;
- Topographical data;
- Ground Absorption; and
- Source sound power levels.

3.1 Meteorological Information

Meteorological conditions utilised are shown in *Table 3-1* and reflect those specified in the *droft EPA Guidance for the Assessment of Environmental Factors No.8 Environmental Noise*. These conditions are considered the worst-case for noise propagation. At wind speeds greater than those shown, sound propagation may be further enhanced, however background noise from the wind itself and from local vegetation is likely to be elevated and dominate the ambient noise levels.

Table 3-1 Modelling Meteorological Conditions

Parameter	Day (0700-1900)
Temperature (°C)	20
Humidity (%)	50
Wind Speed (m/s)	4
Wind Direction*	All
Pasquil Stability Factor	E

* Note that the modelling package used allows for all wind directions to be modelled simultaneously

The EPA policy is that compliance with the assigned noise levels needs to be demonstrated for 98% of the time, during the day and night periods, for the month of the year in which the worst-case weather conditions prevail. In most cases, the above conditions occur for more than 2% of the time and therefore must be satisfied.

3.2 Topographical Data

Digital topographical data was provided by BGC Brikmakers in 1-metre intervals. In addition, it is assumed that an earth bund is placed to the west of the pit areas, as shown in *Figures 4-2 and 4-3*. This bund height is assumed to be 5.0 m for Stage 1 of the operations and 7.5 m for Stage 2. It is also assumed that a 6.0 m high bund is placed on the west and south boundary of the loading area.

3.3 Ground Absorption

Ground absorption varies from a value of 0 to 1, with 0 being for an acoustically reflective ground (e.g. water or bitumen) and 1 for acoustically absorbent ground (e.g. grass). In this instance, the surrounding ground has been assumed to be acoustically absorptive, which is representative of a rural location.

3.4 Sound Power Levels

The sound power data used for this assessment are shown below in *Table 3-2*. They are based on manufacturer's data, or if not available, measurements undertaken by Lloyd George Acoustics on similar equipment. In addition, the modelling assumes that the excavator will be located at natural ground level and the dozer and haul trucks on the pit floor, which is approximately 3 m below natural ground. In addition, the dozer, which is the dominant noise source, will be fitted with after-market noise suppression. From details provided by the engineering firm (Hush Pak) we would expect a reduction of 7 dB in overall noise levels from the dozer.

Table 3-2 Source Sound Power Levels

Description	Octave Band Centre Frequency (Hz)								Overall dB(A)
	31.5	63	125	250	500	1k	2k	4k	
Komatsu PC 450 Excavator	58	58	77	90	99	102	99	93	107
CAT 740 Haul Truck	62	72	101	99	99	102	100	93	108
Komatsu D375 Dozer (with hush kit)	59	81	85	88	100	99	96	92	104
Komatsu WA600 FEL	75	87	98	102	106	106	102	96	111
Truck moving at 25 km/h	67	77	86	94	95	94	92	86	100

Clay will be transported along the access road to Toy Road. It is assumed that there would be 16 truck movements in one hour. As the truck will be travelling at 25 km/h along the access road, the time that the truck will take to reach the stockpile area and return to Toy Road is approximately 140 seconds. Therefore, assuming 16 trucks, the noise from the trucks would be present for approximately 38 minutes in an hour. Therefore the L_{A10} level is relevant.

In determining the L_{A10} level from each truck movement, the noise level to the closest receiver was modelled assuming a truck travelling along the access road. The results of this modelling, together with the measured levels of a truck traveling at 25 km/h, is presented in *Figures 3-1 and 3-2*.

The predicted noise level from truck transportation was then incorporated into the overall noise level predictions. Based on the *Figure 3-2*, the overall L_{A10} noise level at the nearest sensitive receiver, assuming 16 trucks movements in one hour is calculated as L_{A10} 38.8 dB.

For the purposes of modelling, it has been assumed that all of the above equipment will be operating simultaneously. This, coinciding with worst-case wind conditions, is likely to be a rare occurrence and therefore the predictions are considered to be conservative.

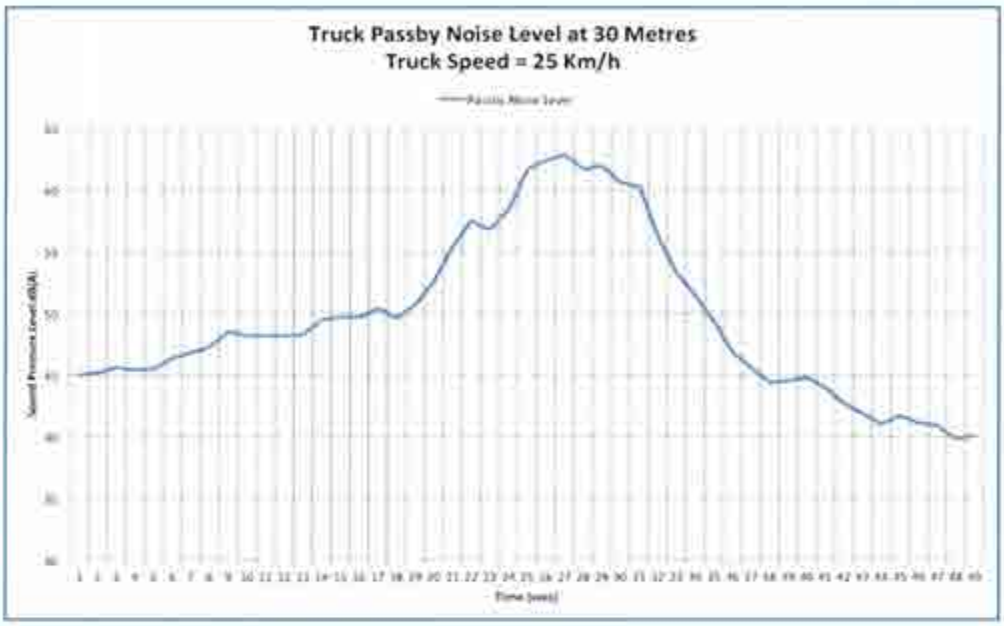


Figure 3-1 Truck Pass-by Measurement Used for The Calculations

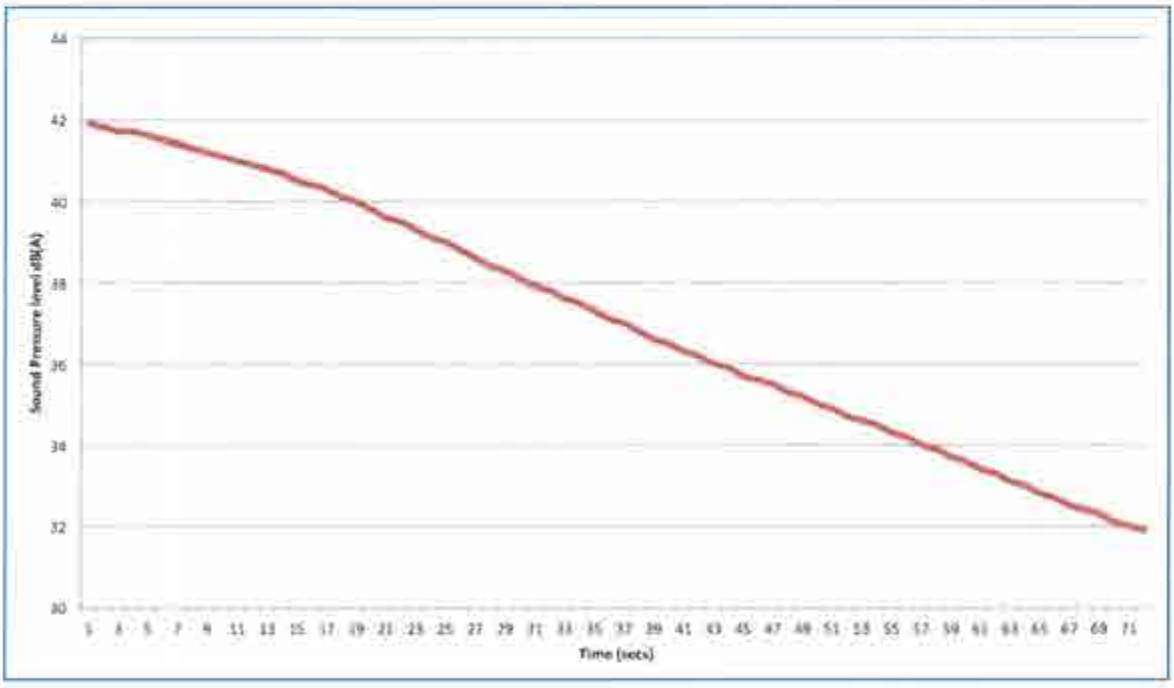


Figure 3-2 Predicted Noise Level at Closest Receiver from Single Truck Traveling Along Access Road

4 RESULTS

The predicted L_{A10} noise level to Receivers 1 to 6, as shown in *Figure 4-1*, for the pit development stages is provided below in *Table 4-1*. The predicted noise levels are also shown as contour lines in *Figures 4-2* and *4-3*.

Table 4-1 Predicted Noise Levels from Pit Operations

Location	Predicted Noise Level (L_{A10} dB) for each Stage		Comments
	1	2	
1	31	32	Complies with daytime assigned levels.
2	35	37	Complies with daytime assigned levels
3	44	44	Complies with daytime assigned levels
4	40	40	Complies with daytime assigned levels.
5	39	39	Complies with daytime assigned levels
6	39	39	Complies with a daytime ssigned levels

Figure 4-1

Signs and symbols

Sensitive receiver

N

Length Scale

0 50 100 200 300 400 500 m

Clay Extraction Pit - Lot 7 Toy Road, Bindoon
Location of Noise Sensitive Receivers

Lloyd George Acoustics
by Daniel Lloyd
daniel@lgacoustics.com.au
(08) 9300 4188

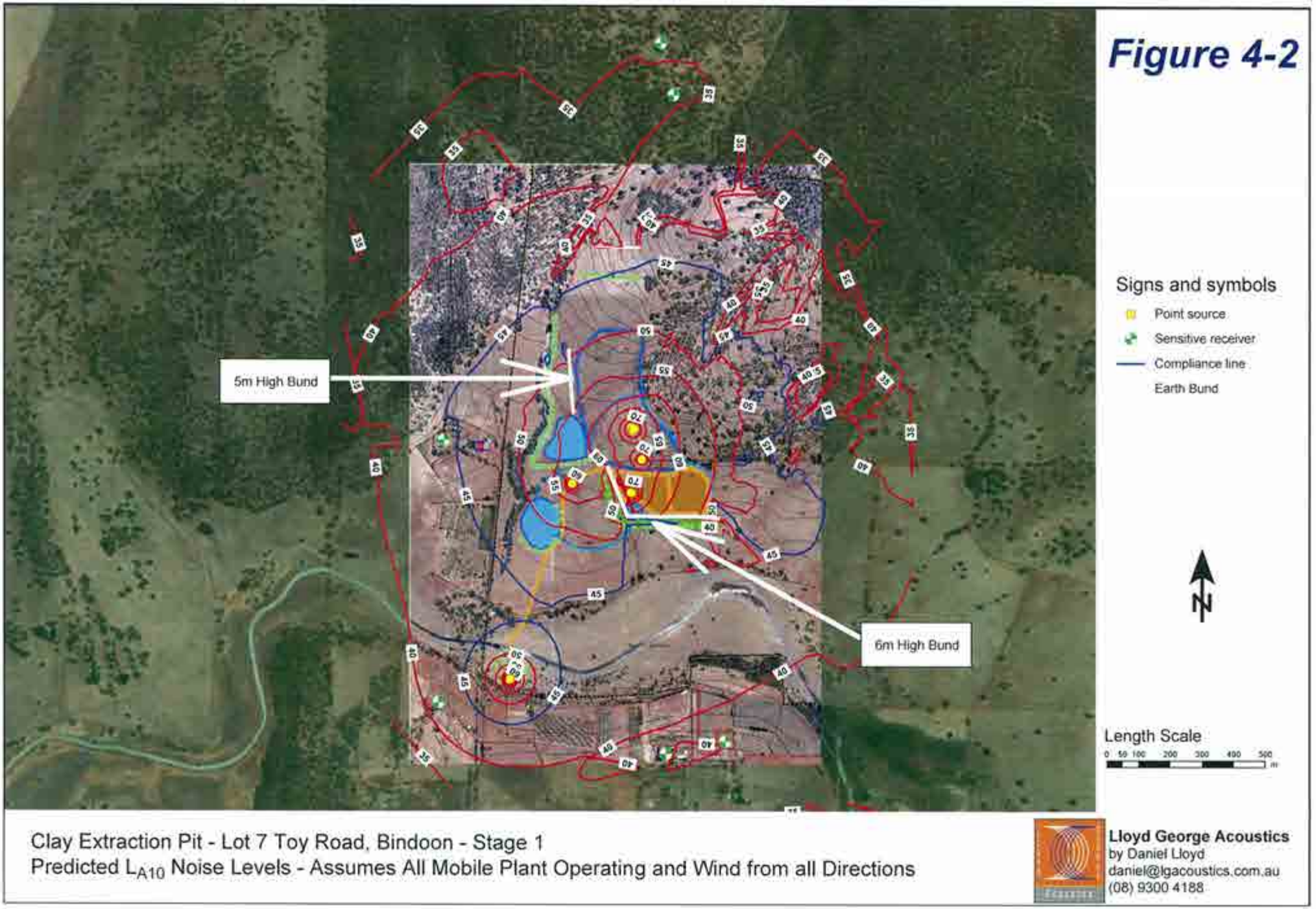


Figure 4-2
5m High Bund
6m High Bund
Signs and symbols
Point source
Sensitive receiver
Compliance line
Earth Bund
Length Scale
0 50 100 200 300 400 500 m
Clay Extraction Pit - Lot 7 Toy Road, Bindoon - Stage 1
Predicted L_{A10} Noise Levels - Assumes All Mobile Plant Operating and Wind from all Directions
Lloyd George Acoustics
by Daniel Lloyd
daniel@lgacoustics.com.au
(08) 9300 4188

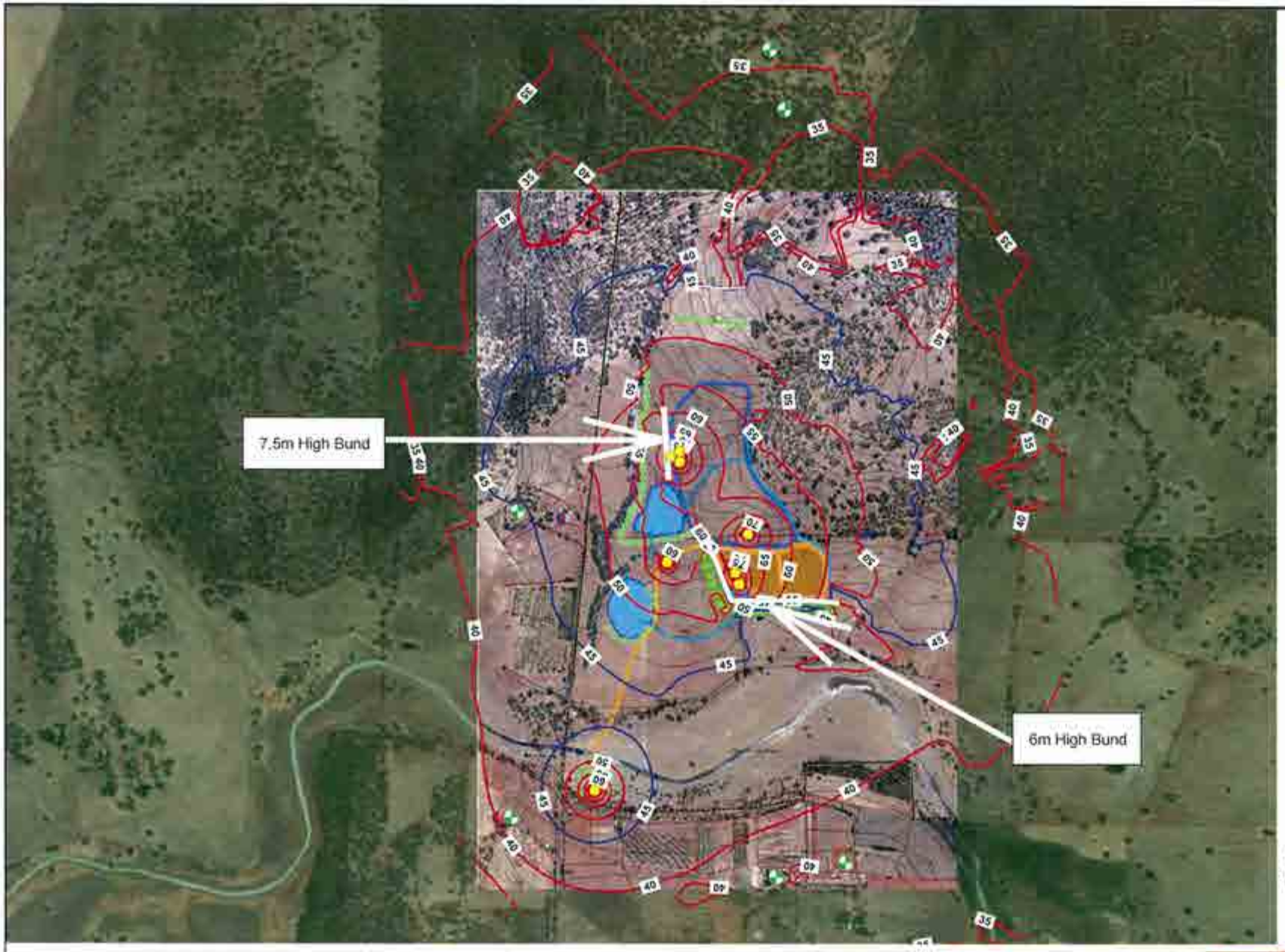


Figure 4-3

Clay Extraction Pit - Lot 7 Toy Road, Bindoon - Stage 2
Predicted L_{A10} Noise Levels - Assumes All Mobile Plant Operating and Wind from all Directions

Lloyd George Acoustics
by Daniel Lloyd
daniel@lgacoustics.com.au
(08) 9300 4188

5 DISCUSSION

The results show that the proposed operations would comply with the Regulations at all noise sensitive receivers during the times 0700 to 1900 Monday to Saturday.

This assessment assumes that the following noise mitigation measures are in place:

- Noise suppression kit fitted to the dozer;
- 6.0 m high earth bund on the west and south boundaries of the loading area;
- Earth bund constructed north of the dam (as shown in *Figures 4-2 and 4-3*). The height of the earth bund would is assumed to be 5.0 m for Stage 1 and 7.5 m for Stage 2 of the operations;
- Trucks are to travel at low speed (25 km/h) while on the access road.

The most affected sensitive receiver is Receiver 3, located to the west of the pit. At this location the predicted noise level, assuming Stage 2, is L_{A10} 44 dB, which is compliant with the Regulations provided that there are no penalties for tonality. While earthmoving plant is inherently tonal in nature, the predictions show that there are a number of items of plant that are predicted to be at approximately the same noise level. This is shown in *Table 5-1*. In these circumstances, assuming all items of plant are operational, tonality is unlikely to be present. If an individual item is operating, which is likely to be tonal, it can be seen that even with a penalty of +5 dB, the noise from each individual item of plant is below L_{A10} 40 dB, so compliance would still be achieved.

Table 5-1 Noise Source Contribution at Most Affected Premises

Noise Source	Predicted Noise Level dB(A)
Excavator	40
Dump Truck 1	39
Dump Truck 2	36
Loader	34
Dozer	32

To ensure continuing compliance with the Regulations, the pit will need to be managed to ensure the pit face is running north-south. This provides maximum shielding of the sensitive receiver to west, from the plant on the pit floor.

Appendix A

Terminology

The following is an explanation of the terminology used throughout this report.

Decibel (dB)
The decibel is the unit that describes the sound pressure and sound power levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

A-Weighting
An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A dB.

Sound Power Level (L_w)
Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. This is similar to a 1kW electric heater always radiating 1kW of heat. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure levels at known distances. Noise modelling incorporates source sound power levels as part of the input data.

Sound Pressure Level (L_p)
The sound pressure level of a noise source is dependent upon its surroundings, being influenced by distance, ground absorption, topography, meteorological conditions etc and is what the human ear actually hears. Using the electric heater analogy above, the heat will vary depending upon where the heater is located, just as the sound pressure level will vary depending on the surroundings. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.

L_{ASlow}
This is the noise level in decibels, obtained using the A frequency weighting and the S time weighting as specified in AS1259.1-1990. Unless assessing modulation, all measurements use the slow time weighting characteristic.

L_{AFast}
This is the noise level in decibels, obtained using the A frequency weighting and the F time weighting as specified in A51259.1-1990. This is used when assessing the presence of modulation only.

L_{APeak}
This is the maximum reading in decibels using the A frequency weighting and P time weighting AS1259.1-1990.

L_{Amax}
An L_{Amax} level is the maximum A-weighted noise level during a particular measurement.

L_{A1}
An L_{A1} level is the A-weighted noise level which is exceeded for one percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

L_{A10}
An L_{A10} level is the A-weighted noise level which is exceeded for 10 percent of the measurement period and is considered to represent the "*intrusive*" noise level.

L_{Aeq}
The equivalent steady state A-weighted sound level ("equal energy") in decibels which, in a specified time period, contains the same acoustic energy as the time-varying level during the same period. It is considered to represent the "average" noise level.

L_{A90}
An L_{A90} level is the A-weighted noise level which is exceeded for 90 percent of the measurement period and is considered to represent the "*background*" noise level.

One-Third-Octave Band
Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20 000 Hz inclusive.

L_{Amax} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded at any time.

L_{A1} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 1% of the representative assessment period.

L_{A10} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 10% of the representative assessment period.

Tonal Noise
A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is:

the presence in the noise emission of tonal characteristics where the difference between -

(a) the A-weighted sound pressure level in any one-third octave band; and

(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

This is relatively common in most noise sources.

Modulating Noise
A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is:

a variation in the emission of noise that —

(a) is more than 3 dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band;

(b) is present for at least 10% of the representative.

Impulsive Noise

An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness is:

a variation in the emission of a noise where the difference between $L_{A\,peak}$ and $L_{A\,Max\,slow}$ is more than 15 dB when determined for a single representative event;

Major Road

Is a road with an estimated average daily traffic count of more than 15,000 vehicles.

Secondary / Minor Road

Is a road with an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

Influencing Factor (IF)

$$= \frac{1}{10}(\%\,\text{Type}\,A_{100} + \%\,\text{Type}\,A_{450}) + \frac{1}{20}(\%\,\text{Type}\,B_{100} + \%\,\text{Type}\,B_{450})$$

where:

$\%\,\text{Type}\,A_{100}$ = the percentage of industrial land within a 100m radius of the premises receiving the noise

$\%\,\text{Type}\,A_{450}$ = the percentage of industrial land within a 450m radius of the premises receiving the noise

$\%\,\text{Type}\,B_{100}$ = the percentage of commercial land within a 100m radius of the premises receiving the noise

$\%\,\text{Type}\,B_{450}$ = the percentage of commercial land within a 450m radius of the premises receiving the noise

+ Traffic Factor (maximum of 6 dB)

= 2 for each secondary road within 100m

= 2 for each major road within 450m

= 6 for each major road within 100m

Representative Assessment Period

Means a period of time not less than 15 minutes, and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.

Background Noise

Background noise or residual noise is the noise level from sources other than the source of concern. When measuring environmental noise, residual sound is often a problem. One reason is that regulations often require that the noise from different types of sources be dealt with separately. This separation, e.g. of traffic noise from industrial noise, is often difficult to accomplish in practice. Another reason is that the measurements are normally carried out outdoors. Wind-induced noise, directly on the microphone and indirectly on trees, buildings, etc., may also affect the result. The character of these noise sources can make it difficult or even impossible to carry out any corrections.

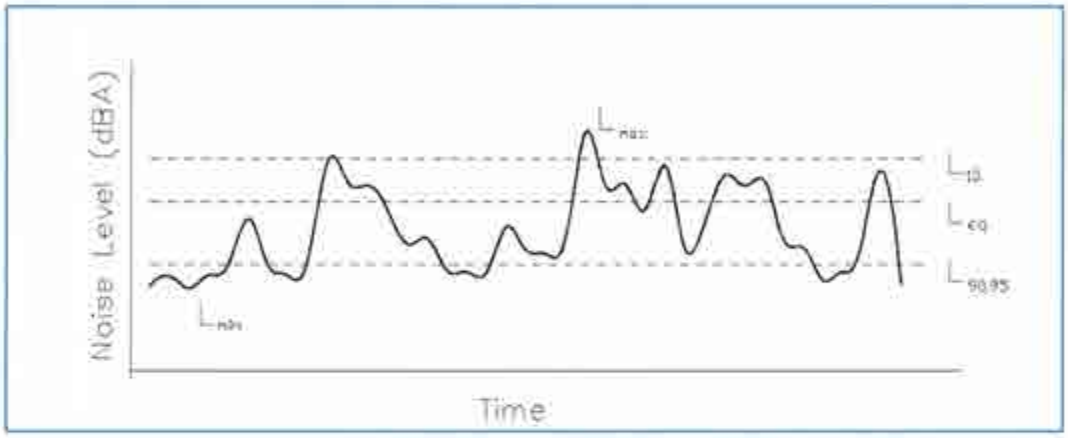
Ambient Noise

Means the level of noise from all sources, including background noise from near and far and the source of interest.

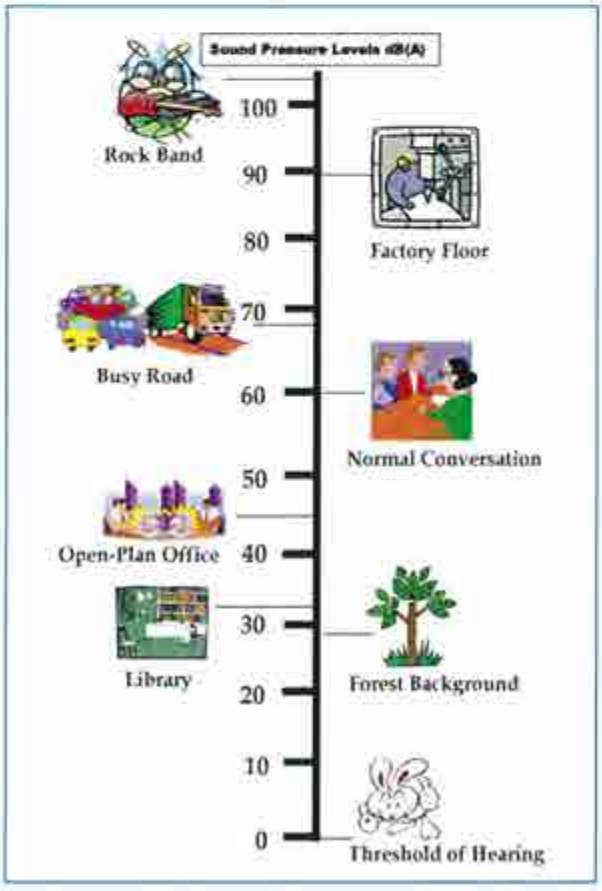
Specific Noise

Relates to the component of the ambient noise that is of interest. This can be referred to as the noise of concern or the noise of interest.

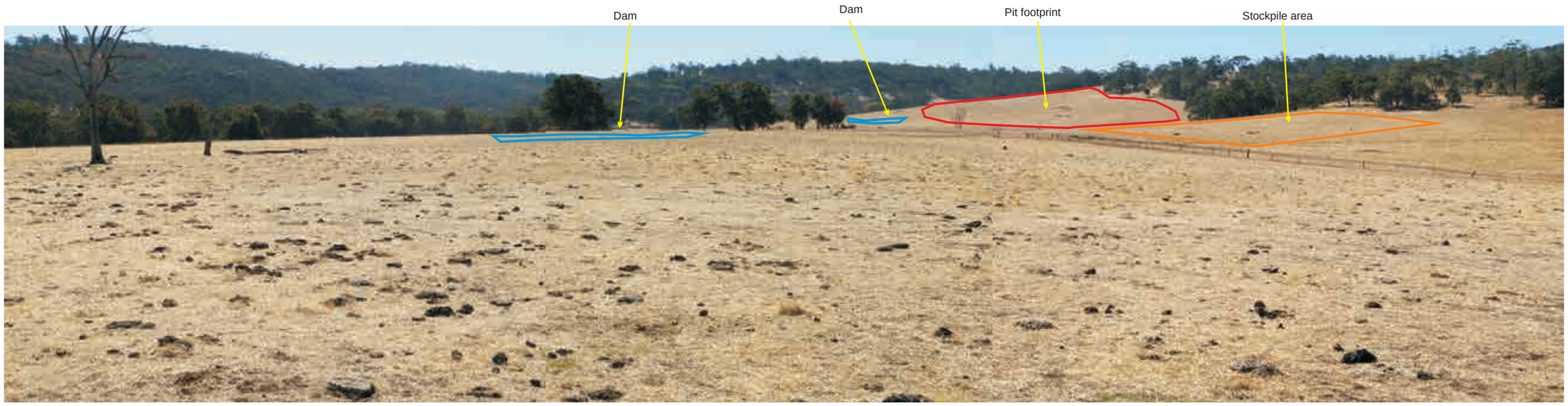
Chart of Noise Level Descriptors



Typical Noise Levels



Appendix 4



Proposed activities, taken with a telephoto lens from the south, near the yards

Top to be excavated at the start of each stage
and rehabilitated to minimise the length of time
of visual exposure.

Proposed activities, taken with a telephoto lens from the south from the south near the yards, with proposed bunding and tree belts placed on the photo at appropriate scale.

Proposed tree planting

Proposed bunding 5 - 8 metres high. covered by pasture/trees

Location of proposed dam. Note the actual water will not be visible from this distance

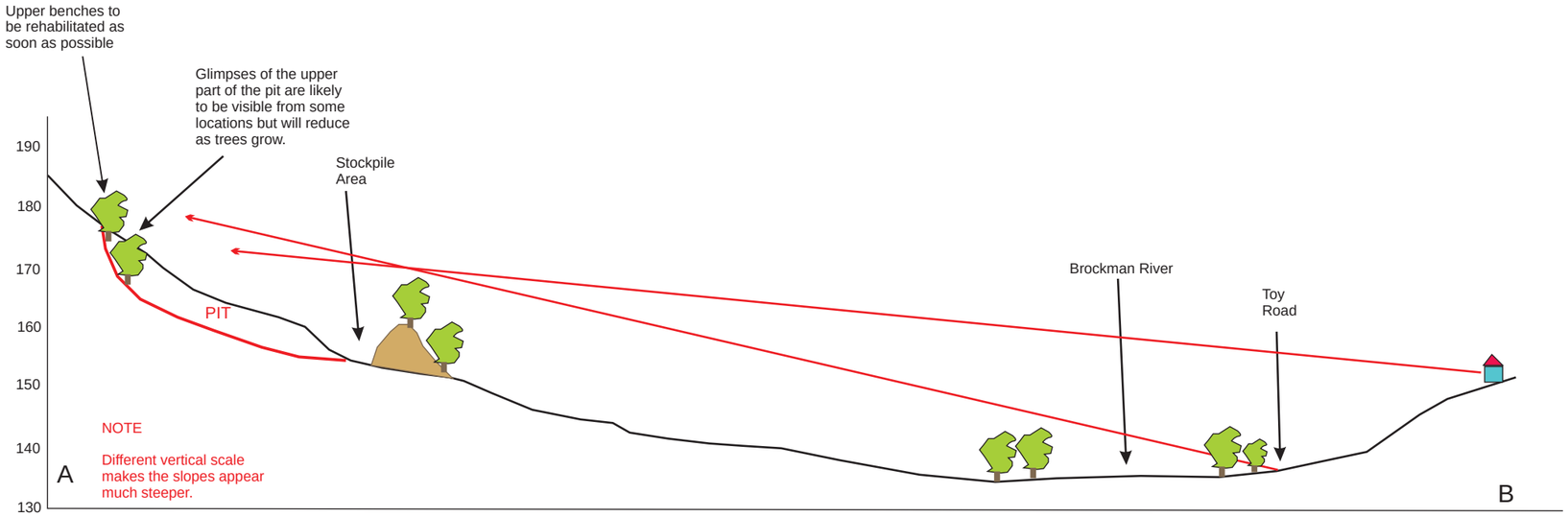
Proposed excavation area

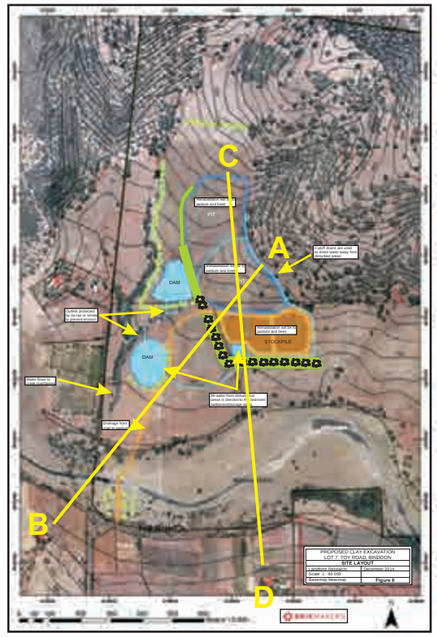
View from Point F
See Figure 3S

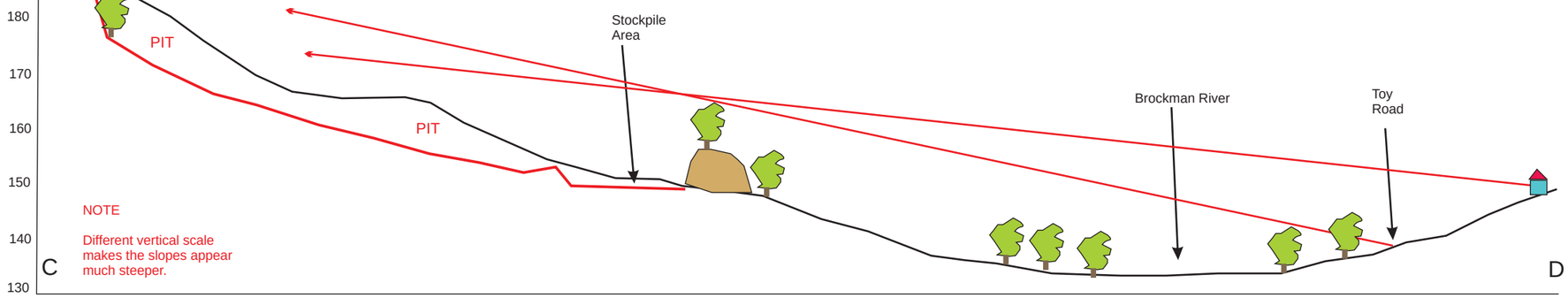
VISUAL MANAGEMENT

PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
PHOTOGRAPHS OF SITE	
Landform Research	January 2015
Scale See Plan	
	Figure 1S

BRIKMAKERS







View from Point B and D
See Figure 3S

BRIKMAKERS

PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
SECTION LINES	
Landform Research	January 2015
Scale See Plan	
	Figure 2S

E

B D

6 km

3 km

4 km

Part of operations most likely to be visible

Proposed pit

Proposed stockpile area

Area from which the upper slopes of the pit may be visible if no trees are present at the viewer. Interpreted from contour plans.

FOR CURRENT CADASTRAL INFORMATION REFER TO THE DEPARTMENT OF LAND ADMINISTRATION

BRIKMAKERS

PROPOSED CLAY EXCAVATION
LOT 7. TOY ROAD, BINDOON

AREA FROM WHICH THE PIT MAY BE SEEN

Landform Research	January 2015
Scale See Plan	
Basemap NEARMAP	**Figure 3S**

Landform Research
Land Systems - Quarries - Environment
08 9397 5145 landform@iinet.net.au

Appendix 5

COMMUNITY CONSULTATION

CLAY QUARRY

LOT 7 TOY ROAD, BINDOON

BRIKMAKERS PTY LTD

August 2015

Community Consultation

Brikmakers contacted nearby landowners in July 2014 in relation to a proposed clay excavation on Lot 7 Toy Road, Bindoon.

In addition a number of residents provided response to the Shire of Chittering dated 9 January 2015.

A summary of the concerns and matters raised by the local residents is provided below.

Nearby Resident	Contact	
Residents 1 and 2	Meeting on Wed 2 July 2014, 10.00 am	Concerned with trucks noise. etc. Safety risks on Toy Road, impact on business and livelihood, noise of road traffic, intersection of Bindoon – Moora Road and Great Northern Highway, dust, degradation of the Brockman River wetlands, unique environment. See attached summary of their concerns and attached joint letter on behalf of the Ginniby Residents Group.
Resident 3	Meeting on Wed 2 July 2014, 10.00 am	
Residents 4 and 5		See the attached letter to the Shire of Chittering on behalf of the Ginniby Residents Group.
Resident 6		See the attached letter to the Shire of Chittering on behalf of the Ginniby Residents Group.
Resident 7		See the attached letter to the Shire of Chittering on behalf of the Ginniby Residents Group (P and M Roberts on behalf of Pamela Hesling).
Residents 8 and 9	Meeting on Wed 2 July 2014, 10.00 am	Concerned with safety on road, dust, visual impact etc.
Residents 10 and 11		No comments on the proposal.
Residents 12 and 13	Left message	See the attached letter to the Shire of Chittering on behalf of the Ginniby Residents Group.
Residents 14 and 15	7 August 2014 at 9.30 am at Bindoon Hill	Concerned with noise and general amenity etc. See the attached letter to the Shire of Chittering on behalf of the Ginniby Residents Group.
Residents 16 and 17	7 August 2014 at Brikmakers	Concerned with noise dust, environment etc. See the attached letter to the Shire of Chittering on behalf of the Ginniby Residents Group.
Resident 18	Email contacts in 2014	Concerned with noise, visual dust etc. See the attached letter to the Shire of Chittering on behalf of the Ginniby Residents Group.
Resident 19		See the attached letter to the Shire of Chittering on behalf of the Ginniby Residents Group.
Resident 20		See the attached letter to the Shire of Chittering on behalf of the Ginniby Residents Group.
Ginniby Residents Group		Buffer zones, resident's amenity, sensitive water catchment, sensitive premises likely to be affected, landscape protection area, valuable agricultural resource affected by gravel extraction, Ginniby Lake, noise, truck movements along Toy Road, suitability of Toy Road, dust, acid sulfate soils will be generated, wildlife will be damaged.

		See the attached letter to the Shire of Chittering on behalf of the Ginniby Residents Group.

As a result of the community input, Brikmakers have reduced the scale and potential impact of the proposal. The changes can be seen by comparing the information and plan attached to the written comments of Residents 1 and 2, in summary, are;

- The excavation area has been reduced in area,
- The disturbance areas have been set further back from the creekline,
- The rate of excavation has remained similar,
- A second water management dam has been provided,
- The access road has been moved further east,
- The number of days on which clay is transported has been halved (approximately 25 days per year), with the transport rate of up to 10 trucks an hour retained,
- A Traffic Management Plan has been prepared by Shawmac,
- A Noise Assessment has been conducted by Lloyd George Acoustics,
- The Management Plan has been written to minimise the potential impacts identified by the local residents.

NOTE

The names of the residents who wrote to the Shire or responded to Brikmakers have been covered in the attached documentation as a matter of courtesy.

BRIKMAKERS PROPOSED CLAY OPERATIONS
AT LOT 7 TOY ROAD BINDOON

IMPACTS ON [redacted] OWNERS AND RESIDENTS OF [redacted] TOY ROAD
RESIDENTS 1 and 2

1. OVERVIEW

We own and reside at 17 Toy Road, Bindoon, known as "Ginniby Rise." We also operate a small olive oil business at Ginniby Rise. We have owned Ginniby Rise since 1997. Ginniby Rise is located on Toy Road, a local "no through road," which services and is the only public access road to 7 properties.

We recently became aware that Brickmakers Pty Ltd, which we understand is a subsidiary of BGC (Australia) Pty Ltd, proposes to operate a clay- pit from Lot 7, Toy Road, Bindoon Lot 7 is owned by Joc Dwyer and is located near the end of Toy Road.

We arranged a meeting with Nathan Blackwell, Brikmakers Clay-Pit Manager, to better understand the proposal. On Wednesday, 2 July 2014, the following people attended the meeting:

- Nathan Blackwell, Brikmakers
- Joc Dwyer, owner of Lot 7
- [redacted], interested residents
- [redacted] interested residents
- [redacted], interested resident

During the meeting it became apparent that Brikmakers proposes to use Toy Road to transport clay from Lot 7 using heavy haulage vehicles. We understand that this would involve heavy haulage vehicles travelling along Toy Road at the rate of 1 truck every 6 minutes and that this rate may vary depending on the size of trucks used.

We are greatly opposed to this proposal and outline some of our concerns below.

We understand that Brickmakers has not yet submitted a formal proposal to the Shire of Chittering for an extractive industries licence, or referred the proposal to the Environmental Protection Authority for assessment of the environmental impacts.

As such, we have outlined our understanding of the current proposal and our significant concerns, so that Brikmakers may consider using an alternative route to Toy Road to connect to the Great Northern Highway, as well as addressing the other environmental impacts, before making any formal proposal.

We intend to comment on any formal proposal to operate a clay-pit at Lot 7 and can be contacted at:

[redacted]

[redacted]

Email: [redacted]

2. **CLAY-PIT PROPOSAL**

During the meeting a map was shown of the location and some operating information was presented. We attach a copy of the map, which shows part of our property at the bottom left-hand corner.

Some of the relevant information presented at the meeting includes:

(a) Brikmakers proposes to cart clay from the proposed pit with double tray trucks via Toy Road, the Bindoon-Moora Road and the Great Northern Highway, to its brickworks in South Guildford.

(b) Brikmakers proposes approximately 6 campaigns per year carting clay. Each campaign would last for 8-10 days and cartage would operate Monday to Friday from 7am to 5pm. That is, there would be approximately 12 weeks of intensive vehicle traffic each year.

(c) Approximately 2000 tonne of clay would be carted each day during a campaign. If double tray trucks were used, each carrying a load of 40 tonnes, this would equate to approximately 50 loaded heavy haulage vehicles carrying clay each day.

(d) On the basis of use of double-tray trucks, the total movement of heavy haulage vehicles would be approximately 100 tucks per day (empty and loaded trucks). This would be one truck every 6 minutes (possibly more if different trucks were used). Other vehicles, including for maintenance crews and site operators, would also use Toy Road on a daily basis.

We are not aware of the projected life of extractive operations.

We understand from the attached plan that the clay pits would be located immediately to the North of the Brockman River and that a bridge, suitable for heavy haulage vehicle traffic, would need to be constructed over the Brockman River.

During the meeting, we asked Brikmakers why its proposal did not include access directly to the Great Northern Highway through Lot 7, which fronts the Great Northern Highway. We understand that there is existing approved access to the Great Northern Highway from Lot 7 for a gravel pit located on Lot 7. We were told that Brikmakers is not currently considering that access route and no reasons were provided.

3. **DIRECT IMPACTS ON GINNIBY RISE**

If heavy haulage vehicles are permitted to use Toy Road, as proposed by Brikmakers:

(a) We, and our family, will be exposed to unacceptable safety risks as we access our home via Toy Road;

(b) Families renting a house on our property will be exposed to unacceptable safety risks as they access their home via Toy Road;

(c) Our business and livelihood will be jeopardised because members of the public are unlikely to visit Ginniby Rise to purchase olive oil (and will be exposed to safety risks if they do);

(d) We will be exposed to increased safety risks if we attempt to move alpacas in floats to and from Ginniby Rise; and

(e) We will be exposed to unacceptable noise due to regular flow of heavy haulage vehicles adjacent to the length of our property and within 60 metres of our house.

We will object to any proposal to use Toy Road for the use of heavy haulage vehicles or increased traffic.

Further Detail

The only access and egress to Ginniby Rise is via Toy Road, which turns into the Bindoon-Moora Road.

We access our home from Toy Road. Our family, including young grandchildren, access our home from Toy Road. Our home is located approximately 60 metres from Toy Road. We constructed our house in its current location 5 years ago to maximise the distance from traffic and noise from the Bindoon-Moora Road.

We also rent a small house on Ginniby Rise and our tenants access this house from Toy Road. The entrance to the rental house at 5 Toy Road is approximately 30 metres from the intersection of Toy Road and Bindoon-Moora Road.

At Ginniby Rise, we grow approximately 800 olive trees, from which we produce extra virgin olive oil. Ginniby Rise is our registered business name and we are a registered food business under the *Food Act 2008* (WA). We sell olive oil from local shops, annually at the Bindoon Agriculture Show, and to the public from our property. Members of the public visit our property to purchase olive oil.

We also raise stock on our property. In particular, we breed and show alpacas. This involves transporting alpacas by float to and from shows and to other properties via Toy Road. As Ginniby Rise is only 12 hectares, running adjacent to Toy Road, our alpacas are located in paddocks adjacent to or in the vicinity of Toy Road.

The proposal would also lead to a significant increase of trucks, using the intersection of Bindoon Moora Road to the Great Northern Highway, which is already a busy major intersection and has had previous accidents causing lights to be installed. We believe this is yet another traffic hazard putting members of the community in danger when attending the hotel, church, off road fruit sales, farming properties as well as being on a school bus route and the heavy mining traffic on Great Northern Highway.

4. **OTHER CONCERNS**

We are also concerned about the impacts of the proposal on visual amenity, noise, dust, degradation of the Brockman River Wetlands, and impacts on the unique environment in the area.

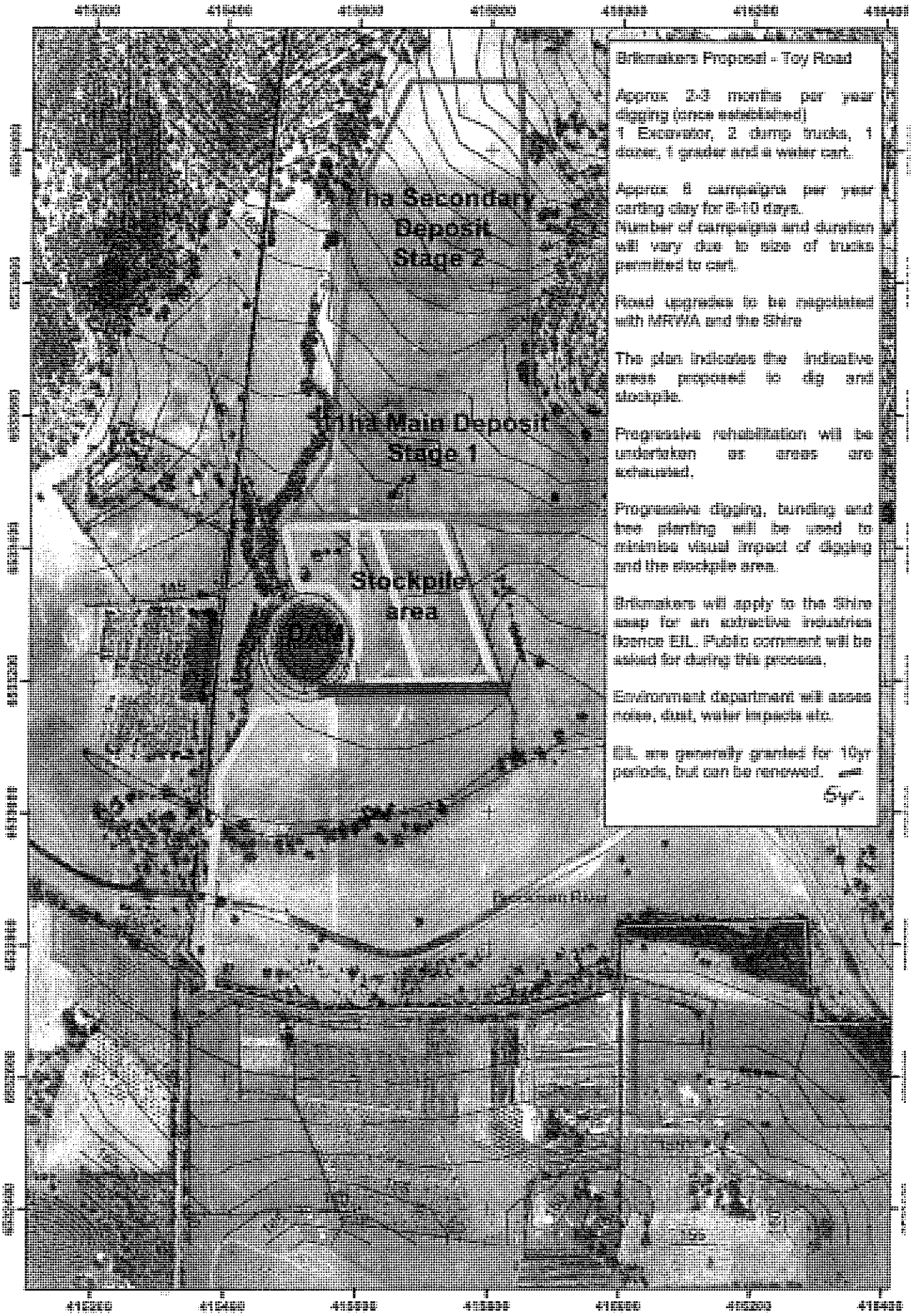
We expect the formal proposal to address each of these issues in detail.

[redacted]

[redacted] Toy Road

Bindoon 6502.

Date: 14 July 2014.


Brikmakers Proposal - Toy Road
Approx 2-3 months per year digging (once established)
1 Excavator, 2 dump trucks, 1 dozer, 1 grader and a water cart.
Approx 8 campaigns per year carting clay for 8-10 days.
Number of campaigns and duration will vary due to size of trucks permitted to cart.
Road upgrades to be negotiated with MRWA and the Shire
The plan indicates the indicative areas proposed to dig and stockpile.
Progressive rehabilitation will be undertaken as areas are exhausted.
Progressive digging, bunding and tree planting will be used to minimise visual impact of digging and the stockpile area.
Brikmakers will apply to the Shire asap for an extractive industries licence EIL. Public comment will be asked for during this process.
Environment department will assess noise, dust, water impacts etc.
EIL are generally granted for 10yr periods, but can be renewed.
5yr.
2 ha Secondary Deposit Stage 2
Stockpile area
Pond
Toy Road

Ginniby Residents Group
[redacted]
Bindoon. 6502

9 January 2015

Shire of Chittering
Bindoon

Attention: CEO
Manager Development Services
Councillors

Dear Gary, Azhar and Councillors,

Re. Brikmakers (BGC) Toy Rd clay pit proposal.

The community of "Ginniby", (being those Chittering residents living in that locality and who, together with their land, are listed in the attachment hereto and described in this letter as "The Residents" hereby put you on notice of the following:

1. The proposal for a clay pit on the land at Lot 7 Toy Road as described by Brikmakers to Ahzar and some of the Residents is rejected by the Residents and will be opposed by them.

2. The Residents hereby notify the Shire of Chittering that no Buffer zone on their land, as required by the proposal, will be tolerated. The Residents request the Council of the Shire, and each of them, to acknowledge that no such buffer zones will be imposed by them except and unless the Resident first gives specific individual written permission.

3. The proposal is not acceptable for at least the following reasons:
a. The proposal would breach numerous provisions of our Town Planning Scheme and relevant Shire policies to the detriment of the Residents' amenity and environment, and will greatly de-value of their property.
b. The area is a sensitive water catchment environment and recharges the Brockman River system which is already compromised.
c. There are many sensitive receptors within the area likely to be affected, including but not limited to, houses, agriculture, specialist agriculture, businesses and tourist activities.
d. The area is part of a special landscape protection area.
e. The area is a valuable agricultural resource that has already been badly affected by an extraction licence for gravel on Lot 7 that now can clearly be recognised as a bad planning decision.
f. The Ginniby lake is formed in winter, it and the wetlands that remain in summer will be directly affected and potentially destroyed.
g. The noise from machinery will make living conditions of the Residents unbearable.

h. The truck movements along Toy Road will do the same but will also adversely affect the wider Chittering community. Major upgrading would be required at the Toy Road/Bindoon Moora Road, the size and frequency of the trucks would make it a dangerous intersection for all road users. Toy Road is a No Through Road.
i. Dust will be a huge problem even if the vast quantities of water necessary for dust suppression could be provided.
j. Acid sulphate soils will be generated.
k. All wildlife will be damaged, especially the bird life.

The Residents repeat that they are determined that this proposal will not proceed, and it will be strenuously opposed. We request that the Shire acknowledge that a clay-pit proposal in this location cannot proceed and to put such an acknowledgement publicly in writing.

A copy of the substance of this letter is being sent to Brikmakers on behalf of the Residents.

Although Brikmakers has not yet lodged its application for approval for the clay-pit, the company has indicated that it intends to do this early in 2015. Residents would welcome the opportunity to discuss this with the Council at your earliest convenience.

Yours Faithfully

[redacted] (on behalf of the Ginniby Residents Group)

Lake Ginniby in winter with proposed clay pit site visible, within 100 metres

APPLICATION FOR PLANNING APPROVAL

EXTRACTIVE INDUSTRY (CLAY) / LOT 7 (NO. 75) TOY ROAD
BINDOON

OUR REF: 8330 4/08/2015

ROWEGROUP

DOCUMENT CONTROL

Printed 04 September 2015 8330_15may01R_al.docx

Version	File Name	Prepared by	Approved by	Date
1	8330_15may01R_al.docx	Camille Clarke	Claire Richards	23.07.2015
2	8330_15may01R_al.docx	Camille Clarke	Claire Richards	03.09.2015

This report has been authorised by;

Claire Richards Senior Planner

Camille Clarke Planner

Jamie Baxter Quality Control

CONTACT PERTH OFFICE

p 9221 1991 **e** info@rowegroup.com.au **w** rowegroup.com.au **a** 3/369 Newcastle Street, Northbridge 6003

CONTENTS

FIGURES

ATTACHMENTS

1. Certificates of Title
2. Development Proposal plans (Map)

01 Introduction

Rowe Group acts on behalf of Brikmakers in relation to the property at Lot 7 (No. 75) Toy Road, Bindoon (herein referred to as the 'subject site'). Our Client seeks Planning Approval from the Shire of Chittering to develop and use a portion of the subject site for the purposes of clay excavation.

This report has been prepared in support of the Application and includes a description of the following matters:

- Location of the subject site;
- Description of the existing land use;
- Overview of relevant planning and environmental issues;
- Detailed explanation of the proposed development; and
- Justification for the proposed development.

Accompanying this report is a Traffic Impact Assessment prepared by Shawmac and an Excavation and Management Plan prepared by Landform Research. The Excavation and Management Plan includes a Dust Management Plan, Water Management Plan, Environmental Noise Assessment, Visual Management Assessment and Community Consultation summary.

02 Description of Site

2.1 Location

The subject site is located in the municipality of the Shire of Chittering and falls within the district of Bindoon. The site maintains frontage to Toy Road to the south and Great Northern Highway to the east. The aforementioned roads are both sealed, gazetted roads.

Refer Figure 1 and 2 – Regional Location and Local Location Plan.

2.2 Cadastral Information

The subject site comprises a single land parcel that is held within two (2) Certificates of Titles. Details of these Titles are as follows:

- Lot 7 on Plan 7148 and held within Certificate of Title Volume 445, Folio 17A;
- Lot 7 on Plan 7148 and held within Certificate of Title Volume 388, Folio 18A.

The street address of the subject site is No. 75 Toy Road. The total area of the subject site is approximately 338.59 ha.

Refer Figure 3 – Site Plan and Attachment 1 – Certificates of Title.

2.3 Existing Improvements

The subject site is used for agriculture and cattle grazing. In this regard, the site is largely cleared but does contain some existing vegetation which is predominantly located in the centre and along the northern boundary of the site.

An existing shed is located in the south-western corner of the subject site near Toy Road, however the balance of the site is free of built structures.

The eastern half of the subject site contains two (2) existing gravel excavation pits which have been in operation for the past 15 years. All vehicular access to these existing gravel pits is from Great Northern Highway. No changes to the existing gravel excavation operations are proposed as part of this Application.

2.4 Surrounding Land Uses

The properties to the south of the subject site (south and west of Toy Road) are currently used for orchard/horticultural uses. A number of these properties contain existing residential dwellings and associated outbuildings. The closest of these dwellings is located approximately 150m from southern boundary of Lot 7 and approximately 750m from the edge of the proposed excavation/stockpile area.

The land to the immediate west of the subject site at Lot 61 (No. 71) Toy Road, contains a small, old and now disused orchard. This property contains an existing dwelling which is currently occupied by the owner of Lot 7. The dwelling is located approximately 150m from western boundary of Lot 7 and approximately 450m from the edge of the proposed excavation area.

03 Description of Proposal

This section of the report provides an overview of the proposed development and contains information regarding site layout, operating hours, project life, number of employees and excavation methods. Development proposal plans (maps) are enclosed at Attachment 2.

A more comprehensive and detailed analysis of the proposed development is contained in the Excavation and Management Plan prepared by Landform Research which accompanies this report. Included within the Excavation and Management Plan is a Dust Management Plan, Water Management Plan, Environmental Noise Assessment, Visual Management Assessment and Community Consultation summary.

3.1 Overview

This Application seeks approval from the Shire of Chittering to excavate clay resources from the south facing valley of the subject site, along its western boundary. The proposed excavation pit will be operated by Brikmakers. In the first instance, approval to excavate the resource is sought on a ten (10) year basis.

The extent of the clay resource on the subject site has been determined through an extensive drilling program. Specific information regarding the type and quality of the resource located on the subject site is contained in the Excavation and Management Plan.

3.2 Operating Area

The proposed development comprises an excavation pit measuring 9.0ha in area, along with a stockpiling area measuring approximately 4.0ha in area, two (2) dams, each measuring approximately 1.0ha in area and a series of bunds located along the western and southern side of the excavation pit. The bunds measure between 5.0m and 7.5m in height.

An access track will provide vehicular connection between the excavation/stockpiling area and Toy Road. The proposed stockpile area is located approximately 600m from Toy Road.

Excavation will occur in two (2) stages, with Stage 1 comprising the area in the southern part of the pit and Stage 2 comprising the northern part. Both stages will measures approximately 4.5ha in area each.

A Site Plan of the proposed excavation area is provided in the Excavation and Management Plan prepared by Landform Research, and reproduced in Figure 4 for ease of reference.

3.3 Project Life

Investigations undertaken by Landform Research indicate that the subject site contains sufficient clay resources to enable the excavation pit to operate for around twenty (20) years. Notwithstanding, as advised above, the Applicant seeks approval, in the first instance, for a period of ten (10) years.

It is anticipated that excavation will be intermittent and restricted to campaigns of 2 – 4 months duration. Between 50 000 and 100 000 tonnes of material is expected to be removed each year. The amount of material extracted will depend on the nature of the local and export brick markets and public demand for particular colours of bricks but is anticipated to be nearer 50 000 tonnes per annum in the early years rising in later years. It is estimated that more than 1 million tonnes of clay resource is available at the subject site for excavation.

Progressive rehabilitation of the excavated pits will be undertaken as the resource is exhausted.

3.4 Hours of Operation

The existing gravel excavation pit operates between 7.00am and 6.00pm, Monday to Saturday. No works are undertaken on Sundays or public holidays. The same operating hours are sought for the proposed clay excavation pit.

As mentioned above, excavation activities from the clay pit are proposed to be undertaken intermittently and restricted to campaigns of 2 – 4 months duration. Once excavated, some of the material will be taken off site and some of material will be stockpiled. Transportation of the resource off site will only occur between 25 and 30 days per year. This means that for the most part of the year, the excavation pit will not be in operation.

To ensure a continuous supply of clay throughout the year, the clay resource will be excavated in the drier months and stockpiled for use during the wetter months when excavation is more difficult.

3.5 Number of Employees

During the construction/initial excavation phase, a maximum of six (6) employees are expected to be on site at any one time. The same number of employees will be located on site once the excavation pit is in full operation.

3.6 Excavation Methods

A variety of excavation methods will be used on site depending on the configuration of the pit, the complexity of blending, and weather conditions at the time. Excavators and loaders will be used to dig, load or form stockpiles. Excavation will occur in benches down to 10-12m below existing site levels, depending on the resource grade.

The faces of the pit will be relatively steep to maximise depth and minimise the excavation footprint. Excavation will be undertaken in accordance with the *Mines Safety and Inspection Act 1994* and the guidelines produced by the Department of Mines and Petroleum ('DMP') for the safe excavation of weathered to partially weathered materials.

Water from the excavated area will be directed to small sumps and then into the storage dams. Stormwater bypass systems are to be installed to prevent water carrying sediment into the dams.

Most of the excavated material will be loaded directly onto road trucks for haulage to Brikmakers' South Guildford factory. The balance of the material will be stockpiled for later use. No processing of the excavated material will occur on the subject site.

More detailed information regarding the excavation process is contained in the Excavation and Management Plan.

3.7 Bunds

During construction of the pit, overburden will placed along the western and southern sides of the pit and stockpile areas to form a series of screening bunds. The bunds will measure between 5.0m and 7.5m high along the western side of the pit and 6.0m along the southern side. The location and height of the bunds has been determined through an Environmental Noise Assessment by Lloyd George Acoustics. A copy of the Environmental Noise Assessment is contained in the Excavation and Management Plan.

At the end of excavation, the recovered overburden will be spread across the excavated pit surface, followed by the recovered topsoil, as part of the final rehabilitation process.

3.8 Clearing

Approximately twenty (20) scattered trees will be required to be cleared to facilitate the excavation of the clay resource. The removal of these trees will be offset through the planting of a number of locally native trees in screening belts and on the steeper slopes at the completion of operations.

3.9 Proposed Vehicle Movements and Access

Access to the excavation area is proposed via Toy Road to the south, which provides connections to Great Northern Highway via the Bindoon – Moora Road. All movements to and from the site will be to the Perth region to the south. The existing access point to Toy Road crosses the Brockman River via an existing causeway. This crossing will be updated as part of the proposed development. A concept crossover design has been prepared and is included in the Excavation and Management Plan.

Vehicle movements associated with the proposed clay excavation will only be accessed via Toy Road. Access to the clay deposit from Great Northern Highway is not possible due to the site's terrain. Therefore, Toy Road is the only viable way to transport the resource off site.

A Transport Statement has been prepared by Shawmac Consulting Engineers to assess the likely impacts of the proposed development on existing traffic conditions in the immediate locality. Potential traffic flows from the subject site were calculated based on an annual extraction rate of approximately 75,000 tonnes, transported in 50 tonne loads for 25 -30 days per year. The number of trips generated by the proposed development for these 25 - 30 days is estimated at 60 which equates to 120 vehicle movements in and out of the site per day.

The assessment concluded that traffic movements generated by the proposed development can be accommodated within the existing network without unacceptable adverse impacts.

3.10 End Use

Once the clay resource has been exhausted, the site will be rehabilitated and returned to a condition suitable for agriculture and cattle grazing. The land surface will be formed into gently sloping soils with a slightly steeper north-eastern corner which matches other natural slopes in the local area, with a more shallow lower portion and a second farm dam. The steeper slopes have a base of saprock and will therefore be stable as the underlying schists will provide stability.

Two (2) dams will be constructed as part of the water management strategy for the proposed development and the dams will be retained once the clay resource has been exhausted and the site rehabilitated.

04 Town Planning Considerations

4.1 Town Planning Scheme No. 6

4.1.1 Zoning

Under the provisions of the Shire of Chittering Town Planning Scheme No. 6 ('TPS6') the subject site is zoned "Agricultural Resource". Refer Figure 4 - Zoning Plan.

The objectives of the "Agricultural Resource" Zone, as stated in Clause 4.2.3 of TPS6, are as follows:

- *To preserve productive land suitable for grazing, cropping and intensive horticulture and other compatible productive rural uses in a sustainable manner;*
- *To protect the landform and landscape values of the district against despoliation and land degradation;*
- *To encourage intensive agriculture and associated tourist facilities, where appropriate;*
- *To allow for the extraction of basic raw materials where it is environmentally and socially acceptable.*

The proposed development has been considered against the objectives of the "Agricultural Resource" Zone. For the reasons set out below, it is our view that the proposed development satisfies the relevant objectives and is therefore acceptable:

- The subject site is currently used for agriculture and cattle grazing. Those parts of the subject site not currently used, or proposed to be used, for extractive industry will continue to be used for agriculture and cattle grazing.
- The area of the subject site currently used, and proposed to be used, for extractive industry is small, representing approximately 3.8% of the site's total land area.
- Once the clay resource has been exhausted, the site will be rehabilitated and returned to a condition suitable for agriculture and cattle grazing. In this regard, the proposed development does not affect the site's long term ability to be used for productive agricultural purposes.
- The proposed development incorporates strategically placed bunds to provide screening of the proposed operations from surrounding roads and adjoining properties, and in doing so, assists in protecting the landform and landscape values of the district.
- A visual assessment of the proposed development has been undertaken and is included in the Excavation and Management Plan. The visual assessment indicates that the majority of the proposed extraction area and associated dams will be hidden from view through the construction of bunding and the planting of vegetation.
- Rehabilitating the excavation area once the resource has been exhausted will ensure that the landform is returned to an acceptable condition.
- The construction of two dams will improve the long term agricultural capability of the site after excavation activities have been completed.

- An environmental investigation of the subject site has been undertaken by the Applicant to ensure that there are no significant environmental impediments to development. The results of this investigation are detailed in the Excavation and Management Plan.
- The operation and management of the subject site will be undertaken in accordance with the Excavation and Management Plan. This will include the construction of noise attenuation and screening bunds, restrictions on operating hours and planting of vegetation.
- A Dust Management Plan has been prepared in relation to the proposed development and is included in the Excavation and Management Plan. Construction and management of the proposed development will be undertaken in accordance with the requirements of this Plan.

4.1.2 Land Use Permissibility

The proposed development falls within the land use classification "Industry – Extractive" which is defined in TPS6 as follows:

> *"An industry which involves the extraction, quarrying or removal of sand, gravel, clay, hard rock, stone or similar material from the land and includes the treatment and storage of those materials, or the manufacture of products from those materials on, or adjacent to, the land from which the materials are extracted, but does not include industry-mining."*

Table 1 – Zoning Table of TPS6 classifies "Industry – Extractive" as an 'A' use class in the "Agricultural Resource" Zone. This means that it is a use that is not permitted unless the Local Government has exercised its discretion by granting Planning Approval after giving special notice in accordance with Clause 9.4 (ie. advertising).

The proposed development is therefore a use that is capable of approval in the "Agricultural Resource" Zone under TPS6, subject to advertising.

4.1.3 Basic Raw Materials

Clause 5.16 of TPS6 contains the following provisions in relation to basic raw materials:

> *(a) 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;*
>
> *(b) 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;*
>
> *(c) Appropriate buffer areas are to be applied to protect both the extractive operations as well as the living or agricultural environment in nearby areas;*
>
> *(d) Council 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.*

The proposed development has been considered against the basic raw material provisions of TPS6. For the following reasons, the proposed development is considered to comply with these provisions and, in this regard, is a suitable land use for the subject site:

- An environmental investigation of the subject site has been undertaken by the Applicant to ensure that there are no environmental impediments to development such as flora, fauna,

groundwater, Aboriginal heritage and other important environmental considerations. The results of this investigation are detailed in the Excavation and Management Plan.

- Once the clay resource has been exhausted, the site will be rehabilitated and returned to a condition suitable for extensive agriculture and cattle grazing in accordance with TPS6.
- Excavation on the site will be conducted in accordance with the *Mines Safety and Inspection Act 1994 and Regulations 1995* and once the resource has been exhausted, the pit faces will be formed and lowered to the comply with Department of Mines and Petroleum requirements.
- The proposed excavation pit is located within an area of the subject site containing limited vegetation. Whilst some 20 trees will need to be removed over the life of the project to facilitate the proposed development, replacement trees will be planted by the Applicant as an offset.
- The nearest residential dwelling to the west of the subject site is located approximately 450m from the edge of the proposed excavation area. Noise attenuation and screening bunds will be installed along the western and southern sides of the excavation area to ensure an appropriate buffer and interface is achieved. The Environmental Noise Assessment undertaken by Lloyd George Acoustics concludes that the proposed development will comply with the *Environmental Protection (Noise) Regulations 1997* subject to the recommended noise mitigation measures being put in place.

4.1.4 Special Control Area - Landscape Protection

The subject site is identified as being located within the Special Control Area - Landscape Protection ('LPSCA') area which is delineated on the TPS6 scheme maps. The purpose of the LPSCA, as outlined within Clause 6.2.2 of TPS6 is as follows:

> *(a) To secure the areas delineated on the Scheme Map from undue subdivision and development that would detract from the landscape value of the rural environment;*
>
> *(b) To conserve and enhance the character of the significant landscape area; and*
>
> *(c) To ensure land use and development are compatible with the landscape values.*

The subject site is located within the 'northern upland' area of the LPSCA, and is identified for protected due to the agricultural quality of the undulating landforms and rural production.

Clause 6.2.4 of TPS6 states that the Shire will not support development with the LPSCA which is not related to the zone objectives, or where the proposal involves the removal of any natural vegetation from any ridgeline or the removal or lopping of trees generally.

The proposed development is consistent with the objectives of the "Agricultural Resource" Zone under TPS6 as set out in section 4.1.1 of this report and therefore satisfies this requirement of Clause 6.2.4.

As noted within section 3.8 of this report, the clearing of approximately twenty (20) trees is required to facilitate the proposed development. These trees are not located on a ridgeline. Clause 6.2.4 of TPS6 states that where the clearing of vegetation is required, the planting of replacement trees may be necessary to ensure that there is no net loss of vegetation on the site. The trees which are required to be removed to facilitate the proposed development will be offset through the planting of trees along the western and southern side of the excavation area as shown in the development proposal plans.

A visual assessment of the proposed development has been undertaken and is included in the Excavation and Management Plan. The visual assessment indicates that the majority of the proposed extraction area and associated dams will be hidden from view through the construction of bunds and the planting of trees.

Having regard to the above, this Application is considered to satisfy the relevant provisions of Clause 3.2.4 and is therefore an acceptable land use in the LPSCA.

4.2 Local Planning Policies

4.2.1 Local Planning Policy No 10 - Basic Raw Materials and Extractive Industries

The proposed development has been assessed against the provisions of the Shire of Chittering Local Planning Policy No. 10 – Basic Raw Material and Extractive Industries ('LPP10'). The objectives of LPP10 are as follows:

- *To facilitate extraction of the Shire's basic raw materials using best available practice;*
- *To provide guidance for the preparation of applications for extractive industry proposals and an indication of conditions likely to be applied to approved proposals;*
- *To 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; and*
- *To maintain the rural character of the Shire and minimize the loss of prime agricultural land.*

The proposed development is considered to satisfy the objectives of LPP10 having regard to the following:

- The proposal will facilitate the extraction of clay using best practice principles through the implementation of various management plans outlined within the Excavation and Management Plan.
- 7.5m, 6.0m and 5.0m high bunds will be strategically constructed around the excavation pit and stockpile area to assist in screening the operations from adjoining properties. These bunds will also provide noise mitigation. In addition to the bunds, the planting of trees is proposed along the western and southern sides of the excavation site.
- The excavation area is proposed to be rehabilitated once the extraction of clay has been exhausted.
- The proposed use is not uncommon in the rural areas of the Shire of Chittering and as such will not impact on the rural character of the area. Although this proposal is positioned on land zoned "Agricultural Resource", the proposed excavation activity will occur on a small area of the subject site which represents approximately 3.8% of the total site area.
- Each stage of excavation area is to be rehabilitated after the clay resource has been exhausted, thereby providing an opportunity for the land to be used for progressively returned to agricultural purposes.

Clause 5.4 of LPP10 sets out requirements in relation to "Preferred Development". These provisions are not mandatory but rather set out the Shire's preference in relation to the location of basic raw material extraction areas.

The proposed development is considered to satisfy all of the provisions outlined within Clause 5.4 of LPP10, except for provisions a) (i), a) (ii), a) (v) and b) (v). These provisions are addressed separately below.

Provision a) (i) - location

The subject site is located to the north of Bindoon Townsite and therefore does not satisfy provision a) (i) of LPP10. Whilst it is appreciated that Council's preference is to locate excavation areas to the south of the Bindoon Townsite, if a resource is identified, it is appropriate and reasonable for that resource to be extracted.

As is evidenced by the existing gravel excavation pits located in the eastern part of the subject site, Council has previously approved applications for excavation areas north of the Bindoon Townsite.

Provision a) (ii) - prime agricultural land

The term "prime agricultural land" is not defined in LPP10 or TPS6. We note however that the subject site is zoned "Agricultural Resource" under the provisions of TPS6 and, in this regard, may be considered prime agricultural land. Notwithstanding, the portion of the subject site to be used for excavation comprises only 3.8% of the total site area. As such, the majority of the subject site is available for agricultural use.

Furthermore, the excavation area is proposed to be rehabilitated after each excavation stage has been completed. This enables the site to be used for agricultural purposes while excavation activities are being undertaken, and ensures that once the resource has been exhausted, the site can be returned to a state suitable for agricultural use. The construction of two large dams will improve the long term agricultural capability of the site after excavation activities have been completed.

Provision a) (v) - distance from the nearest house

The nearest residential dwelling is located approximately 450m to the west of the edge of the proposed excavation area. In this regard, the proposed development does not satisfy provision a) (v) of LPP10.

To protect the dwelling from potential noise, dust and visual impacts, noise attenuation and screening bunds will be constructed along the western edge of the excavation pit and stockpile area. Operating hours will be limited and excavation activities are proposed to be undertaken in campaigns of between two (2) to four (4) months, with the transportation of the resource to occur between 25 and 30 days per year. In this regard, the potential impacts of the proposed development on the neighbouring dwelling are significantly reduced and will be suitably managed for the life of the project. With these mitigation measures in place, the Environmental Noise Assessment undertaken by Lloyd George Acoustics concludes that the proposed development will comply with the *Environmental Protection (Noise) Regulations 1997.*

It is also noted that the clay resource is finite and it is expected that the resource will be exhausted within a period of 20 years. Once the resource has been exhausted, the subject site will be rehabilitated and returned to a condition suitable for extensive agriculture and cattle grazing. In this regard, the proposed development does not affect the site's long term ability to be used for agricultural purposes in accordance with TPS6.

Provision b) (v) - location

As noted above, the nearest residential dwelling is located approximately 450m to the west of the edge of the proposed excavation area, and therefore does not satisfy the provision b) (v) of LPP10.

As also mentioned above, the existing dwelling will be protected from potential noise, dust and visual impacts through the installation of screening bunds and planting along the western and southern edge of the excavation pit.

Given the nature of the proposed development, which comprises excavation activities in campaigns of between two (2) to four (4) months, with transportation of the resource to occur between 25 and 30 days per year, combined with the mitigation strategies proposed by the Applicant in relation to dust, noise and visual impacts, it is considered that the proposed development satisfies the objectives of LPP10 and is therefore appropriate.

4.2.2 Local Planning Policy No 6 - Water Supply and Drainage

The proposed development has been assessed against the provisions of the Shire of Chittering Local Planning Policy No. No. 6 – Water Supply and Drainage ('LLP6'). The objectives of LPP6 are as follows:

- *To ensure safe and healthy water supplies and drainage;*
- *To minimise environmental impact on water resources and associated vegetation;*
- *To avoid visual or aesthetic impact on landscape values from water works/development;*
- *To prevent future land and water use conflicts;*
- *To place minimal restrictions on farmers; and*
- *To clearly identify responsibilities for construction and use of water infrastructure.*

The proposed development is considered to satisfy the objectives of LPP6 having regard to the following:

- The proposed excavation activities will not impact the existing water source and associated vegetation located on the subject site given the extraction area is located approximately 750m north of the nearest water source, being the Brockman River.
- The dams proposed to be constructed on site as part of the extractive industry operation, will provide an additional water supply with no impacts on water quality or quantity (refer to Water Management Plan).
- A visual assessment of the proposed development has been undertaken and is included in the Excavation and Management Plan. The visual assessment indicates that the majority of the proposed extraction area and associated dams will be hidden from view through the construction of bunds and the relocation of vegetation.

As mentioned in section 3.9 of this report, the existing access point to Toy Road crosses the Brockman River via an existing causeway. This crossing will be updated as part of the proposed development and a preliminary crossover design has been prepared.

Clause 3 of LPP6 raises general concerns about the integrity of structures crossing waterways. In response to this statement, the Applicant advises that the proposed crossing will be constructed to a standard that allows access by haulage vehicles. The access crossing and its potential implications for water flow, are discussed in the Water Management Plan included in the Excavation and Management Plan.

As demonstrated below and in the Water Management Plan included in the Excavation and Management Plan, the proposed development satisfies all of the provisions outlined within Clause 5.2 (a) of LPP6:

Provision a) (i) – purpose of the works

The purpose of the proposed dams are to assist in the operation of the proposed extractive industry however they will also improve the long term agricultural potential of the site.

Provision a) (ii) – catchment area

The total catchment area of the two (2) dams is 46ha.

Provision a) (iii) – existing dams within 100m

There are currently no water sources located within a 100m radius of the location of the proposed dams.

Provision a) (iv) – capacity of dam

Each dam is proposed to be constructed to a size that accommodates a capacity of 25,000kL, providing a combined total capacity of 50,000kL.

Provision a) (v) – hydrological report

As noted above, the storage capacity of the two (2) proposed dams exceeds 4,000kL, and therefore a Hydrological Report has been prepared and is included within the Excavation and Management Plan. The report concludes that the proposed development will have no significant impacts on the recharge of the local drainage lines and the Brockman River.

Provision a) (vi) – dam design

Details relating to the design of each dam are included within the Excavation and Management Plan. Each dam is to be constructed to an average depth of 5m with an open area of 1.0ha.

Provision a) (vii) – trees to be removed

A number of trees are proposed to be removed to enable the construction of the dams. Replacement trees will be planted on the subject site as an offset.

Provision a) (viii) – erosion/landscaping management plan

The dams and surrounding land will be monitored by staff located on the subject site to ensure the site does not experience erosion as a result of the dams. Should any erosion be identified, appropriate measures will be undertaken.

Provision a) (ix) – fencing

No fencing is proposed adjacent to the dams.

Provision a) (x) – acid sulphate soil testing

The Hydrological Report notes that based on the soils and rock types located at the subject site, acid sulphate soils do not present a risk.

Having regard to the above, the proposed development is considered to satisfy the relevant requirements of LPP6.

4.2.3 Shire of Chittering Extractive Industries Local Law 2014

The Shire of Chittering *Extractives Industries Local Law 2014* ('Local Law') was gazetted on 24 October 2014 and contains various requirements and conditions in relation to extractive industry operations.

The Local Law indicates that an Extraction Licence is required for excavation works within the Shire of Chittering. The Applicant will seek approval for an Extraction Licence once Planning Approval has been granted.

Clause 6.1 of the Local Law addresses limitations, obligations and prohibitions. Clause 6.1 (e) of the Local Law reads:

> *Subject to any licence conditions imposed by the local government, a person must not excavate within:*
>
> *(e) 500 metres of any adjoining residence unless approved by Council and adjoining neighbours in writing in accordance with the Department of Environment and Conservation Guidelines, March 2011—"A Guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other activities."*

This Clause was discussed with Mr Brendan Jeans, Senior Planning Officer at the Shire of Chittering, on 10 July 2015. Mr Jeans advised that, notwithstanding the language used in the Clause, the Shire does have discretion to approve an application for extractive industry which is located within 500m of a residence. Mr Jeans further advised that the Shire would consider a variation to the 500m setback requirement provided that appropriate dust and noise mitigation methods are proposed.

In relation to the proposed development, it is noted that noise and dust mitigation measures are to be implemented on the site to suitably control dust and noise. These measures include the construction of strategically placed bunds, additional landscaping (tree planting), restrictions on operating hours, the installation of noise suppression kits to equipment and speed limits for trucks accessing the site. Furthermore, it is noted that excavation activities are proposed to be undertaken in campaigned of between two (2) to four (4) months, with the transportation of the resource to occur between 25 and 30 days per year, meaning the intensity of the operation is comparatively low. The Environmental Noise Assessment undertaken by Lloyd George Acoustics concludes that with these mitigation measures in place, the proposed development will comply with the *Environmental Protection (Noise) Regulations 1997*.

Having regard to the noise and dust mitigation measures proposed by the Applicant, it is considered that the proposed development satisfies the intent of Clause 6.1(e) of the Local Law and is therefore appropriate as it will not generate any dust or noise impacts on nearby dwellings.

4.3 Shire of Chittering Local Planning Strategy 2001 - 2005

The Shire of Chittering's Local Planning Strategy 2001 - 2005 ('LPS') identifies the subject site as a "Primary Basic Raw Materials Area". The LPS further identifies the subject site as a "Gravel Extraction Resource".

The objectives of the "Primary Basic Raw Materials Area" under the LPS are as follows:

- *To manage the extraction of basic raw materials within the rural zones in accordance with the best industry practices including consideration of end use and rehabilitation at time of decommission; and*

- *To ensure appropriate buffer areas are applied to protect the extractive operations as well as the living or agricultural environment in nearby areas.*

This Application is consistent with the objectives of the "Primary Basic Raw Materials Area" for following reasons:

- Once the clay resource has been exhausted, the site will be rehabilitated and returned to a condition suitable for agricultural use in accordance with TPS6.
- Excavation on the site will be conducted in accordance with the *Mines Safety and Inspection Act 1994 and Regulations 1995* and once the resource has been exhausted, the pit faces will be formed and lowered to the comply with Department of Mines and Petroleum requirements.
- The proposed development has been designed, and will be undertaken in accordance with, the *Environmental Protection (Noise) Regulations 1986*.
- The nearest residential dwelling to the west of the subject site is located approximately 450m from the edge of the proposed excavation area. Noise attenuation and screening bunds will be installed between the excavation pit and the nearest dwelling to ensure an appropriate buffer and interface is achieved.

As the subject site is zoned "Agricultural Resource" under the provisions of TPS6, the objectives outlined within the LPS which relate to the "Agricultural Resource Area" are also relevant to this Application. The objectives for the "Agricultural Resource Area" as stated within the LPS are as follows:

- *To maintain agricultural lands for primary productive purposes;*
- *To protect and improve the natural environment, including the landscape quality of the land;*
- *To facilitate the conversion of suitable land, to intensive agriculture based upon appropriate soils and irrigable water supplies;*
- *To prevent the loss of productive land to non agricultural purposes;*
- *To allow agro-tourism and eco-tourism to develop in the rural areas;*
- *To allow for the subdivision of non-productive land or areas of vegetation worthy of preservation in sustainable lot sizes under conservation covenants in accordance with WAPC Policy; and*
- *To protect and revegetate streamlines to provide for biodiversity corridors.*

The proposed development is considered to satisfy the objectives of the "Agricultural Resource" Zone under the LPS on the basis of the following:

- The subject site is currently used for agriculture and cattle grazing. Those parts of the subject site not currently used, or proposed to be used, for extractive industry will continue to be used for extensive agriculture and cattle grazing.
- Once the clay resource has been exhausted, the site will be rehabilitated and returned to a condition suitable for agriculture and cattle grazing. In this regard, the proposed development does not affect the site's long term ability to be used for productive agricultural purposes.
- The proposed development incorporates strategically placed bunds to screen the proposed operations from view of surrounding roads and adjoining properties, and in doing so, protects the landform and landscape values of the district.

- A visual assessment of the proposed development has been undertaken and is included in the Excavation and Management Plan. The visual assessment indicates that the majority of the proposed extraction area and associated dams will be hidden from view through the construction of bunds and the relocation of vegetation.
- An environmental investigation of the subject site has been undertaken by the Applicant to ensure that there are no significant environmental impediments to the proposed development. The results of this investigation are detailed in the Excavation and Management Plan.

4.4 Shire of Chittering Local Biodiversity Strategy 2010

The Shire of Chittering adopted a Local Biodiversity Strategy 2010 ('LBS') on 21 April 2010. The LBS identifies the subject site as being located within the "Northern Agricultural" Precinct.

The "Northern Agricultural" Precinct has a total area of 53,770 ha of which 7,880 ha is identified as "Local Natural Areas". 4,731 ha of land within the Northern Agricultural Precinct is to be protected and an additional 2,990 ha is to be retained as Local Natural Areas.

Figure 1 of the LBS indicates that portions of the subject site are identified as being Local Natural Areas; however the portion of the subject site which is proposed to be developed for clay excavation (near the site's western boundary) is not identified as a Local Natural Area. In this regard, the proposed development is acceptable having regard to the LBS, and the designation of land for Local Natural Areas.

4.5 State Planning Policies

4.5.1 Statement of Planning Policy 2.0 - Environment and Natural Resources

State Planning Policy 2.0 – Environment and Natural Resources ('SPP2') was gazetted by the Western Australian Planning Commission ('WAPC') in June 2003. The objectives of SPP2 are as follows:

- *To integrate environment and natural resource management with broader land use planning and decision-making;*
- *To protect, conserve and enhance the natural environment; and*
- *To promote and assist in the wise and sustainable use and management of natural resources.*

The proposed development has been assessed against the objectives of SPP2 and is considered to satisfy the objectives based on the following:

- Whilst some 20 trees will need to be removed over the life of the project to facilitate the proposed development, replacement trees will be planted by the Applicant as an offset thereby ensuring there will be no net loss of trees at the site.
- This Application promotes the sustainable use and management of natural clay resources in the locality. The extraction site will occupy approximately 3.8% of the site and is to occur for a 20 year period, operating in campaigns of between two (2) to four (4) months. Each extraction stage is proposed to be rehabilitated after the clay extraction has been exhausted to ensure that the operation will have minimal long term adverse impacts to the natural environment.
- An environmental investigation of the subject site has been undertaken by the Applicant to ensure that there are no significant environmental impediments to the proposed

development. The results of this investigation are detailed in the Excavation and Management Plan.

Clause 5.6 of SPP2 further outlines principles which relate to agricultural land and rangelands within Western Australia. Given the subject site is zoned "Agricultural Resource" under the provisions of TPS6, the principles at Clause 5.6 of SPP2 are relevant to this Application. These principles include:

- *Protect and enhance areas of agricultural significance, having regard to State, regional and local issues and characteristics;*
- *Consider the natural resource capability of rangelands and agricultural lands; and*
- *Diversify compatible land use activities in agricultural areas and rangelands based on principles of sustainability and recognising the capability and capacity of the land to support those uses.*

The proposed development is considered to satisfy these principles for the following reasons:

- The proposed excavation area represents only approximately 3.8% of the total site area. Those parts of the subject site not currently used, or proposed to be used, for extractive industry will continue to be used for agriculture and cattle grazing.
- Once the clay resource has been exhausted, the site will be rehabilitated and returned to a condition suitable for agriculture and cattle grazing. In this regard, the proposed development does not affect the site's long term ability to be used for productive agricultural purposes.
- The extent of the clay resource on the subject site has been determined through an extensive drilling program. In this regard the proposed development has been designed in response to the natural resource capabilities of the land.
- Noise and dust mitigation measures proposed by the Applicant will ensure that the proposed development is compatible with surrounding land uses.

4.5.2 Statement of Planning Policy 2.4 – Basic Raw Materials

Statement of Planning Policy 2.4 Basic Raw Materials ('SPP2.4') sets out the matters which are to be taken into account and given effect by the WAPC and local governments in considering zoning, subdivision and development applications for extractive industries.

The WAPC's *Resource Protection Working Plans of Perth Metropolitan Region and Outer Areas* identify the eastern port of Lot 7 as a "Gravel Resource" (reference CH17). Currently, the Geological Survey of Western Australia is updating mapping of the Basic Raw Materials of the Perth and near metropolitan areas.

The objectives of SPP2.4 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; and*
- *provide a consistent planning approval process for extractive industry proposals including the early consideration of sequential land uses.*

The proposed development has been assessed against the objectives of SPP2.4 and is considered to satisfy the objectives having regard to the following:

- The extent of the clay resource on the subject site has been determined through an extensive drilling program undertaken by the Applicant. In this regard, the proposed clay resource has been confirmed to exist at this location.
- Part of the subject site is identified under the SPP2.4 'working plans' as containing a Priority Gravel Resource. In this regard, the site is recognised as a key extraction area.
- The proposed development has been designed, and will be managed, in a manner that ensures minimal disruption to the environment by way of clearing, noise and dust impacts.
- The excavation area is small, covering only 3.8% of the subject site's total land area. In this regard, the proposal represents a relatively small scale activity meaning its potential to adversely affect the environment or the amenity of the locality is minimal.

Clause 3.1 of SPP2.4 identifies that one of the essential requirements of an extractive industry as being to provide *"a ready supply of basic raw materials close to established and developing parts of the metropolitan region"*.

The subject site is conveniently situated in relation to the existing (and future) urban front and is therefore well placed to service the expanding metropolitan region. The WAPC's draft North-East Sub-Regional Planning Framework identifies numerous Urban Expansion areas close to the subject site; including Albion/Brabham, Midland, Forrestfield and Bullsbrook. The proposed development will therefore facilitate the manufacture of construction materials essential to Perth's strategic growth, creating locally available materials for developments within the Swan Valley and achieving the objectives of SPP2.4.

Cause 6.3.1 of SPP2.4 outlines the relevant matters that local governments should consider when determining proposals for extractive industry. These include the positioning of the site; the effect on native flora and fauna; the effect of vehicular traffic, noise and dust; the ability to rehabilitate the land; the availability and suitability of road access; and the ability to stage extraction operations to avoid conflicts.

As mentioned in Section 6 of this report, the proposed development will:

- be constructed and managed in accordance with the attached Excavation and Management Plan;
- be constructed and managed in accordance with the attached Dust Management Plan;
- be managed in accordance with the attached Water Management Plan;
- operate in accordance with the recommendations contained in the Environmental Noise Assessment prepared by Lloyd George Acoustics;
- not have an unacceptable impact on existing traffic conditions around the subject site; and
- not have any significant adverse environmental impacts.

In this regard, the proposed development addresses those matters that should be considered by local government when determining proposals for extractive industry.

Clause 6.3.2 of SPP2.4 outlines provisions which are to be considered before the WAPC determines an application within 1,000m of an extractive industry site. These provisions include:

- *The significance of the resource in terms of whether it is a key extraction area, priority resource area or extraction area; and*
- *The likely effects of vehicular traffic, noise, blasting, dust and vibration arising from the extractive industry on the proposed use or development.*

The proposed development has been assessed against the objectives at Clause 6.3.2 of SPP2.4 and are considered to satisfy the objectives having regard to the following:

- The extent of the clay resource on the subject site has been determined through an extensive drilling program undertaken by the Applicant. In this regard, the proposed clay resource has been confirmed to exist at this location.
- The subject site is identified under the SPP2.4 'working plans' as containing a Priority Gravel Resource. In this regard, the site is recognised as a key extraction area.
- The proposed development has been designed, and will be managed, in a manner that ensures minimal disruption to the environment by way of clearing, noise and dust impacts.
- The proposed development will not have an unacceptable impact on existing traffic conditions around the subject site.
- The proposed development has been designed, and will be undertaken in accordance with, the *Environmental Protection (Noise) Regulations 1986*.
- The nearest residential dwelling to the west of the subject site is located approximately 450m from the edge of the proposed excavation area. The area between the excavation pit and the nearest dwelling will be developed with noise attenuation and screening bunds to ensure an appropriate buffer and interface is achieved.

Having regard to the above, it is considered that the proposed development satisfies the objectives and requirements of SPP2.4.

4.5.3 Statement of Planning Policy 2.5 - Land Use Planning in Rural Areas

State Planning Policy 2.5 ('SPP2.5') sets out various principles relating to development and/or subdivision within rural areas.

The objectives of SPP2.5 are as follows:

a) To protect rural land from incompatible uses by:
  i. Requiring comprehensive planning for rural areas;
  ii. Making land use decisions for rural land that support existing and future primary production and protection of priority agricultural land, particularly for the production of food; and
  iii. Providing investment security for the existing future primary production sector.
b) To promote regional development through provision of ongoing economic opportunities on rural land.
c) Promote sustainable settlement in, and adjacent to, existing urban areas.
d) To protect and improve environmental and landscape assets.
e) To minimise land use conflicts.

The proposed development has been assessed against the objectives of SPP2.5 and is considered to satisfy the objectives having regard to the following:

- Once the clay resource has been exhausted, the site will be rehabilitated and returned to a condition suitable for agriculture and cattle grazing. In this regard, the proposed development does not affect the site's long term ability to be used for productive agricultural purposes.
- The proposed excavation area represents only approximately 3.8% of the total site area. Those parts of the subject site not currently used, or proposed to be used, for extractive industry will continue to be used for agriculture and cattle grazing.
- The proposed development has been designed, and will be managed, in a manner that ensures minimal disruption to the environment by way of clearing, noise and dust impacts.
- The proposed development has been designed, and will be undertaken in accordance with, the *Environmental Protection (Noise) Regulations 1986*.
- The nearest residential dwelling to the west of the subject site is located approximately 450m from the edge of the proposed excavation area. The area between the excavation pit and the nearest dwelling will be developed with noise attenuation and screening bunds to ensure an appropriate buffer and interface is achieved.

Having regard to the above, it is considered that the proposed development satisfies the objectives and requirements of SPP2.5.

4.5.4 Statement of Planning Policy 4.1- Industrial Buffers Policy

State Planning Policy 4.1 ('SPP4.1') sets out various provisions relating to the protection and long-term security of the industrial zone, transport terminals, and other utilities and special uses within the state. The objectives of SPP4.1 are as follows:

1. *To provide a consistent Statewide approach for the definition and securing of buffer areas around industry, infrastructure and some special uses.*
2. *To protect industry, infrastructure and special uses from the encroachment of incompatible land uses.*
3. *To provide for the safety and amenity of land uses surrounding industry, infrastructure and special uses.*
4. *To recognise the interests of existing landowners within buffer areas who may be affected by residual emissions and risks, as well as the interests, needs and economic benefits of existing industry and infrastructure which may be affected by encroaching incompatible land uses.*

The proposed development has been assessed against the objectives of SPP4.1 and is considered to satisfy the objectives having regard to the following:

- An environmental investigation of the subject site has been undertaken by the Applicant to ensure that the site is not environmentally constrained. The results of this investigation are detailed in the Excavation and Management Plan.

- The proposed development incorporates strategically placed bunds to assist in screening the proposed operations from view of surrounding roads and adjoining properties, and in doing so, protects the landform and landscape values of the district.
- The proposed development has been designed, and will be managed, in a manner that ensures minimal disruption to the environment by way of clearing, noise and dust impacts.
- The proposed development has been designed, and will be undertaken in accordance with, the *Environmental Protection (Noise) Regulations 1986*.
- The nearest residential dwelling to the west of the subject site is located approximately 450m from the edge of the proposed excavation area. The area between the excavation pit and the nearest dwelling will be developed with noise attenuation and screening bunds to ensure an appropriate buffer and interface is achieved.

Having regard to the above, it is considered that the proposed development satisfies the objectives and requirements of SPP4.1.

4.6 Environmental Protection Authority Guidance Statement - Separation Distances

The Environmental Protection Authority ('EPA') released a Guidance Statement ('Guidance Statement') in June 2005 which recommends separation distances between industrial uses and sensitive land uses.

Appendix 1 of the Guidance Statement lists suggested separation distances based on the type of industrial land use. Based on the proposed use at the subject site being "Industry – Extractive", Appendix 1 of the Guidance Statement recommends a separation buffer of between 500m and 1,000m, depending on the size and processing of the proposed operation.

The nearest residential dwelling is located approximately 450m from the western edge of the proposed excavation area. Noise and dust mitigation measures are to be implemented on the site to suitably control dust and noise. These measures include the construction of strategically placed bunds, additional landscaping (tree planting), restrictions on operating hours, the installation of noise suppression kits to equipment and speed limits for trucks accessing the site. The Environmental Noise Assessment undertaken by Lloyd George Acoustics concludes that with these mitigation measures in place, the proposed development will comply with the *Environmental Protection (Noise) Regulations 1997*.

Furthermore, it is noted that excavation activities are proposed to be undertaken in campaigns of between two (2) to four (4) months, with the transportation of the resource to occur between 25 and 30 days per year, meaning the intensity of the operation is comparatively low.

Having regard to the scale of the development, along with the noise and dust mitigation measures proposed by the Applicant, it is considered that the proposed development is located a suitable distance from the nearest residential dwelling and is therefore acceptable having regard to the recommendations contained within the Guidance Statement.

05 Environmental Considerations

An environmental investigation of the subject site has been undertaken by Landform Research. The findings of this investigation are set out in the Excavation and Management Plan. The following provides a brief summary of the main findings of the environmental investigation.

5.1 Flora

The subject site is used for agriculture and cattle grazing. In this regard, the site is largely cleared but does contain some existing vegetation which is predominantly located in the centre and along the northern boundary of the site. Some of the vegetation species located on the site include *Eucalyptus wandoo* trees on the slopes, *Corymbia Eucalyptus calophylla* on the lower slopes outside the excavation area and *Eucalyptus rudis* on drainage lines and associated with the Brockman River.

Approximately twenty (20) scattered trees are required to be cleared to facilitate the extraction of the clay resource. The removal of these trees will be offset through the planting of a number of trees on the site.

5.2 Fauna

Given the subject site has been largely cleared to facilitate grazing and the proposed excavation area will require the removal of only twenty (20) trees, a detailed fauna study of the site has not been undertaken. There is some itinerant fauna associated with the existing trees outside the excavation area and with the Brockman River such as birds that feed on pasture near the River. This is discussed in the Water Management Plan included in the Excavation and Management Plan.

5.3 Hydrology

5.3.1 Surface Water

The subject site is located to the north of the Brockman River, within the Brockman River Catchment. There are minor watercourses located near the site, running to the south and the west of the proposed clay pit and stockpile area. These watercourses will be protected with setbacks and diversion of all water from disturbance areas to detention basins and a large dam.

A small drainage line will be incorporated into the site activity area. The upper portion of this drainage line will be diverted along contour to join a drainage line in the south that drains to the Brockman River.

Most drainage runs as surface runoff from the clay based hills a small amount of recharge will infiltrate the loam and clay soils. In storm events, when surface water exceeds infiltration, there are diffuse flows to the watercourse. A small portion of this will be diverted by the pit to the water storage dam.

5.3.2 Groundwater

An investigation of groundwater at the subject site was undertaken by Meyer Water and Environmental Solutions, and forms part of the enclosed Water Management Plan.

Drilling by Brikmakers to depths of several to over 10m did not intersect the water table in the drill holes. The bases of the holes were at a lowest elevation of 235m AHD. Some drill holes struck granite

basement at higher elevations. Drilling on the floodplain by Brikmakers intersected a superficial sandy aquifer located below 1 – 2m of loamy clay. The water was abundant and brackish in quality.

This water is not proposed to be used on site as it is not required. Calculations on water requirements show that the two (2) dams proposed to be constructed on the subject site will be able to supply sufficient water for dust suppression and on-site activities.

5.4 Acid Sulphate Soils

The Water Management Plan included in the Excavation and Management Plan states that acid sulphate may only become a risk when a number of circumstances are present. These include:

- *There is rock, soil or regolith present that is carrying sulphides;*
- *Sulfide carrying materials from below the water table are to be exposed to the atmosphere;*
- *Excavation below the water table is to be carried out exposing the sulphide carrying materials to oxygen in the atmosphere; and*
- *Dewatering of the sulphide carrying materials is proposed, exposing them to oxygen.*

The site has been visited by Lindsay Stephens of Landform Research on a number of occasions, to examine the soils and geology. None of the at risk acid sulfate conditions exist at this location or near the excavations which are located in oxidised elevated situations.

5.5 Aboriginal Heritage

A search of the Department of Aboriginal Affairs' database reveals that the subject site does not contain any registered sites of Aboriginal significance.

06 Supporting Documents

The following documents are provided in support of the proposed development and form part of the Application: Excavation and Management Plan, Water Management Plan, Dust Management Plan, Acoustic Assessment and Traffic Impact Statement. A brief summary of each document is provided below.

6.1 Excavation and Management Plan

An Excavation and Management Plan has been prepared in support of the proposed development. The Plan outlines the processes and methods for the extraction of clay at the subject site.

The Excavation and Management Plan also outlines details relating to the following:

- Total extraction area and depth of extraction;
- Amount of clay which is to be extracted;
- Operation hours and number of employees;
- Project life;
- Area to be cleared; and
- Infrastructure to be located at the site.

The Excavation and Management Plan includes a visual assessment of the proposed development. The visual assessment indicates that the majority of the proposed extraction area and associated dams will be hidden from view through the construction of bunds and the relocation of vegetation.

6.2 Water Management Plan

A Water Management Plan has been prepared for the proposed development and is included in the Excavation and Management Plan. The Water Management Plan outlines details relating to the water management assessment conducted by Landform Research, and water management procedures for the proposed excavation detailing how the proposal is consistent with the requirements of LPP6.

This Application proposes to protect the existing Brockman River catchment area through the design and construction of a suitable bridge providing access to the subject site via Toy Road. The bridge will be designed so that it is capable of taking farm traffic and heavy farming machinery for long term, and quarry road trucks for the life of the clay excavation.

This Application proposes the excavation of two (2) dams, each to be one (1) hectare is size, for water storage that will accept runoff from the pit and stockpile area. The dams will act as a water source. Water used for on-site dust suppression will be drawn from the proposed storage dam.

The volumes of water, recharge and other aspects are discussed in the Water Management Plan. A water tank and standpipe will be available for wetting down roads and potable water will be brought to the site as required.

6.3 Dust Management Plan

A Dust Management Plan has been prepared for the proposed development and is included in the Excavation and Management Plan. The Dust Management Plan addresses how the proposed extractive industry will prevent and reduce the potential for dust to be generated at the site.

The Dust Management Plan also notes that prior to excavation the clay stays moist and when initially excavated it is not dusty.

The clay is proposed to be stored in stockpiles to the south of the excavation area. The movement of vehicles on clay could generate dust if left untreated which may impact on the amenity of the area. The Dust Management Plan proposes the watering of roads via a water cart which will eliminate potential dust impacts. All clay that is to be transported from the subject site will be covered.

The water cart will also be used to water all roads and active areas further reducing potential dust impacts of the proposed extraction processes. The proposed vegetative screening and bunds will provide additional dust mitigation at the subject site.

6.4 Acoustic Assessment

An Environmental Noise Assessment of the proposed development has been undertaken by Lloyd George Acoustics and is contained in the Excavation and Management Plan. The Environmental Noise Assessment assess the likely noise impacts from the pit to sensitive receivers and compare the predicted noise levels against the *Environmental Protection (Noise) Regulations 1997*.

The Environmental Noise Assessment concludes that the proposed operations would comply with the relevant regulations at all noise sensitive receivers between the times of 7.00 am and 7.00 pm Monday to Saturday.

6.5 Transport Statement

A Transport Statement has been undertaken by Shawmac Consulting Engineers. The Transport Statement assesses the likely impacts of the proposed development on existing traffic conditions in the immediate locality. Potential traffic flows from the subject site were calculated based on an annual extraction rate of approximately 75,000 tonnes, transported in 50 tonne loads for 25 - 30 days per year. The number of trips generated by the proposed development for these 25 -30 days is estimated at 60 which equates to 120 vehicle movements.

The assessment concluded that traffic movements generated from the subject site can be accommodated within the existing network without unacceptable adverse impacts.

6.6 Community Consultation

In preparing this Application, the Applicant undertook consultation with the local community. Consultation involved contacting nearby landowners by telephone and in person. A summary of the issues raised during consultation is contained in the Excavation and Management Plan. As a result of consultation, the size and operations of the proposed development have been reduced.

It is understood that the Shire of Chittering will undertake further consultation with the local community during assessment of the proposal. The Applicant would appreciate the opportunity to respond to any issues raised during this consultation process.

Should the Application be approved, the Applicant will provide residents with a copy of the Excavation and Management Plan. A complaints mechanism for residents is also proposed, details of which are included in the Excavation and Management Plan.

07 Conclusion

This Application seeks approval from the Shire of Chittering to excavate clay resources from the south facing valley of the subject site, along its western boundary. The proposed excavation pit will be operated by Brikmakers. In the first instance, approval to excavate the resource is sought on a ten (10) year basis. Give the extent of the resource known to exist on the site, it is expected that a further Application to extend this approval period will be submitted by the Applicant prior to the approval expiry date.

The proposed development comprises an excavation pit measuring 9.0ha in area, along with a stockpiling area measuring approximately 4.0ha in area, two (2) dams, each measuring approximately 1.0ha in area and a series of bunds located along the western and southern side of the excavation pit. The bunds measure between 5.0m and 7.5m in height. An access track will provide vehicular connection between the excavation pit/stockpiling area and Toy Road. The area of the subject site to be used for clay excavation measures approximately 9.0ha in area.

Once the clay resource has been exhausted, the site will be rehabilitated and returned to a condition suitable for agriculture and cattle grazing. The land surface will be formed into gently sloping soils with a slightly steeper north-eastern corner which matches other natural slopes in the local area, with a more shallow lower portion and a second farm dam.

The proposed development has been assessed against the range of applicable local and state planning documents and is considered to satisfy the objectives and relevant provisions of the following:

- Shire of Chittering Town Planning Scheme No. 6;
- Shire of Chittering Local Planning Policy No. 10;
- Shire of Chittering Local Planning Policy No. 16;
- Shire of Chittering Extractive Industries Local Law;
- Shire of Chittering Local Planning Strategy;
- Shire of Chittering Local Biodiversity Strategy;
- WAPC Statement of Planning Policy No. 2.0;
- WAPC Statement of Planning Policy No. 2.4;
- WAPC Statement of Planning Policy No. 2.5;
- WAPC Statement of Planning Policy No. 4.1; and
- Environmental Protection Authority Guidance Statement - Separation Distances.

Having regard to the above, the proposed development is considered to be an appropriate form of development and land use for the subject site and accordingly, it is requested that the Application is favourably determined by the Shire of Chittering.

FIGURES

Regional Location

N:\TOWN PLANNING\8000-8999\8330\DRAFTING\A-CAD\8330_FIG01B_20150803 (REGIONAL LOCATION).DWG
William Clements 3 August 2015

Lot 7 (No.75) Toy Road Bindoon

REVISIONS

Rev	Date	Drawn
A	2016.06.29	W. Clements
B	2016.08.03	W. Clements

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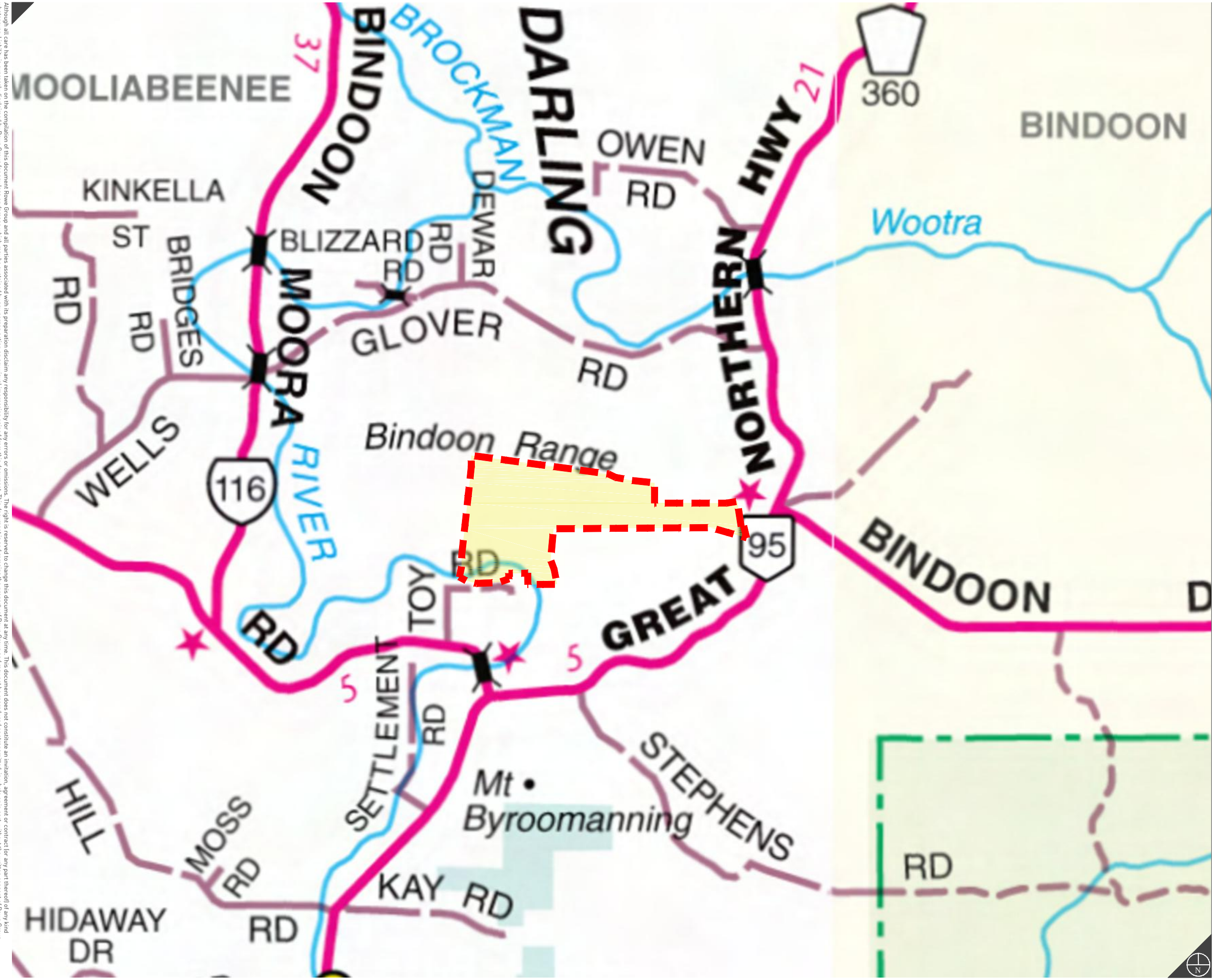
PLANNING DESIGN DELIVERY

w: www.rowegroup.com.au
e: info@rowegroup.com.au
p: 08 9221 1991

Date Drawn:	2015.06.29
Job Ref:	8330
Scale:	N.T.S. @ A3
Client:	Brikmakers
Designer:	C. Clarke
Drawn:	W. Clements
Projection:	MGA50
Plan ID:	8330-FIG-01-B

Map Data supplied by Google



LEGEND

Subject Site

Local Location

N:\TOWN PLANNING\8000-8999\8330\DRAFTING\A-CAD\8330_FIG02B_20150803 [LOCAL LOCATION].DWG
William Clements 3 August 2015

Lot 7 (No.75) Toy Road Bindoon

REVISIONS

Rev	Date	Drawn
A	2015.06.29	W. Clements
B	2015.08.03	W. Clements

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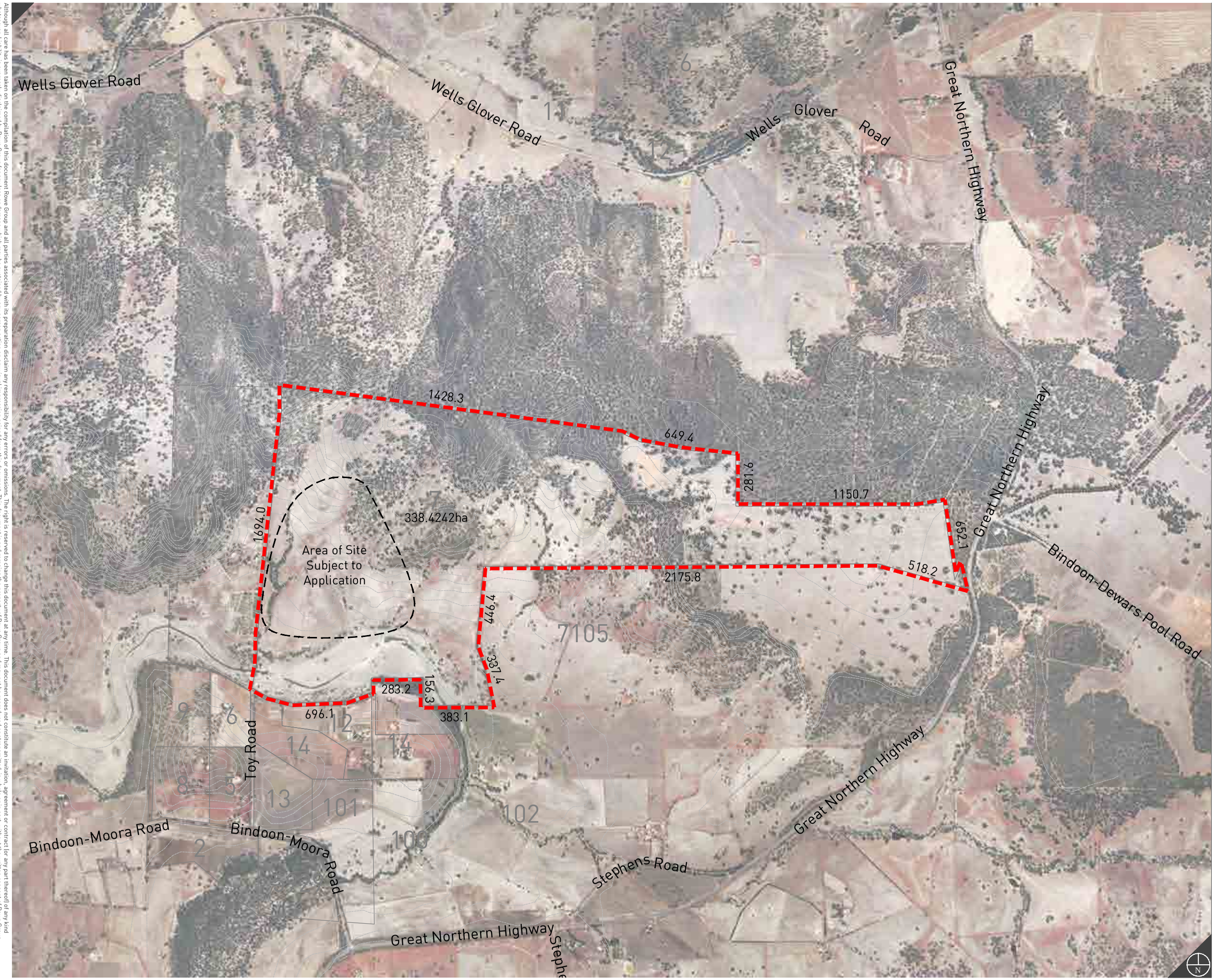
Designer:	C. Clarke
Drawn:	W. Clements
Projection:	MGA50
Plan ID:	8330-FIG-03-A

Map Information Supplied by Streetsmart



LEGEND

- Subject Site
- Contours
- 7 Existing Lot Numbers
- Existing Boundaries

0 250 500 Metres

REVISIONS

Rev	Date	Drawn
A	2015.06.29	W. Clements
B	2015.08.03	W. Clements

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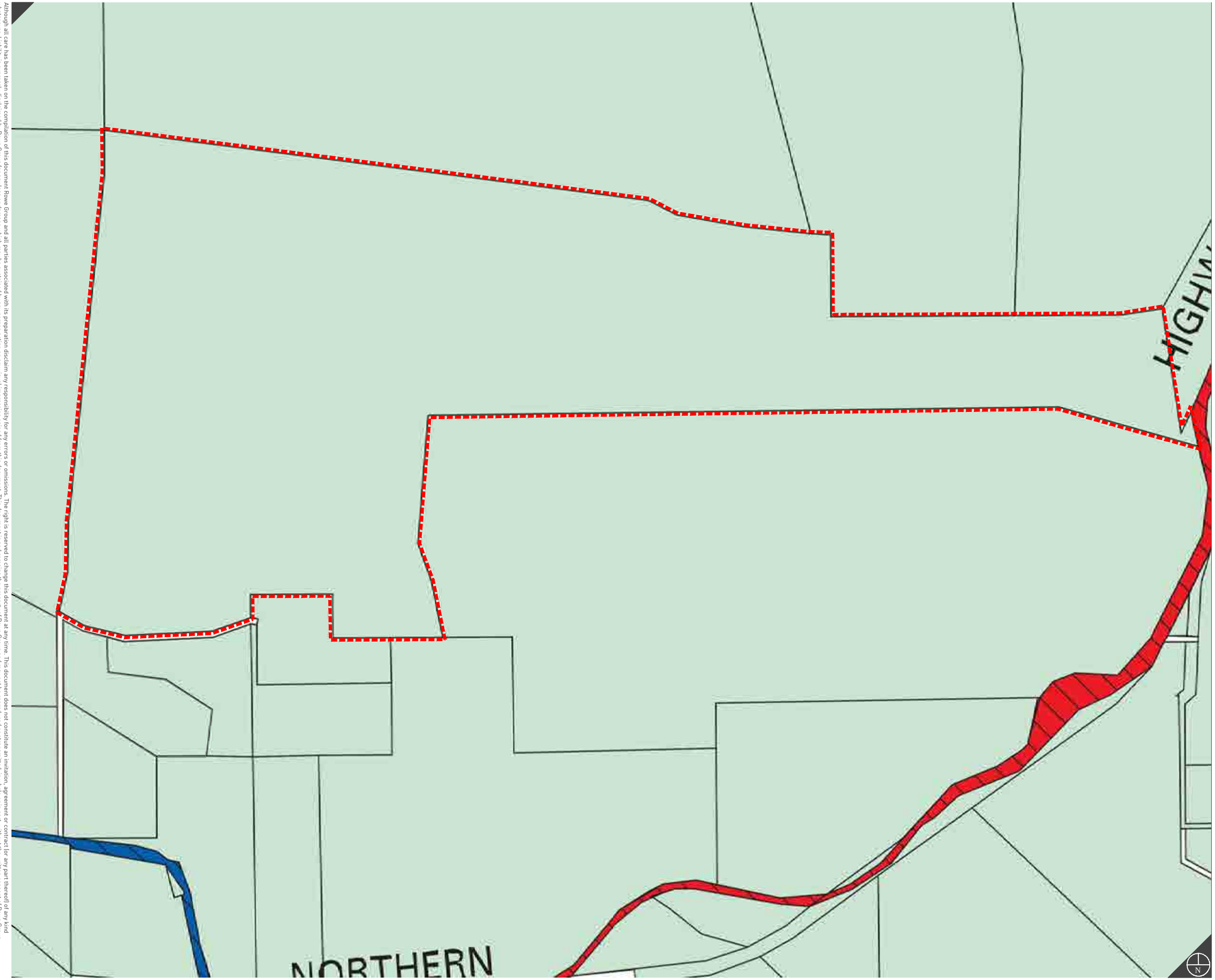
Client:	Brikmaker
Designer:	C. Clarke
Drawn:	W. Clements
Projection:	MGA50
Plan ID:	8330-FIG-03-B

Aerial Photography captured and supplied by Nearmap

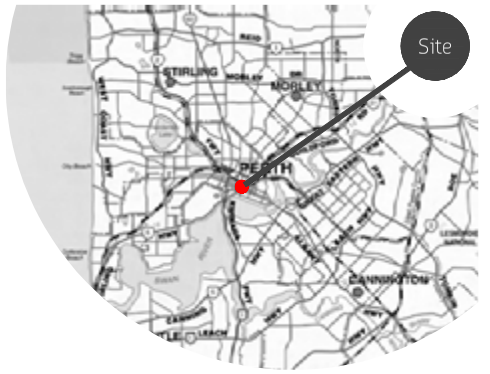
Site Plan

N:\TOWN PLANNING\8000-8999\8330\DRAFTING\A-CAD\8330_FIG03B_20150803 [SITE PLAN].DWG
William Clements 3 August 2015

Lot 7 (No.75) Toy Road Bindoon



Planning Design Delivery



LEGEND

Subject Site

METROPOLITAN REGION SCHEME RESERVES

Primary Regional Road

Major Road

ZONES

Agricultural Resource

0 250 500 Metres

REVISIONS

Rev	Date	Drawn
A	2015.06.29	W. Clements

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Drawn:	W. Clements
Projection:	MGA50
Plan ID:	8330-FIG-04-A

Mapping information supplied by WA Planning Commission

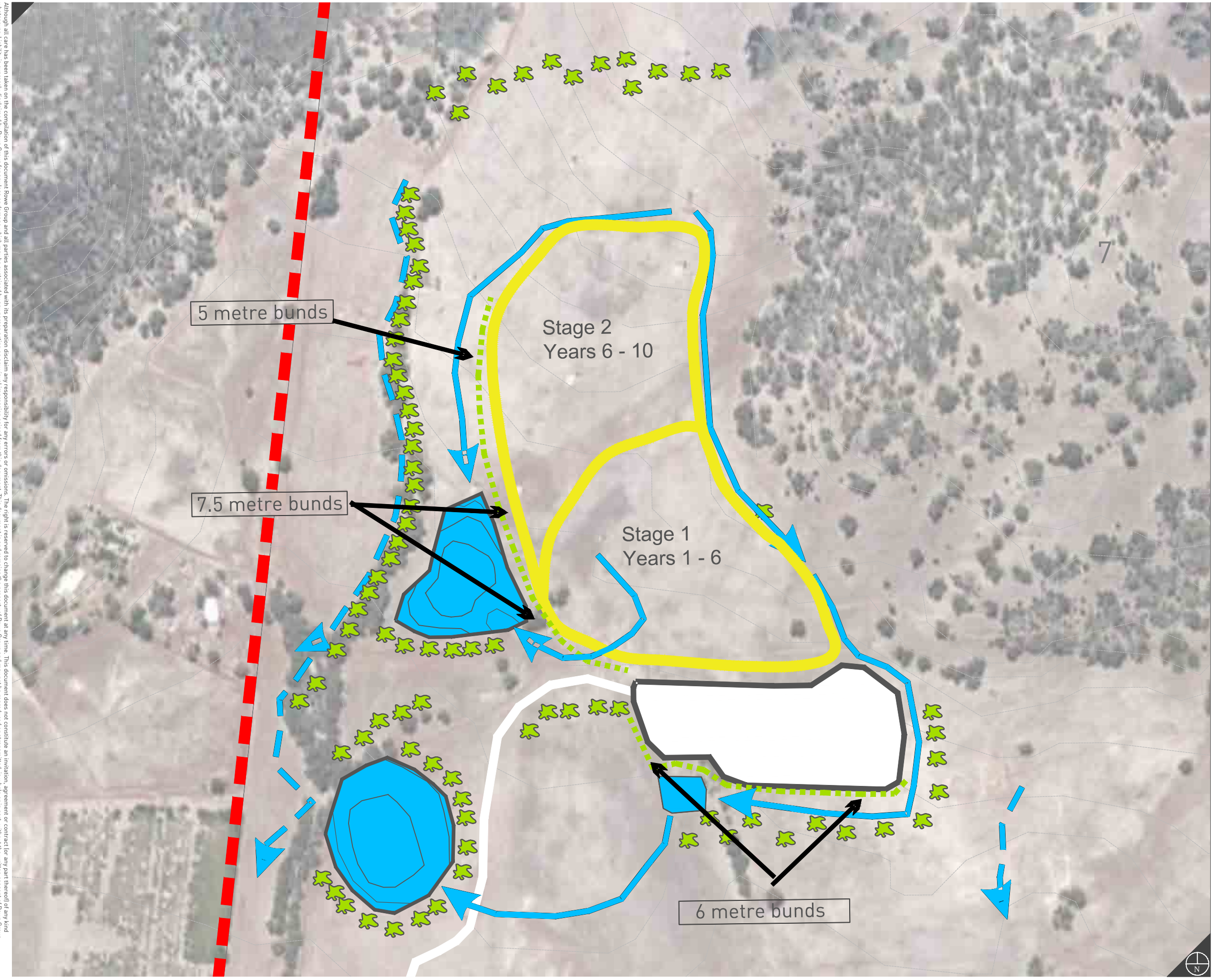
TPS6 Zoning Plan

Lot 7 (No.75) Toy Road Bindoon

N:\TOWN PLANNING\8000-8999\8330\DRAFTING\A-CAD\8330_FIG04A_20150625 [TPS6 ZONING PLAN].DWG
William Clements 2 July 2015

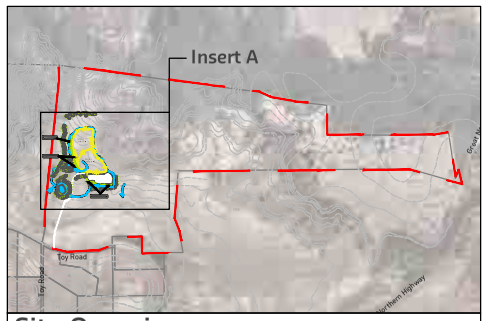
Planning Design Delivery

All areas and dimensions are subject to survey



LEGEND

- Subject Site
- Contours
- 7 Existing Lot Numbers
- Existing Boundaries
- Bunding



Site Overview

0 37.5 75 Metres

REVISIONS

Rev	Date	Drawn
A	2015.06.29	W. Clements
B	2015.08.03	W. Clements

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PLANNING DESIGN DELIVERY

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Job Ref:	8330
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Client:	Brikmakers
Designer:	C. Clarke
Drawn:	W. Clements
Projection:	MGA50
Plan ID:	8330-FIG-05-B

Data referenced from Brikmakers Aerial Figure 3
Aerial Photography captured and supplied by Nearmap

Proposed Extraction Area within Lot 7 (Insert A)

Lot 7 (No.75) Toy Road
Bindoon

N:\TOWN PLANNING\8000-8999\8330\DRAFTING\A-CAD\8330_FIG05C_20150903 (EXTRACTION PLAN).DWG
William Clements 3 September 2015

ATTACHMENT 1

CERTIFICATES OF TITLE

ROWEGROUP

WESTERN AUSTRALIA

REGISTER NUMBER	
N/A	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
N/A	N/A

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

VOLUME 445 FOLIO 17A

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

[redacted]

REGISTRAR OF TITLES

THIS IS A SHARE TITLE

LAND DESCRIPTION:

1/2 UNDIVIDED SHARES OF
LOT 7 ON PLAN 7148

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

JONATHON JAMES DWYER OF 71 TOY ROAD, BINDOON
AS SOLE PROPRIETOR OF THE SHARE SHOWN IN THE LAND DESCRIPTION
(T K944136) REGISTERED 18 MAY 2009

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. EXCEPT AND RESERVING METALS, MINERALS, GEMS AND MINERAL OIL SPECIFIED IN TRANSFER 9123/1913
2. A342869 EXCEPT AND RESERVING ALL MINERALS OTHER THAN MINERAL OIL SPECIFIED IN TRANSFER A342869 REGISTERED 6.11.1970.
3. *M513781 MORTGAGE TO AUSTRALIA & NEW ZEALAND BANKING GROUP LTD REGISTERED 7.1.2014.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: P7148.
PREVIOUS TITLE: 1224-869.
PROPERTY STREET ADDRESS: 75 TOY RD, BINDOON.
LOCAL GOVERNMENT AREA: SHIRE OF CHITTERING.

NOTE 1: DUPLICATE CERTIFICATE OF TITLE NOT ISSUED AS REQUESTED BY DEALING

END OF PAGE 1 - CONTINUED OVER

RECORD OF CERTIFICATE OF TITLE

REGISTER NUMBER: N/A VOLUME/FOLIO: 445-17A PAGE 2

K944137

NOTE 2: L397765 SECTION 138D TLA APPLIES TO CAVEAT L119494

WESTERN AUSTRALIA

REGISTER NUMBER	
N/A	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
N/A	N/A

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

VOLUME 388 FOLIO 18A

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

[redacted]
REGISTRAR OF TITLES

THIS IS A SHARE TITLE

LAND DESCRIPTION:

1/2 UNDIVIDED SHARES OF
LOT 7 ON PLAN 7148

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

JONATHON JAMES DWYER OF 71 TOY ROAD, BINDOON
AS SOLE PROPRIETOR OF THE SHARE SHOWN IN THE LAND DESCRIPTION
(T K944136) REGISTERED 18 MAY 2009

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. EXCEPT AND RESERVING METALS, MINERALS, GEMS AND MINERAL OIL SPECIFIED IN TRANSFER 9123/1913
2. *M513781 MORTGAGE TO AUSTRALIA & NEW ZEALAND BANKING GROUP LTD REGISTERED 7.1.2014.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

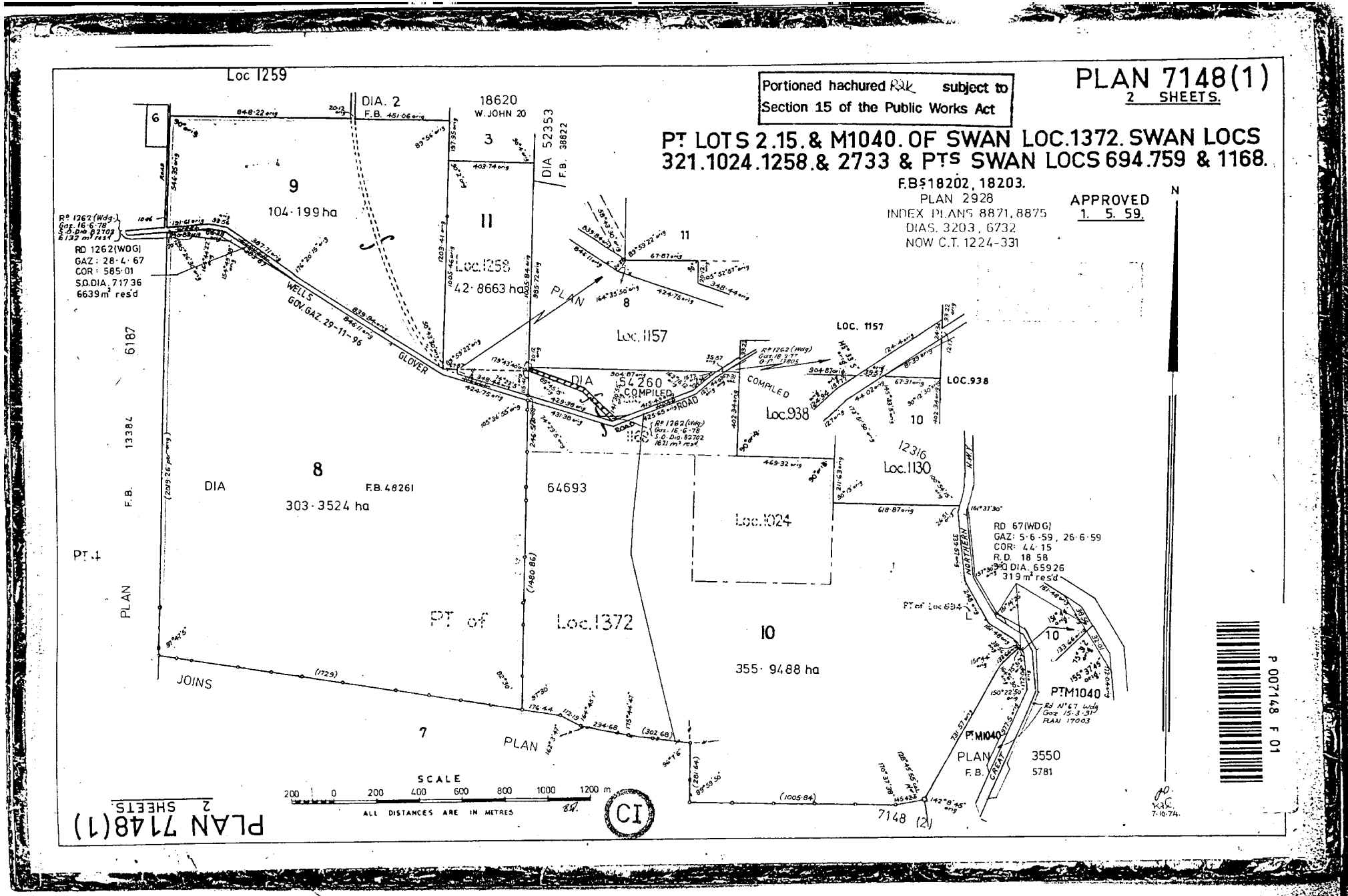
----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: P7148.
PREVIOUS TITLE: 1224-869.
PROPERTY STREET ADDRESS: 75 TOY RD, BINDOON.
LOCAL GOVERNMENT AREA: SHIRE OF CHITTERING.

NOTE 1: DUPLICATE CERTIFICATE OF TITLE NOT ISSUED AS REQUESTED BY DEALING K944137
NOTE 2: L397766 SECTION 138D TLA APPLIES TO CAVEAT L119495



PLAN 7148(2)

2 SHEETS.

PT LOTS 2.15 & M1040. OF SWAN LOC.1372. SWAN LOCS 321.1024.1258 & 2733 & PTS SWAN LOCS 694.759 & 1168.

FBS 18202, 18203.
PLAN 2928
INDEX PLANS 8871, 8875
DIAS 3203, 6732
NOW C.T. 1224-331

APPROVED
1. 5. 59.

N

JOINS PLAN 6187 PT 4 F.B. 13384

8

7
338·5929 ha

10

7148(1)

PLAN 3550
PT M1040
F.B. 5781

PT M1040

6
262·3451 ha

7

5

PLAN 6187
F.B. 13384

759

Loc.2733

Loc.321

Loc.286

PLAN

Loc.324

8023

Loc.98

TOY ROAD
Gaz 12-3-76

NORTHERN HWY

GREAT EASTERN HWY

Rd into Kwinana
Gaz 15-3-51
Dwg 15936

RD. 67 (WDG)
GAZ: 22·9·61
COR: 44·15
R.D. 317·60
O.P. 8753

T/A Dic. H001587/1
493m² taken
LC Plan 10517

Dedicated Local Govt. ACT

COMPILED

SCALE
200 0 200 400 600 800 1000 1200 m
ALL DISTANCES ARE IN METRES

CI

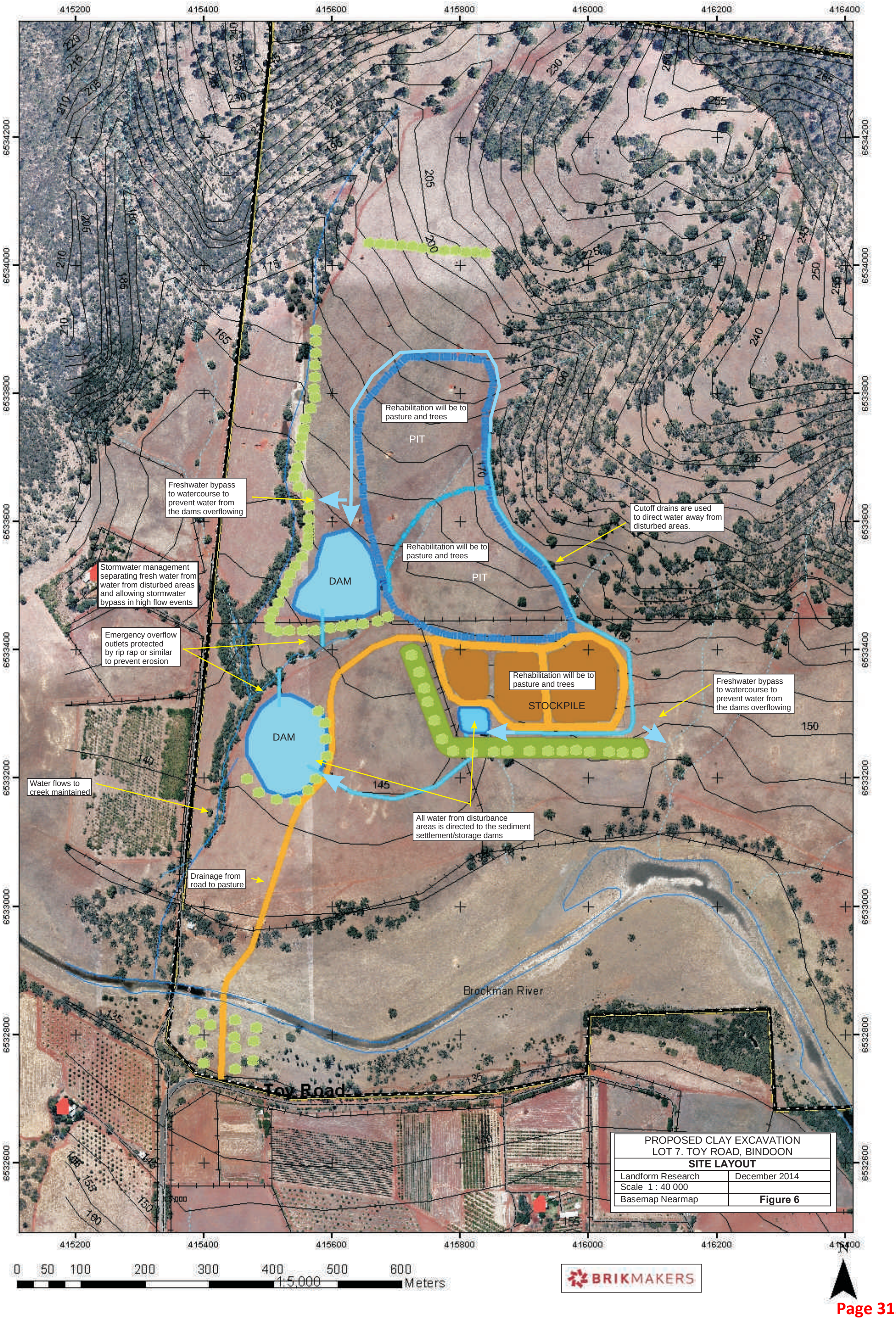
PLAN 7148(2) 2 SHEETS

P 007148 F 02

ATTACHMENT 2

DEVELOPMENT PROPOSAL PLANS (MAP)

ROWEGROUP


415200
415400
415600
415800
416000
416200
416400
6534200
6534000
6533800
6533600
6533400
6533200
6533000
6532800
6532600
Rehabilitation will be to pasture and trees
PIT
Freshwater bypass to watercourse to prevent water from the dams overflowing
Cutoff drains are used to direct water away from disturbed areas.
Rehabilitation will be to pasture and trees
PIT
Stormwater management separating fresh water from water from disturbed areas and allowing stormwater bypass in high flow events
DAM
Emergency overflow outlets protected by rip rap or similar to prevent erosion
Rehabilitation will be to pasture and trees
STOCKPILE
Freshwater bypass to watercourse to prevent water from the dams overflowing
DAM
Water flows to creek maintained
All water from disturbance areas is directed to the sediment settlement/storage dams
Drainage from road to pasture
Brockman River
Toy Road
PROPOSED CLAY EXCAVATION
LOT 7. TOY ROAD, BINDOON
SITE LAYOUT
Landform Research
December 2014
Scale 1 : 40 000
Basemap Nearmap
Figure 6
0 50 100 200 300 400 500 600
1:5,000
Meters
BRIKMAKERS
N

Freshwater bypass to watercourse to prevent water from the dams overflowing

Stormwater management separating fresh water from water from disturbed areas and allowing stormwater bypass in high flow events

STAGE 2
YEARS 6 - 10

STAGE 1
YEARS 1 - 6

All water from disturbance areas is directed to the sediment settlement/storage dams

Freshwater bypass to watercourse to prevent water from the dams overflowing

5.0 m
7.5 m
6.0 m

0 80 m

- Pit footprint
- Stockpile area
- Access road
- Water storage/farm dam
- Existing trees and planted tree belts
- Temporary visual and noise screening bund (vegetated) (see plan for elevation of the bunding)g
- Water harvesting cut-off drains
- Existing watercourse

BRIKMAKERS

PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
EXISTING CONTOURS	
Landform Research	December 2014
Scale 1 : 4 000	
Basemap Nearmap	**Figure 7**

STAGE 2
YEARS 6 - 10

STAGE 1
YEARS 1 - 6

Freshwater bypass to watercourse to prevent water from the dams overflowing

Stormwater management separating fresh water from water from disturbed areas and allowing stormwater bypass in high flow events

All water from disturbance areas is directed to the sediment settlement/storage dams

Freshwater bypass to watercourse to prevent water from the dams overflowing

5.0 m
7.5 m
6.0 m

153 - 154

155
145

190
185
180
175
170
165
160
150
140

- Pit footprint
- Stockpile area
- Access road
- Water storage/farm dam
- Existing trees and planted tree belts
- Temporary visual and noise screening bund (vegetated) (See plan for elevation)
- Water harvesting cut-off drains
- Existing watercourse

0 80 m

BRIKMAKERS

PROPOSED CLAY EXCAVATION LOT 7. TOY ROAD, BINDOON	
CONCEPT FINAL CONTOURS	
Landform Research	December 2014
Scale 1 : 4 000	
Basemap Nearmap	**Figure 8**

Government of **Western Australia**
Department of **Water**

looking after all our water needs

Our ref: RF14421
Enquiries: Kelly Joyce
Tel: [redacted]

RECEIVED
26 MAY 2016
BY:.....

BGC (Australia) Pty Ltd
Brikmakers
PO Box 2440
HIGH WYCOMBE WA 6057

Attention – Nathan Blackwell – Geologist – Raw Materials Manager

Dear Licensee,

Re: Issue of a permit under the *Rights in Water and Irrigation Act 1914*
Property: Lot 7 Toy Road, Bindoon

The Department of Water acknowledges receipt of your application, dated 10 May 2016 for a permit to undertake works on the above property in accordance with your accepted Water Management Plan. Your application has now been **finalised.**

Please find enclosed the following:

- Your permit to interfere with the beds and banks of a watercourse **PMB182828(1)**
- Brochure *Your permit to interfere with the bed and banks of a watercourse*

Please take time to read these documents as they contain important information about your rights and responsibilities.

The Department of Water emphasises that it is the responsibility of the permit holder to ensure the safety and adequacy of the design, method of construction and operation of the works or action the subject of the permit. The department recommends that people obtain an engineer's certificate.

The department focuses upon water resource related issues. It does not assess, and indeed is precluded by the *Rights in Water and Irrigation Regulations 2000* from assessing, the works or action in respect of which the permit has been issued.

Should your authorised modification cause a detrimental effect on another person or damage the water resource or associated environment, the department may amend, suspend or cancel your permit.

The approved modifications must be completed while the permit is current. Should the works be expected to continue past the expiry date of the permit, you must apply for an extension. It is suggested that an application to vary the duration of the permit be made at least one month in advance.

Swan Avon Region
7 Ellam Street Victoria Park Western Australia 6100
Telephone (08) 6250 8000 Facsimile (08) 6250 8050
www.water.wa.gov.au

Please note all sites affected by construction or removal activities should be stabilised using the methods outlined in Stream Stabilisation Report No RR10, which can be obtained on our website at the following link: http://www.water.wa.gov.au/__data/assets/pdf_file/0011/3170/11792.pdf

Compliance with the terms, conditions or restrictions of this permit does not absolve that permit holder from responsibility for compliance with the requirements of all Commonwealth and state legislation.

You can now use online services to manage all of your licensing needs. Water Online provides the easiest, fastest and most efficient way to:

- Apply for a new licence or permit
- Apply to amend, renew or transfer an existing licence
- Manage your account details.

Register for Water Online at www.water.wa.gov.au by clicking on the Water Online Login icon.

The instructions for registering, checking your details and updating them where required can be found by selecting the Quick Reference Guides link on the water online home page.

Please check your details to ensure that they are correct. If they are not correct please contact the department's online business support unit on 1800 508 885 (select option 2).

If you have any queries about this or any other water licensing matter please contact Kelly Joyce on telephone [redacted].

Yours faithfully

[redacted]

Tina Taraborrelli
A/Program Manager
Swan Avon Region

24 May 2016

File No: SN18934

Government of Western Australia
Department of Water

Instrument No. PMB182828(1)

PERMIT TO OBSTRUCT OR INTERFERE (S17)

Granted by the Minister under section 17 of the Rights in Water and Irrigation Act 1914

Permit Holder(s)	BGC (Australia) Pty Ltd	
Description of Water Resource	Brockman River Brockman River	
Location of Water Source	Lot 7 On Plan 7148 - Volume/Folio 445/17a - Lot 7 Toy Rd Bindoon Lot 7 On Plan 7148 - Volume/Folio 388/18a - Lot 7 Toy Rd Bindoon Lot 7 On Plan 7148 - Volume/Folio 2230/363 - Lot 7 Toy Rd Bindoon	
Authorised Activities	**Activity**	**Location of Activity**
	Construction of a bridge over the Brockman River as described in the accepted Water Management Plan. Modification of the banks of the triburay of the Brockman River by clearing trees adjacent to the drainage line as described in the accepted Water Management Plan and clearing application.	Lot 7 On Plan 7148 - Volume/Folio 445/17a - Lot 7 Toy Rd Bindoon Lot 7 On Plan 7148 - Volume/Folio 388/18a - Lot 7 Toy Rd Bindoon Lot 7 On Plan 7148 - Volume/Folio 2230/363 - Lot 7 Toy Rd Bindoon
Duration of Permit	From 24 May 2016 to 23 May 2017	

This Permit is subject to the following terms, conditions and restrictions:

1 The permit holder shall ensure that the proposed works does not act as an artificial barrier or levee, causing water to pond upstream.

2 The permit holder must undertake the works authorised by this permit with minimal disturbance to vegetation on bed and banks.

End of terms, conditions and restrictions

This Permit is granted subject to the Rights in Water and Irrigation Regulations 2000