

CLAY EXCAVATION

PT LOT 36 GREAT NORTHERN HIGHWAY UPPER SWAN

INTERNATIONAL BRICK AND TILE PTY LTD

Report and Recommendations  
of the  
Environmental Protection Authority

Environmental Protection Authority  
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**CONTENTS**

		Page
i	SUMMARY AND RECOMMENDATIONS . . . . .	ii
1.	BACKGROUND. . . . .	1
2.	THE PROPOSAL. . . . .	1
3.	EXISTING ENVIRONMENT . . . . .	3
4.	ENVIRONMENTAL ASSESSMENT . . . . .	4
5.	STAGE 2. . . . .	10
6.	CONCLUSION . . . . .	10

**APPENDIX**

1.	Environmental Commitments. . . . .	11
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**FIGURES**

1.	Location of Proposed Clay Quarry, Upper Swan . . . . .	2
2.	Detailed Surface Drainage, Lot 36. . . . .	4
3.	Proposed Surface Drainage Modifications. . . . .	7

i            **SUMMARY AND RECOMMENDATIONS**

International Brick and Tile Pty Ltd (IBT) has submitted a Notice of Intent to the Environmental Protection Authority outlining a two stage proposal to excavate clay from Lots 1, 2, 3, 10, 11 and 36 Great Northern Highway, Upper Swan. The land is east of the Ellen Brook Nature Reserve and is separated from it by Great Northern Highway.

The Notice of Intent:

seeks approval for Stage 1 which is a proposal for 10 to 15 years clay excavation in the western portion of Lot 36 (referred to as Pt Lot 36); and

proposes detailed investigations for Stage 2 including examining water drainage patterns in the remainder of the land to identify areas where clay excavation could proceed.

The proponent has investigated the groundwater, pattern of surface water flow, and location of the catchment divide, and has concluded that, apart from the relatively small area of drainage catchment in its northern portion, Pt Lot 36 is not hydrologically related to the Ellen Brook Nature Reserve. It is proposed that a drainage diversion system be constructed to ensure that clay excavation on Pt Lot 36 could be conducted without significantly affecting the Ellen Brook Nature Reserve.

Other environmental considerations associated with the proposed clay excavation on Pt Lot 36, such as dust, noise, visual amenity and rehabilitation, have also been addressed.

The Environmental Protection Authority determined that the proposal should be assessed under Part IV of the Environmental Protection Act, 1986 and that the level of assessment for Stage 1 of the proposal would be Notice of Intent (NOI).

The potential environmental impacts have been assessed from information provided in the NOI and investigations carried out by the Environmental Protection Authority. The Authority's main objective in assessing the proposal is to ensure that the rare short-necked tortoise (Pseudemydura umbrina), which is believed to exist only in the nearby Ellen Brook Nature Reserve, is protected. A secondary objective is to ensure that any excavation and subsequent rehabilitation is directed towards providing new and additional habitats that may be utilised by the tortoise.

Following assessment of the proposed clay excavation on Pt Lot 36, the Environmental Protection Authority has concluded that Stage 1 of the proposal would be environmentally acceptable subject to the following recommendations:

**RECOMMENDATION 1**

The Environmental Protection Authority concludes that the proposal to excavate clay from Pt Lot 36 Great Northern Highway, Upper Swan described in the Notice of Intent is environmentally acceptable and recommends that it

could proceed subject to the Environmental Protection Authority's recommendations in this Assessment Report and the commitments made by the proponent in the NOI for environmental management, including for example:

monitoring of groundwater and the drainage diversion system;

progressive rehabilitation of disturbed areas;

dust control; and

vegetation screening.

#### RECOMMENDATION 2

The Environmental Protection Authority recommends that for the first twelve months of operation the proponent monitors:

the water table at the site of excavation to determine its configuration, seasonal variation of water levels, and the effects of the clay excavation on the water table;

the quality and quantity of water flowing into the Great Northern Highway drain from Pt Lot 36 and corrects any detrimental effects due to the clay excavation on Pt Lot 36.

Design of the programme and reporting of results should form part of the Environmental Protection Authority's requirements in Recommendation 8.

#### RECOMMENDATION 3

The Environmental Protection Authority recommends that if any localised erosion hazards arise the proponent undertakes appropriate remedial measures to the satisfaction of the Commissioner for Soil Conservation.

#### RECOMMENDATION 4

The Environmental Protection Authority recommends that all drainage waters from within the excavation area and Coondaree Parade are detained in silt traps, which are acceptable to the Water Authority of Western Australia, to assist in the removal of silt prior to discharge to the Coondaree Swamp drain.

#### RECOMMENDATION 5

The Environmental Protection Authority recommends that the proponent liaises with the Department of Conservation and Land Management to ensure that the necessary monitoring of water levels and quality within the Ellen Brook Nature Reserve are undertaken.

#### RECOMMENDATION 6

The Environmental Protection Authority recommends that within twelve months of commencing the operation the proponent prepares a plan, in liaison with the Authority, providing details of the proposed rehabilitation programme, final contours and end-use. The plan should form part of the Environmental Protection Authority's requirements in Recommendation 8.

#### RECOMMENDATION 7

The Environmental Protection Authority recommends that the proponent undertakes the necessary dust control measures to ensure that dust generation from the excavation area, stockpiles and Coondaree Parade is minimised to the satisfaction of the Environmental Protection Authority.

#### RECOMMENDATION 8

The Environmental Protection Authority recommends that the proponent submits a brief report to the Authority for approval after twelve months of operation summarising the monitoring results, providing details of the proposed rehabilitation programme, final contours and end-use, describing the progress of the vegetation screen, and discussing any problems associated with environmental management which occurred during the first twelve months of operation.

#### RECOMMENDATION 9

The Environmental Protection Authority recommends that only a twelve month approval for clay excavation on Pt Lot 36 is granted in the first instance. Upon reviewing the report to be submitted by the proponent pursuant to Recommendation 8, the Environmental Protection Authority will advise the Minister for Environment whether continued clay excavation on Pt Lot 36 would be environmentally acceptable.

In regard to Stage 2 of the proposal:

#### RECOMMENDATION 10

The Environmental Protection Authority recommends that the proponent proceeds with the detailed investigations proposed for Stage 2 as outlined in the NOI prior to submitting a detailed proposal to the Environmental Protection Authority. However, approval to extract clay from Pt Lot 36 should not be seen as establishing a precedent to extract clay from the remainder of the proponent's landholding.

## 1. BACKGROUND

In August 1987, the Environmental Protection Authority received a brief proposal by International Brick and Tile Pty Ltd (IBT) to excavate clay from Lots 1, 2, 3, 10, 11 and 36 Great Northern Highway, Upper Swan. The land is east of the Ellen Brook Nature Reserve and is separated from it by Great Northern Highway.

The Authority determined that the potential for environmental impact is such that the proposal should be assessed under Part IV of the Environmental Protection Act, 1986. The documentation did not, however, adequately address the relevant environmental issues, and additional information from the proponent was requested.

A detailed Notice of Intent was submitted in December 1987 outlining a two stage development, specifically seeking approval for the first stage and proposing detailed investigations for the second stage.

In considering the Notice of Intent, the Authority determined that the level of assessment for Stage 1 of the development would be Notice of Intent. The information provided in the document was found to be adequate and it was accepted as the Notice of Intent.

## 2. THE PROPOSAL

IBT proposes to excavate clay from Lots 1, 2, 3, 10, 11 and 36 Great Northern Highway, Upper Swan for use in its brickworks at Malaga. The land contains significant shallow reserves of plastic clay suited to brick and tile manufacture. The proposal has been structured into two stages (see Figure 1). The Notice of Intent:

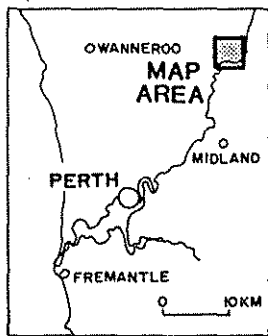
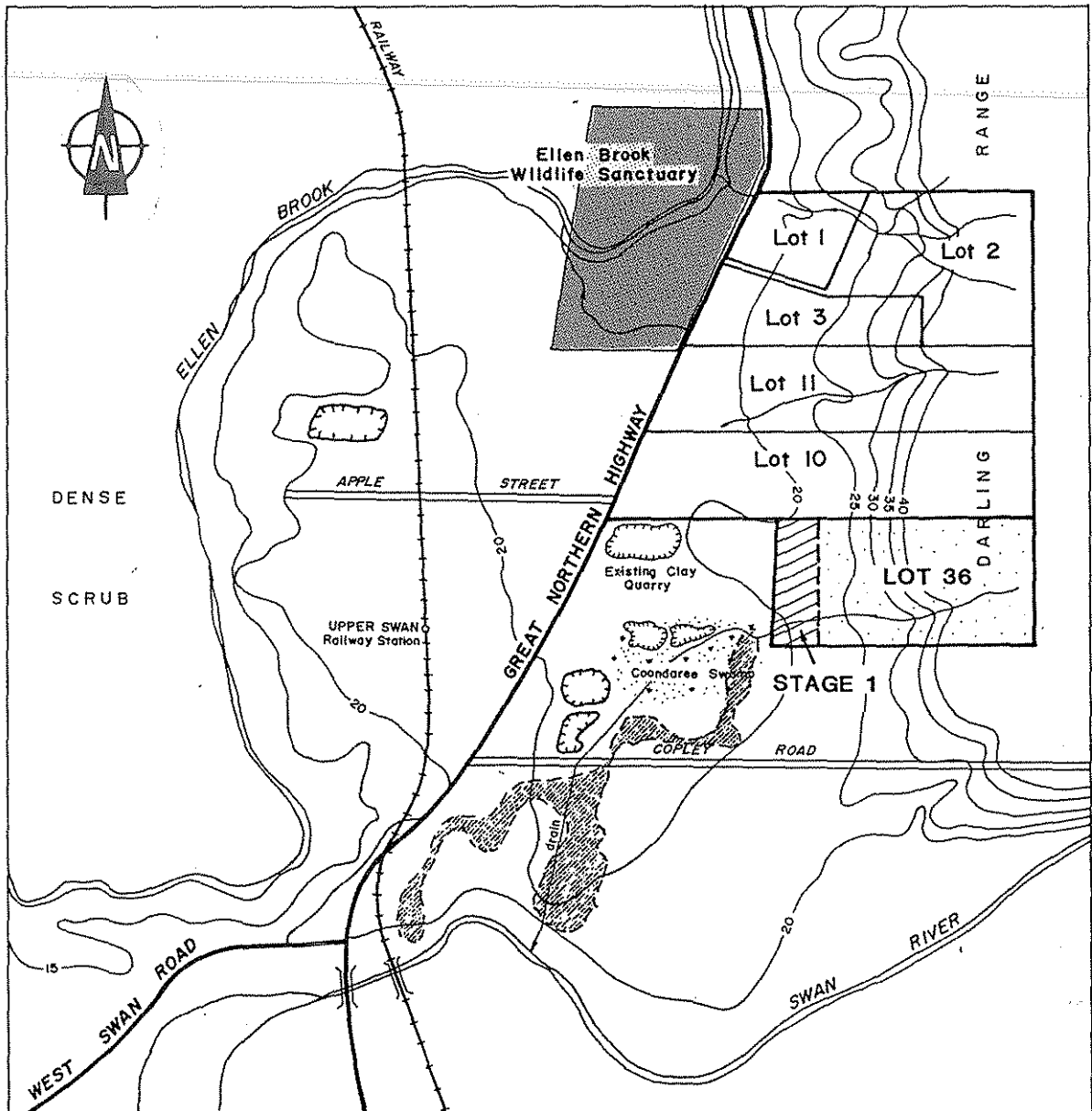
seeks approval for Stage 1 clay excavation in the western portion of Lot 36; and

proposes detailed investigations for Stage 2 - examine water drainage patterns in the remainder of the land to identify areas where clay excavation could proceed.

Stage 1 Exploratory drilling over Lot 36 indicates that there is approximately 640 000 cubic metres in situ of strong plastic clay present and about 285 000 cubic metres in situ of lower grade sandy clay. IBT is proposing to excavate these reserves over a 10 to 15 year period during the summer months. The excavation would be staged, commencing at the southern end of Pt Lot 36. No long term stockpiles would be utilised on-site, and any dust generated by temporary stockpiles of clay or overburden would be controlled by watering.

Prior to excavating the clay at each stage, the 2 metre overburden layer would be removed and temporarily stockpiled. The overburden would be used to form temporary bunds between each stage to minimise the need for dewatering, and also grassed bunds outside of the excavation area to control surface drainage.






The loading and transfer operation would be conducted five days per week between 7.00 am and 5.00pm and would result in a maximum of 6 truck movements per hour. A watering truck would be employed on-site if dust generation from the haulage roads proved to be a problem.



LOCATION

SCALE 1:25000



-  ELLEN BROOK RESERVE
-  STAGE II — EXCAVATION AREA NOT DEFINED
-  STAGE I — LOT 36
-  TOPOGRAPHIC CONTOURS 5m .A.H.D. (15-40m CONTOURS ONLY)
-  APPROVED FUTURE LAKE DEVELOPMENT

## LOCATION OF PROPOSED CLAY QUARRY , UPPER SWAN



A network of screen trees would be planted so that in a short time all activities on-site would be visually inaccessible.

Two monitor bores have been installed to determine the reduced level of the water table one the western side of the property, and measurement of the groundwater level would also be conducted during clay excavation.

During periods of heavy runoff, the drainage diversion system would be observed to determine whether there is significant erosion potential and to establish the suitability of the drainage system in relation to water accumulation in the pits.

On completion of the excavation, which would be to a depth of 7-8 metres, it is proposed to recontour the excavated area with overburden to form an undulating land surface interspersed with lakes.

Stage 2 An investigative programme will be developed and conducted in liaison with the Authority and the Department of Conservation and Land Management to provide an adequate data base to allow an assessment of the potential impact on the Ellen Brook Nature Reserve of excavating clay on Lots 1, 2, 3, 10 and 11 Great Northern Highway, Upper Swan.

### 3. EXISTING ENVIRONMENT

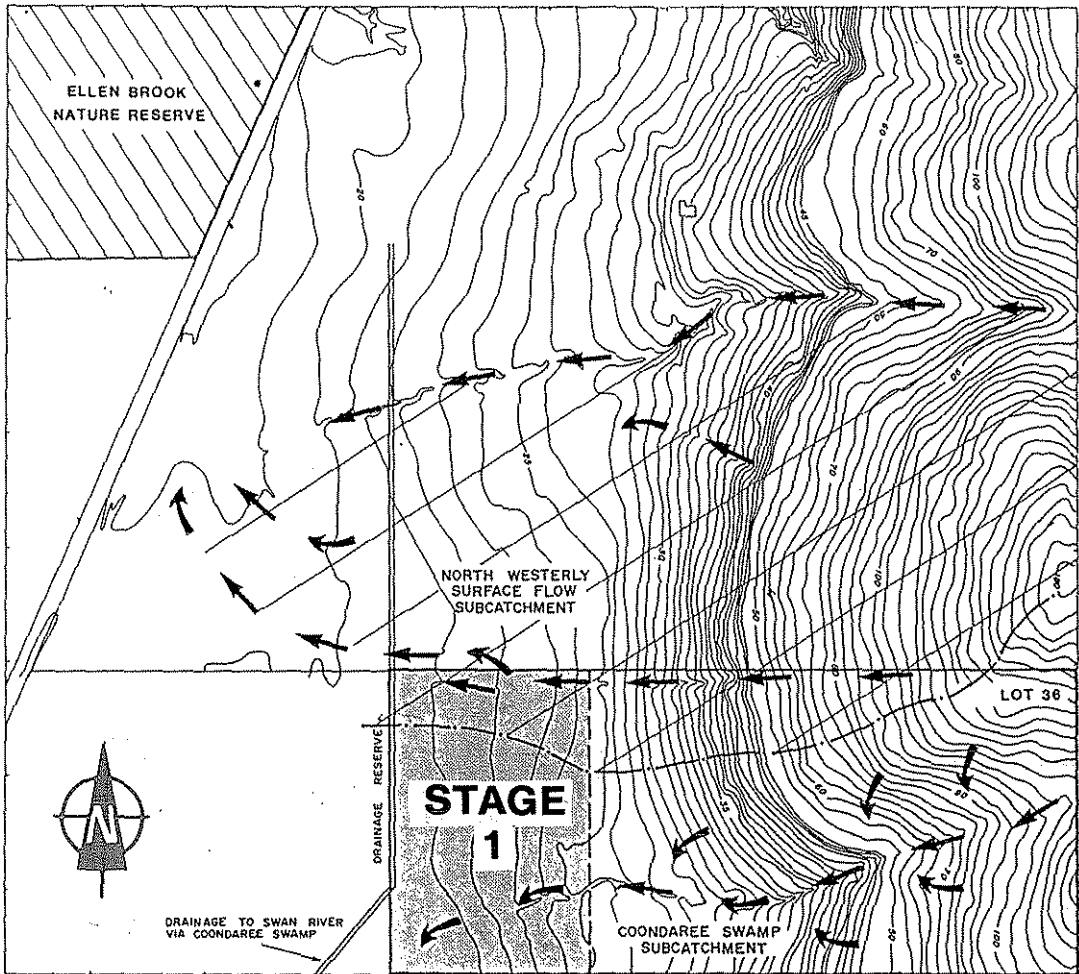
Lot 36 encompasses three geomorphological features - Darling Scarp, Ridge Hill Shelf, Pinjarra Plain and the clay deposit is located on the Pinjarra Plain to a depth of approximately 9 metres. The site is 20-25 metres above sea level.

Groundwater flow is in a general westerly direction away from the Darling Scarp but is deflected by Ellen Brook and the Swan River. Drilling by the proponent suggests that the unconfined water table is at least 13.5 metres below surface, although advice received from the Geological Survey suggests this result may not be correct. There are also isolated perched water tables at shallower depths trapped within the clay layer.

In regard to surface drainage, there is a topographical divide on Lot 36 which creates two main catchment areas. The southern catchment discharges to the Swan River via Coondaree Swamp, and the northern catchment discharges to the drains along Great Northern Highway and then to a westerly flowing drain which moves through the southern portion of the Ellen Brook Nature Reserve into Ellen Brook (see Figure 2).

Lot 36 is approximately 800 metres south east of Ellen Brook Nature Reserve, the purpose of which is the preservation of fauna (the rare short-necked tortoise, Pseudemydura umbrina). Both the Ellen Brook and Twin Swamps Reserves are affected by System 6 area specific recommendation M17 which recommends that ways and means of providing protective buffer areas around the reserves be sought through planning procedures. The Department of Conservation and Land Management has advised that the short-necked tortoise may no longer exist at the Twin Swamps Reserve, and that the Ellen Brook Nature Reserve could be the only known habitat.

The swamp within the Ellen Brook Nature Reserve is an ephemeral wetland which usually dries out for 4-5 months during summer. There are no permanent pools which are fed by groundwater inflow.



CATCHMENT DIVIDE 

0 200  
METRES

## DETAILED SURFACE DRAINAGE LOT 36

The proponent has concluded that, apart from the relatively small area of drainage catchment in its northern sector, Pt Lot 36 is not hydrologically related to Ellen Brook Nature Reserve.

IBT's landholding is zoned Rural in the Shire of Swan's Town Planning Scheme No. 9 and is cleared to pasture. The land to the west and south is also cleared to pasture, although there is an existing clay excavation west of Lot 36 which will progress through the adjacent land.

In a report prepared for the State Planning Commission by Survey and Mapping Group Pty Ltd, "Basic Raw Materials Resource Protection Strategy", November 1987, Lot 36 is within the Clay Resource Area, subject to the Swan Valley Policy.

#### 4. ENVIRONMENTAL ASSESSMENT

The Environmental Protection Authority's main objective in assessing the proposal to excavate clay on Lots 1, 2, 3, 10, 11 and 36 Great Northern Highway is to ensure that the short-necked tortoise is protected. A secondary objective is to ensure that any excavation and subsequent rehabilitation is directed towards providing new and additional habitats that may be utilised by the tortoise.

The Authority has assessed Stage 1 of the proposal (clay excavation on Pt Lot 36) and has determined that the proposal would be environmentally acceptable subject to the Recommendations in this Report. Comments and advice on the Notice of Intent were provided to the Authority by several Government agencies.

#### RECOMMENDATION 1

The Environmental Protection Authority concludes that the proposal to excavate clay from Pt Lot 36 Great Northern Highway, Upper Swan described in the Notice of Intent is environmentally acceptable and recommends that it could proceed subject to the Environmental Protection Authority's recommendations in this Assessment Report and the commitments made by the proponent in the NOI for environmental management, including for example:

- .monitoring of groundwater and the drainage diversion system;
- .progressive rehabilitation of disturbed areas;
- .dust control; and
- .vegetation screening.

#### 4.1 GROUNDWATER

The effects of the proposed clay excavation on Pt Lot 36 (Stage 1) on groundwater and surface water have been considered, with specific consideration given to the possible impact on the Ellen Brook Nature Reserve.

In regard to groundwater, the results of drilling undertaken by the proponent suggest that the water table is below the area to be excavated, and possibly 13.5 metres below the surface, with areas of perched groundwater closer to the surface. Also, the swamp within the Ellen Brook

Nature Reserve is not fed by groundwater inflow. Therefore, the Authority considers that any impact of the Stage 1 clay excavation on the groundwater would only be local (ie not effect the Ellen Brook Nature Reserve).

However, the Authority seeks confirmation on the accuracy of the proponent's estimation of the location of the water table. The surface elevation of Pt Lot 36 is approximately 22 metres and, if the water table is 13.5 metres below the surface, the reduced level of the water table would be 8.5 metres (ie below the level of Ellen Brook and possibly the Swan River). Also, the Notice of Intent omits any reference to the season when the drilling was done, and water levels can vary seasonally by 2-3 metres. Two monitor bores have been installed to determine the reduced level of the water table on the western side of the property, and the proponent has made a commitment that groundwater levels should be measured during clay excavation. It is considered that further investigation into the water table is required and should be conducted for at least the first twelve months of operating the clay excavation.

In regard to surface drainage, it is considered that the pattern of surface flow and the location of the catchment divide as presented in the Notice of Intent is accurate. It is proposed that the northern sector of Pt Lot 36 which discharges towards the Ellen Brook Nature Reserve be isolated from the Reserve's catchment by placement of a system of diversion bunds (see Figure 3).

The proponent has made a commitment that, during periods of heavy runoff, the drainage diversion system would be observed to determine whether there is significant erosion potential and to establish the suitability of the drainage system in relation to water accumulation in the pits. This site management technique would ensure that there would be no significant impact on the Ellen Brook Nature Reserve. However, as a safeguard, waters draining from Pt Lot 36 into the Great Northern Highway drain should be monitored for at least 12 months.

#### RECOMMENDATION 2

The Environmental Protection Authority recommends that for the first twelve months of operation the proponent monitors:

the water table at the site of excavation to determine its configuration, seasonal variation of water levels, and the effects of the clay excavation on the water table; and

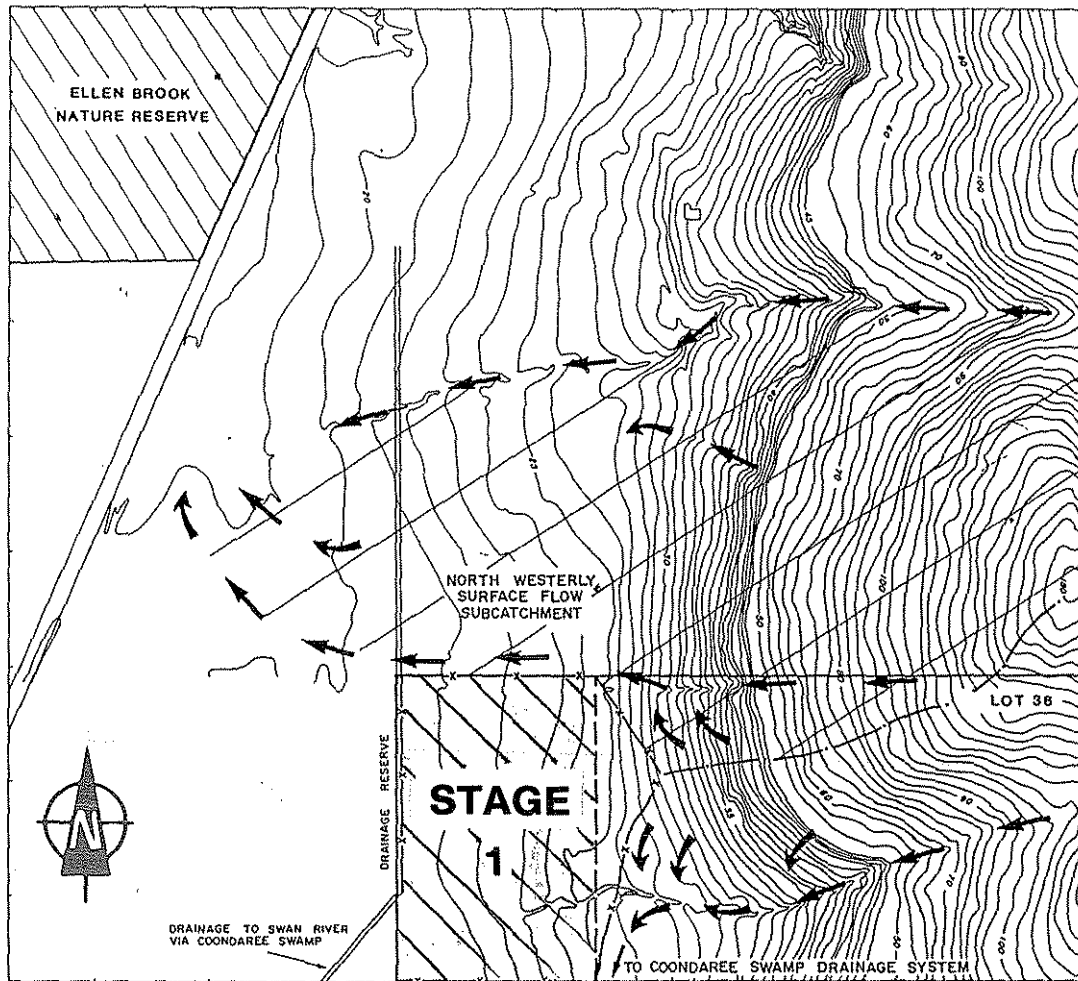
the quality and quantity of water flowing into the Great Northern Highway drain from Pt Lot 36 and corrects any detrimental effects due to clay excavation on Pt Lot 36.

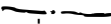
Design of the programme and reporting of results should form part of the Environmental Protection Authority's requirements in Recommendation 8.

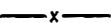
#### RECOMMENDATION 3

The Environmental Protection Authority recommends that if any localised erosion hazards arise the proponent undertakes appropriate remedial measures to the satisfaction of the Commissioner for Soil Conservation.

Drainage waters originating within the excavation area would be contained on-site in temporary storage or diverted south to the Coondaree Swamp drain. All drainage waters from within the excavation area should be



EXISTING CATCHMENT DIVIDE 

DRAINAGE DIVERSION BUND 

0 200  
METRES

## PROPOSED SURFACE DRAINAGE MODIFICATIONS

COURTESY OF BOWMAN BISHAW AND ASSOC.

FIGURE 3

detained prior to discharge to assist in the removal of silt. Drainage waters from Coondaree Parade should also be detained before discharge to the Coondaree Swamp drain.

#### RECOMMENDATION 4

The Environmental Protection Authority recommends that all drainage waters from within the excavation area and Coondaree Parade are detained in silt traps, which are acceptable to the Water Authority of Western Australia, to assist in the removal of silt prior to discharge to the Coondaree Swamp drain.

Monitoring results of water levels and quality in the Ellen Brook Nature Reserve collected by the Department of Conservation and Land Management since the early 1970's were provided to the proponent for a fee. This monitoring should continue so that any detrimental effects of clay excavation on Pt Lot 36 can be detected. Also, these monitoring results will contribute to the investigations to be undertaken by the proponent for Stage 2 of the proposal.

#### RECOMMENDATION 5

The Environmental Protection Authority recommends that the proponent liaises with the Department of Conservation and Land Management to ensure that the necessary monitoring of water levels and quality within the Ellen Brook Nature Reserve are undertaken.

#### 4.2 VISUAL AMENITY AND REHABILITATION

A network of screen trees would be planted so that in a short time all activities on-site would be visually inaccessible. Given that no long term stockpiles would exist on-site, and that the land is approximately 750 metres from Great Northern Highway, the proposed Stage 1 excavation should not have a significant impact on the visual amenity of the area providing the proposed network of screen trees is established successfully.

Rehabilitation of areas disturbed by clay excavation is proposed to be carried out in a progressive manner, minimising the area of direct disturbance at any given time. As overburden is stripped from the next area to be excavated, as much as possible should be respread on the previously excavated area to form the final contours.

It is appreciated that detailed planning of the final contours of the site is difficult at this stage because the extent of the resource has not been accurately identified. The concept of including the lakes as conservation features in the rehabilitation landscape which would provide a wetland habitat is endorsed. However, a more detailed plan addressing the lake embankments, bed formation and landscaping of surrounding areas should be prepared. It is noted that the proponent's landscape consultants will liaise with the regulatory authorities as necessary.

#### RECOMMENDATION 6

The Environmental Protection Authority recommends that within twelve months of commencing the operation the proponent prepares a plan, in liaison with the Authority, providing details of the proposed rehabilitation programme, final contours and end-use. The plan should form part of the Environmental Protection Authority's requirements in Recommendation 8.

#### 4.3 DUST AND NOISE

The proponent has indicated that a water truck would be employed on-site if dust generation from the haulage roads proved to be a problem. The proponent may wish to consider sealing the roads with oil emulsion rather than watering.

No long term stockpiles would be established on-site, and any dust generated by the short term stockpiles would be controlled by watering. Experience has shown that once the surface of clay stockpiles has been watered, a surface "cake" forms which effectively stops any dust lift off.

Given the proximity of Pt Lot 36 to Great Northern Highway, and the presence of strong katabatic easterly winds down the Scarp face during summer, it is imperative that the necessary dust control measures are undertaken to minimise dust generation from the excavation area, stockpiles and Coondaree Parade.

#### RECOMMENDATION 7

**The Environmental Protection Authority recommends that the proponent undertakes the necessary dust control measures to ensure that dust generation from the excavation area, stockpiles and Coondaree Parade is minimised to the satisfaction of the Environmental Protection Authority.**

Given the location of Pt Lot 36, and the fact that working (excavation, loading and transfer) would be restricted to weekdays between 07.00 and 17.00 hours, noise should not be a problem.

#### 4.4 REPORTING

As previously stated, the Authority has concluded that the proposal to excavate clay from Pt Lot 36 Great Northern Highway, Upper Swan is environmentally acceptable, subject to the commitments made by the proponent and the recommendations in this Assessment Report. However, it is imperative that the short-necked tortoise is protected by ensuring the integrity of its habitat, the Ellen Brook Nature Reserve, is not effected. Also, any excavation and subsequent rehabilitation on Pt Lot 36 should be directed towards providing new and additional habitats that may be utilised by the tortoise.

Therefore, the Authority considers that, in the first instance, only a twelve month approval should be granted. Prior to the Authority determining whether further clay excavation on Pt Lot 36 would be environmentally acceptable, the proponent should submit a report to the Authority summarising the monitoring results, describing the progress of the vegetation screen, providing details of the final contours and rehabilitation programme, and discussing any problems associated with environmental management which occurred during the first twelve months of operation. The Authority will then advise the Minister for Environment whether further clay excavation on Pt Lot 36 would be environmentally acceptable, and he will issue the appropriate statement.

#### RECOMMENDATION 8

**The Environmental Protection Authority recommends that the proponent submits a brief report to the Authority for approval after twelve months of operation summarising the monitoring results, providing details of the proposed rehabilitation programme, final contours and**

rehabilitation programme, and discussing any problems associated with environmental management which occurred during the first twelve months of operation.

#### RECOMMENDATION 9

The Environmental Protection Authority recommends that only a twelve month approval for clay excavation on Pt Lot 36 is granted in the first instance. Upon reviewing the report to be submitted by the proponent pursuant to Recommendation 8, the Environmental Protection Authority will advise the Minister for Environment whether continued clay excavation on Pt Lot 36 would be environmentally acceptable.

#### 5. STAGE 2

Approval to excavate clay from a portion of Lot 36 should not be seen as establishing a precedent to excavate clay from the remainder of IBT's landholding.

The detailed investigations for Stage 2 of the proposal outlined in the NOI have been examined. The proponent should proceed with these investigations, in liaison with the Environmental Protection Authority and the Department of Conservation and Land Management, and submit a detailed proposal to the Environmental Protection Authority for environmental impact assessment.

#### RECOMMENDATION 10

The Environmental Protection Authority recommends that the proponent proceeds with the detailed investigations proposed for Stage 2 as outlined in the NOI prior to submitting a detailed proposal to the Environmental Protection Authority. However, approval to extract clay from Pt Lot 36 should not be seen as establishing a precedent to extract clay from the remainder of the proponent's landholding.

#### 6. CONCLUSION

Upon assessment of the International Brick and Tile Pty Ltd proposal, the Environmental Protection Authority has concluded that the proposed excavation of clay from Pt Lot 36 (Stage 1) would be environmentally acceptable subject to the operation being carried out in accordance with the commitments in the Notice of Intent and the Environmental Protection Authority's recommendations.

In regard to Stage 2 of the proposal, the proponent should proceed with the detailed investigations as outlined in the NOI prior to submitting a detailed proposal to the Environmental Protection Authority for environmental impact assessment.



**ENVIRONMENTAL COMMITMENTS**

The following is a list of environmental commitments made by the proponent in the NOI:

Clay excavation on Pt Lot 36 will only proceed during the summer months;

The loading and transfer operation will be conducted 5 days per week (weekdays) during the hours of 7am to 5pm and will result in approximately one truck departure every 25-30 minutes;

Dewatering of the pits will not withdraw any water from the underlying aquifer and therefore will have no effect on the water table levels of the true unconfined aquifer;

A network of screen trees will be planted, and in a short time all activities on site will be visually inaccessible;

No long term stockpiles will be utilised on-site;

Dust generation from temporary stockpiles will be controlled by watering;

A watering truck will be employed on-site if dust generation from the haulage roads proves to be a problem;

The primary objective of management works will be the establishment of a network of simple grassed bunds using earth materials derived from the site. The diversion bunds will direct any turbid surface runoff towards the south west, and good quality surface runoff from the eastern side of the lot towards the north;

Bunds within the excavation area will be placed so that old working areas are separated from new areas and will not require annual dewatering;

Measurement of groundwater levels will be conducted during clay excavation;

Observations during periods of heavy runoff will be conducted to determine whether there is significant erosion potential and to establish the suitability of the drainage system in relation to water accumulation in the pits;

Following completion of each stage, site rehabilitation will be progressively implemented;

Progressive landscaping of the completed pits will establish the vegetative framework required to ultimately transform the area into a high quality small rural water based subdivision. The proponent's landscape consultants will liaise with regulatory authorities as necessary;

An investigative programme for Stage 2 of the proposal will be developed in liaison with the Environmental Protection Authority and the Department of Conservation and Land Management.