

PRELIMINARY
ENVIRONMENTAL ASSESSMENT
PROPOSED S.75W MODIFICATION
CONSENT 267-11-99
LOTS 1 & 2, DP 228308 and LOT 2, DP
312327
ROBERTS ROAD
MARROOTA

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Attachment 1: Table detailing the comparison between current approval and the proposed modification.

1. INTRODUCTION

Dr L S Martin has development consent to:

- extract sand on Lots 1 and 2, DP 228308 and Lot 2, DP 312327 Roberts Road, Maroota (**the Site**). The consent is No.267-11-99.

Our Client, Hodgson Quarry Products Pty Ltd, currently operates the approved extractive industry on the Site.

The approved extractive industry also includes the construction of a water supply dam to aid in the supply of water for the processing of sand extracted from the Site.

Figure 1 shows the regional location of the Site. **Figure 2** shows the location of the Site in more detail and also the cadastral details of the Site.

Figure 3 is an extract from a recent aerial photograph of the Site showing both the existing extraction and the partially constructed dam.

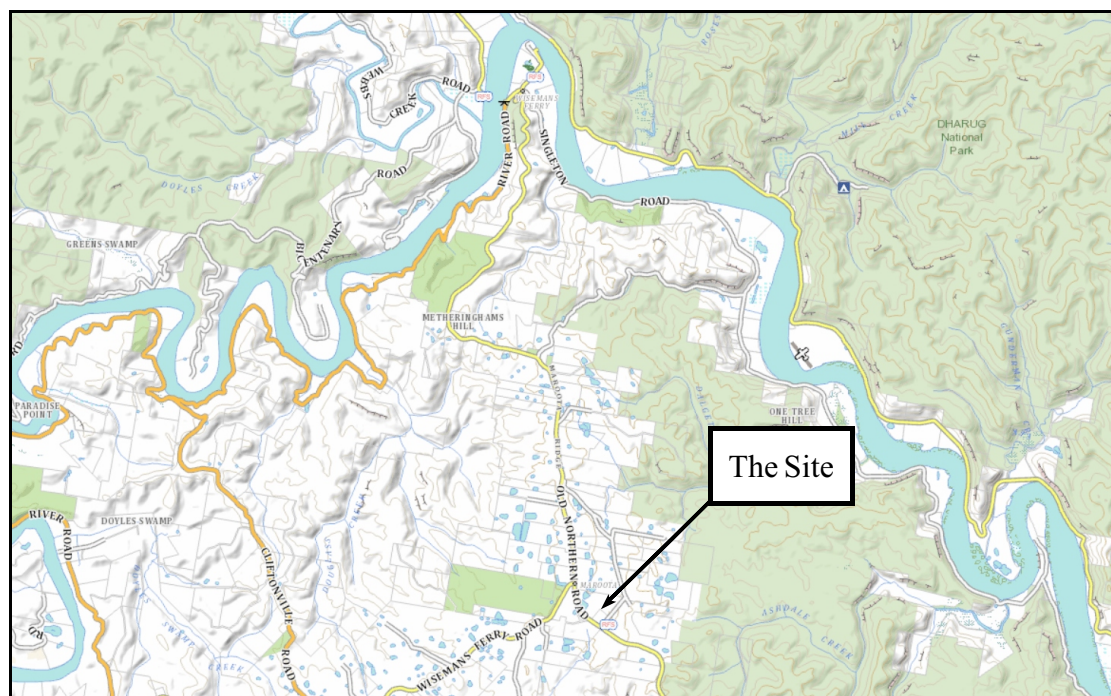
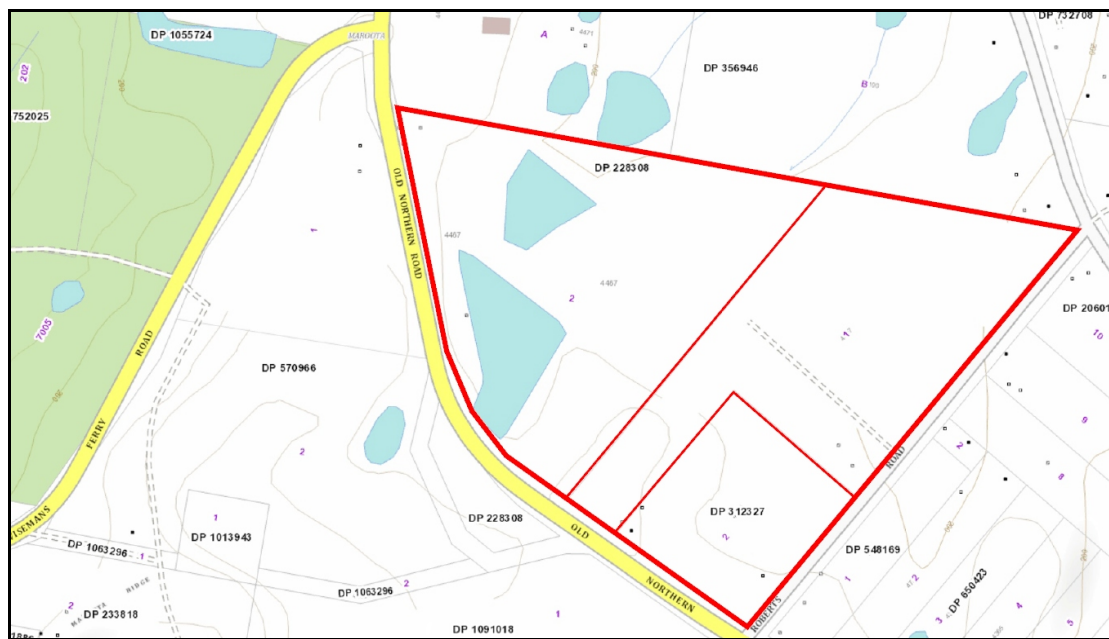


Figure 1: Location of Site.

The Site is within The Hills Shire Council local government area and is zoned RU1 Primary Production pursuant to The Hills Local Environmental Plan 2012.

An extractive industry is a use which is permissible, with consent, in the RU1 Primary Production zone.



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Figure 2: Site location and cadastral details.



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Figure 3: Extract from an aerial photograph showing the Site and the existing extraction activity.

2. PROPOSED MODIFICATION

During the operation of the approved extractive industry on the Site, it has been determined that a number of the approved processes for that extraction are neither efficient nor the most appropriate means by which the extraction can be effected.

It is proposed to modify the consent to not only modify the approved method of extraction but also to extend the life of the approved extraction to accommodate the additional material which has been determined as existing on the Site.

Table 1 at Attachment 1 provides details of the modification as it relates to the existing approved development.

Following is more detail of the proposed modifications.

Dam Construction

Part of Consent 267-11-99 was for the continued construction of a water supply dam on the Site, that dam being required to provide for sufficient water to maintain the life of the approved extraction.

The approved dam was to be constructed in two (2) stages, details of which were described in the Environmental Impact Statement (EIS) which accompanied the application for extraction.

During the construction of the approved dam, the applicant has determined that the construction process would be better served if the dam were to be constructed in three (3) stages rather than the approved two (2) stages. It is proposed to amend the consent to modify the dam construction process accordingly.

The dimensions of the approved dam would not alter to any substantive degree as a result of this modification.

Sequence of Extraction

The consent refers to an approved sequence of extraction for the Site, that sequence of extraction being described in the EIS for the approved development as follows:

The existing processing plant, weighbridge and office facilities will remain at their current location until the end of extraction of Stage 2.

Extraction will initially commence in Cell 1A (within Stage 1 area), located immediately to the west of the process water dam. Prior to extraction, vegetation and topsoil will be stripped and stockpiled at a suitable location near the processing plant for rehabilitation of the final stage of extraction. The latter will be the area comprising the processing plant, the offices and the weighbridge. The existing clay drying beds will also be used. Surface runoff from the upslope

catchment and from the active cell area will be diverted (via diversion drains) into the sedimentation pond prior to discharging into the process water dam to minimise on-going siltation of the water storage dam.

Following completion of the Cell 1A area, excavation will continue within Cell 1B, located to the east of the process water dam. The clay drying area will be located in the previously mined Cell 1A area. The clay materials will be gravity fed from the plant to the designated drying area. Runoff and free water from the drying area would discharge (via formed drains or pipes) into the process water dam's sedimentation pond.

The remaining cells within Stage 1 (Cells 1B to 1K) will be progressively excavated as described above. Prior to extraction, each cell area will be stripped of vegetation and topsoil which will be transported to the third cell in the sequence which is to undergo rehabilitation, as described earlier. Surface runoff from upslope catchments and from the active cell areas will also be progressively diverted (via diversion drains) into the dam's sedimentation pond prior to discharging into the process water dam.

Final maximum rehabilitated batter slopes of 3(H):1(V) are envisaged. Temporary batter slopes adjacent to the Stage 1/Stage 2 boundary would be approximately 2(H):1(V).

Following completion of the Stage 1 area, excavation of the Stage 2 area will then commence. The operation will be similar to the Stage 1 operation using the Stage 1 process plant and sand stockpile pad layout. Prior to extraction, each cell area will also be stripped of topsoil which will be transported to a previously extracted cell for use in rehabilitation as described earlier. Surface runoff from upslope catchments and from the active cell areas will be progressively diverted (via diversion drains) into the sediment pond prior to discharging into the process water dam.

Following completion of excavation of the Stage 2 area, final rehabilitation of Cell 2D and the process plant and sand stockpile pad area (within Stage 1) will be undertaken. The existing processing plant will be dismantled and removed from the site. It is envisaged that sand extraction beneath the plant and stockpile pad will be processed using a mobile plant unit.

During the extraction process, it has been determined that the approved method of extraction is neither an economic nor practical way to achieve that extraction. The existing extraction process on the Site involves a similar cell by cell extraction process but one which is not as rigidly defined as that portrayed above.

It is proposed to modify the approved sequence of extraction to reflect that which is now being undertaken on the Site such that the most efficient means of extraction is achieved.

The proposed modification would not alter the approved depth of extraction.

Extraction Process

The approved extraction is as follows as described in the documentation referred to in the Consent:

.... Sand is extracted using an excavator. The excavator would start at the natural ground surface level but would immediately dig a hole so that the excavator and processing equipment would be working against an extraction face. The extraction face provides significant noise shielding.

The excavator which will be used will be fitted with acoustic mufflers to achieve a noise level of approximately 76 dBA when measured at 7 metres. This noise level has been achieved at several similar sites with noise issues. Discussions with the potential excavator suppliers have found that this specification can be met.

The excavator loads the sand into an acoustically lined hopper. The hopper is located above a belt feeder which introduces the sand into a mixing tank. The belt drive is variable rate controlled and is powered by an electric motor.

A centrifugal electrically driven water pump will be located at the approved clean water storage dam. This pump will pump water to the mixing tank through a rubber and polyethylene pipeline. The flow rate of the clean water will be controlled so that the water level in the mixing tank remains constant.

The sand slurry is then drawn out of the mixing tank by an electrically driven slurry pump and pumped via a rubber and polyethylene pipeline to the sand processing plant.

Electricity will be supplied to the belt feeder and slurry pump from a diesel generator. The generator will be fitted with an acoustic enclosure. A design for the enclosure has been provided by Enco Noise Control Pty Ltd. The design states that a noise level below 44 dBA at 30 metres will be achieved.

The belt feeder, mixing tank, slurry pump and enclosed generator will be located on a rubber tyred trailer. This will allow the unit to be moved as the sand extraction face progresses.

.... The major benefit of the proposed pumping unit system is that sand is won from the extraction cell by means of an excavator rather than a bull dozer and/or scraper. The excavator will be fitted with a power shovel which will allow the excavator to be located on the floor of the extraction cell, thus allowing for acoustic attenuation.

The material won will be mixed with water from the approved water supply dam in a portable mixing tank located in the extraction cell. It is then transported by gravity to the processing plant by means of a pipe system. The only noise generating machinery attached to the mixing apparatus will be a diesel powered

motor which will be contained in an acoustic enclosure for noise attenuation purposes.

.... The pumping unit method of extraction will provide a significant number of environmental benefits which will accrue when compared to the approved method of extraction. These benefits include:

- 1. elimination of the need for both the bull dozer and scraper to win the sand from the extraction cell and transport the material to the processing plant. This will provide for a significant reduction in noise generated from the site during extraction.*
- 2. the removal of the bull dozer and the scraper from the extraction process will mean that many of the noise mitigation measures which are now required will no longer be required to meet the requirements of the EPA. In particular, there will no longer be a need for the perimeter bunding to extend around the site The removal of that bunding will mean a significant improvement in the visual impact of the site when viewed from Old Northern Road, Old Telegraph Road and Roberts Road. We are of the opinion that this will be a major environmental benefit.*
- 3. the use of the excavator and the portable mixing apparatus will mean that a smaller section of the active extraction cell will be worked at any one time compared to the total cell being worked with the use of the scraper, thus reducing the area of the site disturbed at any one time.*
- 4. the removal of the need to transport the extractive material from the extraction cell to the processing plant by scraper will mean that there will be little, if any, traffic on the site other than delivery trucks entering and leaving the site. This will have a significant and positive impact on the potential of the development to generate dust.*

Since commencement of the extraction, it has been determined that the approved "Pumping Unit" method of extraction is not a practical means by which the resource can be extracted.

Whilst the general concept of the "Pumping Unit" method of extraction remains, there have been modifications made to that method as follows:

1. The approved method of extraction is as follows:

Sand is extracted using an excavator. The excavator would start at the natural ground surface level but would immediately dig a hole so that the excavator and processing equipment would be working against an extraction face. The extraction face provides significant noise shielding.

While the above is generally the case, there are instances where sandstone is encountered which is not able to be extracted using an excavator alone. In such

circumstances, the sandstone material is ripped using a dozer and then removed using the excavator.

2. The approved method of extraction states:

The excavator loads the sand into an acoustically lined hopper. The hopper is located above a belt feeder which introduces the sand into a mixing tank. The belt drive is variable rate controlled and is powered by an electric motor.

The introduction of extracted sand into the mixing tank is being undertaken, however, the approved process assumes that the mixing tank is mobile and can move around the active extraction cell with the excavator. This is physically not easily achieved. What actually occurs is that the mixing tank is located close to the processing plant and is generally located there on a semi-permanent basis. The material won from the individual extraction cell is then loaded by the excavator to a dump truck which transports that material to a stockpile adjacent to the mixing tank. From there, a front end loader transfers the sand to the mixing tank.

All other aspects of the extraction process are as per the modified consent.

Approved Volume of Material to be Extracted

Table 4.3 of the EIS which accompanied the original development application provided details of the sequence of extraction, the volume of material to be extracted from each cell, and the time for that extraction to be completed.

Table 4.3 of the EIS was based on the following assumptions and criteria:

- future maximum sand production rate of 1000 t/day on average;
- a total excavation rate of approximately 1,430 t/day (assuming 70% is sand and 30% is clay/silt reject materials);
- production continuous for 5.5 days per week;
- an average bulk density of sand/clay materials of 1.6 t/m³, and
- progressive extraction in a series of "cells" for Stage 1 and 2 areas.

The above data was contained in the Conceptual Mine Plan dated June 1999 prepared by Woodward Clyde.

Based on the above figures from Woodward Clyde, the EIS states:

The Applicant seeks approval for fifty (50) laden truck movements from the site per day with extraction to occur 5.5 days per week. During preparation of many of the technical reports which form the appendices of this EIS, it has been

*conservatively assumed that an average load of 20 tonnes will leave the site and as such the maximum volume of product leaving the site would be 1,000 t/day or 286,000 t/annum. In recent times, however, load limits for individual trucks have been increased significantly to allow a maximum of 33.5 tonnes per load. Thus, under existing maximum load limit regulations, it is expected that a maximum of **1,675 t/day** of extracted material will be taken from the site per day which equals **479,050 t/annum**. As such, with this maximum rate of product leaving the site daily, the resource on the site could be extracted in a period of 8-9 years allowing for time for commencement of operations.*

*The above estimate, due to inclement weather, fluctuations in the demand for product and other limiting factors, may not occur each and every day during the life of the extraction. As such, a conservative average production of thirty (30) laden truck movements per day is anticipated over the life of the extraction which, with an average load of 33.5 tonne per load, represents **1,000 t/day** or **286,000 tonnes per annum**. On the basis of this rate of extraction, the total extraction of the resource could take up to 12-13 years to complete.*

*On the basis of the above, the applicant seeks approval to complete the extraction at the rate of 50 laden trucks per day (**479,050 tonnes/annum**) and it is this figure upon which the impact of the proposed development has been assessed. For the purposes of determining the life of the extraction, however, and hence the life of any approval for that extraction, the above conservative estimate of 30 trucks per day is adopted. Allowing for contingencies and delays in the processing of approvals and the like after the initial consent has been given, an **approval for a 15 year period is sought**.*

It has become apparent that the volume calculations undertaken by Woodward Clyde, as detailed in Table 4.3 of the EIS, are flawed in that they do not provide accurate volumes of the material present on the Site. It is not known how Woodward Clyde obtained the volume figures contained in Table 4.3 of the EIS.

To establish a more accurate figure of the volume of material contained on the Site, VGT Environmental Compliance Solutions (VGT) has undertaken detailed volume calculations utilising survey data obtained in December 2013. Using a computer generated model of the Site, VGT has determined that there is 4,607,822m³ of material on the Site compared to the 2,144,000m³ calculated by Woodward Clyde.

Advice from the applicant is that a conservative estimate of 2 tonnes per m³ should be applied to determine the tonnage of material on the Site. Applying that conversion rate, there is 9,215,644 tonnes of material on the Site. The applicant has advised that a figure of 60% sand to 40% clay/gravel is generally obtained. As such, 5,529,386 tonnes of the volume calculated by VGT would be sand product.

The applicant has advised that approximately 1,000,000 tonnes of sand has been exported from the Site during the life of the extraction to date which means that approximately 4.5 million tonnes of sand product remains to be extracted.

Using the above formula for the rate of extraction contained in the EIS, the following applies:

- maximum 50 trucks per day (approved)
- average load per truck 33.5 tonnes
- 1,675 tonnes per day.
- 5.5 days per week extraction = 286 days per annum
- maximum 479,050 tonnes per annum extracted
- 9.4 years of extraction remaining.

Allowing from the 1 year remaining for the approved extraction, it is estimated that a further 10 years of extraction would be required after 31 May 2015 to complete the extraction of the Site.

Having regard to the errors in the original calculations undertaken by Woodward Clyde, it is now proposed to modify the consent based on the volume figures calculated by VGT.

The applicant seeks a modification to the life of the consent from 31 May 2015 to 31 May 2025.

3. KEY ISSUES

Key issues with the existing extraction relate to:

- Truck numbers and Traffic Impact
- Acoustic Impact
- Soil and Water Management
- Rehabilitation.

All of the above key issues were canvassed in the Environmental Assessments which have been undertaken for the original applications and subsequent modification of the consent. Environmental monitoring takes place on the existing extraction site to ensure that the existing extraction operates within the environmental controls which are contained in the Environment Protection Licence and the conditions of consent under which the extraction operates.

Truck Numbers and Traffic Impact

The additional time for the completion of the approved extraction would mean that truck movements associated with the extraction would be using the local road network for that additional 10 year period.

A detailed traffic impact assessment would be conducted as part of the Environmental Assessment for the proposed modification to determine the existing traffic impact and to determine if the additional period of extraction is likely to impact the capacity of the local road network and/or the intersection of Roberts Road with Old Northern Road.

Acoustic Impact

The modified method of extraction has the potential to impact the acoustic environment of the locality.

A detailed acoustic impact assessment would be undertaken as part Environmental Assessment for the proposed modified development.

Soil and Water Management

A detailed water balance analysis together with soil and water management plans would be developed as part of the Environmental Assessment for the proposed modification.

Rehabilitation

As per the existing extraction, there will be a detailed rehabilitation plan prepared which demonstrates how the Site would be rehabilitated to a landform similar to that which has been approved.

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ATTACHMENT 1

Table 1: Comparison Between Current Approval and the Proposed Modification

In the Table below, the relevant sections of Development Consent 267-11-99 are provided with details of the additional requirements resulting from the proposed modification.

Current Condition of Consent	Proposed Modification
LIFE OF THE EXTRACTION	
9. <i>The duration of the extraction under this Consent is for a maximum period of 15 years. The Applicant shall ensure that the rehabilitation of all disturbed areas is completed within six months of completion of extraction.</i>	The existing condition means that extraction ceases on 31 May 2015. Because there is significantly more volume of material on the Site compared to that which was determined as part of the original EIS for the approved development, it is estimated that a further 10 years would be required to complete the extraction. It is proposed to modify Condition 9 to read: 9. <i>The duration of the extraction under this Consent is for a maximum period of 25 years. The Applicant shall ensure that the rehabilitation of all disturbed areas is completed within six months of completion of extraction.</i>
ADHERENCE TO TERMS OF DA AND EIS	
Condition 2 of the Consent relates to the documentation which forms part of the Consent, that documentation being the original EIS which accompanied the development application plus additional documents which form part of an approved modification to the Consent.	It is proposed to modify Condition 2 of the Consent to include reference to the Environmental Assessment which would accompany the proposed s.75W modification.
VOLUME OF MATERIAL TO BE EXTRACTED	
Table 4.3 of the EIS which accompanied the original development application indicated that there is 2,144,000m ³ of material to be extracted on the Site. This is the volume of material upon which the Consent is based.	To establish a more accurate figure of the volume of material contained on the Site, VGT Environmental Compliance Solutions (VGT) has undertaken detailed volume calculations utilising survey data obtained in December 2013. Using a computer generated model of the Site, VGT has determined that there is 4,607,822m³ of material on the site compared to the 2,144,000m³ calculated by Woodward Clyde. Advice from the applicant is that a conservative estimate of 2 tonnes per m³ should be applied to determine the tonnage of material on the Site. Applying that conversion

	rate, there is 9,215,644 tonnes of material on the Site. The applicant has advised that a figure of 60% sand to 40% clay/gravel is generally obtained. As such, 5,529,386 tonnes of the volume calculated by VGT would be sand product. The applicant has advised that approximately 1,000,000 tonnes of sand has been exported from the Site during the life of the extraction to date which means that approximately 4.5 million tonnes of sand product remains to be extracted. The additional volume of material will form part of the modification of Condition 2.
DAM CONSTRUCTION	
The Consent includes the construction of a water supply dam. The dam is approved to be constructed in two stages.	During the construction of the approved dam, the applicant has determined that the construction process would be better served if the dam were to be constructed in three (3) stages rather than the approved two (2) stages. It is proposed to modify the consent to modify the dam construction process accordingly. The dimensions of the approved dam would not alter to any substantive degree as a result of this modification.
METHOD OF EXTRACTION	
The approved method of extraction is as per the modified Consent.	The general concept of the "Pumping Unit" method of extraction remains, however, the following modifications are proposed: 1. The approved method of extraction is as follows: <i>Sand is extracted using an excavator. The excavator would start at the natural ground surface level but would immediately dig a hole so that the excavator and processing equipment would be working against an extraction face. The extraction face provides significant noise shielding.</i> While the above is generally the case, there are instances where sandstone is encountered which is not able to be extracted using an excavator alone. In such circumstances, the sandstone material is ripped using a dozer and then removed using the excavator.

	2. The approved method of extraction states: <i>The excavator loads the sand into an acoustically lined hopper. The hopper is located above a belt feeder which introduces the sand into a mixing tank. The belt drive is variable rate controlled and is powered by an electric motor.</i> The introduction of extracted sand into the mixing tank is being undertaken, however, the approved process assumes that the mixing tank is mobile and can move around the active extraction cell with the excavator. This is physically not easily achieved. What actually occurs is that the mixing tank is located close to the processing plant and is generally located there on a semi-permanent basis. The material won from the individual extraction cell is then loaded by the excavator to a dump truck which transports that material to a stockpile adjacent to the mixing tank. From there, a front end loader transfers the sand to the mixing tank. All other aspects of the extraction process are as per the modified consent.
SEQUENCE OF EXTRACTION	
The approved development nominates a sequence of extraction with cells defined in two stages as follows: The consent refers to an approved sequence of extraction for the Site, that sequence of extraction being described in the EIS for the approved development as follows: <i>The existing processing plant, weighbridge and office facilities will remain at their current location until the end of extraction of Stage 2.</i> <i>Extraction will initially commence in Cell 1A (within Stage 1 area), located immediately to the west of the process water dam. Prior to extraction, vegetation and topsoil will be stripped and stockpiled at a suitable location near the processing plant for rehabilitation of the final stage of extraction. The latter will be the area comprising the processing plant, the offices and the weighbridge. The existing clay drying beds will also be used. Surface runoff from the upslope catchment and from the active cell area will be diverted (via diversion drains) into the sedimentation pond</i>	During the extraction process, it has been determined that the approved method of extraction is neither an economic nor practical way to achieve that extraction. The existing extraction process on the Site involves a similar cell by cell extraction process but one which is not as rigidly defined as that which is approved. It is proposed to modify the approved sequence of extraction to reflect that which is now being undertaken on the Site such that the most efficient means of extracting the approved material is achieved. The proposed modification would not alter the approved depth of extraction.

prior to discharging into the process water dam to minimise on-going siltation of the water storage dam.

Following completion of the Cell 1A area, excavation will continue within Cell 1B, located to the east of the process water dam. The clay drying area will be located in the previously mined Cell 1A area. The clay materials will be gravity fed from the plant to the designated drying area. Runoff and free water from the drying area would discharge (via formed drains or pipes) into the process water dam's sedimentation pond.

The remaining cells within Stage 1 (Cells 1B to 1K) will be progressively excavated as described above. Prior to extraction, each cell area will be stripped of vegetation and topsoil which will be transported to the third cell in the sequence which is to undergo rehabilitation, as described earlier. Surface runoff from upslope catchments and from the active cell areas will also be progressively diverted (via diversion drains) into the dam's sedimentation pond prior to discharging into the process water dam.

Final maximum rehabilitated batter slopes of 3(H):1(V) are envisaged. Temporary batter slopes adjacent to the Stage 1/Stage 2 boundary would be approximately 2(H):1(V).

Following completion of the Stage 1 area, excavation of the Stage 2 area will then commence. The operation will be similar to the Stage 1 operation using the Stage 1 process plant and sand stockpile pad layout. Prior to extraction, each cell area will also be stripped of topsoil which will be transported to a previously extracted cell for use in rehabilitation as described earlier. Surface runoff from upslope catchments and from the active cell areas will be progressively diverted (via diversion drains) into the sediment pond prior to discharging into the process water dam.

Following completion of excavation of the Stage 2 area, final rehabilitation of Cell 2D and the process plant and sand stockpile pad area (within Stage 1) will be undertaken. The existing processing plant will be dismantled and removed from the site. It is envisaged that sand extraction beneath the plant and stockpile pad will be processed using a mobile plant unit.