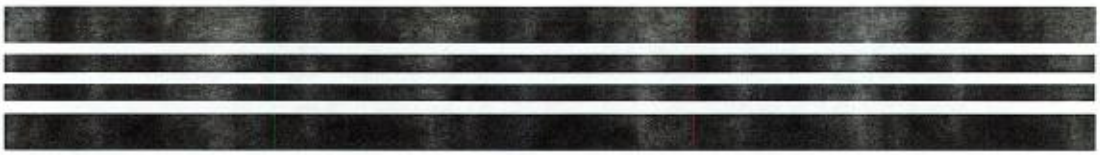

EIS 836

AB019538

Fynred Pty. Ltd. environmental impact statement for gravel extraction, Halls Creek

ENVIRONMENTAL IMPACT STATEMENT

GRAVEL EXTRACTION

HALLS CREEK

for

FYNRED PTY. LTD.

FYNRED PTY. LTD.

ENVIRONMENTAL IMPACT STATEMENT

FOR

GRAVEL EXTRACTION

HALLS CREEK

Prepared by

T.J. Stewart & Company Pty. Ltd.
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August, 1993

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[42827] Form 4

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979 (SECTION 77(3)(d))

ENVIRONMENTAL IMPACT STATEMENT

This Statement has been prepared by or on behalf of FYNRED PTY.LTD. c/- T.J.STEWART PTY.LTD. being the applicant making the development application referred to below.

The Statement accompanies the development application made in respect of the development described as follows:—

The extraction of gravel from gravel deposits in Halls Creek, the crushing and screening on site and then transportation to a stock pile area in Lloyd Street, Manilla as well as selected transport direct to batch plant.

The development application relates to the land described as follows:—

No. ..... Street Halls Creek Road, Halls Creek

Locality/suburb Halls Creek and Manilla

Real property description (1)Gravel site- Lot 2 DP.579652&Pors.16,44 and 50 Ph. Fleming-- STOCKPILE SITE-Town of Manilla.

(e.g. Lot, D.P./M.P.S., vol./fol., Parish, Portion)

The contents of this statement, as required by clause 34 of the Environmental Planning and Assessment Regulation, 1980, are set forth in the accompanying pages.

Name, Qualifications and Address of person who prepared Environmental Impact Statement

TERENCE JAMES STEWART

Unrestricted Regd. Valuer
Consulting Surveyor

P.O.BOX 212,

ARMIDALE NSW. 2350

Certificate.

I, TERENCE JAMES STEWART, of T.J.Stewart Pty.Ltd, hereby certify that I have prepared the contents of this Statement in accordance with clauses 34 and 35 of the Environmental Planning and Assessment Regulation, 1980.

Signature

19th. AUGUST 1993

Date

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NOTES ON THE TEXT

Would/Will

As a determination as to whether or not the proposal will proceed will only be made after the Environmental Impact Statement (EIS) has been on public display and public submissions have been considered, the future conditional tense is used throughout this EIS when describing the proposal and alternatives and assessing impacts. "Would" is, therefore, used throughout the text in preference to "will".

If it is decided to proceed with the project after a determination is made, all "would' references should be interpreted as "will".

INTRODUCTION

1.0 INTRODUCTION

1.1 OBJECTIVE OF THE PROPOSAL

Fynred Pty. Ltd. seeks development consent to extract gravel from a single site area in the Halls Creek, a tributary of the Namoi River and approximately 15.9 kilometres North-East of Manilla.

The Company desires to carry out the gravel extraction to use in the production of concrete by firstly, extracting the gravel from the Halls Creek bed and then crushing on site and transporting by trucks to a stockpile on vacant land within the Town of Manilla and then, as required, to be transported to the existing batching plant for concrete production. There may be times when the transported material will be taken direct to the existing batching plant.

It is further anticipated that certain amounts of crushed gravel would be sold to other local users.

The purpose of the gravel extraction at the site in Halls Creek is to provide a reliable source of gravel which is of good quality for use in the concrete manufacture, as well as, for other uses such as road works, gravel bedding etc..

The deposit will meet the requirement of the concrete industry which is the prime use. It is within a reasonable location to the main market area of Manilla.

The proposal is for the operation of gravel extraction, crushing, site storage, transportation to Manilla for stockpiling and the secondary transport to the batching plant with some transportation from the stockpile in Manilla to outside interests.

It is proposed to provide environmental protection controls into the planning and operation of the site as to minimum adverse impact. This well also include transportation and stockpiling in Manilla.

The extraction proposal is under the Environmental Planning and Assessment Act, 1979 Schedule 3 defined as "designated development".

With lodgement of a Development Application, an Environmental Impact Statement has to accompany such and this document has been prepared to fulfil the requirement of the Act.

1.2 SCOPE OF THE STATEMENT

The Environmental Impact Statement for the site identifies and assesses the environmental impacts, the resources and includes actions required to minimise any adversity to the area. It has been prepared in accordance with Regulations 34 and 35 of the Environmental Planning and Assessment Regulations, 1980. The Director of the NSW. Department of Environment and Planning has been consulted as to completing the preparation of the Statement and matters of the form and contents of the Statement have been addressed and taken into account.

The requirements of the Director are attached herewith in Appendix 1.

The major components of the Statement are:

a. a full description of the designated development proposed by the Development Application;

b. a statement of the objectives of the proposed designated development;

c. a full description of the existing environment likely to be affected by the proposed designated development;

d. identification and analysis of the likely environmental interactions between the proposed designated development and the environment;

e. analysis of the likely environmental impacts or consequences of carrying out the proposed designated development (including implications for use and conservation of energy);

f. justification of the proposed designated development in terms of environmental, economic and social considerations;

g. measures to be taken in conjunction with the proposed designated development to protect the environment and as assessment of the likely effectiveness of those measures;

h. details of energy requirements of the proposed development and measures to be taken to conserve energy;

i. any feasible alternatives to the carrying out of the proposed designated development and reasons for choosing the latter;

j. consequences of not carrying out the proposed designated development.

In addition the Director has specifically required attention to the following matters:

- amount of gravel to be extracted per annum and expected life of operation;
- impact on Halls Creek and Namoi River including potential for bank or bed erosion both at site and downstream and impact on water quality. Measures to control erosion and water quality to be specified;
- impact on flooding;
- identification of other gravel and/or sand extraction activities on Halls Creek and consideration of cumulative impact;
- traffic and road issues, including the need for any road or access upgrading. Traffic volumes, routes and vehicle types to be identified;

- measures to control dust and noise, particularly from crushing operations;
- bushfire hazard;
- progressive rehabilitation measures;
- results of consultation with:

  Department of Water Resources
  Environment Protection Authority
  Department of Conservation and Land Management
  (Soil Conservation Service)

In preparing the Environmental Impact Statement an approach is to be made to the Manilla Shire Council and take into account any comments Council considers may apply to its determination of the proposal.

In assessing the requirement for this Statement, service of various experts have been used in various fields.

Also consultation has been made with various other Government Authorities and their requirements have been incorporated into the project plan of management. The responses to these consultations are tabled in Appendix 7.

1.3 PROJECT OWNERSHIP

Fynred Pty. Ltd. is a family Company with Edward and Gwendolin Taylor as the Directors/Shareholders. The Company address is Northbrook Lane, Manilla.

The Company has been operating a concrete batching plant in Manilla for about 15 years and started operations with a Council approval batching plant and obtains its raw material as follows:

Cement from Tamworth
Sand/Gravel from Tamworth and Gunnedah (mainly from Pioneer Concrete)

The Company has been purchasing these materials from these sources since the commencement of operation and now is finding costs of the materials and transportation rising to a degree of a question of economic viability and to be able to remain in an economical situation, as well as, continuing to provide the Town and area with a concrete supply desires to obtain the hard material gravel from a local source. Also there is the question of the gravel supply being secure in provision from outside sources. This will allow a cost saving in one of the materials. The supply of sand and cement will still have to be maintained from sources in Tamworth and Gunnedah.

With Manilla continuing to develop the Company desire to be able to provide a continuing supply of basic concrete economically and competitively to the Town.

The Company Shareholders also own the only timber mill in Manilla, as well as, providing building supplies and a Bobcat hire.

Mr. & Mrs. Taylor are established residents of Manilla and are an integral part of the community both in business and community and the ability of being able to obtain the gravel components from a local source will allow them to maintain a viable business and provide a continuing necessary product to Manilla and to it continuing development, which otherwise would have to come from outside sources which would be more expensive, as well as, taking expenditure out of the area.

By having the subject project the Company would be able to rationalise its operation and further possibly expand, as well as, being able to, in the implementation of the project, ensure a continuous supply of gravel material and maintain its position, as well as, supply to the Manilla district in a very important part being concrete production.

SUMMARY

2.0 SUMMARY

2.1 OBJECTIVE

Fynred Pty. Ltd. is seeking development consent to extract gravel from the bed of Halls Creek which contains an aggregate deposit therein, 15.9 kilometre North-East of Manilla.

The Company proposes to extract the gravel and use a single site for screening and then transporting direct along the Bendemeer-Manilla Road and into Manilla for stockpiling using an articulated or/and rigid single axle and/or bogey rigid vehicle.

Total extraction will average 200 cubic metres a month being about 2400 cubic metres a year. The site of extraction contains a reserve of about 30,000 cubic metres.

Extraction will by front end loader and if required a secondary use will be made by excavator. The extracted material will be taken to the screening plant where after screening and stockpiling into size will be loaded for transportation to Manilla.

The total life of the operation is estimated at 10 years. However, the reserve of about 30,000 cubic metres is above water level and geological assessment provides additional reserves of 30,000 cubic metres below water level. The Geological Report also mentions that as gravel is removed it will be replenished with new gravel during peak flood events. The life of the operation mentioned is a stated minimum life which will in all practical observation be extended beyond this.

Employment will consist of 2 persons on site who will carry out the extraction, screening and transportation to Manilla. This employment will have indirect benefit to other supplying goods to the project.

No blasting operation will occur, only gravel removal and screening and all operations will be confined to 7.00 a.m. to 5.00 p.m. for five days a week with operation on Saturdays from 7.30 a.m. - 12.00 noon and no Public Holiday or Sunday activity.

The object of the proposal is to make available reserves of good quality gravel suitable for aggregation in concrete and secondary for other projects in development projects within the Manilla area. A basic requirement of the proposal is to remove the requirement of importing gravel from outside sources for the concrete batching plant which comprises part of the escalating costs of concrete products. This proposal will assist in reducing and helping to keep the costs in an economical viable state and will follow through for benefit to the Manilla area, as well as, providing a reliable source. Should the gravel extracted contain any sand material this will be screened out and used to assist in supplying the batch plant.

2.2 MANAGEMENT

In the operation of the site, the Company will comply with all legislative controls, State Government and Local Government Council controls and conditions thereto and will obtain necessary licences.

Management will include all safeguards to the environment, will control and keep any environmental adverse effect to a minimum and will be conscious of protecting the environment at all times.

It will also respect the residents of the area and transport routes to allow a continuation of enjoyment of existing living standards. The residents along the route and within the area of the operation will be encouraged to advise of any request if any disturbance to their enjoyment occurs and review meetings would be part of management practice to co-ordinate changes to normal flow patterns.

The procedure of the management before the proposal proceeds would be to obtain the following detailed consents, licences, approvals and concurrences:

- Manilla Council - to obtain development consent for the extraction operation of the site. The Development Application is to be lodged to Council with this Environmental Impact Statement;
- obtain approval from the Environmental Protection Authority before commencing any work and if required by the Authority to obtain an annual licence;
- obtain a permit from the Water Resource under Section 3A of the River and Foreshores Improvement Act;
- obtain an authority under Section 21D of the Soil Conservation Act to cover any damage or destruction of any trees within the riverine zone or within 20 metres of the banks;
- obtain a licence under Part II of the Water Act for pumping from Halls Creek;
- authority under the Clear Water Act for discharge of sediment basin waters back into Halls Creek;
- obtain any necessary approval under the Clear Air Act and Noise Control Act.

In addition consultation has been made with various Government and Local Government Authorities and their requirements and requests have been incorporated into the project plan of management. The response to these consultants are included in Appendix 7.

2.3 ENVIRONMENTAL IMPACT

There would be strict adherence to any requirement of State and Local Government conditions and there would be stringent controls to prevent any pollution entering Halls Creek.

The operation would have built-in safeguards to reduce the level of atmospheric pollution. There would be no loss or very little loss to existing flora and fauna and impact in archaeological sites are nil.

There would be very minor visual impact to the operation by existing residents near the project and those travelling along the nearby Manilla-Bendemeer Road. Every attempt and step would be taken to take corrective action on any impact.

Dust nuisance would be minimum and would only occur under certain conditions especially hot and dry windy days, but by the very nature of the material it has very low dust particles. The major nuisance would be any stockpiling in severe conditions and also by truck movements on the site and to the Public Road, but control of operation would ensure minimum impact.

Due to the isolation of the site and the low population of the area, noise pollution will be minimal and in fact is considered will not exist except for some noise generation from the screening plant in favourable wind conditions.

There is from investigation only one other possible economical source along Halls Creek available and this is some 5.6 kilometres further East. It is, however, inferior to the subject area and its cost of preparation and extraction would be higher and with an indepth analysis could show to be uneconomical.

Because of the restricted and limitation on suitable deposits of the quality gravel no real alternative site is available or known. The major concern of detrimental environmental impact is impact the operation has to the Halls Creek natural characteristics, as well as, potential for water pollution, as well as, increased heavy vehicle traffic on the transport route to Manilla and within Manilla.

No extraction would mean the Company would be at a disadvantage to other sources of concrete manufacturers. The Company has been producing concrete for many years for the Manilla district with imported raw material. It now finds the total costs of these are greatly increasing and this will cause additional cost to the consumer and also there is the factor of the question of reliability for this heavy component of concrete manufacture. The worst scenario is the Company could see itself of having to terminate sections of employment and even shut down of the batching plant.

Manilla is a small country Town which is further developing and needs this business as it provides the second highest employment in the Town while the business provides a necessary service to the area and the Town would be at a complete disadvantage without the plant. Manilla would be the poorer if such a loss occurred. The integration of obtaining a supply of gravel from the proposed source with the other required materials of cement and sand from outside areas will allow a continuation of economic viability for production of concrete to the Town.

DESCRIPTION OF THE ENVIRONMENT

3.0 DESCRIPTION OF THE ENVIRONMENT

3.1 LOCATION

The site is approximately 15.9 kilometres North-East of the Town of Manilla by all bitumen surface except for a small section from the access from the main Roadway to the site.

The access Road from Manilla is the Halls Creek Road from Manilla to Bendemeer/Watson Creek.

Locality Plans are attached showing the site in Appendix 2:

1. Figure 1 - Regional Map.
2. Figure 2 - Part of Land Information Council Plan "Mundowey" - 9036 -1-S.
3. Figure 3 - Local Plan of the area which is an enlargement of Figure 2.

3.2 ACCESS

Access to the proposed area is from the Halls Creek Road through an existing ramp at the original house area of 'Springfield' (such house has burnt down) and then Northward to an existing gate for 150 metres and then follows along a rough existing track along the Halls Creek bank to the site being some 400 metres from the access ramp.

Transportation of the gravel will be from the site to the Halls Creek Road at the access ramp then along Halls Creek Road to enter Manilla in Strafford Street via Arthur Street, Market Street, Manilla Street, Charles Street, Arthur Street and into Lloyd Street.

At some occasion material will go direct to the Batching Plant via Kanangra Road and into Glencoe Street.

From inquiry to Manilla Shire Council this route within the Township is in accord with their preferred transport route.

3.3 LAND TENURE

The gravel extraction site occupies that area of Halls Creek between the banks with screening, bin area and other associated works on the right bank side of Halls Creek.

The access Road area from Halls Creek Road to the site is within portion 12, Parish of Cuerindi, County of Darling and is the land in Lot 2, D.P. 579652 and being lands on the South side of Halls Creek.

Lots 1 and 2, D.P. 579652 are in the ownership of Lionel Bruce and Kathleen Berry as tenants in common of equal shares in Certificate of Title Identifier 1/579652 and 2/579652.

The Title contains the following Reservation and Condition:

1. Land excludes Minerals and is subject to Reservation and Condition in favour of the Crown.

2. Land excludes the Roads shown in D.P. 579652.

The crushing site is within Portions 44 and 50, Parish of Fleming, County of Darling and are the lands in Lots 44 and 55, D.P. 752182.

Lots 44 and 50, as well as, Portion 16 (Lot 16, D.P. 752182) Parish of Fleming are in the ownership of Barry John and Julianna Umback as joint tenants in Certificate of Title identifier:

Portion 44 - 44/752182
Portion 50 - 50/752182
Portion 16 - 16/752182

The Title contains the following Reservation and Condition.

1. Land excludes Minerals and is subject to Reservation and Condition in favour of the Crown.

2. Land excludes the Roads shown in D.P. 752182.

Adjoining Portions 50 and 16 is Portion 53 all in the Parish of Fleming, County of Darling and Portion 50 is known as Lot 50, D.P. 752182. Portion 50 is in the ownership of Barry John and Julianna Umback under Certificate of Title Volume 1997, Folio 234.

The Title contains the following Reservation and Condition:

1. Land excludes Minerals and is subject to Reservation and Condition in favour of the Crown.

2. Land excludes the Roads shown in D.P. 752182.

A copy of the Title and Title Plan, as well as, a Tenure Plan is attached in Appendix 2.

The Title to both sides of Halls Creek show the banks of Halls Creek as the Title boundary and the gravel beds considered to be in private Title lands.

However, it is of opinion that as the Titles to the land are of an original Crown tenure nature that by virtue of the date of Grant have a claim of Riparian rights to the land of Halls Creek which would result in each Title holder on each side of Halls Creek (banks) having Title right to the central thread of the stream.

The land to be used for stockpiling in Manilla is Portions 184 and 186, Parish of Veness and comprises 1.027 Hectares.

The lands are in the ownership of E.E. & G.M. Taylor being the Directors of the applicant Company.

3.4 ZONING

Under Manilla Shire Council Local Environmental Plan, 1988 the land is zoned 1(a) General Rural in the area of the gravel excavation and screening.

In the stockpile area within the Town of Manilla the land is also zoned 1(a) General Rural and is within the flood liable area.

1. Objectives of zone

The objectives of this zone are:

(a) to enable development for purposes that are:

(i) appropriate in a rural location; and

(ii) sympathetic with the environmental characteristics of the land and the costs of providing public services and amenities;

(b) to promote efficient sustainable agricultural utilisation of agricultural land, particularly prime crop and pasture land;

(c) to facilitate farm adjustments;

(d) to conserve prime crop and pasture land by ensuring that:

(i) it is not unnecessarily converted to non-agricultural purposes and

(ii) any allotment created for an intensive agricultural pursuit is potentially capable of sustaining a range of purposes suitable to the locality; and

(e) to protect or conserve:

(i) soil stability by controlling development in accordance with soil capability;

(ii) forests of commercial value for timber production:

(iii) valuable deposits of minerals, coal, petroleum and extractive materials by controlling the location of development to enable the efficient extraction of those deposits;

(iv) trees and other vegetation in environmentally sensitive areas where the conservation of the vegetation is likely to reduce land degradation;

(v) water resources; and

(vi) travelling stock routes.

2. Without development consent

Agriculture (other than ancillary dwellings and intensive livestock keeping establishments); forestry (other than ancillary dwellings).

3. Only with development consent

Any purpose other than a purpose included in Items 2, 4 or 5.

4. Advertised development - only with development consent

Subdivision proposals providing for the creation of 6 or more allotments; intensive livestock keeping establishments; shops.

5. Prohibited development

Boarding-houses; motor showrooms; residential flat buildings.

Under the zoning description paragraph 1(e) states one of the objectives of the zone is:

(iii) to protect and conserve valuable deposits of minerals, coal, petroleum and extractive materials by controlling the location of development to enable the efficient extraction of those deposits;

The zoning therefore gives permission to carry out extractive industries, as well as, use of areas as a stockpile subject to consent of Council which is further given approval under paragraph 5 of the objectives as such is not a prohibited development. Such development has to be in an environmental acceptable manner.

The development area under Schedule 3 of the Environmental Planning and Assessment Regulation, 1980 is development defined as designated development by virtue of paragraph (n) is stating an extractive industry is described as:

(i) the winning of extractive material, not being coal, petroleum, or any mineral within the meaning of the Mining Act, 1973; or

(ii) an industry or undertaking not being a mine, which depends for its operations on the winning of extractive material from the land which it is carried on, but not being extractive industries on land to which Sydney Regional Environmental Plan. No. 11 - Penrith Lakes Scheme for the time being.

Under the Environmental Planning and Assessment Model Provision 1980, extraction industry is further defined to include extractive material:

(a) the winning of extractive material; or

(b) an industry or undertaking not being a mine, which depends for its operations on the winning of extractive material from the land which it is carried on;

"extractive material" means sand, gravel, clay, turf, soil, rock, stone or similar substances.

In Manilla Shire Council L.E.P. 1988 Zone 1(A) to which the areas are located does not exclude extractive industry as : 5. Prohibited; 3. Only with Development consent; or 2. Without Development consent,.

The gravel extraction and its associated stockpiling is therefore a permitted development subject to Advertisement and Development consent and due to Schedule 3 and Sec 77(3)(d) of the Environmental Planning and Assessment Act, 1979 is a designated development requiring a Development Application with an Environmental Impact Statement and therefore the application for the subject extraction is considered a permitted application.

Zoning information to the sites is attached in Appendix 2, Figure 16, 17 and 18-1 to 18-6.

3.5 SERVICES

(a) Extraction site - Halls Creek

Electricity and telephone are within the immediate area. Both could be made available for use without undue disturbance of the existing environment. It is not expected, however, that each of these services as provided would be required for extension into the excavation and screening areas.

(b) Stockpile site - Lloyd Street

Electricity, telephone and mains water are available with a water meter provided to the site. There will be no known requirement for either electricity or telephone. Water could be of use to watering down any requirement for tipping or static stockpiles where dust could generate in windy conditions by the drying of material.

3.6 ACCESS

(a) Extraction site - Halls Creek

Access to the site is by the Halls Creek Road from Manilla to Bendemeer which is a good quality rural bitumen surface Road and is all weather.

Entry to the site is by an existing ramp with satisfactory sight distance each way. From the ramp to the extraction site the current low profile track would be upgraded to a gravel surface to allow use of heavy trucks.

Transportation of the majority of material is from the site to the stockpile area in Lloyd Street, Manilla. There would be occasions where the material may be required direct to the batching plant. From the stock pile area the material would be taken as required to the batching plant.

The Company sees at times there may be a requirement for sale of the gravel outside the direct use by the batching plant. This would be from the stockpile area in Lloyd Street and then onto the Main Road No. 63 for destination.

The main access Road from the extraction site to Manilla, as well as, the various Streets in Manilla to be used are Shire controlled Roads.

The access Roads in the extraction area, as well as, the Town Streets are shown in Appendix 2, Figures 19 and 17 while Figure 30 and Appendix 6, Figure 9 shows the immediate transport routes to be used by the Company.

3.7 ARCHAEOLOGY

An Archaeological Survey has been conducted over the extraction area at Halls Creek by Clair Smith of the University of New England, Armidale and with the Department of Archaeology and Palaeoanthropology.

The Survey completed in November, 1992 recommends that the project can proceed as no site of Aboriginal, scientific or public significance were identified. However, the Report does require a halting of operation in the event of discovery of any relics during works.

These results followed a detailed field Survey for Aboriginal archaeological site in order to ensure that appropriate sensitive areas, as well as, review and liaise with the Aboriginal Land Council to determine their interest in the study area.

This study was recommended by the NSW National parks and Wildlife service - see Appendix 7.

The Survey and Report have made two recommendation as mentioned above into allowing the project to proceed and these in more detail are:

1. On the basis of the surficial evidence and the significance assessment outlined above no objection should be raised on archaeological grounds to the proposed development being undertaken in the Survey area.

2. All operations should be halted if any other relics as defined under the National Parks and Wildlife Service Act (1974) are discovered. It is an offence under the Act to damage, deface, disturb or destroy any relic unless prior written consent has been given by the Director. If other relics are discovered the Armidale District Office of the New South Wales National Parks and Wildlife Service should be contacted immediately and work on that section of the development should be halted until clearance has been give by National Parks and Wildlife Service.

The Archaeological Report is attached as Appendix 3. No report was commissioned for the stockpile within the Town area.

3.8 TOPOGRAPHY

(a) Halls Creek area

In the area of the extraction area and screening area comprises a wide range of topographical features from River bed to level River bank areas to ridges, slopes, terrain and steeper grades on the North side of Halls Creek.

Elevations are from the Creek bed and valley area of about 400 metres to rising to altitudes of 600 metres in the North and about 530 metres in the South with further areas to 650 metres.

Basically the area comprises a valley with the Halls Creek meandering through from its catchment in the East within the Great Dividing Range and empties into the Namoi River in the West.

The area is mainly unforested, but some woodland areas exist in the East. The unforested environment is due to European settlement and the general clearing of land for agricultural in the River bank areas and grazing elsewhere.

Existing vegetation comprise basically stringy bark, peppermint, weeping willow, peppercorn and river red gum with river she-oaks.

The area originally would have supported a wide range of flora and fauna, but today is basically reduced to unforested area with open scattered timber and grazing by cattle, sheep, horses, rabbits and any introducing goats.

The site area itself will not cause or create for further destruction of existing trees save some possible young growth scattered through the gravel deposits. It is not seen that the development will cause any acceleration of further erosion. In fact by the proposed management erosion mitigation work together with natural benefit will be incorporated and will especially benefit the choked nature of the Creek and its natural damage that is being created to side banks or energy stored water as they change direction.

Appendix 2 - Figure 2:	Shows the timber density of this area.
Appendix 2 - Figure 2:	Shows the contours to 10 metre intervals of the site and immediate surround.
Appendix 2 - Figure 20:	Shows the relief of the region.
Appendix 2 - Figure 21:	Shows the slopes of the region.
Appendix 2 - Figure 22:	Shows the site detail.

3.9 GEOLOGY

The geology of the site has been carried out by Associate Professor Peter G. Flood of the Geology Department of the University of New England.

The deposit area is some 6 kilometres from the Namoi River and comprises longitudinal gravelling bars within a braided stream.

The bank of the Creek contains sandy loam and are subjective to existing erosion. The basic geology of the area is Paleozoic basement rock which includes greywacke, cherts, volcanics and sandstones.

The soils are predominantly duplex red brown earth. In the Halls Creek itself are two areas of the more permanent waterway and then extended gravel terraces that also incorporates themselves into the Creek flow.

Subsoils are layered due to variable deposition of the original parent material.

The geological study of the Creek area reports that the proposed extraction will have minimal effect and will further assist in reducing erosion that is naturally occurring to the Creek parts.

The Geological Report is contained in Appendix 4 and a further reference to the geology is contained in the Archaeological Report Appendix 3..

No Geological Report was carried out for the stockpile area in Manilla.

3.10 FLORA AND FAUNA

A Flora and Fauna study has been made of the area of the gravel extraction in Halls Creek by David Paul, BSC & Associates, Environmental Consultants of Armidale.

In his Report he advised as follows:

1. Description of site

   (a) General

   Hall's Creek, a tributary of the Namoi River, meanders it's way through the Western foothills of the Moonbi Range to join the Namoi near Manilla. This region is characterised by an undulating topography which flattens out as you come towards the Namoi. The Creek itself varies considerable in depth and width ranging from substantial pools to shallow, fast flowing areas broken up by the rocky substrate. The Northern side of the Creek is characterised by steep eroded banks while the Southern side is characterised by flat, rocky banks. The alluvial bank conditions are due to periodic flooding of the Creek and are typical of small, meandering waterways. At the proposed extraction site there is a substantial area of deposited rocky substrate on the Southern/Eastern side of the bend with eroded banks on the Northern/Western side, up to 3 metres high. This highlights the propensity of this section of the Creek to deviate from it's current position although the Creek itself at the site is presently a series of shallow pools.

(b) Vegetation

The foothills in the Hall's Creek area are characterised by low, grassy woodland, though most of the lowland areas have been cleared for agricultural purposes. These woodland communities are characterised by several endemic plant species, particularly two of the tree species, *E. mannifera* subsp. *elliptica* and *E. bridgesiana* subsp. *malacoxylon*. Other trees species recorded in the area were *E. conica, E. radiata,* and *E. blakleyi*.

The riparian vegetation community along Hall's Creek were characterised by the following tree species; *E. mannifera, E. bridgesiana, Casuarina cunninghamiana, Schinnus areira* (Pepper Tree) and *Salix babylonica* (Willow Tree). The understorey is mainly dominated by introduced weeds, predominantly *Verbascum virgatum, Argemone mexicana,* and *Commelina benghalensis.*

Aquatic plants in and along the Creek were mainly *Juncus sp* and a small-leafed floating hydrophyte.

(c) Faunal Species Detected at Hall's Creek (16 - 17 December)

Due to limited time available to undertake extensive surveying, faunal diversity presented here is certainly an underestimate of all species utilising the riparian habitat of Hall's Creek. However, the Creek and both banks of the development area were thoroughly searched during the day and night and all species observed or detected are given below. Further searches were made upstream and downstream of the development site to pay particular attention to the platypus and frog species.

Various bird life was found and is listed in the Report, as well as, reptile, amphibian and mammal listing. See Appendix 5.

Disturbance has occurred to the area by agricultural usage and by introduced trees and weeds to the area. However, there are good numbers of faunal species and there is a high level of species diversity.

In the Creek area disturbance has occurred by stock and feral animal usage and also by the introduced carp.

The envisaged gravel extraction will have some effect on the existing fauna rather than the flora and is dependent on scale and operative life.

There are two identified threatened species in the area and being:

(a) Platypus (mammal)

(b) Bush Thick-Knee (bird)

A full report of the Flora and Fauna is enclosed in Appendix 5.

3.11 CLIMATE

There is no official meteorological station in the locality and climatic considerations have ben ascertained from local sources and for that at Tamworth.

3.11.1 Rainfall

Rainfall for the area is 660 mm per year average with lowest falls in the Autumn and Winter months. Rain days per month vary from 8 - 10 with the greatest number during the Spring and Summer months. Appendix 2, Figures 23, 24, 25 and 26 shows the rainfall and percentile for January/April/July/October while Figure 27 shows the average monthly evaporation rate within January, being the highest.

3.11.2 Temperature

Mean monthly temperatures vary in Tamworth area from 15°C in July to 31°C in January.

3.11.3 Winds

Statistics show that the prevailing winds are from the South-East for five months of the year. The maximum consistent wind is about August to September.

At the site during morning periods, winds would be gentle and generally Easterly during the hotter months and they would be Westerly during the colder months. Afternoon winds are likely to be stronger and from the West throughout the year, but stronger during Winter periods.

The site area would, by its topography, have a large effect on the surface winds and with the protection of surrounding hills there would be direction and speed effects to the more open areas.

Inversion layers form during the cooler months and are close to the ground prior to sunrise and generally disperse by later morning.

3.12 VISUAL ASPECT

The site is surrounded by grazing land and the occasional cropped land. Dust levels in the atmosphere would be, from the site, very low and would vary in accordance with traffic use of the rural Roads and agricultural activity, rainfall and wind.

It can be said that dust levels would be higher in dry periods with strong winds and lowest in rainfall periods with low winds.

At the site, atmospheric quality can be described as rural clean with contaminants limited to dust from the rural Road, stock movement, ploughing and fertilisation plus agricultural and Road machinery fumes.

Air quality is consistent with the rural environment and is considered to be good. Any deterioration that would occur would thus result from:

- wind passing over dry and exposed lands including exposed recent ploughed land;
- activities by vehicles on gravel Roads and agricultural machine operation in dry exposed conditions including ploughing and harrowing which would generate windborne dust;
- strong prevailing Westerly winds carrying other area materials such as smoke and dust.

3.13 HYDROLOGY AND WATER QUALITY

The gravel extraction area is located in Halls Creek and within the Namoi River catchment area.

To the site and adjoining in the North-East bank are two ephemeral streams which runs North-East and East and comes from higher ridge country.

Surface water sampling of Halls Creek has not taken place. However, in the flora and fauna Report, the study shows that the Creek itself is in relative good condition with levels of invertebrates high together with small native fish also being present.

Contamination of the stream would at present result from stock use and natural erosion occurring to the banks, as well as, the carrying of sediments during flood periods.

3.14 LAND USE

The surrounding area is used for grazing of stock, being cattle and sheep and the properties at the site are medium size holdings. Some areas of cultivation occur for cash cropping along the banks of Halls Creek.

The site itself has been used for grazing and forms part of the properties of 'Amaroo' owned by L.B. & K.I. Berry and 'Croydon' owned by B.J. & J. Umback.

Properties in the area are variable in size from 172 Hectares to larger medium properties of 800 Hectares. A property map is enclosed in Appendix 2, Figure 4.

3.14.1 Residential

There are four residential buildings within the immediate area and these residential dwellings are shown in Appendix 2, Figure 28.

Residential dwellings along the transport route outside the Town of Manilla area are referred to under paragraph 3.15 (Road Inventory).

The closest dwelling is 'Amaroo' which has in fact three residential houses there being two original dwellings and a new residence on a higher altitude.

The second closest is 'Croydon' which is located upstream. Both these properties adjoin the subject gravel site and both being grazing properties.

The fourth residential building in the area is 'Drumlisk' which is located downstream and West of the extraction site.

All the dwellings have access from Halls Creek Road and only the new residence of 'Amaroo' would have a possibility of direct visual observation of the site and this would be greatly restricted by existing trees. The reason for this is its location on the top of a ridge line, at a higher altitude to the extraction site.

The dwelling affected land holders are L.B. & K.I. Berry of 'Amaroo' who it is advised have no objection and the land holders B.J. & J. Umback of 'Croydon' whom were interviewed and also are in full support of the project.

Neither the dwellings of 'Amaroo' or 'Croydon' will have any direct association with the project as they are both located East of the project. All the district residences are associated with agricultural farming being cultivation and grazing pursuits.

Residential homes within the stockpile area in Manilla are shown in Appendix 2, Figure 29.

3.14.2 Recreational

The area is not used for any recreation and no recreation areas are provided or in existence. All lands are privately owned and the Public only have access along the Public Roads.

Halls Creek is not an ideal watercourse for swimming as water depth is relatively shallow, as well as, size of the water area. Fishing is not considered an appropriate sport and if interests occur, approval from property owners would be required.

3.14.3 Public Utilisation

Except for normal rural property service of electricity, telephone and Shire Roads, there are no other Public utilities within the area.

3.15 ROAD INVENTORY

Access to the site is via a single Road known as Halls Creek Road which is within the Shire of Manilla and is maintained by Manilla Shire Council.

Halls Creek Road provides the only access direct to Manilla from the Halls Creek Valley, but also provides a route to the New England area of Uralla/Armidale/ Bendemeer and Watsons Creek. It also allows access from Manilla to Attunga.

The Road is all bitumen surface and is within a 100 kph zone. It has good geometry and the general longitudinal section is easy and comprises low energy undulation with areas of very low grade to level.

From advice from the Manilla Shire Council Engineer, traffic counts along Halls Creek Road are low being 30 to 60 vehicles per full day.

Along the route from Manilla there are two main intersecting Roads being one from Attunga and another the Glen Barra Road.

The Road layout and profile is shown in Appendix 2, Figure 4 and Figure 30.

A summary of the transport route from Manilla to the site with the residences in visual and/or noise contact is shown below together with any relevant comments.

The Survey has commenced with the impact consideration from the intersection of Halls Creek Road with Kanangra Road.

Included are those visible dwellings along the periphery of the Road with a notation of (V) for visible to the Road and (N) for consideration of hearing Road noise.

LOCATION	DISTANCE FROM P.O. (km)	ROAD CONDITION	SPEED LIMITATION	HOUSE NO. & LOCATION	COMMENT
Kanangra Rd	1.2	bitumen	60	-	Town boundary
Halls Creek Rd	1.5	bitumen	60	1A-R	N/V
Halls Creek Rd	1.6	bitumen	100 sign	-	N/A
Halls Creek Rd	1.6	bitumen	100	2A-L	V
Halls Creek Rd	1.8	bitumen	100	3A-R	Golf Club - N/V
Halls Creek Rd	1.8	bitumen	100	4A-L	N/V
Halls Creek Rd	1.8	bitumen	100	5A-L	V
Halls Creek Rd	2.0	bitumen	100	6A-L	V
Halls Creek Rd	2.3	bitumen	100	7A-R	N/V
Halls Creek Rd	2.3	bitumen	100	8A-L	V
Halls Creek Rd	2.7	bitumen	100	9A-R	V
Halls Creek Rd	2.9	bitumen	100	10A-L	V
Halls Creek Rd	3.4	bitumen	100	-	Crest in Road
Halls Creek Rd	4.0	bitumen	100	-	Yarramanbully Creek Bridge
Halls Creek Rd	4.1	bitumen	100	R	Attunga Road
Halls Creek Rd	4.1	bitumen	100	11A-R	V/N 'Wilga Vale'
Halls Creek Rd	5.4	bitumen	100	-	Crest in Road
Halls Creek Rd	6.7	bitumen	100	12A-L	V - 'Coolalinga'
Halls Creek Rd	6.7	bitumen	100	-	Low radius curve
Halls Creek Rd	7.2	bitumen	100	13A-L	N/V
Halls Creek Rd	7.4	bitumen	100	-	Crest in Road
Halls Creek Rd	8.8	bitumen	100	14A-L	V - 'Namoi Park'
Halls Creek Rd	9.7	bitumen	100	15A-R	V - 'Chelsea'
Halls Creek Rd	10.3	bitumen	100	16A-R	V/N 'Southerndown'
Halls Creek Rd	11.3	bitumen	100	17A-R	V/N - 'Eltrickdale'
Halls Creek Rd	12.5	bitumen	100	18A-R	V - 'Myrtle Dale'
Halls Creek Rd	13.4	bitumen	100	19A-R	N/V - 'Silverdale'
Halls Creek Rd	13.5	bitumen	100	20A-L	V
Halls Creek Rd	13.5	bitumen	100	L	Glen Barra Road
Halls Creek Rd	14.1	bitumen	100	21A-L	V
Halls Creek Rd	14.1	bitumen	100	22A-R	V
Halls Creek Rd	15.1	bitumen	100	23A-L	V/N - 'Drumlisk'
Halls Creek Rd	15.9	bitumen	100	L	Access to gravel
Halls Creek Rd	16.2	bitumen	100	24A-L	V - 'Amaroo'
Halls Creek Rd	16.5	bitumen	100	25A-L	V - 'Amaroo'

V = Visual to Road
N = Hear Noise from Road
R = House right hand side
L = House left hand side
N/A= Not Applicable

House numbers 1, 1A to 10A are all within 2.9 kilometres of the Town boundary and comprise part of the extended residential areas of the Town with varying small holdings and are not considered as part of the rural infrastructure. These dwellings have not been shown on the referring Plan.

Houses No. 11A to 25A are all considered rural homes with an interest in grazing pursuits and are located along the Halls Creek Road for access.

Dust from travelling vehicles has virtually no impact as the Road is of bitumen surface.

3.16 ACOUSTIC ENVIRONMENT

The acoustic environment has a sound quality that can be described as non-urban quiet which is typical of a rural environment remote from major noise sources such as major Roads and Railways and aircraft flight paths at lower altitudes.

Disturbance to this environment would be caused by noise from:

- low volume Road traffic;
- agricultural machinery;
- wind in trees;
- insect activity, bird calls and stock;
- individual aircraft on a flight path over the area.

DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.1 PROJECT DESCRIPTION

The proposed development is to extract gravel from an existing gravel bed in Halls Creek and transport to a crusher plant.

The crusher plant would produce varying sizes of aggregates and then transported to Manilla for use mainly into concrete products.

To allow closeby source of material for the batching plant it is proposed to have on-site storage for the material at a property owned by the Directors located in Lloyd Street, Manilla. This is necessary as insufficient space is available at the batching plant and with outside transportation of sand and cement required, the majority of space available has to be allocated to these materials.

It is proposed to extract the gravel from commencement on the lower stream and move in an upward direction with level of extracts not below existing water level.

In total the area of extraction extends for approximately 325 metres and varies in width from 16 to a maximum of 42 metres. Over the 325 metre length the elevation of the deposit falls about 6 metres. The thickness of the deposit above the water level is arranged in three by 1 metre high steps or terraces of varying width.

In the extraction, the existing water flow area will not be disturbed allowing the natural flow and pooling area to continue. Part of the development is to use water from one of the pools and its protection is of necessity. All extraction will be in the dry area of the Creek.

There will be a screening plant erected on the site on the higher area of the right bank within the property 'Croydon' and to be out of known flood height. Access will be from the extraction area across an existing ford of the Creek and then on a rising grade on an existing excavated access to the screening plant.

The extraction area is limited by topographical restraint, as well as, material limitation. Considering these restraints, the development and potential for total development is very restricted and can only be, in total, considered as a small scale development.

4.2 METHOD OF EXTRACTION

The extraction method would be a methodical, well managed and environmentally controlled programme.

The method of extraction is to commence removal of the existing gravel bed from the lower stream point which is closest to the crossing and screening/crusher plant location.

A front end loader will be used to dig and load the haulage truck to the screening plant, as well as, to be used for rehabilitation works.

The excavation of the gravel will, although commence on the downstream end of the deposit, concentrate on the West bank side and away from the existing watercourse. The topography of the site indicates that the original bed of the Creek was on the West side and it traversed around left hand bend, continued to deposit material and move in its flow path to the East side whereupon it is continuing to do so and erode the vertical banks .

No blasting is required as all deposits are loose and accessible to a front end loader and in any situation where a front end loader is unsuitable an excavator will be used. The area of deposit on the South end and on the right side of the Creek will be only commenced, in operation after the main area is depleted.

This area of extraction will be carried out on a smaller scale to the main area, purely as a means of providing some additional payment in the form of Royalty to the owner of 'Croydon', to assist in supplementing financially strained resources from the property.

A single loader will be present on the site. The truck driver on arrival at the site will be accompanied by a second person who will operate the crusher. The truck will operate constantly all day transporting material from the front end loader to the screening plant.

Following the obtaining of graded material stockpile it will then be transported to the main stockpile in Lloyd Street, Manilla.

The crushing plant will be located, as mentioned, on the high right hand bank area and is at the base of a steeply rising slope with existing trees to its immediate foreground. Noise from the crushing plant will be contained within the area and by the distance to the Public Road and nearest dwelling, noise levels at these points can only be obviously considered as nil or very low.

All extraction of gravel will be above low water level and can only be conducted when conditions are dry as wet conditions could possibly result in a high Creek level making extraction impossible.

In accordance with the requirements of the New South Wales Water Resources, extraction will commence, as mentioned, on the downstream end and continue upstream at a gradient of 1 in 50. With no excavations below the normal flow level immediately adjacent to the Creek flow line. The same slope of 1 in 50 will be maintained from the water edge to the excavation limit.

Side batters of the excavation will finish with a gradient of 1 in 3 and at the upstream end of the gravel deposit attention will be directed to any washing away of the resource by maintaining a continuing working face at no steeper grade than 1 in 4. (The cross-sections are shown in Appendix 6, Figures 1-7). Nominated specific requirements of the New South Wales Water Resource are listed below:-

1. The excavations shall commence at the downstream end of the site and continue in an upstream direction at a slope no further than one part vertical in 50 parts horizontal. This same slope must also be maintained from the waters edge back to the limit of excavations, perpendicular to the flow of Halls Creek.

2. The side batters of the excavation should not exceed 1 part vertical to 3 parts horizontal. When operations approach the upstream end of the gravel deposit, some care should be taken to minimise the risk of the remaining resource being washed away during the flood events by maintaining the working face at no steeper than 1 part vertical to 4 parts horizontal.

3. Maximum depth of excavations shall not be below the normal flow level of Halls Creek immediately adjacent to the excavation.

4. Any stockpiles of gravel and/or topsoil, both prior to and following crushing, are to be placed above the 1 in 100 year flood level and located so as not to impede or divert surface flow. The stockpiles should be protected from erosion using the Soil Conservation Service standard erosion mitigation conditions.

4.3 MATERIAL OF EXTRACTION

A full investigation of the material was evaluated by P.G. Flood, Associate Professor of Geology of the University of New England and a full text of his Report is Appendix 4.

The gravel area comprises a series of longitudinal bars with a braided stream. The bars contain a range of closest sizes from 20 cm to 2 mm diameter, with an average sizing of 4 cm.

The gravel comprises chert, jasper, metabasalt, cleaved argillite and metagneywacke. These rock types are indicated. From the deposit are some sand sized particles or quartz and felspar.

The deposit is arranged in three in 1 metre high steps or terraces or varying lengths and extends for some 400 metres varying form 16 metres to 42 metres in width with a calculated resource of 30,000 m^3.

There is an additional resource of approximately 30,000 m^3 located below water level.

The Geological Report considers the environmental impact of removal at 200 - 500 tonnes per month would be minimal and while aggregate is removed from above water level no siltation will occur.

The Geologist also reported that morphology of the Creek is very stable and will continue with excavation taking place at the 200 - 500 tonne per month rate. Also the actions of the Creek are such that as removal takes place, replenishment will occur with new gravel during peak flood events.

4.4 EXTRACTION RATE AND LIFE OF OPERATION

The estimated total reserve within the area and above water level of Halls Creek is 30,000 cubic metres.

The extraction would vary, but expectations are for 200 m^3 a month possibly rising to a maximum of 400 m^3 on some occasions. Total annual extraction rate is about 2,400 m^3 with a possible rise to 3,500 m^3.

Variation will occur according to demand. The life of the resource at the extraction rate is, on average account, about 10 years.

4.5 PROCESSING OPERATION

The material will be extracted by front end loader and taken by truck to the crushing/screening plant where it will be crushed and screened and placed in graded piles. Transportation will then be to Manilla for stockpiling or direct to the batching plant. There may be a situation where an excavator is used in lieu of a front end loader. A material flow diagram is shown in Appendix 6, Figure 11.

4.6 DRILLING AND BLASTING

No drilling or blasting will take place as all material on site is able to be dug and loaded by a front end loader.

4.7 EQUIPMENT

Mobile equipment that would be used are as follows:-

1. Caterpillar 930 rubber tyred front end loader - 1.8 m^3.

2. Mercedes 2233 prime mover (registered) single steer axle, dual rear axle, 14 m^3 articulated tipping body.

3. International 1830 (registered) single steer, rigid single axle, 5 m^3 tipping body.

4. International AACO 2150B (registered) single steer, rigid dual axle, 9 m^3 tipping body.

5. Crusher/screening plant (yet to be purchased) considered to be mobile.
   Cone crusher.
   Jaw crusher.
   2 tier aggregate screen with sand washer.
   Generator.

6. Excavator - Type not known at this stage, but only of small size (about 2 m^3).

4.8 EMPLOYMENT

The Company has an infrastructure where the subject development and operations would form part of its overall infrastructure.

The utilisation of the gravel deposit is a very important component of its activities to its purpose of incorporation within its concrete manufacture. At present it has to rely on outside sources at distance and this is becoming a question of viability of economics, as well as, reliability of sources.

The Company has seven in employment and excluding Council is the largest permanent employer in Manilla giving consideration to an Engineering Firm that uses a majority of temporary staff.

To maintain its employment structure this development would form part of the useable resources of those employees who have expertise because of their day to day duties.

The Company has expertise in truck and large truck driving, earthmoving equipment and operating procedure in excavation works.

In a normal cycle of gravel recovery, two persons will be employed with one a front end loader driver/truck driver and the other a plant operator.

4.9 TRANSPORT

The production of about 200 m^3 rising to a maximum of 400 m^3 a month will be transported to Manilla at the rate of 100 m^3 a day for up to 2 days a month with a maximum, when required, of up to 4 days. At some times there may be less per day transported causing more day requirements of use of Roads.

Using the rigid trucks, transportation will require about 14 loads a day and with the articulated vehicle only about 7 loads a day or 28 and 14 daily movements respectively.

Vehicles to be used would be normal Road registered heavy truck of either single axle 5 m^3 tipping body to dual axle 9 m^3 tipping body to an articulated vehicle capacity 14 m^3.

The main transport route is shown in Appendix 2, Figure 30 in which Halls Creek Road will be used to Manilla and then via Town Streets to the stockpile area or/and some loads to the batching plant via Kanangra Road. The transport route in Manilla is shown in Appendix 6, Figure 9.

The transport route within Manilla meets the requirement of the preferred route by Manilla Shire Council following consultation thereto.

The intended route along Halls Creek Road to Manilla is the most direct and economical route to be used and does have the lowest impact to residents of the district.

4.10 ENERGY REQUIREMENTS

Only diesel fuel is to be used and this would be consumed by trucks, loader and generator set for the crusher/screening plant.

Total consumption rates would vary but it is envisaged for a single day operation would be in the area of 550 litres a day or 1100 litres a month up to a maximum of 2200 litres a month on certain occasions.

4.11 HOURS OF OPERATION

On site hours of operation and those at the stockpile site in Lloyd Street would be:

Monday to Friday - 7.00 am to 5.00 pm
Saturday - 7.30 am to 12.00 noon

There would be no operations on Sunday or Public Holidays and operating days will vary, but not continuous.

4.12 FUTURE REQUIREMENTS

There is no proposal to expand operation or further extension either upstream or downstream and all activities are those described and mentioned in this Report.

The site of the gravel deposits is restricted in its total area and the proposed development would utilise the area to the restraint points and then would shut down the site and leave the site under full rehabilitation.

4.13 WATER REQUIREMENTS

Water will be required for any suppression of generated dust in the crushing/ screening plant, as well as, necessary water for its operation.

Because of the nature of the gravel beds its very unlikely dust will be created from activities and therefore only limited water demands will be made and directly to the crushing plant.

Water requirements are calculated to be 35,000 litres per hour and used water will be collected in a sediment pond and silt collection pond.

4.14 PROJECT CONSTRUCTION

At present the site has been used by the owners of the properties for grazing and cultivation, as well as, stock movement and watering.

Also in the right bank area there appears to have been prior activities in quarry type activities and an adjoining non permanent water course has a small catchment dam for stock use, as well as, providing an erosion control to the exposed area.

The project construction programme is envisaged to commence immediately after approval and issue of all necessary licences.

The construction phase would include:-

- transportation of required machinery to site;
- site preparation of crushing/screening plant and constructing/improving accessways;

- construct sedimentation ponds and retention banks around plant;
- commencement of revegetation on the landward side of the sites together with screen planting in the crusher/screening plant area;
- commence an orderly development programme in accord with the management plan and utilisation in accord with design. Development plans are shown in Appendix 6, Figures 8 and 10.

4.15 STOCKPILING AND MATERIAL QUALITY

The material excavated on site is crushed and screened and stockpiling would be limited to about 2 days transport supply of 200 m^3.

The main stockpiling would occur in the stockpile site in Lloyd Street, Manilla. Here it would hold about 1,000 m^3 for a minimum of 3 - 4 months supply to the batching plant area and any outside direct sales.

The concrete batching plant produces about 150 m^3 of concrete a month of which 200 m^3 of gravel is required.

The gravel in the deposit area meets the requirements of the required quality of produced concrete.

The subject gravel deposits are a very strategic part of the Company operation and further is very important to also be able to supply gravel material to outside requirements within the Manilla area.

4.15.1 Stockpile Site - Manilla

The stockpile site in Manilla is the main area for drawing of gravel material for the batching plant. The site is shown in Appendix 2, Figure 29.

The requirement of such a site is necessary because insufficient space is available at the batching plant.

At the batching plant is the owner's dwelling, concrete manufacturing plant, small storage area for material, and parking area for the heavy vehicles.

When fully in use there is very limited available space and it can be said the area is highly congested and allows no room for extension.

Using the site in Lloyd Street for stockpiling of the gravel provides an area within easy reach and allows for the holding of material to allow a continuation of operation of the batching plant.

The site in Lloyd Street requires no extensive investigation as to environmental impact except in so far as address to flooding, visual and noise impact, as well as, pollution.

The site itself is located in a sparsely populated area on the North side of Manilla and North of the Namoi River and East of the Manilla River.

The area is in the General Rural 1(a) Zone and is nominated as flood liable land under Clause 22 Council shall not grant consent to carry out works within a floodway if such development is likely to:-

a. impede the flow of flood waters on that land or land in its immediate vicinity.

b. imperil the safety of person on that land or land in its immediate vicinity in the event of those lands being inundated with flood waters;

c. aggravate the consequences of floodwaters flowing on that land (or land in its immediate vicinity) with regard to erosion, siltation and the destruction of vegetation; or

d. have an adverse effect on the water table of that land (or of land in its immediate vicinity).

The site has access from Lloyd Street and comprises land owned by E.E. & G.M. Taylor and is at present a vacant site, containing 1.027 Hectares of land and being adjacent the bridge over the Namoi River on Main Road 63 and has frontage to Lloyd Street.

The site has been used for a period of time with stockpiling of sand.

For its stockpiling of the gravel a contour bank will be constructed approximately 5 - 6 metres above normal River medium flood level and above the existing outflow channel.

Above the contour bank level, stockpiling of the gravel will occur with the contour bank acting as a protector and catchment for the operating area of the stockpile.

None of the lower lands will be used and all operations are located with distance from the Namoi River bank.

The amount of stockpiling is low only about 1000 m^3 and such will not:-

a. impede the flow of floodwaters;

b. imperil the safety of persons in the vicinity;

c. aggravate the consequences of floodwater flowing on the land - in fact local residents advise that any flooding on the land has been only backwater;

d. have an adverse affect on the water table of the land or adjacent land.

Access of such transported material to and from the stockpile site will be from MR63 (Manilla Street) into the bitumen surface Charles Street, then on to the gravel surface of Arthur Street and then the unformed surface of Lloyd Street. This will have the least impact on those residents in the area.

Transport of material will not be everyday, but will be on irregular days of the month and there will be numerous days of no transport.

Also cartage will occur from the stockpile site to the batching plant at the rate of about 200 m^3 a month with some additional movement for transport to other destinations.

During the main transportation days of material from the Halls Creek site some 14 to 28 movements maximum a day will occur depending on the operating carrying vehicle and also requirements for stockpiling volumes.

For transport to the batching plant requires 200 m^3 a month will necessitate 7 to 14 loads a month and 14 to 28 movements depending again on the type of vehicle used to the stockpile area.

Visual impact to the site is minimal as the area is low in residential density and use and any observation from the high level Namoi River Bridge would be minimal by the height of the bridge, surrounding vegetation barrier and that more emphasis would be to Road observation at the Bridge crossing by the driver than sightseeing. Also the stockpile amounts are low and have little impact to the surround. Also the colour of such gravel would blend with local colours.

Noise impact will be from truck movement and loading, unloading but all machinery is registered and all comply with noise levels for registration. The operators will be always aware of noise to nearby residents and will observe no excessive noise creation.

The gravel material is not a dust generator and no air pollution will occur. All loading and unloading will be, however, kept to a minimum height and should likelihood of any dust occur then the material will be watered from the provided main water on site.

4.16 PROJECT DEVELOPMENT

In association with the development plans in Appendix 6, Figures 8 and 10 the following is a sequential development and extraction programme which would at all times, besides providing required material, be continually developing an environmentally friendly programme to minimise impact to the least possible and with the management intention that at exhaustion have an area that is visually and environmentally improved and left safe in all aspects.

The detail programme of project development is from the existing site shown in Appendix 2, Figure 22 to develop as shown in Appendix 6, Figure 8 which is a revegetation plan and Figure 10 which is the activity development.

4.16.1 Stage 1 - Development

a. On initial commencement consultation with the two effected landholders as to programme for development and to meet all their requirements as to stock protection which will consider areas of any fencing, location of gates (if any), access requirements and tree planting including protection from stock.

b. Construct satisfactory access from Halls Creek Road along existing access, ford crossing and to proposed screening plant. Particular attention will be given to the ford crossing and where the current access Road passes close to the Halls Creek bank area.

In respect to the ford, it at present contains a compacted armour of a lateral bar across the Creek with a low level flow of approximately 150 mm depth. Good clean gravel from site (free of any clay, sand and other sediments) will be added to the ford to allow a continuous flow to occur without raising any water level and at the same time allowing vehicles to cross without causing any formed wave motion. The Water Resources requirement will be adhered to for the Creek crossing. There were no habitats found for fish refuge at the ford and no interference will occur to any existing vegetation.

On the existing access Road through the right bank of Halls Creek to the screening plant, the current grade is low and suitable for heavy vehicles. It will be upgraded by a compacted gravel base, regrading to allow outfall surface drainage, as well as, providing easily trafficable cross banks to prevent Road erosion. Management will be for use of the ford and access Road on low flow levels and in dry weather conditions only. The guidelines for the planning, construction and maintenance of tracks for the Soil Conservation Service of C.A.L.M will be used.

c. The site of the crusher/screening plant will be developed in accord with Appendix 6, Figure 11 and will have a base R.L of 100.5 metres on the local datum. This site will be at the present disused quarry site and require levelling earthworks due to the irregular surface left from the past quarrying activities.

The local top flood-level at the crusher site has been assessed (with no known records) at 99.0 metres, varying lower according to Creek flow character.

With crusher site construction completed, a 1 metre high bund wall will be constructed together with a sedimentation pond of 1 in 20 year ARI plus 2 months use of crusher water to allow collection of all screening plant water. A 250 mm outlet pipe is to be placed to the existing small watercourse on the East with a low grade and outlet protection. Construction of the sedimentation pond and outlet pipe to be in accordance with the C.A.L.M Manual of Urban Erosion and Sediment Control, 1992 and as shown in Appendix 6, Figure 12.

d. Construct silt dam on existing Creek by enlarging existing dam and provide capacity for 1 in 100 year ARI with dam wall at R.L. minimum 99.5 metres. Place spillway on low grade into existing watercourse.

e. Relocate and/or improve all fencing in association with landholders considering revegetation planting.

f. Screen plant bund wall and area around crushing plant and sedimentation pond.

g. Construct pipe line from Halls Creek to screening plant with pipe exposed but securely fixed from Creek to landward side of Creek bank and then locate underground to screening plant. A pump is to be located above flood level and pump size requirements are 80 x 60 - 200 of 15 kw capacity.

h. Construct any reasonable requirements of Manilla Council as to access area in Albert and Lloyd Streets as to stockpile area.

i. Construct contour bund wall in stockpile site at Lloyd Street, Manilla.

4.16.2 Stage 2 - Development

a. Install screening plant and generator to provided site.

b. Establish landscape and revegetation area along Creek banks in accord with plan Appendix 6, Diagrams 8 and 10.

c. Commence extraction programme from downstream end of gravel deposit and continue in an orderly state observing all requirements for above low level flow level with no interference to existing flow path or Creek water ecology. All existing Creek character including snags, trees, etc. to be protected and not interfered with. Make all side slopes into gravel area at a safe stable grade during operation.

d. Maintain all access Roads in good condition.

e. During extraction provide good management to establishing trees and replace any losses. Grass any suitable exposed area of Creek bank.

f. At regular suitable periods clean out sedimentation and silt dam and spread over cultivated area of property on right bank (B.A. & J. Umback) for ploughing in.

4.16.3 Stage 3 - Development
(Complete)

At the cessation of extraction activity the landscaping that has been placed in the earlier stages would have become established and beginning to mature and develop into young trees. Full rehabilitation of site at conclusion will comprise:

a. Leaving all extracted floors at required grades as shown in appendix 6, Figures 1 - 7 and obtain approval from Water Resources.

b. Providing continuing accessways for landholders.

c. Remove all plant and equipment from site and all waste and any foreign material.

d. Inspect all revegetation areas and attend to any requirements so as to leave site with all revegetated areas able to continue unattended.

e. Clean out sedimentation and silt dam and disperse material into cultivated area and plough in. Sedimentation pond, silt dam, screening plant areas and bund walls to be left in good order to permanently accommodate runoff as no further disturbance would be occurring to cause excess deposition of sediment and thus permanently protect Halls Creek. The two dams would always remain active and will supply stock water.

f. At completion inspection to be carried out with Water Resources and Soil Conservation Service of C.A.L.M for approval of site. In this regard consideration to be given to any benefit to grassing crusher/screening plant site.

ENVIRONMENTAL FACTORS - CONTROL AND MANAGEMENT

5.0 ENVIRONMENTAL FACTORS - CONTROL AND MANAGEMENT

5.1 PROJECT IMPACT

Impact for the project would be controlled and be kept to a minimal as possible. The site exists by virtue of its geology.

The plant that has been outlined is considered to have minimal adverse effect to the environment and the management plan is one of responsibility in the extraction/processing development being very conscience of the protection of enjoyment of living to those residing in the area, as well as, respect and protection of the flora and fauna and the safeguards to the Creek. Yet at the same time being able to operate the development in a productive and economic manner and with a business nature.

The plan of management includes a rehabilitation programme with the most suitable environmental control built in. The plan is based on an annual consumption rate of 2400 m^3 - 3500 m^3 with a life of about 10 years.

The significant impacts of the project are:-

1. potential for noise from equipment operation;
2. transportation of materials along Public Roads;
3. potential for River pollution by waste water, vehicle usage, accelerated erosion, oil products by machinery;
4. potential for disturbance to the existing water flow;
5. dust generation by stockpiling, stockpiles, plant operation and vehicle movement;
6. the changed shape of the Creek surface by extraction activity and its workings thereto;
7. visual observation of the extraction and its activities;
8. obstruction to existing Crown Roads within the development;
9. potential for pollution to air by air impurities excluding dust;
10. potential for damage to riparian vegetation;
11. potential for disturbance to instream macrophytes;
12. potential for damage to the stream channel;
13. potential for increase in turbidity and siltation and productive riffle areas;

14. potential for destabilisation of Creek banks and alteration of stream morphology;

15. potential for disturbance to local frog, reptile and bird species;

16. potential for disturbance to threatened species including platypus, Bush Thicknee (bird) and bats;

17. potential to affect Manilla water supply;

18. potential for damage and loss of Aboriginal artefacts;

19. potential for affect in flood flows;

20. potential for disturbance of ground water table.

The main important issue with all these possible potentialities for impacts detrimental to the environment is that the development is a small scale operation considering that over 365 days of the year the operation will yield on average only 6.5 m^3 maximising to 9.5 m^3 a day.

With the application of the following mitigating actions and procedures these impacts would be reduced to a minimum where they would be ameliorated to comply in all respects with appropriate authorities, the regulations, as well as, the requirements and considerations that the community would seek and should be satisfied with.

In the implementation of ensuring that safeguards would be put into place, consultation has taken place with the following Government Departments and Local Government Offices, as well as, private Consultants:

- National Parks and Wildlife Service;
- NSW Fisheries;
- Soil Conservation Service (Department of C.A.L.M.);
- Roads and Traffic Authority;
- State Pollution Control Commission;
- Department of Minerals and Energy;
- Manilla Shire Council;
- Department of Water Resources;
- Department of Archaeology and Palaeoanthropology of the University of New England;
- Department of Planning;

- Crown Lands Office (Department of C.A.L.M);
- Environmental Protection Authority;
- Public Works Department;
- Environmental Service of Armidale for flora and fauna study;
- Geology Department, University of New England;

The response to each of these instrumentalities is contained within Appendices 1 and 7 except, it is noted the Department of Archaeology and Palaeoanthropology of the University of New England Report is contained separately in Appendix 3, the Report on Geology is contained separately in Appendix 4 and the Report on the Flora and Fauna in Appendix 5. These three Reports in Appendices 3, 4 and 5 are a result of private commissions.

5.2 TRANSPORT

Vehicles in use for transport of the quarry material would be normal articulated and non-articulated vehicles that would comply with appropriate registration procedures and all vehicles are modern and in good repair.

These vehicles are classified as heavy vehicles and in association thereto there may be the occasional transportation by low loader of excavation machinery and its return when not in use, or alternatively with the front end rubber tyred loader it may be driven to site.

The haul vehicles would operate on varying degrees of intensity along the Public Roads from nil per day to a possible 14 truck movement on some days rising to 28 on some days. The proposed development is for the extraction of gravel at irregular intervals of up to 200 m^3 and then be transported to Manilla for stockpiling with some transportation to the concrete batching plant.

The truck movements would only be operated during daylight hours and with their speeds governed, as well as, the entry to a 60 kph zone where traffic on the supply Road reaches its peak the addition of these vehicles is not considered of any significant impact to this district Road usage or likely to cause severe deterioration to the Roads both bitumen and gravel surface. The average Road use is 30 - 60 vehicles per full day.

The drivers of the vehicles are local and very experienced operators and have full knowledge of the Roads, vehicle usage, etc., and will be aware of the daily school bus and mail vehicle and there is no obvious danger situation generated by the truck movements.

The location of the transport route within Manilla has been determined in consultation with Manilla Shire Council and is considered to be of the least impact to residents.

The stockpile area is a low residential area and impact of truck movement is low. The highest impact is along Strafford Street, Arthur Street (South) and Market Street. The proposed route will avoid the main CBD of Manilla and all Town operations will observe residential living enjoyment and will operate at lowest noise level.

The impact to both visual and noise in the rural areas will be highest on those dwellings located close to the Roadway. However, the vehicle movements will only be occurring on the Roads at irregular intervals.

Because of the low incidence of monthly movement it is considered that impact on residents along the traffic route will possibly not be noticeable or if noticeable of no disturbance to existing living enjoyment.

The Company will, however, always welcome any residents request if any disturbance to their enjoyment occurs and will promote review meetings as part of management practice to co-ordinate changes to normal flow patterns.

5.3 ATMOSPHERIC QUALITY

Possible source of air pollution generated from the operation and corrective actions are:-

5.3.1 Vehicle Dust

The main access route, being the Halls Creek Road, is a bitumen good quality Road and no vehicle dust will be generated. From the bitumen surface, gravel Roads will be traversed in Arthur Street and an unformed surface in Lloyd Street, as well as, a gravel constructed surface from the exit/access ramp off Halls Creek Road to the extraction and crushing/screening plant and these are potential sources of air pollution.

The Company will comply with all reasonable requirements of Council with regard to dust control in the unsealed areas of Manilla. At the extraction site truck speeds will be low and only have to traverse a short distance. The closest dwelling is 400 metres to the East and there is a reasonable tree cover between the access Road and the dwelling.

The access Road will be constructed with on site gravel which is low in silt and clay and generation of air dust would be very low. However, in the event of any generation of dust, and expected to only occur in high wind/temperature days, vehicle speed will be kept to about 15 kph and dust prevention measure will be taken by watering the accessway.

It is expected that all existing dwellings within the immediate area of the haulage route should not suffer from the truck movement and use therefore with the above safeguards.

5.3.2 Exhaust Emission

Exhaust emission would occur from all equipment which are all diesel powered.

The registered trucks are required to conform to the requirements of registration, while all on-site machinery would comply with the requirements of the Clean Air Regulations 1964.

5.3.3 Site Dust

Sources of site dust are from digging and excavation of the gravel deposits, loading to the crusher/screening plant operation and stockpiling. Also loading of trucks of the crushed material.

Because of the low content of silt and clay in the gravel deposits there is a very low ability to create nuisance levels of dust. It is very unlikely from excavation to truck loading for destination that any dust whatsoever will be generated by these operations. Further the crusher/screening plant will use water in its processing and therefore the material will have a high water content.

Should, however, dust generation become a problem or occur the following controls will be implement or a suitable alternate ford:

- Excavation: Material would be pre-watered before digging and excavation and transport to the crushing plant.

- Stockpiles: Stockpiles would be kept to a low height and could be wet down in dry windy conditions. The low heights and the placement in protected sites would reduce dust generation. As the project develops protection would increase as planted trees take size and provide a lee and calm area of the extraction surface and stockpile surface.

- Front End Loader: To alleviate the potential for dust, front end loader activity in the excavation and loading area would be restricted to only move in a purposeful manner, at slow speed and with a minimum drop height of material into haulage trucks. Also stockpiles and active work areas could be water sprayed for control of any dust generation.

- Crusher and Screening Operation: Possible internal dust generation points are the boot bins, crushers, screen, conveyor transfer points and discharge chutes. If dust is generated mist sprays would be incorporated and suitable dust shields, if not in existence, then placed at required points. Enclosures would also be added to give further assistance.

The Company would seek the advise of the State Pollution Control Commission for any guidance if dust becomes in any way a matter of control from this plant. It is unlikely dust would be generated as the crusher requires water for operation.

All transfer and discharge points in the crusher/ screening plant would have minimum drop areas to avoid dust.

All water used in dust suppression would be provided by the sedimentation pond/silt pond and this would have a benefit of maintaining the collection at levels to carry any further incoming surface water in inclement weather.

5.4 NOISE

Noise would be generated by plant and equipment. Noise created by the operation would be restricted to the hours of operation. The potential noise sources are the trucks, screening plant, front end loaders and generator.

All engine driven plants (trucks, front end loader, generator and screening plant) would be fitted with exhaust mufflers and engine shielding to ensure noise levels do not exceed recommended limits.

All equipment shall comply with Noise Control Act and Regulations of 1975. Registered vehicles are required to conform to the requirements of registration.

In addition safeguards will be incorporated into the project to reduce noise impact.

Trucks transporting material from the site at Halls Creek and the stockpile area in Lloyd Street will be maintained in good condition and regularly serviced. Trucks will not travel in convoy and will adhere to speed restrictions.

Access Roads and haul Roads will be maintained in good condition and constructed with good grades. The low grades will minimise engine noise from laden trucks and by maintaining Roads in good condition, noise normally associated with empty trucks will be reduced.

Within a 2 km radius of the extraction site there are 5 residences as shown on the plan in Appendix 2, Figure 28.

These include the properties of 'Drumlisk', 'Amaroo' (3 houses) and 'Croydon'. None are located closer than 400 metres

Existing topography and vegetation will suppress a considerable amount of noise output. The highest noise level will be created by the generator and crusher/ screening plant.

In the initial development stage where the greatest exposure will occur, noise would be at its highest, but as haul Roads are formed and compacted, areas around the screening plant are filled to act as bund walls, vegetation planted begins to mature, would more and more attenuate noise to a lower level.

The crushing/screening plant will be located on higher ground out of known flood level and will because of the landform, have the ability to create noise accentuation up and down the valley floor and could be assisted by any existing favourable wind situation and then on cold still mornings.

The Company is fully conscious of this and will continue to monitor the noise levels at the dwellings by consultation with the occupiers and will co-operate and carry out changes to its programme if any discomfort is experienced.

Operation at the extraction site will be variable and not continuous and times of operation are restricted to 7.00 am to 5.00 pm Monday to Friday and any Saturday operation will be from 7.30 am to 12 noon. There will be no operation on Sunday or Public Holiday period.

The crushing/screening plant and generator have not as yet been purchased, but from a typical plant proposed for purchase the noise levels are as follows:

- 3 tier aggregate screen - 90 dB(A) or 5 metres;
- Core cracker - 102 dB(A) or 5 metres;
- Jaw crusher - 79 dB(A) or 5 metres;
- Generator set - 80 dB(A).

At 15 metres the aggregate reading is 80 dB(A). These are manufacturer's tests.

The Company under the Noise Control Act will apply to the Environmental Protection Authority for approval to carry out the work at the extraction site.

In all noise the Company is aware of the offensiveness of environmental noise that the extraction site would generate and would reduce on all accounts the source level, its time of occurrence and pay particular respect to the control that both operation and noise acoustic barrier can provide in protecting the recipient.

In the haulage to Manilla the Company is very aware that the route passes the Manilla Hospital and will pay particular attention to truck noise when passing the Hospital.

Also the movement on the stockpile site will be so performed to keep noise levels at their lowest possible minimum. All equipment on the site will be Road Registered and will only comprise trucks and a front end loader. In the event of an excavator being used it will contain exhaust mufflers.

5.5 VISUAL QUALITY

Visual impact on the extraction site from the Public Road will be extremely low as the gravel deposits are below the surrounding landform; running North to South and thus produce the lowest angle of observation and further there is a good tree canopy to act as a visual barrier. The screening plant will not be visible from the Road.

The only dwelling that will possibly have any visual contact with the extraction area is the newer dwelling on 'Amaroo' which is located on the higher slopes of the Western side of a ridge. The dwelling is about 800 metres in a direct line to the area but has restriction of observation by the existing vegetation. The dwelling will not be able to observe excavation by the lower level of the gravel beds, nor the screening plant, but will be able to observe operation of truck movements. Also the closest residence about 400 metres to the East will be able to observe truck movements.

All other residents in the area will have no visual contact with the site. As the landscaping develops further visual protection will be given to the area.

The general area of the extraction site is private land and is not frequented by the Public and it would be a case of virtually having a extremely low impact on visual observation.

At the stockpile site in Lloyd Street, Manilla the visual impact is relatively low as the only addition to the site will be the stockpiling of gravel to an amount of only 1000 m^3. Such material is neutral colour and would blend with the surround. The low volumes of the stockpile and in association with existing sand stockpiles together with the scattered residence in the area will not cause any significant visual impact.

Although the stockpile would be visible from the Namoi River Bridge, impact would be again low by the elevated nature of the Bridge, the screening by existing trees and bridge railing and that users of the Bridge would be more conscious of travelling over the Bridge rather than sightseeing. However, if required landscaping will be provided in consultation with the Water Resources to make sure that there is no interference caused to any free flow of floodwaters that could enter the area.

5.6 PROTECTION OF THE GROUND WATER TABLE

The extraction operations will be undertaken above low flow water level and then above the ground water table. The extraction will commence on the downstream end of the site and will maintain the required grades.

No holes will be created nor will there be any removal of gravel from below water level or from any gravel riffles that may exist.

Consequently there will be no additional bed degradation created which would lead to a lowering of the groundwater table.

5.7 CONTROL OF TURBIDITY

The extraction of the gravel from the gravel deposits can only be carried out during periods of low flow when the deposit is exposed.

In all cases dry weather conditions are essential for operation and for access to the deposit and transport to and from the screening plant.

The gravel beds contain negligible silt and clay for the creation of turbid conditions. Consequently the potential for runoff from the extraction site is negligible.

However, as an added precaution a sump will be created in the extraction area for the containment of any runoff that may occur during rainfall periods.

When the Creek has high flow condition the material in the sump will be flushed and that is when the level of suspended matter in the Creek water is high and the contribution from the extraction site is low.

5.8 FLOODING

There are, from investigation, no known recorded flood levels at the site. Inspection of the site indicates from visual debris the expected highest flood level. Also from inspection of the adjoining cultivated flat there is on the West side of the extraction area, deposits of loose stone on the clay loam soils and such stone is not part of the natural soil. This has occurred along a depression in the flat.

The alluvial flats have resulted from aggregate of deposited suspended matter during floodtime when the narrow area of the Creek profile has widened dramatically causing water velocity to drop and then deposit its suspended matter.

These alluvial flats have built up to a substantial level to the existing Creek bed and now provide an overflow area for high flooding. Because of the size of the flats the depth of any water over them would not be great in flood and they act as a controlling mechanism to the height of floodwaters by their acreage. But they do prevent the area of land on the East bank, where the screening plant will be located, from becoming inundated and there is from inspection no indication that such area has ever been flooded. It lies on a level higher than the alluvial flat and all floodwater would be accommodated over the alluvial flat.

This is visually evident by the mentioned deposits that have taken place of stone on the floodplain. The stones are, as mentioned, foreign to the underlying soil and consist of coherent but heterogeneous material and exhibit friction patterns due to River tumbling. It is the same material that comprises the gravel beds.

It is then evident the Creek is in a process of moving stone downstream and is the result of the existing gravel beds. The geometry of the Creek and the site is that it takes a large change in direction clockwise and then anti-clockwise and medium floods would cause the deposition of suspended and moving material to occur at the same point. Then in heavy flood the underlying beds are protected by lower water velocity at depths and the suspended material then moves further downstream if not released across the broad floodplain area of the alluvial flat.

The general plan of the area and cross-section of the gravel deposits are indicative to the considered flood heights of the area.

For the reason of the existing paths of the Creek in floodtime is the determination of the location of the screening plant and associated stockpiling on the higher East bank area being safe from any flooding.

Halls Creek is active in its transport of stone and for many kilometres upstream of the deposit the Creek contains numerous deposits of aggregation gravel beds, smaller and not as readily accessible as the proposed site.

On inspection of the junction of Halls Creek with the Namoi River, stone movements have reached the junction and a gravel deposit is accumulating and spilling into the River.

Although the subject extraction will not halt the transporting of stone to the Namoi River it must have a beneficial impact to some degree of allowing moving material in floodtime to fill the excavation area and thus reduce the quantity of material eventually reaching the Namoi River.

The Geology Report states that "as extraction occurs on the gravel bed it will be replenished with new gravel during flood events and will principally come from within the 400 metre length of upstream" which will then allow deposit of material from further upstream into the area over a longer period.

The Geology Report further states that "overall the morphology of the Creek is very stable and it will continue to remain so regardless of the removal of gravel aggregate at the proposed rate and continue" and "whilst aggregate is removed from above the water level no siltation will occur".

The cross-section structure of the Creek at the extraction site is one of lower level Creek proper, then of higher gravel terraces to a Creek bank and outer alluvial flats. On the opposite side the Bank rises steeply from the Creek proper to the top of the bed and then onto level to undulating areas.

The majority of flow within the Creek would be contained within the bank area and the Geologists Report concludes that "the slope of the sandy loam bank at the edge of the Creek adjacent to the gravel bar will not be affected during normal flow conditions and the most likely affect during flood events will be reduced erosion during to the increase in the cross-sectional profile."

The existence of the gravel parts are having a choking effect to the Creeks availability freedom of the flow such that higher levels have to be taken to accommodate freshes or medium increases in Creek flow. This has resulted in the water flow moving tangential away from the gravel beds and having a greater angle to change direction is forcefully cutting away at the vertical sandy loam banks, which is showing as relatively active with exposed tree and grass roots as shown in Appendix 7 photographs.

Velocity of flow is very low in normal periods and the Creek has a very tranquil atmosphere. Such normal flow velocities vary in accord to the cross-section area from point to point as such are constantly changing. At one recorded low cross-sectional area a visual analysis velocity was 3 kph. Other areas were less such as in pools.

5.8.1 Flooding Controls

Controls to be incorporated against flooding include:-

- The location of the crusher/screening plant and associated stockpile above the 1 in 100 year determined flood level and so located not to impede or divert surface water flow as directed by the Water Resources.

  The location has been determined to be the right bank as shown in the Management Plan and is, from investigation, considered clear of any flooding except for an exceptional flood that has not been locally recorded as yet.

  The stockpiles will be protected from erosion and probable very high flood using the soil Conservation Service standard erosion investigation conditions - Reference will be made to the Manual of "Urban Erosion and Sediment Control."

- All machinery and being the front end loader and truck (if any) will be stored in the area of its crusher/screening plant when not in operation and if a duration is to occur to the next term of processing will be taken from the site as the loader/trucks will be required for other activities. At no time will any machinery be left idle or overnight within the Creek bed area.

- To improve stability and the Creek ecology, as well as, to decrease erosion during flooding a buffer zone of native trees and re-vegetation will be carried out along the Creek bank and Creek bank area.

- The extraction processes is to be carried out in an orderly manner with graded extraction and no vertical sides to prevent in case of flood any cause for increased turbulence. All extraction to be in accord with Water Resource direction of working grades.

5.9 CONTROL OF BED AND BANK EROSION

In consultation with the NSW Water Resources the extraction programme has been designed to prevent bank erosion with the following specific measures:-

- no extraction below the normal flow level of Halls Creek immediately adjacent to the excavation;

- commencement of the extraction at the downstream end of the site and continue upstream at a slope of 1 in 50 and also at 1 in 50 upwards from the waters edge in a cross-section direction;

- not exceeding 1 to 3 side batters;

- the final flow of the extraction site to have a gradient of 1 in 50 longitudinal and cross-section with the upstream and smoothed in grade not to impede or divert surface flow. In this consideration consultations will be made with the Water Resources to consider realignment of the existing water flow path to its original position being the centre of the existing bed to protect banks from unnecessary erosion and to assist in preventing rechoking of the Creek again;

- no extraction to take place near water supply pipeline;

- no extraction of active bedload material;

- no extraction within the bed of the low flow channel;

- provide a compacted gravel base at no higher than existing water level at the existing Creek crossing to the screening/crusher plant and only rubber tyred vehicles to be used in such crossing area;

- use only the existing track which is at a good grade out of the Creek to the crusher/screening plant. Such track to be improved with outfall design and low trafficable cross banks. Also establish and maintain a vegetation cover on the shoulder, banks and embankment area of the access track.

  In addition the track will be covered with a compacted gravel base to stabilise the surface and prevent erosion during any flooding, as well as, a hard surface for traction and any occurrence of loose soil particles entering the Creek flow;

- establish a revegetation of the bank and landward side of the bank to improve stability and existing erosion of the bank;

- one only existing access route as improved for use by heavy vehicles;

- use only the existing access route across the Creek at low speed and restrict all movements in the Creek area to only the gravel deposits. Any upper stream crossing to the smaller gravel deposit to be by front end loader only and to be a gravel compacted crossing at no higher level than existing low water flow;

- there would be no trees and shrubs removed within the bed and bank areas except for some juveniles in the direct path of the extraction area. There would also be no trees or shrubs located within 20 metres of the Creek damaged or destroyed. If at all any damage or destruction is required an authority will be obtained as under Section 21D of the Soil Conservation Act;

- all operations of the Creek and Creek bank area will be in strict accord with the directions from Water Resources and the Soil Conservation Service.

5.10 CREEK POLLUTION CONTROL

There is a potential for oil and diesel spillage into the water flow by truck and front end loader crossing of the stream, front end loader operation in the Creek area, pumping apparatus, stockpiling and crusher/screening plant operation.

To avoid any contamination of the Creek water the following remedy action will be taken:

- all vehicle fuel tank and oil tank will be kept in good maintenance and condition and contain no breakage. This includes ancillary points such as fuel and oil lines, taps, pumps, etc. located on the equipment;
- trucks and the loader will have its engine, hosing and other oil/fuel supply area kept clean;
- the area of possible oil/fuel breakage with equipment and where located low to ground would have protective guards where exposed to possible fracture and operational work. All fuel and oil reservoirs will be kept at levels below their total maximum capacity to prevent overspill;
- the machinery would only be used in the Creek area when operations are in progress and would not be used in areas of water collection such as small water-holes and River flow areas and will be restricted to on the gravel beds only;
- the machinery would be parked in flood free area away from the Creek during periods of non-use;
- no extractions are to take place in the active flow area of the River;
- the machinery would only be used in the nominated hours and would be restricted to daylight hours;
- operation would only occur in dry weather and no work would take place during any flood.
- the crusher/screening plant and stockpile area would be protected by a bund wall with a collection sedimentation tank capacity in excess of requirements and all located above known flood level.
- Protecting the existing watercourse on the East side and near the screening plant from entering the operation area.
- there will be no separate storage of fuel and oil on site.

5.11 RIVER ECOLOGY

Through the years the Creek has been disturbed by agricultural uses and extensive clearing operations. The riparian vegetative community has been isolated from nearby native communities and has suffered considerable encroachment by introduced trees and weeds. Also there are impacts due to utilisation of the Creek by stock and feral animals, as well as, carp on the deeper and more sheltered pools.

There are snags and decaying timber within the Creek area and also hanging trees which all provide shelter, food and breeding sites for fish. Some of the trees are exotic such as Willows which are preventing an understorey of growth of shrubs, reeded grasses and consequently are also causing an increase in the Creek bed erosion by the exposure of the surface of the Earth.

The Flora and Fauna Report stated "despite impact by human, stock and feral animals, as well as, the planting of exotic trees, the Creek itself is in relatively good condition and levels of invertebrates in the water are high, as well as, native fish are present and there is the presence of amphibia species."

The study also showed the presence within the area of Platypus, Bush-Thicknee (bird) and Bats which are a threatened species.

The planned operations are likely to disturb some local frog, reptile and bird species particularly of those that are breeding in the area during operation. Black-fronted Dotterils were using the rocky gravel beds as a breeding ground during a survey in December, 1992. Also at that time birds were nesting in nearby trees.

The Flora and Fauna Report stated that "extractive industries can have a number of adverse effects on freshwater habitats including increased turbidity and siltation, destruction of banks and weedbeds, have an effect on channel stability, as well as, the possibility of chemical pollution".

Under Section 4A of the Environmental Planning and Assessment Act, 1979, the likelihood of significant effect on the environment of endangered species has to consider the following factors:-

a. the extent of modification or removal of habitat, in relation to the same habitat type in the locality;

b. the sensitivity of the species of fauna to removal or modification of its habitat;

c. the time required to regenerate critical habitat, namely, the whole or any part of the habitat which is essential for the survival of that species of fauna;

d. the effect on the ability of the fauna population to recover, including interactions between the subject land and adjacent habitat that may influence the population beyond the area proposed for development or activities;

e. any proposal to ameliorate the impact;

f. whether the land is currently being assessed for wilderness by the Director of National Parks and Wildlife under the Wilderness Act 1987;

g. any adverse effect on the survival of that species of endangered fauna or of populations of that fauna.

A comprehensive report has been prepared by Environmental Consultants of Armidale as included in Appendix 5.

The study recommended the following:

- tree planting should be undertaken around exposed banks and the perimeters of the excavation area. It is suggested that local tree and shrub species should be used and it is best to plant in clumps around exposed edges. However, willow seems to be the most effective bank stabiliser species. More information about tree-planting can be obtained from local offices of the Forestry Commission, Greening Australia or Landcare Group;

- the Creek bed should be left as flat as possible with no extracted material to be stored near the river or on the flood prone land. Some drainage access for the Creek should be kept throughout operations. Any settling ponds should be also located away from floodways. Snags within a waterway should not be removed but can be stored for later replacement. Disturbance to the surrounding habitat should also be kept to a minimum;

- operations which may affect Platypus populations should have follow-up monitoring undertaken.

The study advised that the extraction of the gravel could enhance the dispersal ability of Platypus in Halls Creek and records show that Platypus have returned to areas where extraction activities have taken place.

To provide the least impact to the Creek ecosystem the control under Creek pollution and River and bank erosion will enhance the protection to the ecosystem.

As well the following measures will be carried out:

- no consistent emission of exhaust fumes under tree canopies;

- no removal of any snags, trees or shrubs or grasses from the Creek and surrounding area;

- restricting water crossing to only provided ford;

- no interference with any pools except for the requirement of pumping water and return of overflow from the sedimentation pond;

- sediment from sedimentation tank is to be removed and spread over alluvial flat of about 6 1/2 Hectares to be ploughed in and used for cultivated cropping.

5.12 WATER MANAGEMENT

Water will be required to the crusher/screening plant for its operation and direct prevention. The quantity of water required is 35,000 litres an hour and for a full day 280,000 litres.

It is intended that water be provided from an existing pool in the Halls Creek immediately adjacent the South end of the extraction area and be pumped by electrical pump (using the generator from the crusher) through piping to the crusher plant.

Waste water will be collected systematically and under control from the plant and taken by gravity feed over a gravel bed drain to the sedimentation tank (or dam).

The sedimentation tank would also collect rain water from the crusher and stockpile site by natural drainage. The sedimentation pond would have a capacity of 1 in 20 year ARI plus 2 month usage of the screening plant.

Overflow from the sedimentation pond would be by pipe to discharge into the existing watercourse level and then into the silt dam with a 1 in 100 ARI.

The system will fully retain all waste water from the plant from entering Halls Creek in an untreated manner. Only sediment free water will be allowed back into the river.

All piping at the Creek will be securely held to the bank preventing any damage in the event of flood and all equipment taken to site plus the ponds will be above known flood level.

The provision of a bund wall around the operation area of the screening plant will isolate outside water away from the site, as well as, allowing the existing ephemeral watercourse further North-East not to become in any way contaminated before it enters Halls Creek.

It is advised that the crusher/screening plant will be located at the site of a now disused dry land quarry which used the haulage Road and access way to the Halls Creek Road as proposed to be used by the operation.

The provision of the sediment tank and collection area will assist in capturing existing surface material that occurs in rain periods from the still exposed quarry area.

The design and programme management of development will have all water management in place before operations commence, as well as, obtaining a license to operate from the Water Resources.

Not having carried out accurate water volumes except in so far as on site mechanical means which established a flow rate in December 1992 for 500,000 litres/hour and therefore is considered there is sufficient water to cater for requirements and should not interfere with the available water downstream.

In the report it is noted that water usage will only occur on irregular periods while the screening plant is in operation.

The nearby existing ephemeral watercourses are dry for most of the year and neither one carries any significant vegetation or aquatic fauna as no sustaining of such aquatic life can occur.

The provision of the sediment pond and the silt dam are safeguards against pollutant or suspended solids being carried out of the operating area into the Creek. The screening plant area, by its operation and exposure of material, does have the potential for production of water pollution by oils, fuel and lubricant escaping from machinery, as well as, above normal suspended solids. These will be all contained in the sedimentation pond which would ensure just about a fail-safe system of any sedimentation, pollution or erosion into Halls Creek.

A domestic waste water unit will be required for the employees on site and this will comprise a factory made unit with a portable waste system. It will be located within the sediment catchment area of the screening plant and will have a separate bund wall around it for full protection of any waste discharge being able to enter Halls Creek.

5.13 WASTE MATERIAL

No waste material will be produced on site. All processed gravel extracted and won will be transported to Manilla and all refuse produced will be carried from the site.

5.14 LAND USE

The surrounding site is at present used for rural purpose. The operation would not effect the land use of the surrounding area.

The operation of the site would not be effected by the surround land use and will not interfere with such.

The Department of Conservation and Soil Management has stated that no extraction is to interfere with the existing Crown Road in Portions 50 and 53 in the Parish of Flemming. This will be adhered to as all removals are within the Creek bed and no interference will occur to the Crown Roads.

It is the Company's policy to cause at least as possible disturbance to the activities and general living standards of the landholders in the effected area of operation.

5.15 CONTROL OF OPERATION

The operation of the quarry would be subject to complying with conditions imposed by Manilla Shire Council, Legislative Control of Regulation of NSW which would include the Clean Air Act, Clean Water and Noise Control Acts, etc..

All required licences and approvals from the various State and Local instrumentalities would be sought and the Company would comply with conditions imposed on it by the Soil Conservation Service, Water Resource, National Parks and Wildlife Service, Manilla Shire Council, Environmental Protection Authority, NSW Fisheries, Road Traffic Authority, Department of Conservation and Land Management, etc..

5.16 SOCIAL - ECONOMIC

Included in the environment is the welfare of the people in respect to their living standard based on employment.

The Company has for the Town of Manilla a respective employment and to provide continuing employment and by its very structure of business require a secure gravel supply site within its theatre of operation.

The gravel site provides a source for some 10 years as an economical location.

The site is also able to provide approved select fill for certain works and building sites. This site would give the Company the ability to continue (and with possible expansion) providing security and hence employment security, as well as, the possibility of further employment.

With the requirement now of training programmes for employees the Company expends money in this programme and is able to have experienced and knowledgeable operators of machinery. This takes a considerable time to bring on line and then if there is lack of supply of gravel then contracts have to be foreclosed or not tendered for, meaning a downturn in activity and consequential loss of these staff members.

With survival inherent in all business especially a local business as this with high overhead and capital equipment outlay, rebuilding into either other programmes or the difficult possibility of locating other suitable sites, if this site was denied, would be expensive and time consuming in retaining personnel to a suitable standard.

The main impact of not using the site is the possible loss of employment and this would be very significant to employees due to loss of employment opportunity, loss of residents to the Town with limited available employment chances.

5.17 ENERGY CONSERVATION

Procedure to be adopted to minimise energy uses are:-

1. regular servicing and maintenance of all equipment both mobile and on site equipment;

2. operating machinery only as required and then used in an efficient manner to eliminate unnecessary usage;

3. restricted use of all equipment in periods of adverse conditions such as extreme of wet weather and very hot, dry windy conditions;

4. the location of all operations so that it provides for an efficient operation such as haul Road to stockpile, excavation to stockpile, travel distance in site area;

5. correct use of power to power requirements in all machinery operations and a quality controlled management programme to ensure the least waste of energy.

5.18 REHABILITATION

The extraction site is located below the floodplain terraces and relatively well screened from public viewing areas.

The NSW Water Resources has indicated and directed the required rehabilitation measures to be taken. These include a gradual slope batter of 1 in 50 longitudinal and on cross-section up the stream and a 1 in 3 side batter to the bank area. On the upstream end of the gravel deposit an eased in grade is to be provided to prevent the remaining resource to be washed away during flood events.

All existing trees and shrubs will not be interfered with except for removal of some small juveniles in the direct path of the extraction area.

To protect the stability of the Creek and to redress the River ecology the NSW Water Resources Report requests a buffer zone on the landward side of the site will be revegetated using native species including *Callistemon sp.* (Bottlebrush), *Leptospermum sp.* (Tea Tree), *Casuarina cunninghamiana* (River Oak) and locally occurring *Eucalyptus* species.

The revegetation will not enter the private fenced in and used as a lucerne paddock on the left bank and will also not enter the cultivated lands and fenced in on the right bank. Such fenced in areas on the right bank are adequately vegetated and is not within the operating area.

The area in general has a good vegetation cover but the additional planting will add to the stability of existing banks.

No works are to be carried out within the watercourse area and all standing and fallen trees within the watercourse will not be interfered with.

The proposed buffer zone to be provided, will be designed to allow non conflict with existing and restricted accessway but at the same time providing a much additional stability to the Creek area, as well as, the Creek ecology. It is not envisaged to carry out any planting within the excavation area as any flooding will cause immediate loss, as well as, stock use.

The immediate planting of the buffer zone will allow protection from stock damage as the site will be occupied for an anticipated period of 10 years allowing the planted trees to mature to a stage to be self supporting.

The excavated area will, after exhaustion, return to a natural environment by interaction of the physical characteristics of the Creek and it is expected then with following larger flow in the Creek, all excavation activities would virtually disappear.

The rehabilitation programme is shown in the Revegetation Plan Appendix 6, Figures 8 and 10.

The Rehabilitation Plan has the following purposes:

1. to provide additional rehabilitation to the Halls Creek area within the development area;

2. to comply with the requirement of the Water Resources;

3. to rehabilitate the area so that soil stability will be increased and erosion kept to a minimum;

4. to protect existing agricultural lands;

5. to rehabilitate the area such that the activities of the site are not reduced in quality. This includes the removal of all equipment, etc. used in the development from the site on conclusion;

6. to improve the Creek ecology;

7. to forward plan the mining operation and the rehabilitation procedure so that potential problems are discussed and solved before they are allowed to develop.

5.19 FUTURE DEMANDS AND OPERATIONS

The population of the country is increasing and is indeed a policy of the Government to support such a growth. The growth requires a demand on natural resources.

Within the Town of Manilla, additional housing growth is taking place, as well as, the upgrading of existing Roads and provision of extended services. Manilla has a growth rate of approximately 35 houses a year of which about 80% are of concrete slab construction and the remainder are erected on concrete strip and pier footings. There are also new farm buildings being erected and requiring concrete in their foundations.

Manilla has its own concrete batching plant to which the main ingredient of concrete is cement, sand, water and gravel. It is in the gravel content where existing practice of purchasing outside the area is becoming uneconomical and a question of reliability, as well as, high energy resources required to deliver.

The concrete requirement for Manilla is about 150 m^3 a month which requires about 200 m^3 of gravel and this is seen as a continuing demand for the area.

The proposed development site is relatively close to the Town and is served by good bitumen access Roads and the site will be able to accommodate this resource requirement for about 10 years without causing any detrimental effect to the area.

At the expectation of the extraction site there is no intention of extending the existing site, but the Company would have to locate other alternatives which may be difficult to locate or/and at further distance, but would be researched within the life of the current development.

5.20 CONCLUSION

1. The existing site is located below the floodplain terrace and is only a small operation with no high impact on the environment.

2. The development site contains no known deposits or sites of Aboriginal significance.

3. Extraction of the site can be made with minimal disruption to the surrounding district, especially by its small scale operation, the larger surrounding properties and scattered population.

4. The proposed methods to protect the environment are both feasible and effective.

5. The extraction from the Creek bed would be of benefit to the Creek system and not detrimental thereto.

6. Rehabilitation areas would allow the post-extraction landform to be blended in to benefit the surrounding land.

7. The site has a close relationship with existing access and no high impact development is required of existing service.

8. The development will have minimal impact on the existing flora and fauna of the area and including those mentioned endangered species.

9. The development will ensure a continuing service supply of economically priced concrete to the Manilla area.

10. The proposed stockpiling of material in the selected area within the Town of Manilla will have a low impact to the current enjoyment of the existing residence and properties in the neighbourhood.

ANALYSIS OF ENVIRONMENTAL INTERACTION AND IMPACT

6.0 ANALYSIS OF ENVIRONMENTAL INTERACTION AND IMPACT

6.1 GEOLOGY AND GEOMORPHOLOGY

The extraction operation of the removal of gravel deposits will remove the lateral bars from an area of Halls Creek which are forming an obstruction to stream flows and causing an acceleration in Creek bank erosion.

This in time will provide a well defined and wider stream course in an area of no vegetation, allowing the free flow of freshes and will lessen the incidence of bank erosion by the more central location of the stream having removed the obstruction which deflects the Creek against the easily weathered alluvial sediments.

The Geological studies have shown that the removal of these gravel areas will not interfere with the morphology of the Creek and will allow it to continue in a stable situation.

6.2 SEDIMENT TRANSPORT AND BED DEGRADATION

The Creek area continues upstream for almost 30 km and for many kilometres upstream the Creek contains numerous deposits of aggregated gravel beds.

Movement of gravel is a long term process with replenishment taking place only during high discharge periods. This situation applies irrespective of the presence of extraction industries. The Geological Study shows that the extraction area will be replenished with new gravel principally coming from within the immediate upstream area of the Creek and also within the confines of the gravel extraction.

At present much of the bedload of gravel has accumulated at the upstream end of a well armoured point at the Creek crossing where its downstream movement is impeded. This is also assisted by the high change of direction of the Creek in the area and the ability to overflow into a flood channel and dramatically alter the Creek velocity and then disperse its suspended material.

With continued grazing, and the over clearing in the upper catchment has resulted in more frequent freshes to the Creek which will be carrying eroded particles irrespective of extraction works further downstream, until finally it reaches the Namoi River.

The extraction operation will not be carried out below low flow level and will provide well graded floors with no holes or random excavations. Consequently, there will be no alteration of the bed gradient and also no risk of bed scour.

The longitudinal profile of the final floor level and because its above low flow level will not cause any increased ability to catch bedload passing through the area. The operation will increase the channel cross-section at bank full flow.

The existing gravel beds are semi-permanent storage areas of some sediment with an armoured surface. Although deep testing of the site has not been carried out, the existence of some sediment storage is evident as the land supports juvenile tree growth which has resisted and been able to continue in growth after flooding.

These armoured banks provide a higher retention to erosion than the alluvial sediment in the banks and with the aggrading of the bars the Creek has found a less resistant position against the banks and there is now a higher erosion rate taking place at these banks where the flow path adjoins.

Following the extraction there will be finer gravel exposed which will have the ability to be collected in full bank flow and transported to downstream position. But in general the new 'armour' layer would be resistant to erosion and bed degradation.

With the wider cross-section of the Creek floor there will be a wider area of floor for the more frequent low floods. This will cause stream velocity to decrease and a reduction in its competence. Deposition will occur at the upstream end initially and as mentioned there will be transportation within the area of operation.

Because the low flow channel is not being affected, nearly all finer bedload in transport will continue through the area and only full bank flow or approach thereto will create any possible supply of new coarse material from upstream.

As a result because continuing movement of gravel is occurring throughout the Halls Creek, itis s to be expected that gravel will continue to find its way downstream and on a long time basis will replenish the extracted areas.

It is further noted that in the Geology Study and as the gravel extraction are above low flow level no siltation at this level will take place.

6.3 GROUNDWATER

Extraction operations are all above low flow level and will consequently not lower the low flow level and the corresponding groundwater level or cause any detrimental effect to any downstream groundwater.

6.4 FLOODING

In the gravel extraction there will be an increase provided in the full bank cross-sectional area with corresponding lowering of the roughness co-efficient in the hydraulic equation, but an ability of the Creek to carry more water between its banks in any given fresh or flood and then a potential reduction in over bank flooding and damage to the hinterland where there has been evidence of deposits of stone over existing lucerne flats.

As the cross-sectional area is increased and the Creek is less 'choked', the area can carry higher flows at less top water height and the potential for increased flooding beyond the normal experienced is negligible.

With the increase in the cross-sectional area and the raising of the hydraulic radius there is in the hydraulic radius an increase mean bank full velocity by Manning's equation. This has the effect of increasing potentiality of carrying larger particles but the significance is minimal as the true velocity increase is nominal. There may be a slight increase in sediment yields to downstream bars but it must be seen that the operation is only of small scale and the effect on this is negligible.

6.5 BANK EROSION

Bank erosion and instability to the bank areas would not be increased by the extraction process, but in fact the extraction will be of benefit to reduce current erosion occurring at the site.

It is in the periods of freshes in the Creek that are having accelerated action of bank erosion as they undermine the vertical bank sides and cause collapse of the higher areas to allow the action to continue.

The extraction of the site will cause removal of the gravel beds which have been causing the stream in the freshes to deviate to areas of lower resistance to the softer more easily erodable alluvial area of the banks. These gravel beds form obstructions and in their removal will allow relocation of the main flow into a higher cross-sectional area and not in a concentrated small cross-section and will allow the Creek to re-align itself in freshes away from the unstable banks.

In addition the extraction will provide an operation not below low flow level and will have a batter of 1 in 3 at the toe of the bank of the gravel bed area which will give an 'armour' protection as such gradient is the natural angle of repose of bank sediments.

6.6 WATER POLLUTION

By the control imposed on the operation the collection of sediment from the crusher/screening area and also including sediment polluted water to the sedimentation pond, and then a silt pond with a 1 in 100 year ARI, the likelihood of reducing the existing quality of the water of Halls Creek is very minimal.

In the Creek area extraction operations are to be carried out only during low flow level and then above such low flow level and in gravel bars that are low in silt and clay and therefore the potential for release of sediment carrying water into the main flow is negligible.

There will be no significant detrimental effect to water quality in the Creek by the extraction.

It was found from inspection of the lower reaches that during low flow level there are areas before the Creek entry into the Namoi River that contain no flow and the Creek water is apparently passing into lower resistant subterrain layer instead of the natural Creek bed. This has the effect of carrying out further filtering of any sediment laden water that could enter the Namoi River and then the Manilla water supply.

6.7 NOISE POLLUTION

The requirement to the operating machinery to comply with Noise Control standards and the fact that the area is sparsely populated would have little impact to the community. The main impact is to the closeby property owners' dwelling.

Although no specific noise report has been obtained for the site it is considered that such an issue of noise factors is of low significance and effect to the local environment. The higher noise would be received at the closest resident.

Any requirement by the Environmental Protection Authority would be strictly adhered to.

Also, as discussed, a landscaping, screening and operation procedure would keep noise to the lowest possible level.

Tree planting will be carried out to attenuate noise. Use of well maintained equipment, experienced operators and the location of plant would all give an appropriate lowest possible noise.

The transportation machinery are all noise controlled by registration. The potential for greatest noise is the crusher/screening plant and generator. These will be given noise protective screens to restrict noise to the lowest possible level.

There is, at present, a good surround of vegetation and in the initial development natural screening occurs and together with the gravel material being below floodplain height will all provide assistance to reduce noise in the area.

6.8 DUST POLLUTION

Dust would generate from truck movements to the site from the end of the bitumen access Road, crusher operations including front end loader movement, stockpiling and loading of stockpiles.

The material extraction would have certain moisture therein and this through to screening such material would not create any dust problem. Further, the stockpile material would have moisture therein and it would only be in situations where such is allowed to dry out or there is movement from dried material after screening, that there possibly could be a dust generation therefrom. It is intended not to keep stockpiles for long durations, but to operate more on a day to day basis of extraction, crushing and transporting.

There is negligible silt and clay in the gravel bed and there is very little potential for dust generation from these areas.

Access Roads will be only of minimal length and will have a gravel rock base thus minimising dust creation.

Within the site, control is to be effected to include low dumping and low speeds of machinery. The screening plant should not generate a high dust impact as it requires water for operation, but in the event dust is created, mist water will be used on the plant.

The greatest potential for dust is the movement of trucks from the bitumen Road to the stockpile and return and then the effect to the residence located closeby. The potential will be accelerated during dry wind conditions and more so in hot wind conditions.

By the provision of hard gravel bedding for the Roads, the opportunity for dust creation will be greatly reduced.

In the event of any dust creation, watering will occur of the access Road and further if dust nuisance is caused to residents, the Company will comply with any reasonable requirements of Council and/or the Environmental Protection Authority.

The Company also will, in its management policy, refer the residents from time to time to determine any complaint and will address the issues accordingly.

The highest potential for dust in all the development is the transporting of gravel along the residential Roads in Manilla to the stockpiling area where such Roads are not sealed.

Although there are limited residents in the area, such residents will be given every protection and a close monitoring with Manilla Council will be carried out.

Dry Roads have the potential to produce dust up to 500 metres at a rate of 267 mg/m2/day (Williamson and Contrell, 1980) and from studies carried out the effect of dust on residents is that levels lower then 130 mg/m2/day are acceptable.

On these studies the potential for those unsealed Streets of Arthur and Lloyd Street is environmentally unacceptable. Measures will have to be taken to reduce the dust level on these Streets. Watering of the Streets can reduce the dust level to 80 mg/m2/day or alternatively a light bitumen seal may be considered.

Accordingly the Company will comply with any reasonable requirements of Council with regard to dust control given the short duration of the development and the non-continuance operation thereto.

6.9 FLORA AND FAUNA

Existing native trees being *E.mannifera, E.Bridgesiana, Salix babylonica* (Willow Tree) and *Shinnus areira* (Pepper Tree) and *Casuarina cunninghamiana* (River Oak) occurring along Halls Creek will not be disturbed by the gravel extraction or access Roads. The screening plant will be located in a disused quarry area devoid of timber.

There will be some removal of juvenile trees in the line of gravel extraction, but this will only occur as extraction progresses.

None of the surrounding bank area or non-gravel area will be interfered with nor will the low flow area of the Creek, except for a crossing area.

There will be a revegetation programme implemented along the landward side of the Creek with a diversity of local native species to increase the stability of the Creek bank area and the Creek ecology.

The study of the flora and fauna by D. Paul of Environmental Consultants found that the nature of the development will have low impact on flora and fauna and that the operation will not have an impact on threatened species in the area, being the Platypus, Bush Thick-Knee (bird) and certain Bat species.

The revegetation plan will include close liaison with the Water Resources and from tree selection and planting procedures with the Forestry Commission, Greening Australia and Landcare Group.

In all activities there will be total regard spent to protection of all flora and fauna.

Further the extraction areas and screening plant are within two local residential properties and they will be consulted as well for a satisfactory programme.

On completion the site will be completely cleaned and left in a tidy situation with all machinery and waste removed. It is not considered that any operation will have an effect on the Platypus in the area but on conclusion the National Parks and Wildlife will be requested to advise whether a monitor survey will be necessary and if so will be completed and a report provided to them.

6.10 ROADING

The low volumes of the trucks using the site would have very little impact upon the district and it is considered the vehicles would cause very little deterioration (if any) to the existing Shire Road System. Transportation is, in the main, contained to one direct access Road being Halls Creek Road with all trucks only carrying loads of permitted weight.

There will be use of also Town Streets for the main supply to go to the stockpile in Lloyd Street and then to be collected for the batching plant.

Because of the small scale of the projects and the intermittent use of the Roads, overall annual traffic levels on all Roads are low and therefore impact to these Road systems will be minimal.

6.11 VISUAL IMPACT

The extraction operation of the site at Halls Creek are below the high bank and floodplain levels and together with the existing vegetation and also being on a North-South direction are well screened from the Pubic Road.

Topography, vegetation and isolated location only permit limited vision from the nearby residence.

A tree planting programme is to be carried out immediately and this will, as the vegetation matures, completely screen the project from any visual observation.

The visual impact to the project is very minimal.

6.12 ARCHAEOLOGY

The Archaeology Survey found no site of Aboriginal scientific, historical or public significance. However, in the event of any discovery of relics as defined under the National Parks and Wildlife Service Act, 1974, all operations will cease and the Armidale Office of the NSW National Parks will be contacted with the information. Operations will not commence until a clearance is given by the National Parks and Wildlife Service.

It is reported the Archaeological Survey was initiated by the Company to provide a low as possible impact to the Aboriginal heritage in its recording and keeping of available relics.

6.13 LAND ZONING

The existing Manilla Local Environmental Report, 1988, allow for extraction industries, as well as, the stockpiling of the material within the selected area in Manilla, all subject to Council consent.

There would be no requirement for any rezoning. The preparation of an Environmental Impact Statement is in keeping with the requirement to obtain this consent.

6.14 LAND USE

The relationship of the proposed extraction area and the screening/crushing area to the surrounding lands both in a grazing and agricultural use has no impact.

The extraction site and plant area has a low percentile comparison to the grazing area and none of the works are located in agricultural areas or grazing areas.

Proper safeguards will be implemented to protect stock from potential injury. A close consultation will be carried out with the two landholders for stock protection.

The access Road to the site is over an existing property access route, as well as, its position will minimise disturbance to the farming activities of the local property owner.

6.15 ENERGY RESOURCES

The impact on energy resources is of very low rate and existing facilities can provide for all required use from transportation to Manilla, to Company receipt to site use.

The proposed operation is expected to utilise only some 1,100 to 2,200 litres a month.

6.16 HEALTH AND SAFETY

The area of extraction would have, by the fact of using only gravel material, no detrimental effect to health. The area is a pleasant one with air of high quality and the nearby Halls Creek provides a tranquil site for meal breaks.

The extractive processes would not create any hazards with all normal precautions observed by machinery operation.

Operators of site equipment would always be aware of stock and truck drivers are fully conscious of local requirements and to always observe traffic regulations. Experience has shown the truck operators courteous to other users of the Road network. Extreme caution will be taken during school bus activities.

The extractive processes would not create any public dangers as the area would be denied to the public. In the event of further protection, if required, suitable preventative measures would be taken.

Further there will be no holes created to allow cave-in, no dangerous side slopes to operate in and crusher/screening operation is self operating with any human contact only after being switched off and rendered safe to work on.

Staff will not be permitted to engage in any works in the crusher/screening plant when in operation.

6.17 EMPLOYMENT

The operations would employ current employees with the Company. No further generation of employment would occur immediately, but it would give continued employment to persons. However, the use of the extractive area could see an extension of Company activity and thus increased employment.

The operation does have an indirect effect upon others as the provision of the material allows others in the industries associated thereto to maintain associated activities and thus continuing employment.

The Company and its employees purchase wearable goods, equipment, servicing, fuel, spares from Manilla, as well as, living with their families in the Town. The operation therefore has a positive impact on the general community and well-being of the economy of Manilla.

6.18 CUMULATIVE EFFECT

It is understood there are no other approved operations of gravel extraction within the locality of the proposed operation.

Any activities that may exist would be of low order but none are known to have carried out an Environmental Impact Statement and Development Application to Council.

The application is of only a small scale being from 2500 - 3500 m^3 per annum of extraction. However, it is required to extract in accordance with the requirements of the NSW Water Resources, as well as, the Statutory and Local Bodies and such work to be above the low flow channel to protect River ecology, water supplies, public utilities and the least possible impact to the environment using all protective measures.

Indiscriminate extraction has long standing detrimental impact on the fragile nature of this Continent.

It is unknown if other Environmental Impact Statements are being prepared or considered and the overall assessment of cumulative effect cannot at this stage be determined.

It is not seen that the subject application would have any overall cumulative effect that is adverse to the locality. The subject proposed extraction here is considered to have in the end result a further benefit to the environment and in any further application it is essential that all operations and operators comply within the requirements of the Water Resources which are designed to ensure that cumulative detrimental effects are negligible and all maintained in a very minimal overall effect to the necessary demand to the raw material.

JUSTIFICATION OF THE PROPOSED DEVELOPMENT AND ALTERNATIVES

7.0 JUSTIFICATION OF THE PROPOSED DEVELOPMENT AND ALTERNATIVES

7.1 REQUIREMENT OF GRAVEL EXTRACTION

The Company structure is to provide premix concrete through its batching plant in Manilla for the Manilla district.

In the manufacturing of concrete, sand and gravel are the major raw materials. Concrete is used in the construction industry for houses and other buildings, Roads as kerbs and gutters, bridges, etc.

All the ingredients of the concrete premix including the gravel contents must comply with the stronger specifications of the Australian Standards Specification, as well as, State and Local Authorities.

The gravel content is best found from water active areas where the stream has produced material that is of sound quality and is resistant, having been able to overcome the forces of the stream and the crushing effect in which poor stone could not withstand and would disintegrate and become small particles and down to sediment.

Such gravel areas are usually very clean from unwanted material of silt and clay as they are of poor resistance to the forces of the water flow which are usually carrying them further downstream into other areas.

The end result is that gravel beds that accumulate in River and Streams are free of sediment material and the silts and clays and other soil components are separated into other areas downstream.

The concrete batching plant that requires the gravel component is located in Manilla and the subject extraction area provided a local source thereto.

7.2 ECONOMIC CONCEPTS

Besides the location of the supply is the relationship of the market and compatible supply areas. The relation of the location to the market is a dictating factor as to ability to land the material competitively and this is directly affected by transport costs which are related to vehicle type, performance, Road conditions and distance.

Another major factor is that the supply to the market must be of a quality as expressed prior and be reliable.

The subject extraction area being of small scale is a cost efficient operation and is able to supply the required market of the Town of Manilla, as well as, supply any additional demand for specific uses that require good quality aggregate.

The whole purpose of the application is to allow a security for the future in providing from a deposit approved for excavation and to allow secure economic supply in the manufacture of premix concrete in Manilla.

There is a ready market in Manilla for local produced concrete and such market is to a degree dependable on a local supply of concrete. Any denial to extraction would cause alternative supplies of gravel (and sand) to be brought in from other areas that will be more and more expensive to the consumer, as well as, a question of firstly, reliability of provision of the gravel and secondly, the continual survival of the Company.

7.3 SOCIAL FACTORS

The extraction at the site provides permanent employment for two persons with and thus income, as well as, indirect income to others in the Manilla region. This gives the project both financial and social merit amplified by the current economic climate of hardship in obtaining employment and the resultant social impact to the individual.

7.4 FUTURE DEMAND

Statistics show the Town of Manilla and area as both growing in population and there would be a continuing demand on gravel material in concrete for the construction industry. Further, this demand is expected to remain at a steady rate with the applicant Company having varying peak times. The Company with this resource is able to provide for those future needs.

7.5 ENVIRONMENTAL ISSUE

The area subjects itself to the least possible impact on the environment and these issues that stand out as potential for creating adverse impact can be controlled, reduced and mitigated by management procedures, environmental control, adhering to legislative control, planned action that are all addressed in this Report.

The subject area of extraction is somewhat remote having occupation and residence of only one property in immediate contact and then of only a narrow corridor giving part visual observation with some limited noise production and dust potential. The residence is on the property to which the extraction is located and the owner has agreed to such development.

The site previously was in the area of a once used dryland quarry and the subject application will improve the untidy state in which the site has been left and then improve the local environment.

7.6 ALTERNATIVE MATERIALS

River gravel provided the best concrete aggregate material and meets all the specifications and provide high quality concrete, as well as, good workability and good compaction.

Tests have been carried on slag as a by-product of steel mills as an alternative, but this has shown to be with technology at this stage to be unsuccessful and it could

be many years before a successful substitute can be found for natural gravel which is locally available and economically viable to provide to the markets.

Also a major restraint to any use of slag would be the haul from the Steel Mills.

Other potential areas of gravel are the hard rock quarries and from investigation potential sources are the basalts of the Liverpool Ranges and andesite and other volcanics in other areas.

The closest operating basalt quarry is believed to be that operated by the State Rail Authority at Arglen and the cost of transport to Manilla would be very high.

In all alternatives, the gravel deposits in the Rivers and Creeks where of sufficient quantity are the most economic to retrieve as extraction is simple, as well as, crushing and screening. These deposits are by far the most economical to use when compared with the alternatives.

Hard rock quarries are unsightly and remain forever unless a fill programme can be found but usually not because of their location, topographical feature and size. River and Creek extraction areas have the ability to replenish and completely remove the indication of extraction.

7.7 ALTERNATIVE LOCATIONS

The subject location is the closest viable source to the existing batching plant at Manilla and offers the most economical situation. It also affords the higher return, greater security and has ease of access.

It is in an area of low overall environmental impact and within an ideal area for quantity of supply.

Other gravel areas, but not as good, are located further upstream but would increase cost of transport, have more impact on the environment and some would be considered as environmentally unacceptable for development.

There are gravel deposits associated within major River systems in the area but the subject area has the least impact on the environment and the least disturbance thereto.

7.8 DEVELOPMENT ALTERNATIVES

The development programme as discussed herein is the only viable alternative and has the least adverse impact on the environment and allow security for future supply. It allows full utilisation of equipment, confined area of operation and an ability to improve the general environment in the long term by its development programme, including rehabiliation.

7.9 NO DEVELOPMENT ALTERNATIVE

a. no action would mean variable quality of gravel from other areas and long transport distances and thus higher prices, as well as, security of supply;

b. without the development, employment and indirect benefit to others would discontinue with financial and social consequences. On a community basis consumers which include Local and State Government bodies would pay more for the product of concrete;

c. if other sites were selected, there could be a potential for greater impact on the environment in an adverse manner. The subject area offers the lowest possible impact to the environment and in fact has been demonstrated to be an area that has beneficial effects to the environment.

The environmental investigation has shown that the proposed gravel extraction can be carried out with the least impact on the environment.

7.10 CONCLUSION

Any extraction of natural material is, in today's environmental sensitiveness, very high as a contentious issue. River/Creek gravels are required, as explained, for the continued provision in further development of the requirements of people, as well as, maintaining high standards for concrete supplied to consumers.

Their adverse impact can be kept to a minimum and their basic adversities are visual impact, noise and dust generation impact, as well as, their effect on waterway ecology.

However, with good management, proper attitudes towards the local environment and a full and proper rehabilitation programme can be during operation and on completion, either totally eliminate or minimise to community acceptable level, their environmental impact.

It is considered the development programme has been designed to implement safeguards, recognise the main impacts and minor impacts and would use the resources of Government instrumentality to provide the best possible environment.

The adverse impacts must be balanced against the benefit which comes from the demands of the populace. This includes the provision of the product by market demand, the provision and maintenance of employment and the economic cost of provision of the demand for the material to the community. Together with this is the cycle of monetary exchange with operational expenditure in the local district and then the capital expenditure to the supply point.

Creek gravel extraction is a safe industry to the environment and with proper care, control and management can be made acceptable to the high standard of maintaining environmental protection. It is considered the development meets all those criteria.

To each of the Government Instrumentalities consulted, as well as, private expertise, their requirements have been addressed and the necessary actions taken and with the community at large providing the judgement this development can, with all credibility, meet the criteria's imposed upon it. It is particularly emphasised that the water ecology and the flora and fauna receive the highest protection and least disturbance.

REFERENCES

8.0 REFERENCES

- Environmental Planning and Assessment Act 1979 and Regulations.
- Guidelines for Application of Environmental Impact Policy.
- Clean Water Act 1970 and Regulations.
- Noise Control Act 1975 and Regulations.
- State Pollution Control Commission Act 1975 and Regulations 1985.
- Atlas of New England - 1977 - D.Lea, J.Pigram, L.Greenwood.
- Geology of site by Assoc. Prof. P.G.Flood.
- National Parks and Wildlife Service.
- Department of Meteorology.
- Environmental Impact Statement - P.J.Steel, Mitchell College.
- Crown Land Consolidation Act and Crown Lands Act 1991.
- Archaeological Survey by Department of Archaeology and Palaeoanthropology of University of New England, Armidale.
- Environmental Noise Control Manual.
- Environmental Protection Authority.
- Soil Conservation Service.
- Department of Agriculture - NSW Fisheries.
- Department of Minerals and Energy.
- Department of Water Resources.
- Department of Conservation and Land Management.
- Public Works.
- Manilla Shire Council.
- Flora and Fauna Survey - D.Paul
- Manilla Shire Council LEP 1988.
- Urban, Erosion and Sediment Control Manual - C.A.L.M
- Roads and Traffic Authority.
- Environmental Impact Study in Cockburn & Peel River - Resource Planning 1987.
- Freshwater Habitat Management Guidelines - NSW Agriculture
- Tyrid Pty. Ltd.
- E.I.S. - Sand Extraction, MacDonald River - T.J. Stewart

APPENDIX 1
Specifications of the NSW Department of Environment and Planning

New South Wales Government

Department of Planning

Remington Centre
175 Liverpool Street, Sydney 2000
Box 3927 G.P.O. Sydney 2001
DX . 15 Sydney

Telephone : (02) 391 2000 Ext: 2071
Fax No : (02) 391 2111

Contact: Richard Pearson

Our reference: G92/00374/001

Your reference: 5876

Mr T J Stewart
Terence J Stewart Pty Ltd
PO Box 212
ARMIDALE NSW 2350

Dear Sir,

Proposed Gravel Extraction and Crushing, Parishes of Cuerindi and Fleming, County of Darling

Thank you for your letter of 4 August, 1992 indicating that you are consulting with the Director with regard to the preparation of an environmental impact statement (EIS) for the above development.

2. As development consent is required for the proposal and it is a designated development within the meaning of Schedule 3 of the Environmental Planning and Assessment Regulation, 1980, as amended, an EIS must accompany the development application to the Manilla Shire Council. The EIS shall be prepared in accordance with clause 34 of the Regulation and shall bear a certificate required by clause 26(1)(b) of the Regulation (see Attachment No. 1).

3. In addition, pursuant to clause 35 of the Regulation, the Director requires that the following matters be specifically addressed in the EIS:

- amount of gravel to be extracted per annum and expected life of operation;
- impact on Halls Creek and Namoi River including potential for bank or bed erosion both at site and downstream and impact on water quality. Measures to control erosion and water quality to be specified;
- impact on flooding;
- identification of other gravel and/or sand extraction activities on Halls Creek and consideration of cumulative impact;
- traffic and road issues, including the need for any road or access upgrading. Traffic volumes, routes and vehicle types to be identified;

- measures to control dust and noise, particularly from crushing operations;
- bushfire hazard;
- progressive rehabilitation measures;
- results of consultation with:

  Department of Water Resources
  Environment Protection Authority
  Department of Conservation and Land Management
  (Soil Conservation Service)

4. Attachments No. 2A and 2B are a guide to the type of information most likely to be relevant to the development you propose; not all of the matters raised therein may be appropriate for consideration in the EIS for your proposal; equally, the guide is not exhaustive.

5. In preparing your EIS you should approach the Manilla Shire Council and take into account any comments Council considers may apply to its determination of the proposal.

6. Should you require any further information regarding this matter please do not hesitate to contact us again.

Yours faithfully,

B Adams 9.9.92

B. Adams
Manager
Assessments and Major Hazards Branch
As Delegate for the Director

DEPARTMENT OF PLANNING
ATTACHMENT NO. 1

STATUTORY REQUIREMENTS FOR ENVIRONMENTAL IMPACT STATEMENTS

In accordance with Part IV of the Environmental Planning and Assessment Act, 1979, an environmental impact statement (EIS) must meet the following requirements.

Pursuant to clause 34 of the Environmental Planning and Assessment Regulation, 1980, as amended, the contents of an EIS shall include the following matters:

(a) full description of the designated development proposed by the development application;
(b) a statement of the objectives of the proposed designated development;
(c) a full description of the existing environment likely to be affected by the proposed designated development, if carried out;
(d) identification and analysis of the likely environmental interactions between the proposed designated development and the environment;
(e) analysis of the likely environmental impacts or consequences of carrying out the proposed designated development (including implications for use and conservation of energy);
(f) justification of the proposed designated development in terms of environmental, economic and social considerations;
(g) measures to be taken in conjunction with the proposed designated development to protect the environment and an assessment of the likely effectiveness of those measures;
(g1) details of energy requirements of the proposed development and measures to be taken to conserve energy;
(h) any feasible alternatives to the carrying out of the proposed designated development and reasons for choosing the latter; and
(i) consequences of not carrying out the proposed development.

The EIS must also take into account any matters required by the Director of Planning pursuant to clause 35 of the Regulation, which may be included in the attached letter.

The EIS must bear a certificate as required by clause 26(1)(b) of the Regulation.

DEPARTMENT OF PLANNING
ATTACHMENT NO. 1

STATUTORY REQUIREMENTS FOR ENVIRONMENTAL IMPACT STATEMENTS

In accordance with Part IV of the Environmental Planning and Assessment Act, 1979, an environmental impact statement (EIS) must meet the following requirements.

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(b) a statement of the objectives of the proposed designated development;
(c) a full description of the existing environment likely to be affected by the proposed designated development, if carried out;
(d) identification and analysis of the likely environmental interactions between the proposed designated development and the environment;
(e) analysis of the likely environmental impacts or consequences of carrying out the proposed designated development (including implications for use and conservation of energy);
(f) justification of the proposed designated development in terms of environmental, economic and social considerations;
(g) measures to be taken in conjunction with the proposed designated development to protect the environment and an assessment of the likely effectiveness of those measures;
(g1) details of energy requirements of the proposed development and measures to be taken to conserve energy;
(h) any feasible alternatives to the carrying out of the proposed designated development and reasons for choosing the latter; and
(i) consequences of not carrying out the proposed development.

The EIS must also take into account any matters required by the Director of Planning pursuant to clause 35 of the Regulation, which may be included in the attached letter.

The EIS must bear a certificate as required by clause 26(1)(b) of the Regulation.

DEPARTMENT OF PLANNING
ATTACHMENT NO 2A

ADVICE ON THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR AN EXTRACTIVE INDUSTRY

A definition of extractive industry may be found in paragraph (n) to Schedule 3 of the Environmental Planning and Assessment Regulation, 1980, (as amended). These industries are operations undertaken for the purpose of mining sand, gravel, clay, turf, soil, rock, stone or similar substances. The definition of extractive industry specifically excludes coal, petroleum or minerals which are prescribed under the Mining Act, 1973. Extractive industries may take the form of dredging operations, quarrying operations, turf farms or various forms of land excavation etc. Processing of extracted material on the same site as the winning of the material may also constitute an extractive industry.

Extractive industries have prompted considerable public controversy in the past since, among other things, they affect visual amenity, generate heavy vehicle movements, raise dust and cause disturbance through noise and blasting. This is the prime reason for designation of extractive industries under the Environmental Planning and Assessment Act, 1979.

The purpose of this paper is to outline various issues relevant to the preparation and consideration of an EIS for extractive industries. It is intended to assist the preparation of the EIS. However, it is the applicant's responsibility to identify and address as fully as possible the matters relevant to the specific development proposal in complying with the requirements for EIS preparation (see Attachment No 1).

The matters nominated in this paper are not intended as a comprehensive identification of all issues which may arise in respect of an extractive industry. Some of the issues nominated may not be relevant to a specific proposal. On the other hand, there may be other issues, not included, that are appropriate for consideration in the EIS.

Information provided should be clear, succinct and objective and where appropriate be supported by maps, plans, diagrams or other descriptive detail. The purpose of the EIS is to enable members of the public, the consent authority (usually the Council) and the Department of Planning to properly understand the environmental consequences of the proposed development.

1. Description of the proposal.

The description of the proposal should provide general background information on the location and extent of the works proposed, an indication of adjacent developments, and details of the site, land tenure, zonings and relevant forward planning proposals and any other land use constraints.

2/...

The EIS should address the compatibility of the proposal with any regional strategy for extractive industries in the area and with the provisions of the Local Environmental Plans for existing and proposed development.

This section should provide specific information on the nature, intent and form of the development. It should, as far as possible, include such details as the processes involved (highlighting any proposed crushing or blasting), disposal of wastes, landscaping and site rehabilitation. A description should also be provided of associated operations such as the transport of materials and use of the end product if likely to have environmental implications.

Particular details that may be relevant include:

- Characteristics and economic significance of the resource.
- Possible availability of alternative resources.
- Quantity of materials to be extracted.
- Details of any blasting and/or crushing.
- Effects of vibrations.
- Type of machinery and equipment to be used for dredging and stockpiling operations and for any processing plant.
- Expected life of the operation.
- Hours of operation.
- Details of necessary stockpiling.
- Access arrangements - truck routes, truck numbers etc.
- Site drainage and erosion controls.
- Proposals for rehabilitation.

2. Description of the Environment.

This should provide details of the environment in the vicinity of the development site and also of aspects of the environment likely to be affected by any facet of the proposal. In this regard, physical, natural, social, archaeological and economic aspects of the environment should be described to the extent necessary for assessment of the environmental impact of the proposed development.

3. Analysis of Environmental Impacts.

Environmental impacts usually associated with extractive industries are listed below. Where relevant to the specific proposal, these should be addressed in the EIS, taking into account the adequacy of safeguards proposed to minimise them.

- The flow of any affected rivers or watercourses.
- The effect of the extraction on the sediment transport rate of any affected rivers or watercourses.
- The bed and bank stability of any affected rivers during and after completion of the operations and any need for recurrent maintenance dredging.
- Any possible siltation, sedimentation or downstream effects of the operation.
- Any likely cumulative effects of the proposed operation when considered together with other operations in the vicinity.

- Details of floods and any likely effects of the operation on flood liability of surrounding lands.
- The possible effects of flooding on the operation.
- Effects on flora and fauna.
- The agricultural viability of the landholding.
- Likely noise/vibration disturbance caused by the operations, including transport operations, on nearby residences.
- Other impacts of trucking movements, including access over railways and onto highways.
- Dust nuisance likely to be caused.
- Effects on water quality of nearby watercourses.
- Disposal of waste material.
- Effects on the visual environment.
- Any likely affectation of sites of Aboriginal archaeological or European heritage value if located in the vicinity of operations.
- Impact of the operations on navigation aspects for all types of shipping (commercial, recreational, etc).

In addition, any potential for hazard or risks to public safety and any proposals to monitor and reduce environmental impacts should be included.

4. Contact with relevant Government Authorities.

In preparing the EIS, it is suggested that authorities, such as those listed below, should be consulted and their comments taken into account in the EIS.

- The Environment Protection Authority in regard to air, water and noise impacts and relevant pollution control legislation requirements;
- The Department of Mineral Resources concerning its responsibilities under Sydney REP No 9 Extractive Industry;
- The Department of Water Resources concerning the implications of the proposal on their jurisdiction;
- The Department of Conservation and Land Management regarding appropriate erosion control and rehabilitation procedures;
- The Department of Agriculture if prime agricultural land may be affected by the proposal;
- The Heritage Council of NSW if the proposal is likely to affect any place or building having heritage significance for the State; the National Parks and Wildlife Service if aboriginal places or relics are likely to be affected.
- The Maritime Services Board in relation to navigational aspects of shipping; and
- The Public Works Department in relation to hydrological impacts and relevant legislative requirements.

It is the responsibility of the person preparing the EIS to determine those Departments relevant to the proposed development.

DEPARTMENT OF PLANNING

ATTACHMENT NO. 2B

ADVICE ON THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR CRUSHING GRINDING OR MILLING WORKS

An EIS is required to be completed, pursuant to paragraph (k), Schedule 3 of the Environmental Planning and Assessment Regulation, 1980, (as amended), for crushing, grinding or milling works, being works in which more than 200 tonnes per annum of rock, ores, minerals, chemicals or natural grain products are processed by crushing, grinding, milling or separating into different sizes. The reason for designation is that developments of these types have the potential to create considerable public nuisance due to noise, dust, odours and wastes which affect air and water quality.

(N.B. When determining the capacity of the works in this regard, it is considered reasonable to take into account the daily working hours, the working week and working year normal for such a plant and the maximum production rate of the plant to be installed).

The purpose of this paper is to outline various issues relevant to the preparation and consideration of an EIS for a crushing grinding or milling works. It is intended to assist the preparation of the EIS. It is the applicant's responsibility to identify and address, as fully as possible, the matters relevant to the specific development proposal in complying with the statutory requirements for EIS preparation (see Attachment No. 1).

The matters nominated in this paper are not intended as a comprehensive identification of all issues which may arise in respect of such work. Some of the issues nominated may not be relevant to a specific proposal. On the other hand, there may be other issues, not included, that are appropriate for consideration in the EIS.

Information provided should be clear, succinct and objective and where appropriate be supported by maps, plans, diagrams or other descriptive detail. The purpose of the EIS is to enable members of the public, the consent authority (usually the council) and the Department of Planning to properly understand the environmental consequences of the proposed development.

1. Description of the proposal.

The description of the proposal should provide general background information on the location and extent of the works, existing and proposed, an indication of adjacent developments, and details of the site, land tenure, zonings and relevant forward planning proposals and any other land use constraints.

2/...

The extent to which the supply of raw materials and access to markets for the finished product has determined the location of the plant in preference to alternative sites should be stated.

This section should provide specific information on the nature, intent and form of the development. It should, as far as possible, include such details as the processes involved, wastes created and landscaping. A description should also be provided of associated operations such as the transport of materials and the use of the end product if such use is likely to have environmental implications.

Particular details that may be relevant include:

. Characteristics and economic significance of the product.
. Plans of operation.
. Any proposals for future expansion, including staging and timing.
. Capacity of plant now and in the future.
. Sources and quantities of raw materials.
. Type of machinery and equipment to be used.
. Expected life of the operation of the plant.
. Number of persons to be employed.
. Hours of operation.
. Means of storage, location, quantity and details of necessary stockpiling.
. Types and quantities of finished products and details of any storage required.
. Access arrangements - truck routes, truck numbers, parking, etc.
. Site drainage and erosion controls.
. Water supply requirements.

2. Description of the Environment.

This should provide details of the environment in the vicinity of the development site and also of aspects of the environment likely to be affected by any facet of the proposal. In this regard, physical, natural, social, archaeological and economic aspects of the environment should be described to the extent necessary for assessment of the environmental impact of the proposed development.

3. Analysis of Environmental Impact.

Potential environmental impacts usually associated with these types of operations are listed below. Where relevant to the specific proposal, these should be addressed in the EIS, taking into account the adequacy of safeguards proposed to minimise them.

. Likely noise disturbance caused by the operations, including transport operations, on nearby residences, particularly at night.

3/...

. Other impacts of trucking movements, including access across railways and on to highways.
. Potential for air pollution, including odours, organic vapours and particulate matter.
. Water management: including water requirements and the separating of clean and contaminated runoff before discharge; water treatment; quality and quantity of effluent for disposal.
. Treatment and disposal of waste material.
. Effects on the visual environment.

In addition, any potential for fire hazard or risks to public safety and any proposals to monitor and reduce environmental impacts should be included.

4. Contact with relevant Government Authorities.

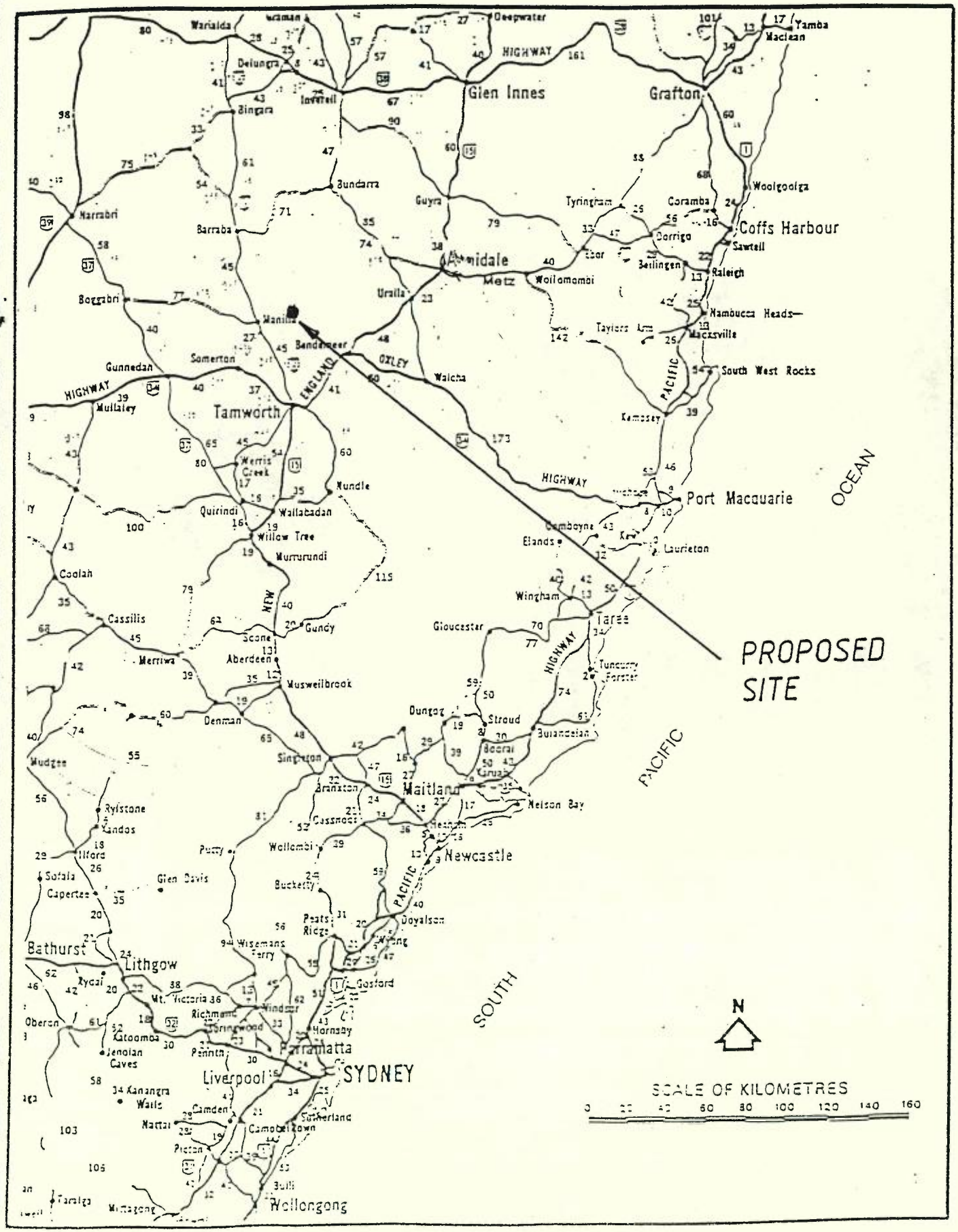
In preparing the EIS, it is suggested that authorities, such as those listed below, should be consulted and their comments taken into account in the EIS.

. The Environment Protection Authority in regard to air, water and noise impacts and relevant pollution control legislation requirements;
. The Heritage Council of NSW if the proposal is likely to affect any place or building having heritage significance for the State; the National Parks and Wildlife Service if Aboriginal places or relics are likely to be affected;
. New South Wales Agriculture should be contacted if prime agricultural land may be affected by the proposal.

It is the responsibility of the person preparing the EIS to determine those Departments relevant to the proposed development.

APPENDIX 2
Environmental Plans

FIGURE 1: REGIONAL MAP



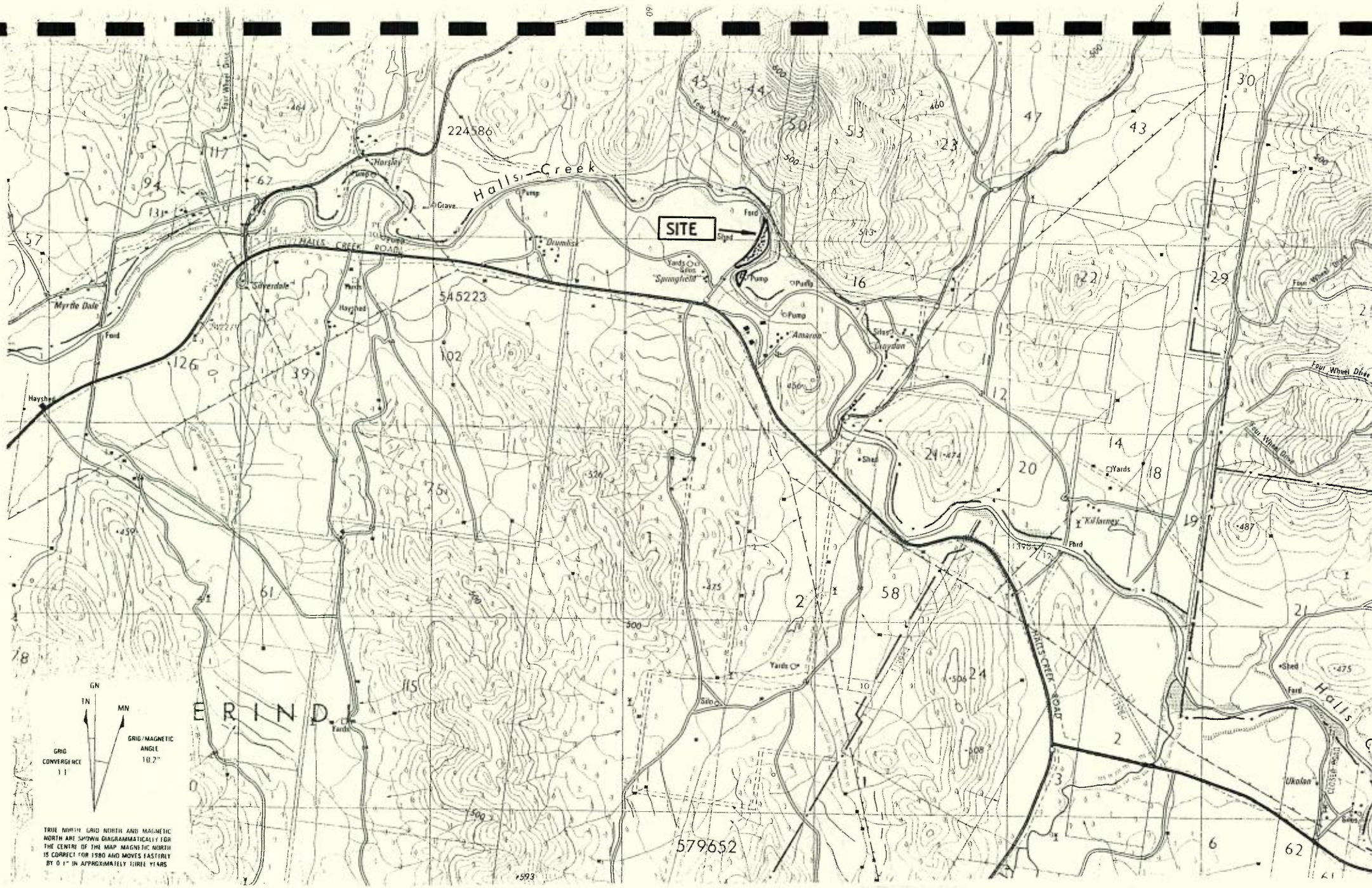
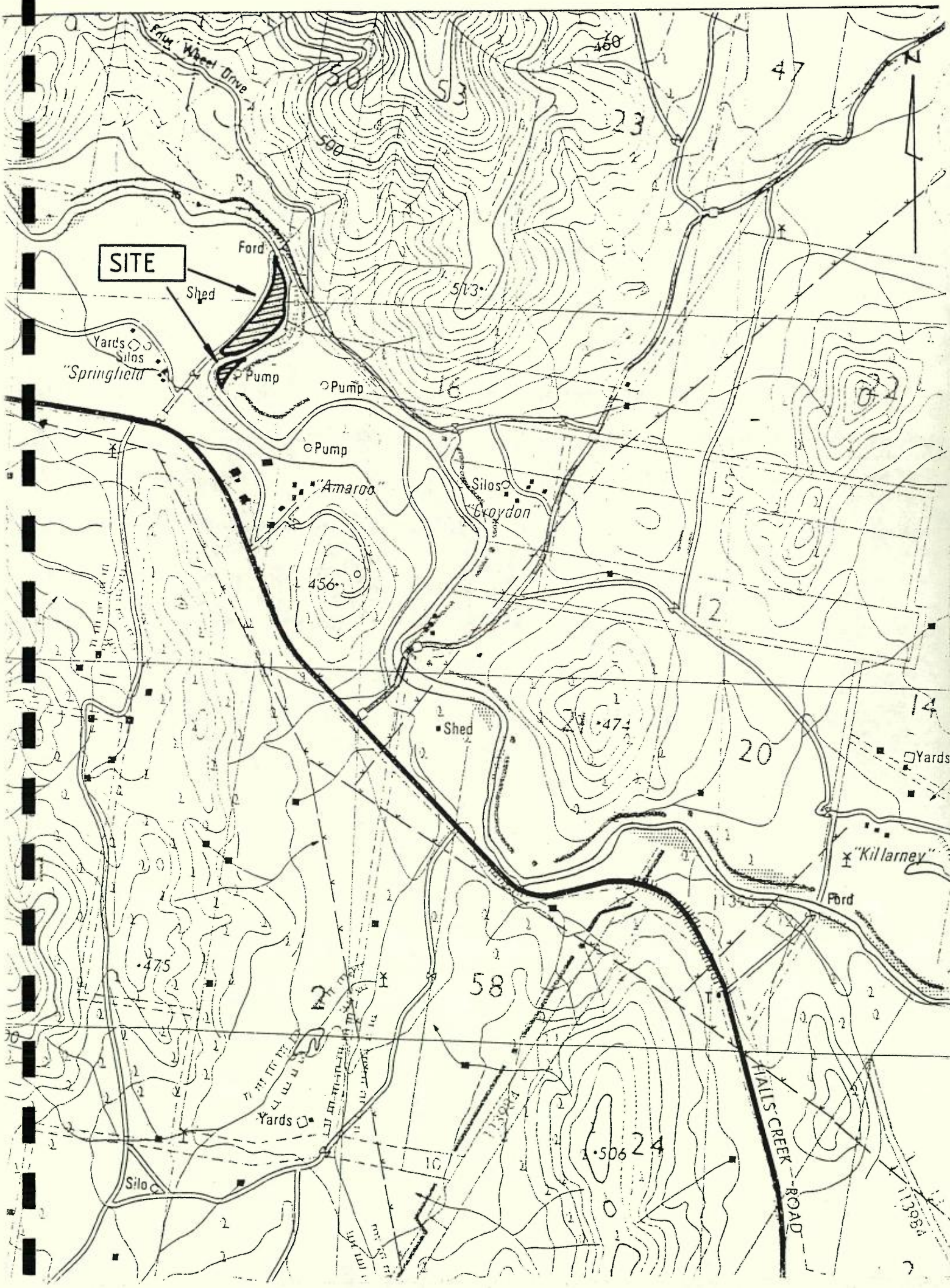


Figure 2

Topographic map of region.

MUNDOWEY 9036-I-S

FIGURE 3: LOCAL MAP



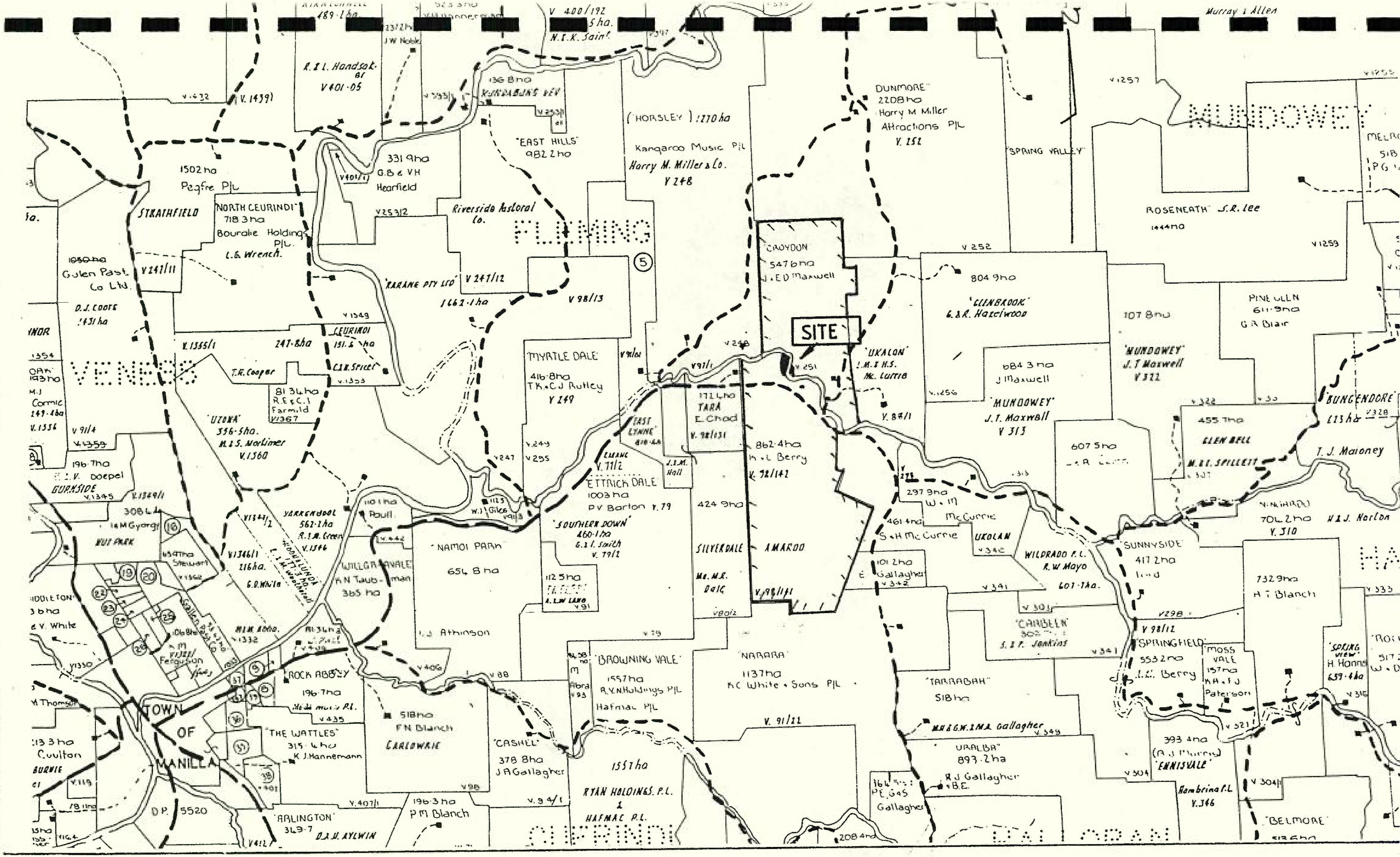
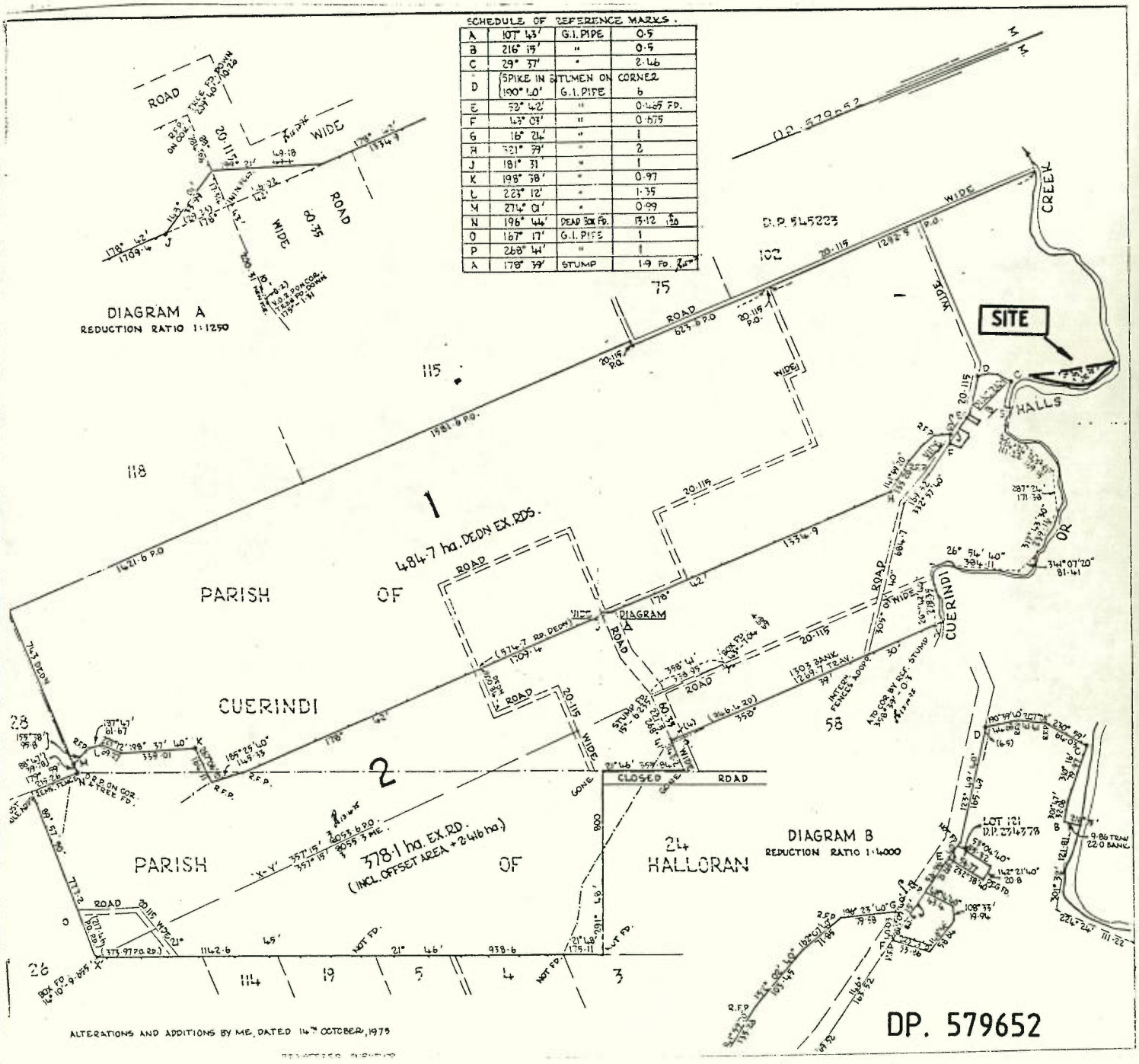


FIGURE 4: - LAND OWNERSHIP PLAN

FIGURE 5
TITLE PLAN



LT 11/101

COMPUTER FOLIO SEARCH

Issued pursuant to the Real Property Act, 1900, and certified overleaf

LAND TITLES OFFICE
NEW SOUTH WALES

TORRENS TITLE

FOLIO IDENTIFIER	
1/579652	
EDITION No. & DATE OF CURRENT CERTIFICATE OF TITLE	
-	-

No. B120

Search certified to:
Date 4. 8.1992 Time 8.00AM

VOL 12941 FOL 179 IS THE CURRENT CERTIFICATE OF TITLE FOR THIS COMPUTER FOLIO AND SHOULD BE LODGED WITH THE NEXT DEALING

LAND

LOT 1 IN DEPOSITED PLAN 579652
AT HALLS CREEK
SHIRE OF MANILLA
PARISH OF CUERINDI COUNTY OF DARLING & OTHER
TITLE DIAGRAM: DP579652

FIRST SCHEDULE

LIONEL BRUCE BERRY
KATHLEEN INA BERRY
AS TENANTS IN COMMON IN EQUAL SHARES (T Q634633)

SECOND SCHEDULE
---
1. LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)
2. LAND EXCLUDES THE ROAD SHOWN IN THE TITLE DIAGRAM
3. Q634634 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA (FORMERLY COMMONWEALTH TRADING BANK OF AUSTRALIA)

NOTATIONS

UNREGISTERED DEALINGS: NIL

FIGURE 6
TITLE - FIG.5

4. 8.1992 B120

* ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE

WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER

LT 11/101

COMPUTER FOLIO SEARCH

Issued pursuant to the Real Property Act, 1900, and certified overleaf

NEW SOUTH WALES

TORRENS TITLE

FOLIO IDENTIFIER	
2/579652	
EDITION No. & DATE OF CURRENT CERTIFICATE OF TITLE	
2	29. 8.1989

No. B120

Search certified to:
Date 5. 8.1992 Time 8.00AM

LAND

LOT 2 IN DEPOSITED PLAN 579652
AT HALLS CREEK
SHIRE OF MANILLA
PARISH OF CUERINDI COUNTY OF DARLING & OTHER
TITLE DIAGRAM: DP579652

FIRST SCHEDULE

LIONEL BRUCE BERRY
KATHLEEN INA BERRY
AS TENANTS IN COMMON IN EQUAL SHARES (T Y570844)

SECOND SCHEDULE
---
1. LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)
2. LAND EXCLUDES THE ROAD SHOWN IN THE TITLE DIAGRAM

NOTATIONS

UNREGISTERED DEALINGS: NIL

FIGURE 7
TITLE

5. 8.1992 B120

* ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE

WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER

FIGURE 8
TITLE PLAN

See Mines Maps for ... under Mining Acts affecting Portion

Amended Survey

PLAN

of Portions 44 & 45

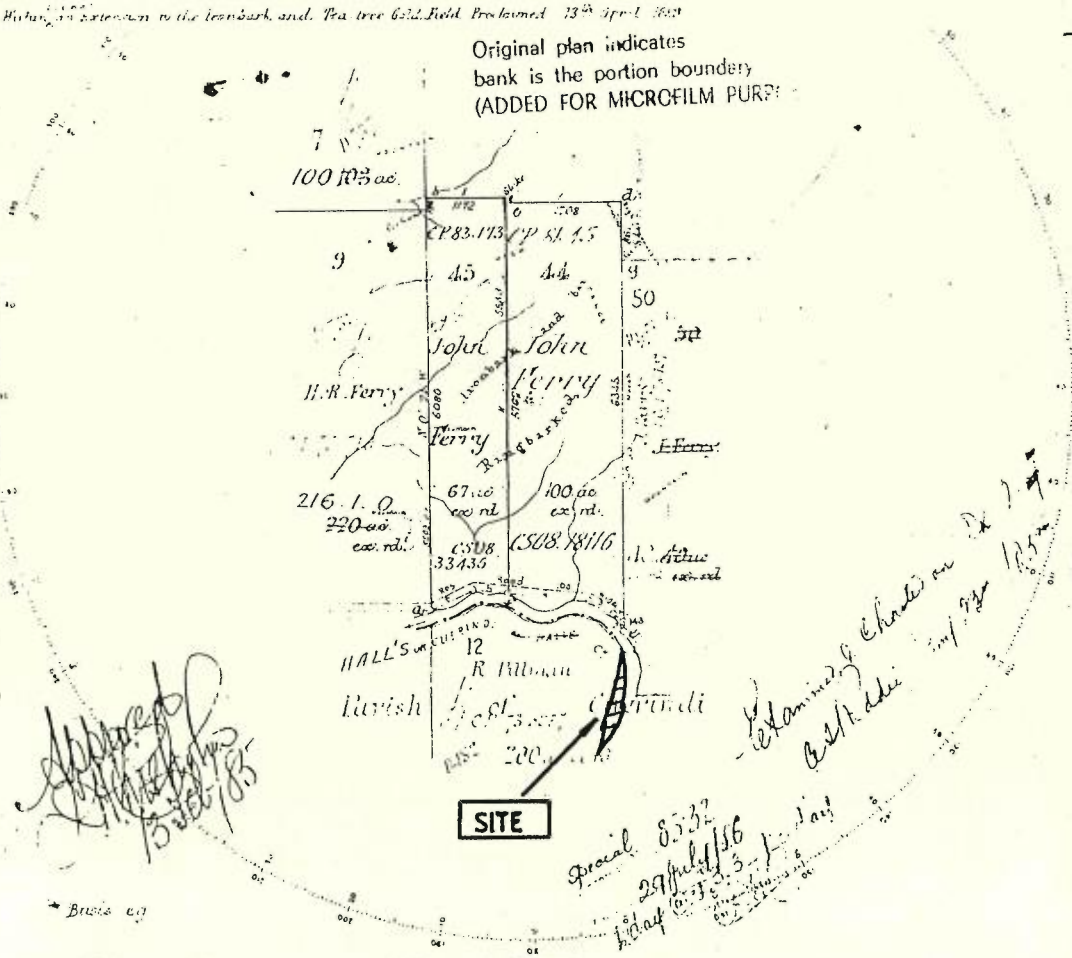
Parish of Fleming

County Darling

Applied for under the 21st clause of the Crown Lands Alienation Act of 61

by John Ferry

Original plan indicates
bank is the portion boundery
(ADDED FOR MICROFILM PURP



Reference to Corners

Corner	Bearing	From	Links	Mins From
a	[illegible] E	Apple	19	S 45. W
b	N 5° 30' E	Box	8	45
c	N 43° 0' E	Gum	16	44 . 45
d	N 5° 15' E	do.	53	44
e	S 71° 0' W	do.	46	44 . 50
f	N 79° 30' W	do.	88	. . 45
g	N 35° 45' W	Bundy	19	50

Reference to Traverse

Line	Bearing	Distance
1	306° 22'	275
2	326° 44'	351
3	298° 5'	327
4	275° 47'	787
5	275° 48'	504
6	245° 45'	689

I hereby certify that I in person made and on the 26 Oct 32 completed the survey represented on this plan, on which are written the bearings and the lengths of the lines measured by me and I declare that the survey has been executed in accordance with the regulations published for the guidance of Licensed Surveyors and the practice of the Surveyor Generals Department.

Francis Gardiner

Surveyor

Value of Improvements Por 44 - £6.5.0 . Por. 45 £4.4.0.

Situated in the Currundi Run.

Scale 20 Chains to an Inch

Forwarded to the Surveyor General with my letter of ... 19..

Cable Book 715 ... 151

Surveyor Generals Office, Sydney, ... 19..

1487-1808

LT 11/101

COMPUTER FOLIO SEARCH

NEW SOUTH WALES

Issued pursuant to the Real Property Act, 1900, and certified overleaf

TORRENS TITLE

FOLIO IDENTIFIER	EDITION No. & DATE OF CURRENT CERTIFICATE OF TITLE
44/752182	- -

No. B120

Search certified to:
Date 4. 8.1992 Time 8.00AM

VOL 1922 FOL 178 IS THE CURRENT CERTIFICATE OF TITLE FOR THIS COMPUTER FOLIO AND SHOULD BE LODGED WITH THE NEXT DEALING

LAND

LOT 44 IN DEPOSITED PLAN 752182
SHIRE OF MANILLA
PARISH OF FLEMING COUNTY OF DARLING
(FORMERLY KNOWN AS PORTION 44)
TITLE DIAGRAM: SEE CROWN PLAN 1487.1808

FIRST SCHEDULE

BARRY JOHN UMBACK
JULIANNA UMBACK
AS JOINT TENANTS (ND Y16464)

SECOND SCHEDULE
---
1. LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)
2. LAND EXCLUDES THE ROAD(S) SHOWN IN THE TITLE DIAGRAM
3. Y16465 MORTGAGE TO WESTPAC BANKING CORPORATION

NOTATIONS

UNREGISTERED DEALINGS: NIL

FIGURE 9
TITLE-FIG 8

4. 8.1992 B120

* ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE

WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER

See Mines Map for ... affecting Portion

77
123112

Tamworth

PLAN

FIGURE 10
TITLE PLAN

of 1 portion of land No 50

Parish of Fleming
County of Darling

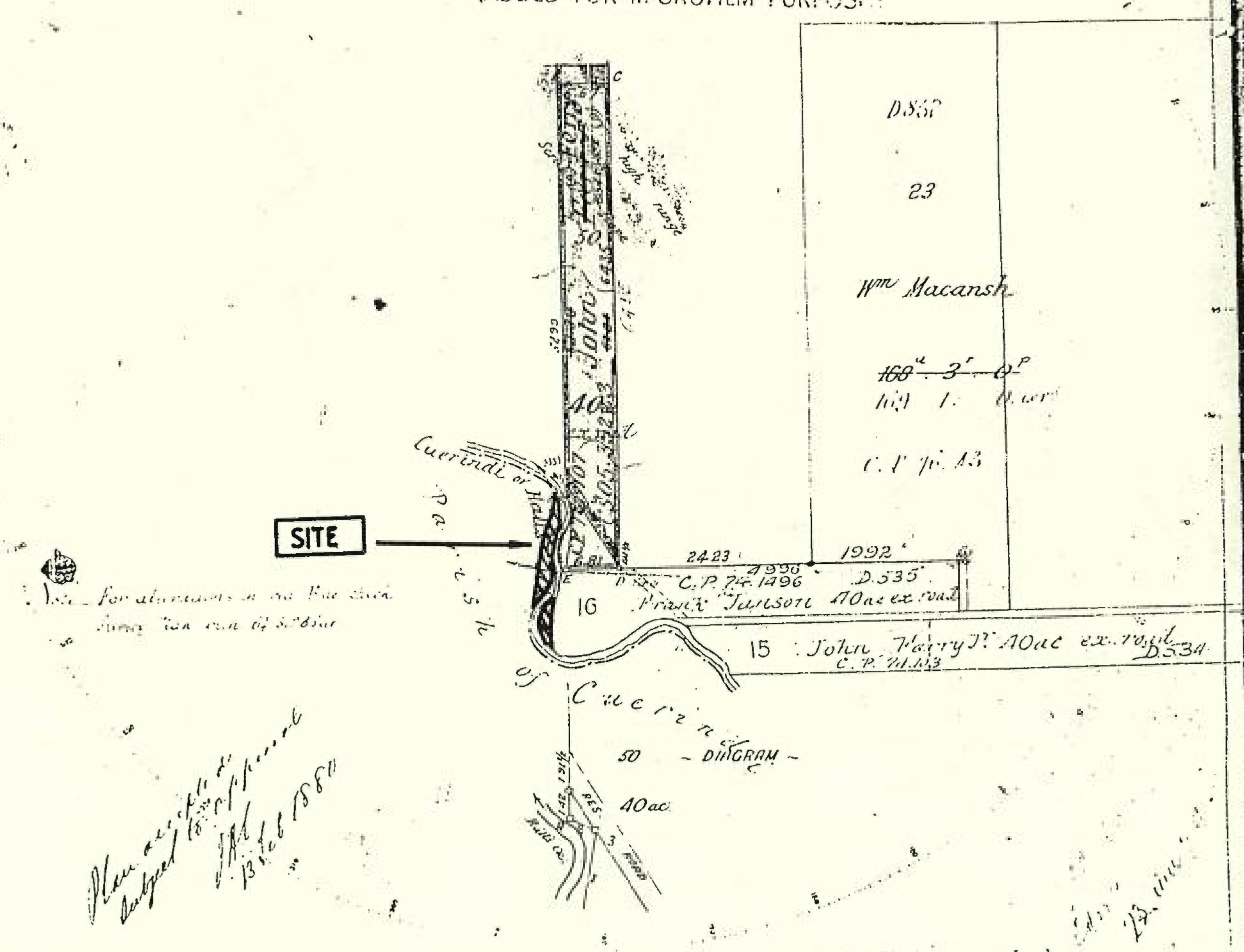
Applied for under the 21st clause of the Crown Lands Alienation Act of 1861 by

John Ferry

Within the Boundaries of an Extension to the Ironbark and Teatree Gold Field Proclaimed 13th April 1889

A.C.P. 78.107 ... Sale Completed

Original plan indicates
bank is the portion boundary
(ADDED FOR MICROFILM PURPOSES)



Note. For alterations in this Plan check ...

Plan accepted & Lodged 18 ... J.R.L. 13 Feb 1880

Reference to Corners

Corner	Bearing	From	Links	No. on Tree
A	S76°40'W	GUM	46	50
B	N55°45'W	IRONBARK	19	50
C	N12°0'E	GUM	13	50
D	S60°10'E	APPLE	71	50
E	S46°5'W	D°	68	16.50

Reference to Traverse

Line	Bearing	Distance
1	N10°13'E	8.93
2	N64°59'W	1.59
	RES. ROAD	
3	N31°30'W	12.76½

Scale 20 Chains to an Inch.

Marked in accordance with regulations
Instrument used in Survey Theodolite
Date of Survey 23rd and 24th Septr 1878.
Value of Improvements Nil.
Situated in the Cuerindi Run
Land stony and broken - Serpentine ridges
Timber Ironbark, Pine, Myall and Gum
Bad grazing country

Transmitted to the Surveyor General with my letter of the 10th ... 1879

Hugh H. More Licensed Surveyor

1191-1808

1191

LT 11/101

COMPUTER FOLIO SEARCH

NEW SOUTH WALES

Issued pursuant to the Real Property Act, 1900, and certified overleaf

TORRENS TITLE

FOLIO IDENTIFIER	
50/752182	
EDITION No. & DATE OF CURRENT CERTIFICATE OF TITLE	
-	-

No. B120

Search certified to:

Date 4. 8.1992 Time 8.00AM

VOL 1665 FOL 93 IS THE CURRENT CERTIFICATE OF TITLE FOR THIS COMPUTER FOLIO AND SHOULD BE LODGED WITH THE NEXT DEALING

LAND

LOT 50 IN DEPOSITED PLAN 752182
SHIRE OF MANILLA
PARISH OF FLEMING COUNTY OF DARLING
(FORMERLY KNOWN AS PORTION 50)
TITLE DIAGRAM: SEE CROWN PLAN 1191.1808

FIRST SCHEDULE

BARRY JOHN UMBACK
JULIANNA UMBACK
AS JOINT TENANTS _ (T Y16464)

SECOND SCHEDULE

1. LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)
2. LAND EXCLUDES THE ROAD(S) SHOWN IN THE TITLE DIAGRAM
3. Y16465 MORTGAGE TO WESTPAC BANKING CORPORATION

NOTATIONS

UNREGISTERED DEALINGS: NIL

FIGURE 11
TITLE- FIG.10

4. 8.1992 B120

* ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE

WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER

85|6159 PLAN OF PORTION 53

County of Darling Parish of Fleming

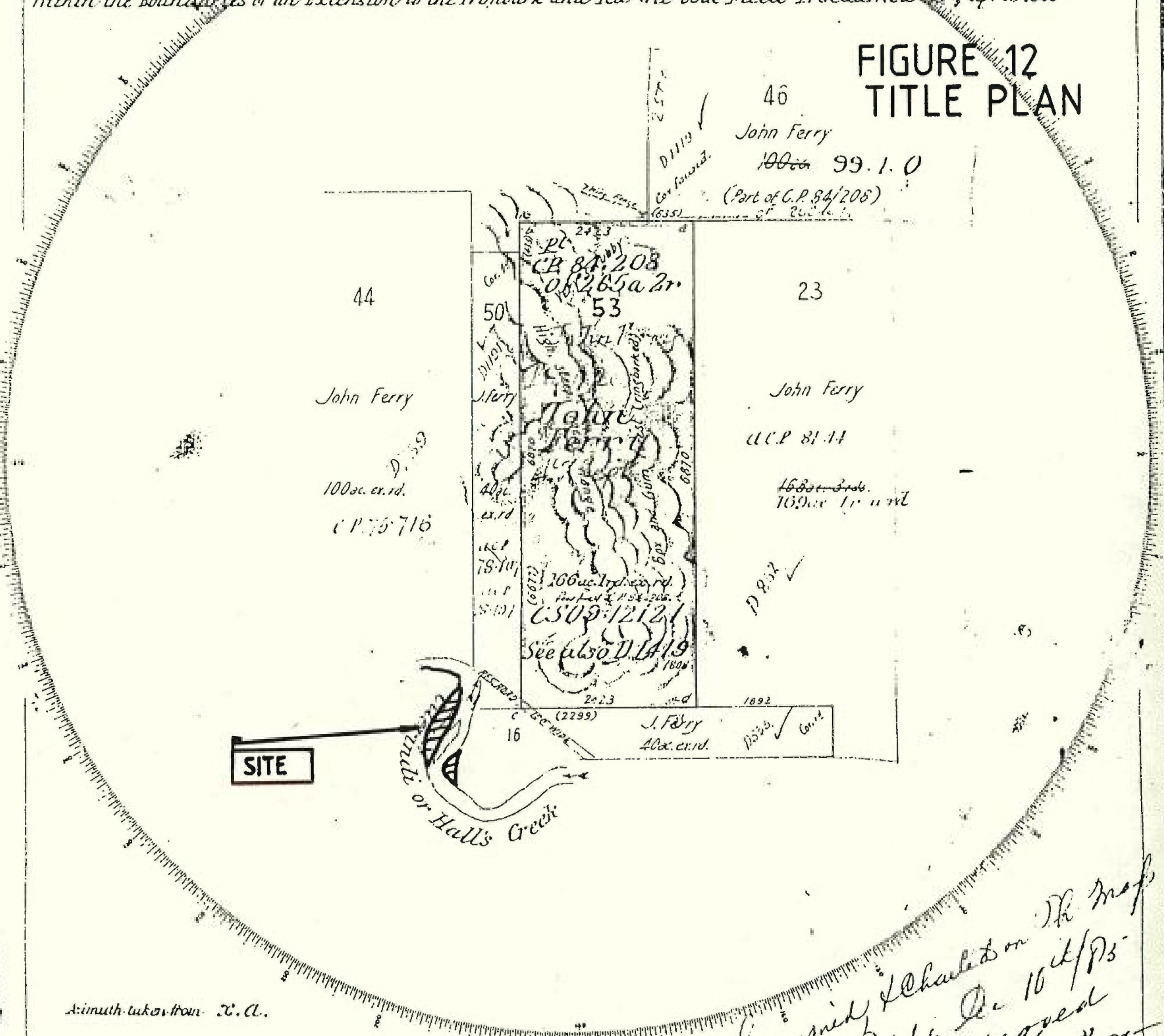
Applied for under the 21st clause of the Crown Lands Alienation Act of 1861 by

John Ferry

Part of A.C.P. 84-208 dated 1st Sept. of 26 ... Sale Completed

Comprising also Por. 16

Within the Boundaries of an Extension to the Ironbark and Tea tree Gold Field Proclaimed 13th April 1889



Azimuth taken from X.A.

Reference to Corners

Corner	Bearing	From	Links	N° on Tree
a	S40° 50'W	Box	45	23.53
b	S10° 10'W	Box	55	53
c	S60° 10'E	Apple	71	50.53
d	N50° 00'W	Box	37	23-53
x	N82° 00'E	Box	13	46

Reference to Traverse

Line	Bearing	Distance
		85.62

16 Dec 85 Francis ... Def. J.W.L.

Value of Improvements £8-6-3

Situated in the Gueriндi Run

Examined A. Charleston ... A. Reddie Dec 16th/85

approved J.H. ... 15 Dec 85

I hereby certify that I in person made and on the 26th June 85 completed the survey represented on this plan, on which are written the bearings and lengths of the lines measured by me, and I declare that the survey has been executed in accordance with the regulations published for the guidance of Licensed Surveyors, and the practice of the Surveyor General's Department.

Francis Gardner

Licensed Surveyor

Scale 20 Chains to an Inch Transmitted to the Surveyor General with my letter of the 23rd August № 85.41

D 1523-1808

No. 1909/3482 State of New South Wales. [LAND GRANT.] B

FIGURE 13
TITLE-FIG.12

NEW SOUTH WALES. Duty shillings 2 STAMP DUTY. SYDNEY, N.S.W.

REGISTER BOOK, VOL. 1997 FOL. 234

4th August 1982

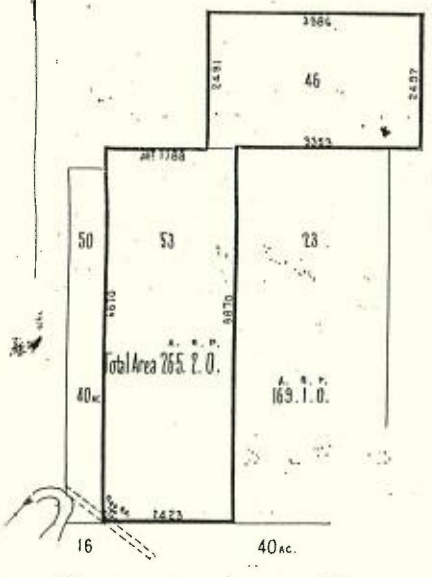
GRANT OF LAND PURCHASED BY CONDITIONAL SALE WITHOUT COMPETITION.

(UNDER THE CROWN LANDS ALIENATION ACT OF 1861.)

L.P. 84.208 Tamworth

EDWARD VII, by the Grace of God, of the United Kingdom of Great Britain and Ireland, King, Defender of the Faith, and so forth:—
TO ALL to whom these Presents shall come, Greeting:—

WHEREAS John Perry of Manilla in Our State of New South Wales claims to be entitled in respect of a purchase by Conditional Sale without competition under the 21st Section of the Crown Lands Alienation Act of 1861 to the Parcel of Land hereinafter described and the declaration as by law required has been made and the Minister for the time being charged with the administration of the public lands is satisfied that all things required by law to be done to entitle the said John Perry to a grant of the fee-simple of the said Lands subject to the Reservations hereinafter contained have been done and performed And Whereas the sum of Two hundred and sixty five pounds ten shillings sterling being the purchase money payable for the said Land has been duly paid into the Office of the Treasurer of Our said State Now Know Ye That for and in consideration of the said sum for and on Our behalf well and truly paid into the Treasury of Our said State before these Presents are issued and of all and singular the premises We for Us Our Heirs and Successors Do HEREBY GRANT unto the said John Perry his Heirs and Assigns subject to the several and respective Reservations hereinafter mentioned ALL THAT piece or parcel of land in Our said State containing by Admeasurement Two hundred and sixty five acres two roods be the same more or less situated in the County of Darling and Parish of Nemuing Portions 46 and 53



Scale 20 chains to an inch

Commencing on the Northern boundary of portion sixteen of forty acres at the South Eastern corner of portion fifty of forty acres and bounded thence on the West by the Eastern boundary of portion fifty and a line on all bearing North sixty eight chains seventy links on the North by a line bearing East about seventeen chains eighty eight links aforesaid on the West by a line bearing North two minutes East twenty four chains ninety one links aforesaid on the North by a line bearing North eighty nine degrees fifty three minutes East thirty nine chains eighty six links on the East by a line bearing South twenty four chains ninety seven links on the South by a line and the Northern boundary of portion twenty three of one hundred and sixty nine acres one rood on all bearing West thirty three chains fifty three links aforesaid on the East by a Western boundary of portion twenty three bearing South sixty eight chains seventy links and aforesaid on the South by part of the Northern boundary of portion sixteen aforesaid bearing West twenty four chains twenty three links to the point of commencement.

Exclusively of a road one chain wide passing through this land at the South Western corner the area of which has been deducted from the total area.

As per plan in the margin hereof with all the Rights and Appurtenances whatsoever thereto belonging To Hold unto the said John Perry his Heirs and Assigns for ever subject nevertheless to the several and respective Reservations hereinafter contained that is to say Provided Nevertheless And We do Hereby Reserve unto Us Our Heirs and Successors all Minerals which the said Land contains with full power and authority for Us Our Heirs and Successors and such person or persons as may from time to time be authorised by Us Our Heirs and Successors or by the Governor for the time being of Our said State to enter upon the said Land and to search for mine dig and remove the said Minerals with full right of ingress egress and regress for the purposes aforesaid Provided Also And We do hereby further Except and Reserve unto Us Our Heirs and Successors all such parts and so much of the said Land as may hereafter be required for a Public Way or Public Ways Canals or Railroads in over and through the same to be set out by Our Governor for the time being of Our said State or some person by him authorised in that respect And also all Sand Clay Stone Gravel and Indigenous Timber and all other Materials the natural produce of the said Land which may be required at any time or times hereafter by the Government of Our said State for the construction and repair of any Public Ways Bridges or Canals or for Naval Purposes or Railroads or any Fences Embankments Dams Sewers or Drains necessary for the same together with the right of taking and removing all such materials And also the right of full and free ingress egress and regress into out of and upon the said Land for the several purposes aforesaid or any of them In Testimony Whereof We have caused this Our Grant to be Sealed with the Seal of Our said State

WITNESS Our Right Trusty and Well-beloved FREDERIC JOHN NAPIER, BARON CHELMSFORD, Knight Commander of Our Most Distinguished Order of Saint Michael and Saint George, Our Governor of Our State of New South Wales and its Dependencies, in the Commonwealth of Australia, at Sydney, in Our said State, this twenty fourth day of August in the ninth year of Our Reign, and in the year of Our Lord One thousand nine hundred and nine

Chelmsford
Governor.

REGISTERED PROPRIETOR Barry John Umback and Juliana Umback as joint tenants by Notice of Death Y164631 and Transfer Y164647 Registered 30-11-1988.

FIGURE 14
TITLE PLAN

PLAN

of a portion of land N° 16 containing 40 acres

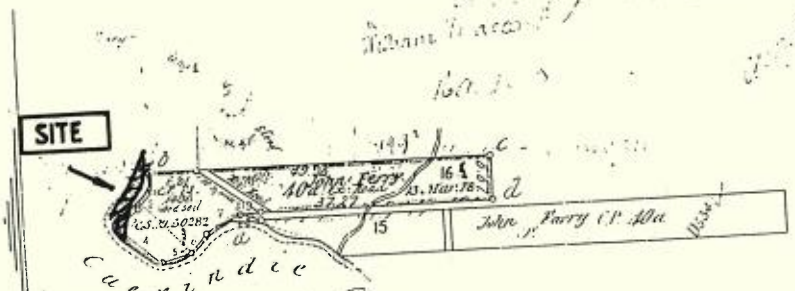
Parish of Fleming

COUNTY OF DARLING

Revised for as a conditional purchase under clause 13 of the Crown Lands Alienation Act by

Frank Jauson

23rd March 84
8th April 84
17 April 84



Original plan includes
back is the portion boundary
[illegible] FOR MICROFILM PURPOSES

TRAVERSE

N°	bearing	distance
	180°12'	287
2	221.29'	330
3	227.52'	428
4	128.57'	7.96
5	76.04'	424
6	39.38'	379
7	64.32'	592
8	107.15'	335
9	126.24'	11.26

CORNERS

Cor	bearing	from	links	N°
a	275°33'	gum	0.54	
b	226.05'	apple	0.68	16
c	96.10'	dec	0.33	
d	339.30'	dec	0.31	

NOTES

Scale 20 chains to an inch
Marked in accordance with the regulations
surveyed with theodolite on the 25th August
Value of improvements £20
Length of connection 3.35 chains

13 Nov 84

Transmitted to the Surveyor General with my letter N° 74/84 dated 31st August 1884

535-1808

LT 11/101

Issued pursuant to the Real Property Act, 1900, and certified overleaf

TORRENS TITLE

FOLIO IDENTIFIER	
16/752182	
EDITION No. & DATE OF CURRENT CERTIFICATE OF TITLE	
-	-

No. B120

Search certified to:
Date 4. 8.1992 Time 8.00AM

VOL 497 FOL 58 IS THE CURRENT CERTIFICATE OF TITLE FOR THIS COMPUTER FOLIO AND SHOULD BE LODGED WITH THE NEXT DEALING

LAND

LOT 16 IN DEPOSITED PLAN 752182
SHIRE OF MANILLA
PARISH OF FLEMING COUNTY OF DARLING
(FORMERLY KNOWN AS PORTION 16)
TITLE DIAGRAM: SEE CROWN PLAN 535.1808

FIRST SCHEDULE

BARRY JOHN UMBACK
JULIANNA UMBACK
AS JOINT TENANTS (T Y16464)

SECOND SCHEDULE
---
1. LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)
2. LAND EXCLUDES THE ROAD(S) SHOWN IN THE TITLE DIAGRAM
3. Y16465 MORTGAGE TO WESTPAC BANKING CORPORATION

NOTATIONS

UNREGISTERED DEALINGS: NIL

FIGURE 15
TITLE- FIG.14

4. 8.1992 B120

* ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE

WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER

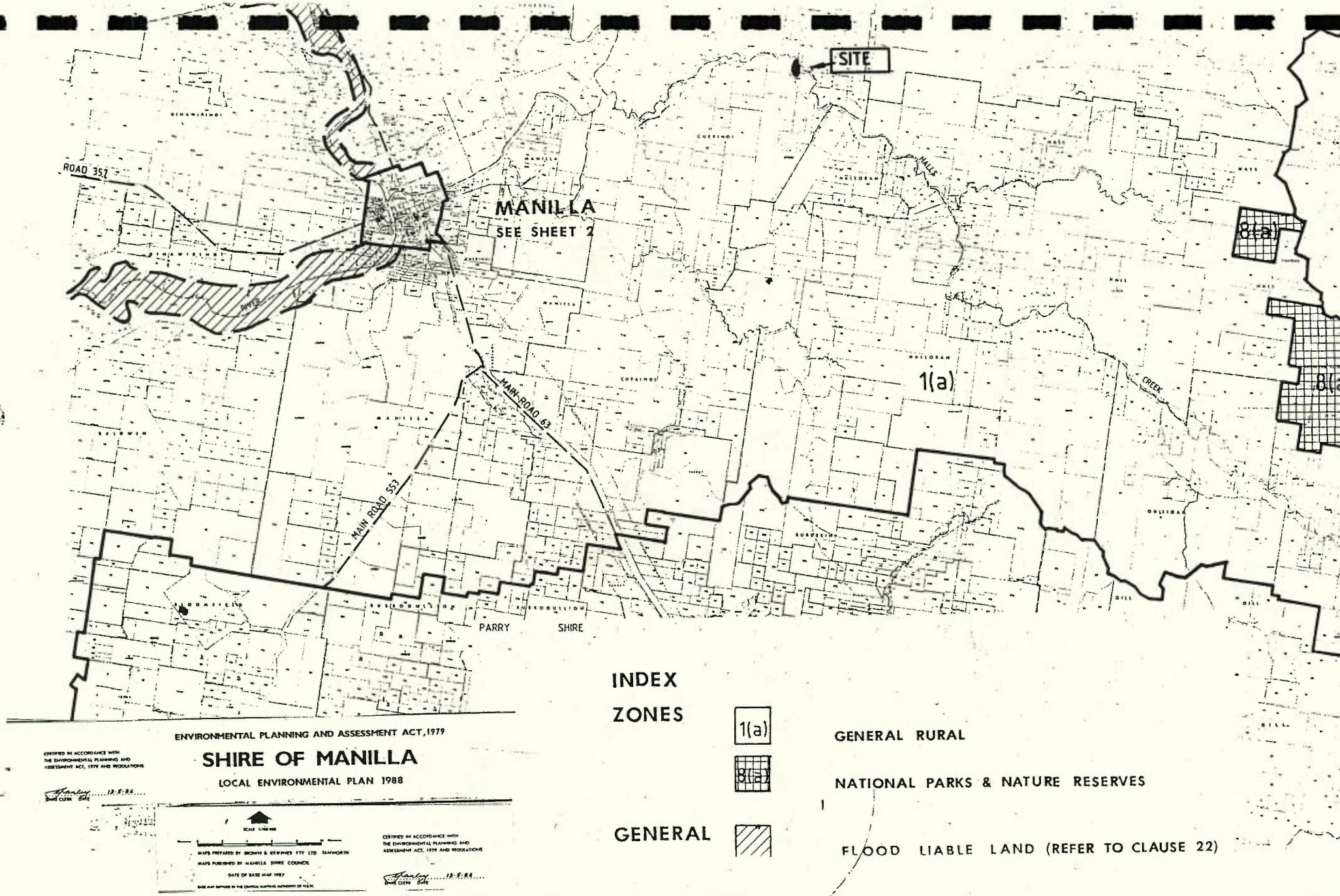


FIGURE 16- EXTRACTION AREA- ZONING PLAN

NOTE: FLOOD AFFECTED LAND INFORMATION IS NOT SHOWN.

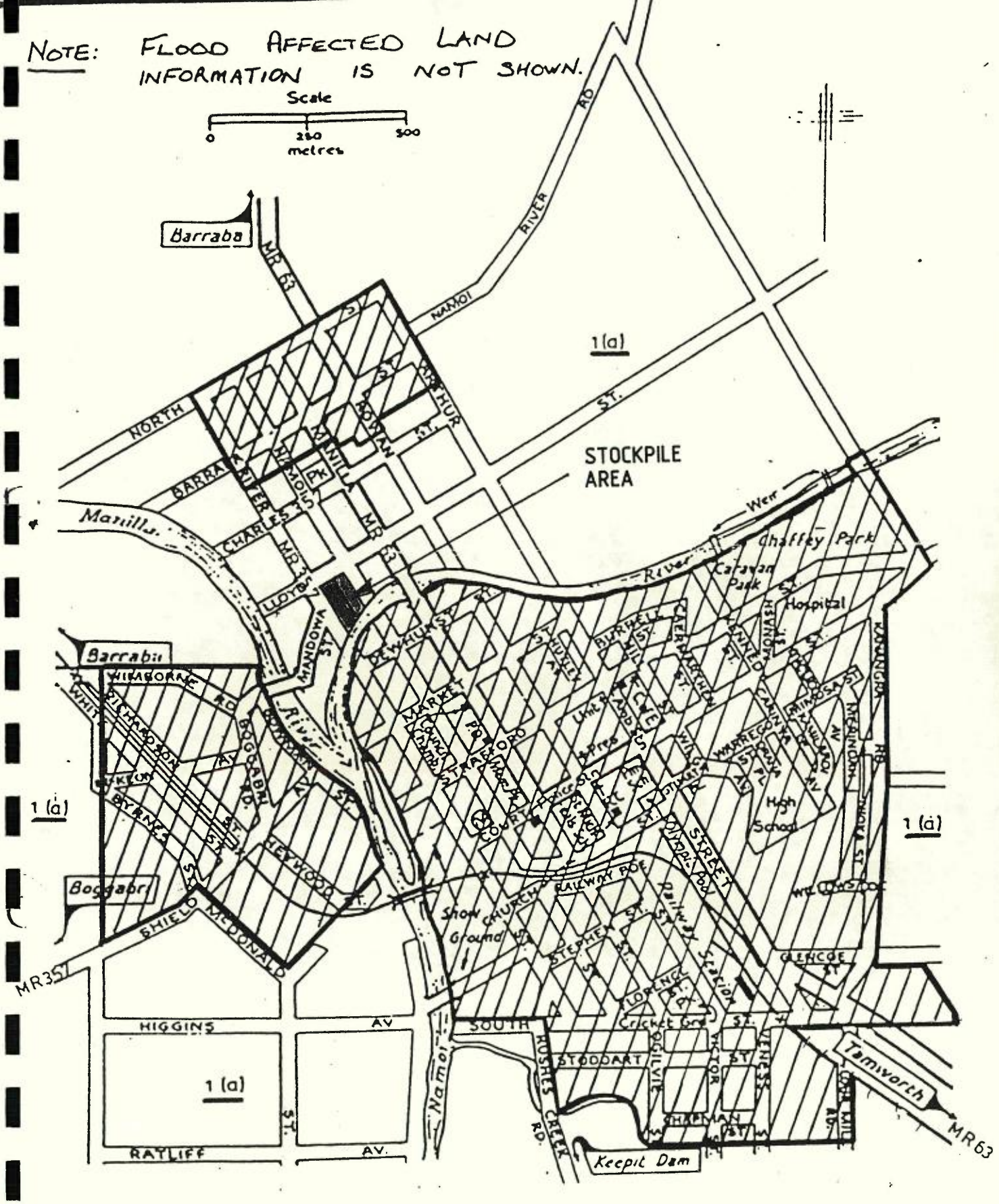


FIGURE 17
STOCKPILE AREA
ZONING PLAN

INDEX

ZONE Nº 1(a) GENERAL RURAL

ZONE Nº 2(v) URBAN

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

SHIRE OF MANILLA

DRAFT LOCAL ENVIRONMENTAL PLAN

SHEET Nº 2 OF TWO SHEETS

FIGURE 18-1

[*Published in Government Gazette No. 85 of 13th May, 1988.*]

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

MANILLA LOCAL ENVIRONMENTAL PLAN 1988

I, the Minister for Planning, in pursuance of section 70 of the Environmental Planning and Assessment Act 1979, make the local environmental plan set out hereunder. (84-1886)

DAVID HAY,
Minister for Planning.

Sydney, 2nd May, 1988.

PART 1—PRELIMINARY

Citation

1. This plan may be cited as the Manilla Local Environmental Plan 1988.

Aims, objectives, etc.

2. The general aims of this plan are—

(a) to encourage the proper management, development and conservation of natural and man-made resources within the Shire of Manilla by protecting or conserving—

(i) prime crop and pasture land;

(ii) timber, mineral, soil, water and other natural resources;

(iii) areas of ecological significance;

(iv) areas of high scenic or recreational value; and

(v) places of archaeological or heritage significance to the Shire of Manilla, and

(b) to replace the existing planning controls with a single local environmental plan to help facilitate growth and development of the Shire of Manilla in accordance with paragraph (a) and in a manner which—

(i) encourages efficient and effective delivery of services and facilities; and

(ii) encourages a range of living environments and economic opportunities in accordance with the demand for those environments and opportunities.

Land to which plan applies

3. This plan applies to all land within the Shire of Manilla as shown on the map, with boundaries as indicated on the map.

Relationship to other environmental planning instruments

4. This plan repeals Interim Development Order No. 1—Shire of Manilla.

Definitions

5. (1) In this plan—

"animal boarding or training establishment" means a building or place used for the purpose of the keeping, maintaining, receiving or training of animals for purposes other than agriculture, and includes riding schools, kennels and the like;

"appointed day" means the day upon which this plan takes effect;

"arterial road" means Main Roads 63, 357 and 553 as shown on the map;

"caravan park" has the same meaning as in the Caravan Parks and Moveable Dwellings Ordinance under the Local Government Act 1919;

"clear felling" includes ringbarking, cutting down, felling, poisoning or otherwise destroying, topping, lopping, removing or injuring trees, or causing trees to be ringbarked, cut down, felled, poisoned or otherwise destroyed, topped, lopped, removed or injured;

"Council" means the Council of the Shire of Manilla;

"demolition", in relation to an item of the environmental heritage, means the damaging, defacing, destruction, pulling down or removal of that item, in whole or in part;

"environmentally significant land" means land within 60 metres of a water course or ridgeline named on the map;

"flood liable land" means land shown diagonally hatched with black lines on the map;

"floodway" means land shown cross-hatched with black lines on the map;

"holding" means the combined area of any adjoining or adjacent land held in the same ownership as at the appointed day;

"intensive agricultural pursuits" means market gardening, mushroom growing, fruit growing, flower growing, intensive livestock keeping or other like purposes;

"intensive livestock keeping establishment" means a building or place in which or upon which cattle, sheep, goats, poultry or other livestock are held for the purposes of nurturing by a feeding method other than natural grazing and, without limiting the generality of the foregoing, includes—

(a) feed lots;

(b) piggeries;

(c) poultry farms; and

(d) fish farming (including the farming of crustaceans and oysters),

but does not include an animal boarding or training establishment or land used for the keeping of livestock or poultry intended solely for personal consumption or enjoyment by the owner or occupier of the land;

"item of the environmental heritage" means a building, work, relic or place listed in Schedule 1;

"prime crop and pasture land" means land—

(a) which is identified as Class 1, Class 2 or Class 3, or as land of merit for special agricultural uses, on the map prepared by or on behalf of the Director-General of Agriculture before the commencement of this plan, entitled and deposited in the office of the Department of Agriculture; or

(b) which is identified as Class 1, Class 2 or Class 3, or as land of special agricultural uses, on a map prepared after the commencement of this plan by or on behalf of the Director-General of Agriculture marked "Agriculture Land Classification Map" and deposited in the office of the Department of Agriculture;

"recreation area" means—

(a) a childrens' playground;

(b) an area used for sporting activities or sporting facilities;

(c) an area used by the Council to provide recreational facilities for the physical, cultural or intellectual welfare of the community; or

(d) an area used by a body of persons associated together for the purpose of the physical, cultural or intellectual welfare of the community to provide recreational facilities for those purposes,

but does not include a racecourse or showground;

"relic" means any deposit, object or material evidence relating to the settlement (including Aboriginal habitation) prior to 1st January, 1900, of the Shire of Manilla;

"renovation" in relation to a building or work, means the making of structural changes to the inside or outside of the building or work;

"rural land" means land other than land in Zone No. 2 (v) or 8 (a);

"the map" means the set of 2 maps marked "Shire of Manilla Local Environmental Plan 1988";

"trees" includes saplings, shrubs and scrubs;

"vacant land" means land devoid of dwellings.

(2) In this plan—

(a) a reference to a building or place used for a purpose includes a reference to a building or place intended to be used for that purpose;

(b) a reference to a map is a reference to a map deposited in the office of the Council; and

(c) a reference to land within a zone specified in the Table to clause 9 is a reference to land shown on the map in the manner indicated in clause 8 as the means of identifying land of the zone so specified.

Adoption of model provisions

6. The Environmental Planning and Assessment Model Provisions 1980, except for—

(a) the definitions of "arterial road" and "map" in clause 4 (1); and

(b) clauses 11, 13, 15, 18, 20, 21, 22, 23, 24, 28, 29, 31 and 34,

are adopted for the purposes of this plan.

Consent authority

7. The Council shall be the consent authority for the purposes of this plan.

PART 2—GENERAL RESTRICTIONS ON DEVELOPMENT OF LAND

Zones indicated on the map

8. For the purposes of this plan, land to which this plan applies shall be within a zone specified hereunder if the land is shown on the map in the manner specified hereunder in relation to that zone:

Zone No. 1 (a) (General Rural Zone)—edged heavy black and lettered "1 (a)".

Zone No. 2 (v) (Residential Village or Urban Zone)—edged heavy black and lettered "v".

Zone No. 8 (a) (National Parks and Nature Reserves Zone)—edged heavy black, cross hatched and lettered "8 (a)".

Zone objectives and development table

9. (1) The objectives of a zone are set out in the Table to this clause under the heading "Objectives of Zone" appearing in the matter relating to the zone.

(2) Except as otherwise provided by this plan, in relation to land within a zone specified in the Table to this clause, the purposes (if any) for which—

(a) development may be carried out without development consent;

(b) development may be carried out only with development consent; and

(c) development may be carried out only with development consent granted in respect of an application that has been advertised in the same manner as designated development is required to be advertised; and

(d) development is prohibited,

are specified under the headings "Without development consent", "Only with development consent", "Advertised development—only with development consent" and "Prohibited development", respectively, appearing in the matter relating to the zone.

(3) Except as otherwise provided by this plan, the council may only consent to the carrying out of development on land to which this plan applies if the Council is of the opinion that the carrying out of the development is consistent with the objectives of the zone within which the development is proposed to be carried out.

TABLE

ZONE No. 1 (a) (GENERAL RURAL ZONE)

1. Objectives of zone

The objectives of this zone are—

(a) to enable development for purposes that are—

(i) appropriate in a rural location; and

(ii) sympathetic with the environmental characteristics of the land and the costs of providing public services and amenities;

(b) to promote efficient sustainable agricultural utilisation of agricultural land, particularly prime crop and pasture land;

(c) to facilitate farm adjustments;

(d) to conserve prime crop and pasture land by ensuring that—

(i) it is not unnecessarily converted to non-agricultural purposes; and

(ii) any allotment created for an intensive agricultural pursuit is potentially capable of sustaining a range of purposes suitable to the locality; and

(e) to protect or conserve—

(i) soil stability by controlling development in accordance with soil capability;

(ii) forests of commercial value for timber production;

(iii) valuable deposits of minerals, coal, petroleum and extractive materials by controlling the location of development to enable the efficient extraction of those deposits;

(iv) trees and other vegetation in environmentally sensitive areas where the conservation of the vegetation is likely to reduce land degradation;

(v) water resources; and

(vi) travelling stock routes.

2. Without development consent

Agriculture (other than ancillary dwellings and intensive livestock keeping establishments); forestry (other than ancillary dwellings).

3. Only with development consent

Any purpose other than a purpose included in Item 2, 4 or 5.

4. Advertised development—only with development consent

Subdivision proposals providing for the creation of 6 or more allotments; intensive livestock keeping establishments; shops.

5. Prohibited development

Boarding-houses; motor showrooms; residential flat buildings.

ZONE No. 2 (v) (RESIDENTIAL VILLAGE OR URBAN ZONE)

1. Objectives of zone

The objectives of this zone are—

(a) to regulate the subdivision and use of land to permit a wide range or urban purposes; and

(b) to recognise existing urban, commercial, industrial and open space areas within the zone and enable future development appropriate to their function.

2. Without development consent

Nil.

3. Only with development consent

Any purpose other than a purpose included in Item 4 or 5.

FIGURE 18-3

4. Advertised development—only with development consent

Residential flat buildings; caravan parks; clubs; hotels; motels.

5. Prohibited development

Extractive industries; intensive livestock keeping establishments; mines; offensive and hazardous industries.

ZONE No. 8 (a)—(NATIONAL PARKS AND NATURE RESERVE ZONE)

1. Objective of zone

The objective of this zone is to identify those lands included in national parks, nature reserves, aboriginal areas and state recreational areas and to permit development of land within the zone as deemed appropriate by the Director of the National Parks and Wildlife Service.

2. Without development consent

Any purpose authorised by or under the National Parks and Wildlife Act 1974, or any purpose ancillary or incidental to any such purpose.

3. Only with development consent

Nil.

4. Advertised development—only with development consent

Nil.

5. Prohibited development

Any purpose other than a purpose included in Item 2.

PART 3—SPECIAL PROVISIONS

Development within Zone No. 1 (a) generally

10. (1) The Council shall not consent to an application to develop rural land unless it has made an assessment of the effect that the carrying out of the development will have on—

(a) the present and potential use of the land for the purpose of agriculture;

(b) vegetation, timber production, soil resources and soil stability, water resources (including the quality and stability of water courses and ground water storage and riparian rights;

(c) the future recovery of known or prospective areas of valuable deposits of minerals, coal, petroleum, sand, gravel or other extractive materials;

(d) the protection of areas of ecological significance or of high scenic or recreation value; and

(e) future expansion of settlements in the locality.

(2) In making such an assessment the Council shall have regard not only to the land the subject of the application but also to other land in the locality.

(3) The Council shall not consent to an application to subdivide rural land for purposes other than a dwelling unless the Council has made an assessment of whether a condition should be imposed in connection with a future dwelling on the allotment or whether a dwelling should be prohibited.

(4) Subclause (1) does not apply to—

(a) an alteration or addition to a building or work; or

(b) the erection of a dwelling-house on an allotment of land created in accordance with this plan for the purposes of a dwelling.

Subdivision of land generally

11. (1) A person shall not subdivide land to which this plan applies except with the consent of the Council.

(2) The Council shall not grant its consent to subdivide land within Zone No. 1 (a) unless the application for development consent—

(a) states, in relation to each allotment created by the subdivision, the primary purpose for which that allotment is intended to be used;

(b) identifies any allotment which is intended to be used primarily for the purposes of agriculture;

(c) identifies any allotment which is intended to be used primarily for the purposes of a dwelling;

(d) identifies any allotment on which it is intended to erect a dwelling and states whether or not the dwelling is the primary purpose for which the allotment is being created; and

(e) shows the approximate location of any dwelling erected on the land at the date of the application.

Consolidation of rural land

12. (1) Nothing in this plan shall prevent the subdivision of rural land on which a dwelling house has been lawfully erected provided that—

(a) one allotment created by the subdivision has an area of not less than 2 hectares and comprises the allotment on which that dwelling-house is erected; and

(b) any other allotment created by the subdivision is consolidated with an adjoining or adjacent allotment that is used for the purposes of agriculture or forestry.

(2) An allotment that has been created by a subdivision effected pursuant to subclause (1) may not be further subdivided pursuant to that subclause.

Development along arterial roads

13. (1) This clause applies to land within Zone No. 1 (a) having a frontage to an arterial road.

(2) The Council shall not grant consent to an application to develop land which has a frontage to an arterial road unless, in the opinion of the Council—

(a) access to that land is provided by a road other than the arterial road, wherever practicable; and

(b) the safety and efficiency of the arterial road will not be adversely affected by the development of that land by—

(i) the design of the access to that land;

(ii) the emission of smoke or dust from that land; and

(iii) the nature, volume or frequency of vehicles entering or leaving the arterial road.

(3) The Council shall not consent to the development of land to which this clause applies for a purpose specified in Schedule 3 if the development of the land for that particular purpose will have direct access to an arterial road or to a road connecting with an arterial road and the access to that road is within 90 metres (measured along the road alignment of the connecting road) of the alignment of the arterial road.

Subdivision for agricultural purposes in Zone No. 1 (a)

14. The Council shall not consent to an application to subdivide land within Zone No. 1 (a) if any allotment to be created by the subdivision is to be used primarily for the purposes of agriculture (other than intensive agricultural pursuits) unless—

(a) each allotment created for that purpose in the subdivision has—

(i) an area of 200 hectares or more; and

(ii) if the allotment has frontage to an arterial road—frontage to that road of 400 metres or more; and

(b) in the opinion of the Council, each allotment created for that purpose is capable of sustaining agricultural food or fibre production.

Subdivision for intensive agricultural pursuits

15. The Council shall not consent to an application to subdivide land within Zone No. 1 (a) if any allotment to be created by the subdivision is to be used primarily for the purposes of intensive agricultural pursuits unless—

(a) each allotment created for that purpose in the subdivision has an area of 20 hectares or more;

(b) in the opinion of the Council—

(i) each allotment created for that purpose is capable of sustaining a range of intensive agricultural pursuits; and

(ii) an adequate water supply is available to service the intensive agricultural pursuits to be carried out on the allotment; and

(c) the Council has consulted with the Director-General of Agriculture and has taken into consideration the advice received.

Residential use of land within Zone No. 1 (a)

16. (1) This clause applies to all land within Zone No. 1 (a), but does not include prime crop and pasture land.

(2) The Council may approve the subdivision of land to which this clause applies and the erection of a dwelling-house on each allotment created provided that each allotment has an area of not less than 2 hectares and the Council is satisfied that the land is to be used primarily for residential purposes.

(3) The Council shall not approve the subdivision of land under subclause (2) unless it is satisfied that—

(a) the land is within reasonable proximity to a range of services and facilities;

(b) the land has reasonable all-weather access to a township of 200 people or more;

(c) the land is not subject to significant environmental hazards;

(d) the dwelling to be erected on the land—

(i) has an adequate potable water supply and a bulk water supply for fire fighting and additional domestic uses; and

(ii) has adequate provision for the on-site disposal of effluent without detriment to the environment.

(4) The Council shall not consent to the creation of more than 20 allotments under this clause in any calendar year.

Subdivision for other purposes in Zone No. 1 (a)

17. (1) The Council shall not consent to an application to subdivide land within Zone No. 1 (a) if any allotment to be created by the subdivision is to be used primarily for purposes other than agriculture or a dwelling, unless in the opinion of the Council—

(a) the land does not comprise any prime crop and pasture land or any land that is or could be used for a form of agriculture common in the area, and

(b) the area of each allotment to be created by the subdivision is appropriate having regard to the purpose for which it is being created.

(2) Nothing in subclause (1) shall prevent the Council from granting consent to an application to subdivide land to create an allotment to be used for a purpose other than agriculture or a dwelling, where, in the opinion of the Council—

(a) the purpose for which the allotment is to be used involves the supply of goods or services of which there is a demand in the locality;

(b) no other land in the locality could reasonably be used for that purpose; and

(c) the level of demand for the goods or services which are to be supplied from the allotment and the extent to which that allotment is proposed to be used to meet that demand justifies the creation of the allotment notwithstanding its agricultural value.

Subdivision of land within Zone No. 2 (v)

18. Land within Zone No. 2 (v) shall not be subdivided for the purpose of a dwelling-house unless each allotment to be created in the subdivision for that purpose has an area of 600 square metres or more in a sewered area or an area of 800 square metres or more in an unsewered area.

Dwellings on vacant land

19. (1) A person shall not erect a dwelling on vacant land unless the land—

(a) if in Zone No. 1 (a)—

(i) has a site area of 200 hectares or more;

(ii) comprises an allotment created under clause 16 for the purposes of a dwelling; or

(iii) comprises an allotment created in accordance with clause 15 or 17 and the use of that dwelling will be ancillary to the purpose for which the allotment was created; or

(b) if in Zone No. 2 (v), has a site area of 600 square metres or more in a sewered area or a site area of 800 square metres or more in an unsewered area.

(2) Notwithstanding subclause (1), a person may erect a dwelling on vacant land which comprises—

(a) an allotment created by a subdivision for which the consent of the Council was granted before the appointed day; or

(b) the whole of a holding.

(3) Nothing in subclause (2) (b) prevents the Council from granting consent for the erection of a dwelling if the area of the holding has been affected only by a subdivision created for a purpose for which the consent of the Council is not required under any State environmental planning policy or regional environmental plan which applies to the land to which this plan applies.

Erection of additional dwellings in Zones Nos 1 (a) and 2 (v) (ancillary dwellings and dual occupancy)

20. The Council may consent to the erection of one additional dwelling on land within Zones Nos. 1 (a) and 2 (v) (including the alteration of an existing dwelling to create 2 dwellings) if—

(a) a dwelling could be erected on the land in accordance with clause 19 where the land is within Zone No. 1 (a) or 2 (v);

(b) no additional access to a public road is required from the land;

(c) separate ownership of the proposed dwelling can only be achieved by a subdivision of the land; and

(d) in the opinion of the Council, the dwelling to be erected on the land will not interfere with the purpose for which the land is being used.

Development of environmentally significant land

21. (1) A person shall not develop environmentally significant land for the purposes of intensive livestock keeping, junkyards, liquid fuel depots, offensive or hazardous industries, sawmills or stock and sale yards.

(2) A person shall not, except with the consent of the Council, clear fell more than one hectare or more than 5 percent of the area of a holding (whichever is the lesser) of the trees present (as at the appointed day) on environmentally significant land.

(3) The Council shall not consent to an application made in accordance with subclause (2) unless, in the opinion of the Council, the clear felling of the land will be carried out in a manner which, in respect of that land and the land in its immediate vicinity, minimises—

(a) the risk of soil erosion or other land degradation;

(b) the loss of scenic amenity; and

(c) the destruction of important vegetation systems and natural wildlife habitats.

FIGURE 18-5

(4) A consent granted by the Council in accordance with this clause does not remove any requirement, as required by any Act or regulation, for a person to obtain permission to clear land of trees.

Flood liable land

22. (1) A person shall not erect a building or carry out works for any purpose on flood liable land or on land within a floodway except with the consent of the Council.

(2) The Council shall not grant consent to the erection of a building or the carrying out of works on land within a floodway if, in the opinion of the Council, the carrying out of the development is likely—

(a) to impede the flow of flood waters on that land or land in its immediate vicinity;

(b) to imperil the safety of persons on that land or land in its immediate vicinity in the event of those lands being inundated with flood waters;

(c) to aggravate the consequences of floodwaters flowing on that land (or land in its immediate vicinity) with regard to erosion, siltation and the destruction of vegetation; or

(d) to have an adverse effect on the water table of that land (or of land in its immediate vicinity).

(3) The Council shall not grant consent to the erection of a dwelling on flood liable land unless the floor level of the living accommodation of the dwelling is located at least 0.5 metres above the highest known flood level as determined by the Council over the subject land.

(4) Nothing in this clause shall limit or restrict the authority of the Council to consent to the carrying out of water control measures.

Land subject to bushfire hazards

23. The Council shall not grant consent to subdivide land or to erect a building on land which is subject to bushfire hazards by reason of the vegetation on the land or on any adjacent land unless, in the opinion of the Council—

(a) adequate provision is made for access for fire fighting vehicles;

(b) adequate safeguards are effected in the form of fire breaks, reserves and fire radiation zones; and

(c) adequate water supplies are available for fire fighting purposes.

Items of the environmental heritage

24. (1) A person shall not, in respect of a building, work, relic or place that is an item of the environmental heritage—

(a) demolish, renovate or extend that building or work;

(b) damage or despoil that relic or place or any significant part of that relic or place;

(c) excavate any land for the purpose of exposing or removing that relic; or

(d) erect a building on the land which that building, work or relic is situated or the land which comprises that place,

except with the consent of the Council.

(2) The Council shall not grant consent as referred to in subclause (1), unless it has made an assessment of—

(a) the significance of the item as an item of the environmental heritage of the Shire of Manilla.

(b) the extent to which the carrying out of the development in accordance with the consent would affect the historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the item and its site;

(c) whether the setting of the item and, in particular, whether any stylistic, horticultural or archaeological features of the setting should be retained; and

(d) whether the item constitutes a danger to the users or occupies of that item or to the public.

Development in the vicinity of an item of the environmental heritage

25. The Council shall not consent to the carrying out of development on land in the vicinity of an item of the environmental heritage unless it has made an assessment of the effect which the carrying out of that development will have on the historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the item of environmental heritage and its setting.

Heritage Council to be given prior notice of demolition consent

26. Where a person makes a development application for consent to demolish a building or work that is an item of the environmental heritage the Council shall not grant consent to that application until 28 days after the Council has notified the Secretary of the Heritage Council of its intention to do so.

Conservation incentives relating to heritage items

27. Nothing in this plan prevents the Council from granting consent to the use for any purpose of a building that is an item of the environmental heritage or of the land on which that building is erected, if the Council is satisfied that—

(a) the use will have little or no adverse effect on the amenity of the area; and

(b) conservation of the building depends on the Council granting consent in pursuance of this clause.

Applications that must be advertised

28. (1) Pursuant to section 30 (4) of the Act, the provisions of sections 84, 85, 86, 87 (1) and 90 of the Act apply to and in respect of proposed development for the purposes listed in Schedule 2 in the same way as those provisions apply to and in respect of designated development.

(2) Subclause (1) does not apply to the partial demolition of a building or work if, in the opinion of the Council, the partial demolition is of a minor nature and does not adversely affect the significance of the building or work as part of the environmental heritage of the Shire of Manilla.

Notification to National Parks and Wildlife Service

29. The Council shall advise the National Parks and Wildlife Service of any development applications that are received and which relate to areas adjoining or adjacent to—

(a) areas reserved under the National Parks and Wildlife Act 1974; and

(b) aboriginal sites as advised by the National Parks and Wildlife Service.

Community use of school facilities or sites

30. Nothing in this plan prevents or restricts the community use of school facilities or sites which are currently used as educational establishments, whether or not any such use is a commercial use of the land.

SCHEDULE 1

(Sec. 5 (1))

Items of the environmental heritage

1. The business section of Manilla Street described as follows:
   in section 18, lots 5 and 6;
   in section 17, lot 6;
   in section 28, lot 1;
   in section 29, Reserve for Public Building (R. 12923) and Reserve for Police Purposes (R. 12927);
   in sections 21 and 25, all allotments between Manilla Street and Alexander Lane facing west;
   in sections 26 and 24, all allotments between Manilla Street and Progress Lane facing east.
2. The Sunken Dairy on the property known as "Beuna Vista", Oakhampton Road.
3. The original Manilla Hospital Building, Court Street.

4. The 4 Manilla Churches, being—

   Holy Trinity Anglican Church, Strafford Street;
   St Michael's Catholic Church, Court Street;
   St Andrew's Presbyterian Church, Rowan Street;
   Uniting Church, Strafford Street.

5. Grantham's Stone Bridge, No. 106 Court Street.

6. The Manilla Railway Station, South Street.

7. The railway viaduct across the flood plain, travelling east to west from Namoi Street to Main Road 357.

8. Manilla General Cemetery, Namoi River Road.

9. Royce Cottage Museum, Manilla Street.

10. Warrabah Nature Reserve.

11. Warrabah National Park.

12. The Never Never Mountain Area on the property known as "Glendon", Bendemeer Road.

13. Upper Manilla Road Bridge, Main Road 63.

14. Manilla Road Bridge over the Namoi River between Market Street and Charles Street.

SCHEDULE 2

(Clause 9, 28)

Applications that must be advertised

1. The demolition of a building or work that is an item of the environmental heritage.

2. Any development requiring advertising as specified in the Table to clause 9.

SCHEDULE 3

(Clause 13)

Purposes prohibited along arterial roads

Bulk stores; caravan parks; car repair stations; commercial premises; hotels; industries (other than home or rural industries); junk yards; mines; motels; places of public assembly; recreation facilities; refreshment rooms; retail plant nurseries; roadside stalls; sawmills; service stations; stock and sale yards; transport terminals (other than bus stations); warehouses.

NOTE

TABLE OF PROVISIONS

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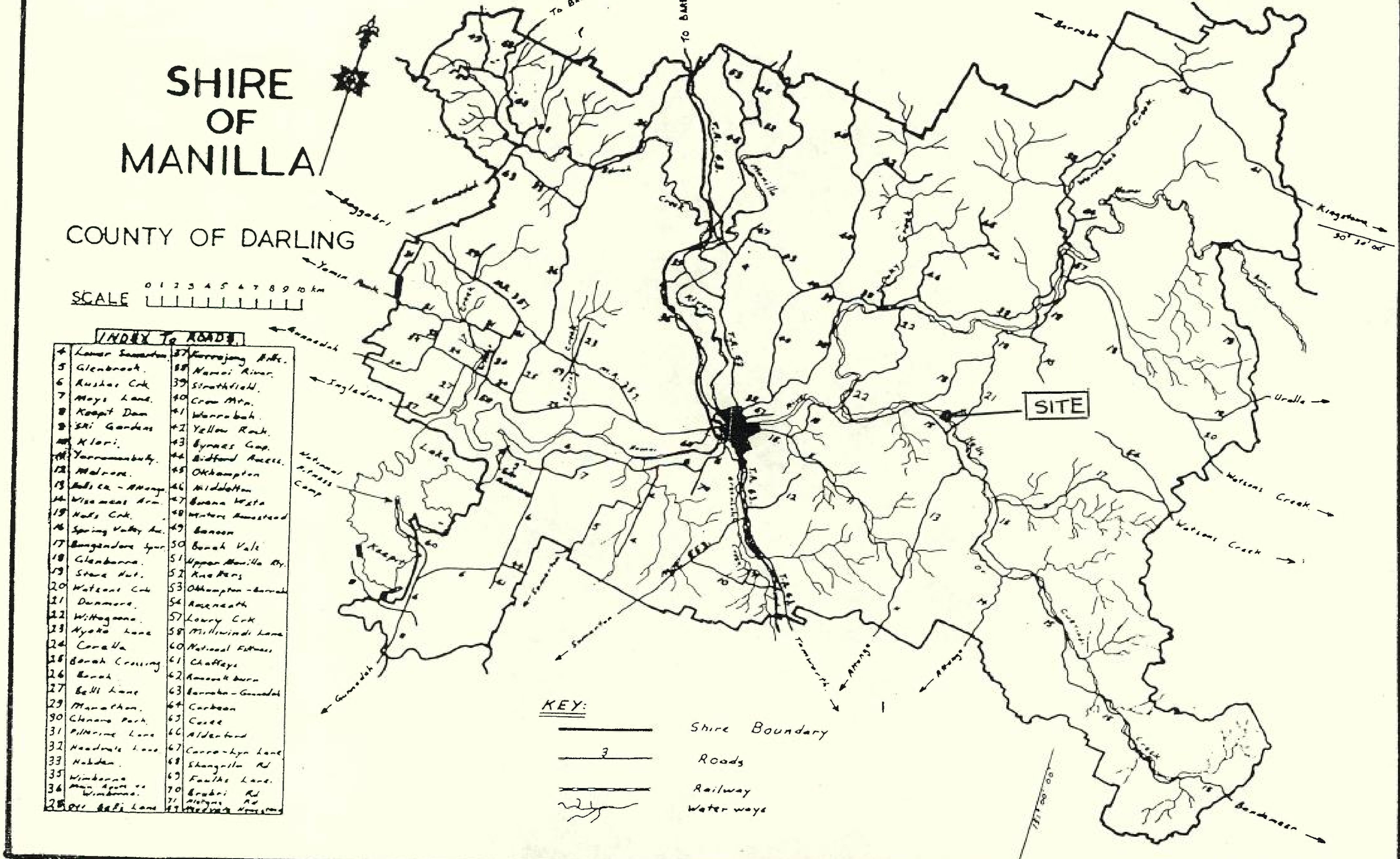
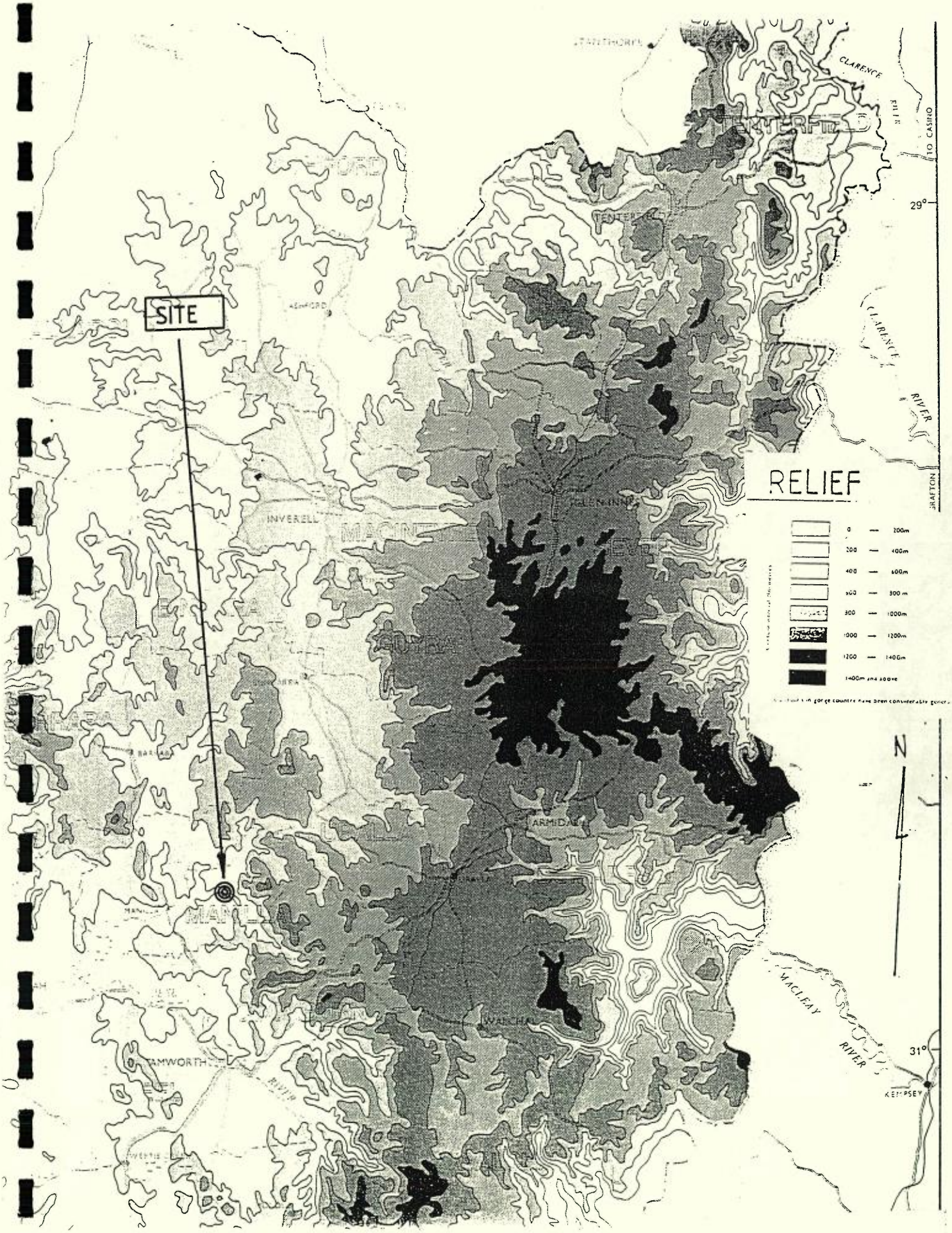
FIGURE 19



SHIRE OF MANILLA
COUNTY OF DARLING
SCALE
0 1 2 3 4 5 6 7 8 9 10 km
INDEX TO ROADS
4 Lower Somerton
5 Glenbrook.
6 Rushes Crk
7 Moys Lane.
8 Keepit Dam
9 Ski Gardens
10 Klori.
13 Halls Ck - Attunga
15 Halls Crk.
17 Bungendore Spur
18 Glenbanna.
19 Stave Hut.
20 Watsons Crk
21 Dunmore.
22 Wittogarne.
23 Nyoka Lane
24 Corella
25 Borah Crossing
26 Borah
27 Bells Lane
29 Marathon.
30 Glenara Park.
31 Pilkerine Lane
32 Headrais Lane
33 Hebden.
35 Wimborne
36 Main Access Wimborne.
37 Kurrajong Arks.
39 Strathfield.
40 Crow Mtn.
41 Warrabah.
42 Yellow Rock.
43 Bynes Gap.
44 Bidford Access.
45 Okhampton
46 Middleton
47 Buena Vista
48 Watsons Homestead
49 Banoon
50 Borah Vale
51 Upper Manilla Rly.
52 Knotters
53 Okhampton - Barraba
54 Rosenneath
57 Lowry Crk
58 Millwinda Lane
60 National Fitness
61 Chaffeys
62 Rannockburn
63 Barraba - Gunnedah
64 Carbeen
65 Cooee
66 Alderford
67 Carra-Lyn Lane
68 Shangrila Rd
69 Foulks Lane.
70 Brabri Rd
71 Alchyna Rd
To BARRABA
Barraba
Kingstown
Boggabri
Gunnedah
Yarrie Park
Ingledown
National Fitness Camp
Lake
Keepit
M.R. 357
T.R. 63
Manilla
Namoi
Creek
SITE
Uralla
Watsons Creek
Somerton
Tamworth
Attunga
Bendemeer
30° 30' 00
KEY:
Shire Boundary
Roads
Railway
Water ways

FIGURE 20



RELIEF

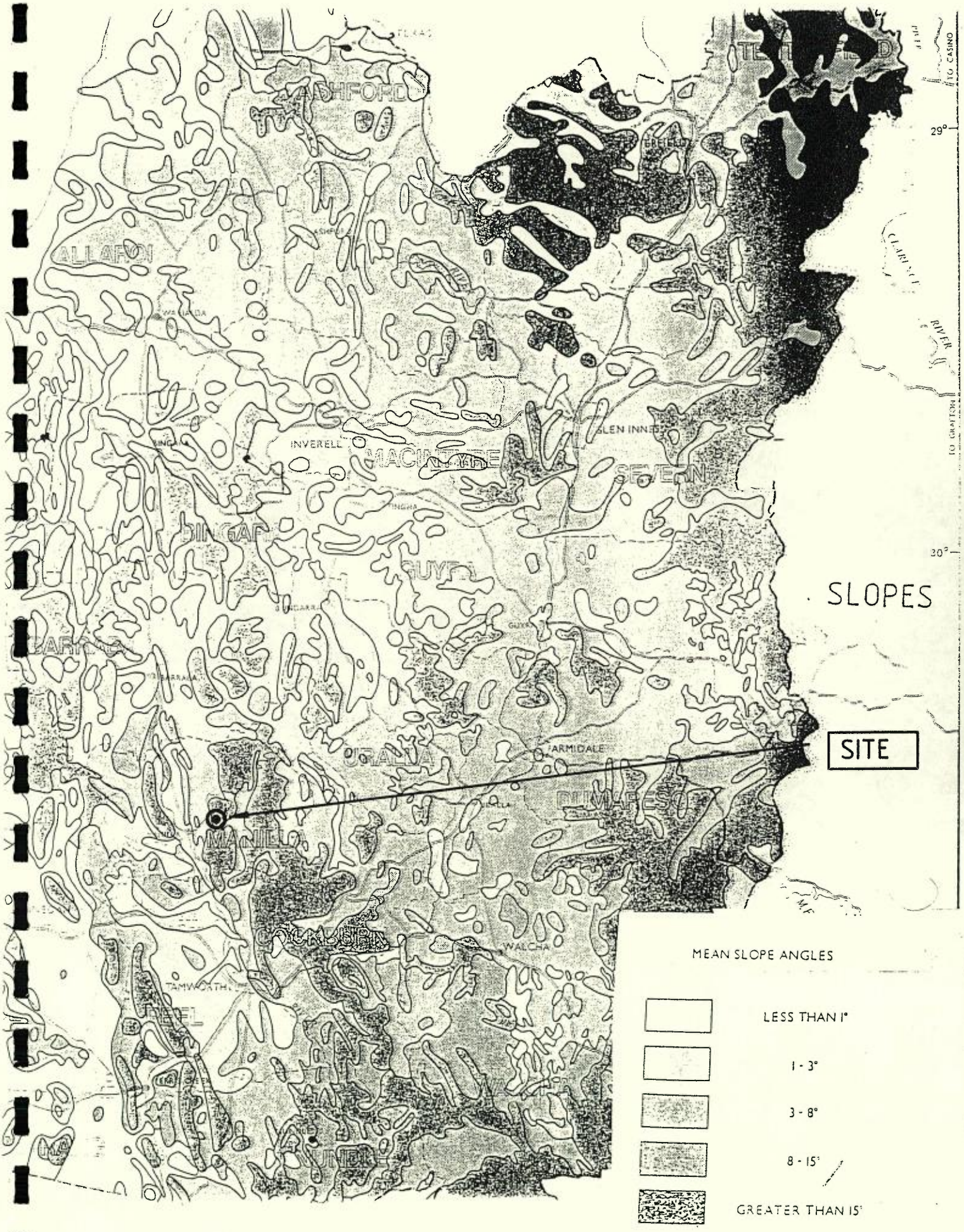

SLOPES
SITE
MEAN SLOPE ANGLES
LESS THAN 1°
1 - 3°
3 - 8°
8 - 15°
GREATER THAN 15°
ASHFORD
INVERELL
GLEN INNES
ARMIDALE
MANILLA
WALCHA
TAMWORTH
TO CASINO
TO GRAFTON
29°
30°

FIGURE 21

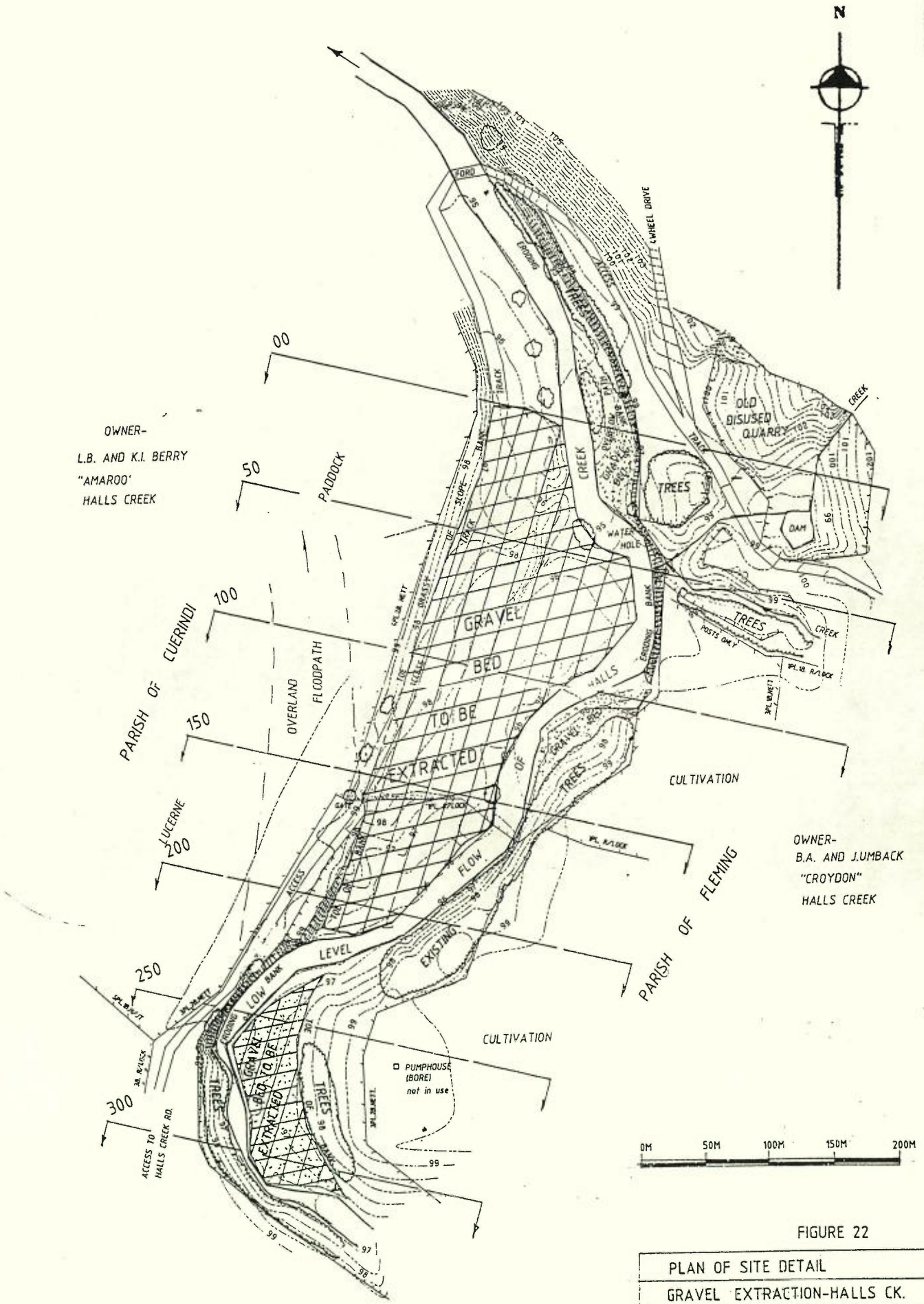


FIGURE 22

PLAN OF SITE DETAIL
GRAVEL EXTRACTION-HALLS CK.
CONTOUR INTERVAL- 500MM.
FYNRED PTY.LTD.
T.J.STEWART& CO.- CONSULTING SURVEYORS-ARMIDALE NSW

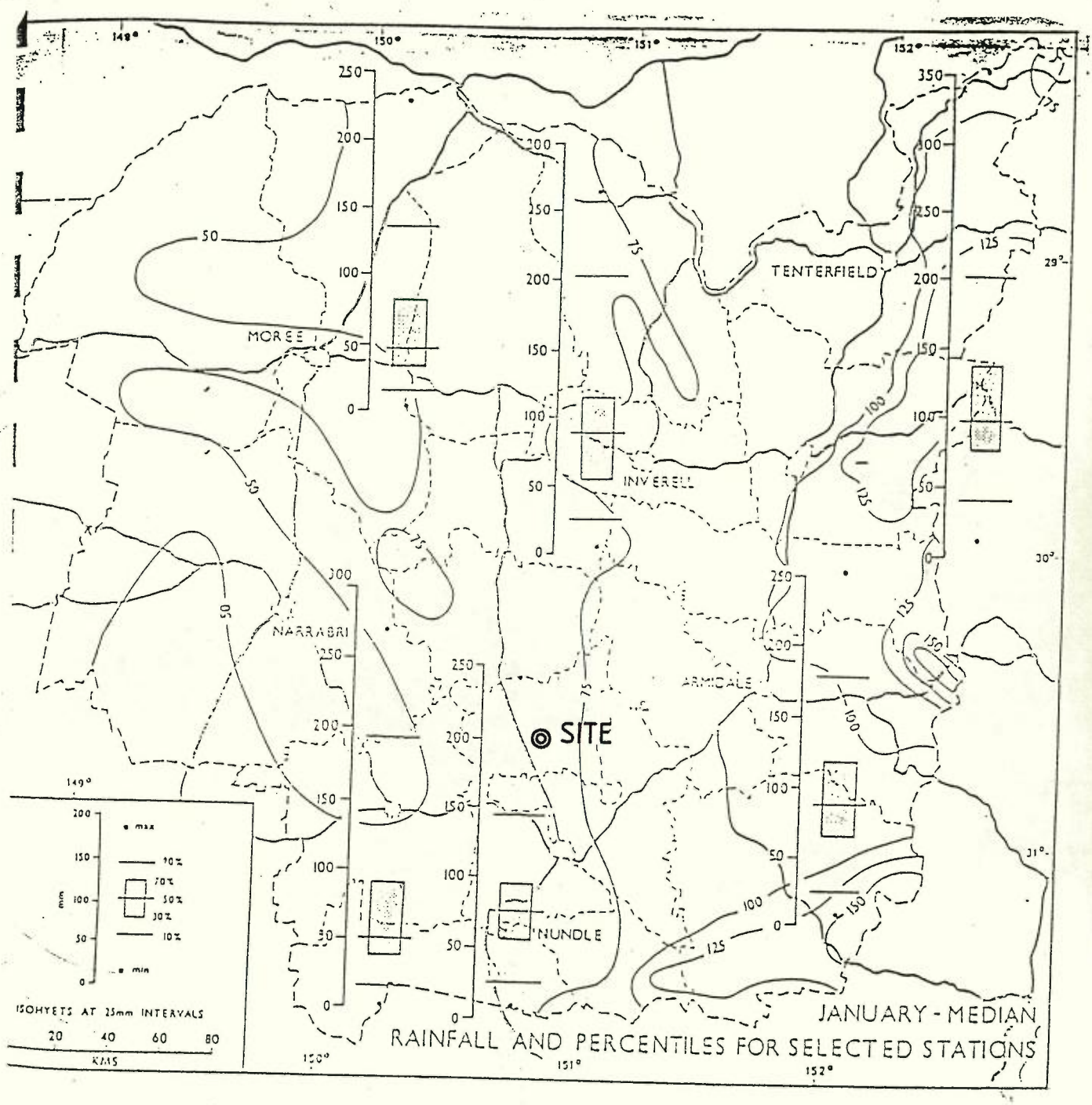

SITE
MOREE
NARRABRI
INVERELL
TENTERFIELD
ARMIDALE
NUNDLE
ISOHYETS AT 25mm INTERVALS
KMS
JANUARY - MEDIAN
RAINFALL AND PERCENTILES FOR SELECTED STATIONS

FIGURE 23

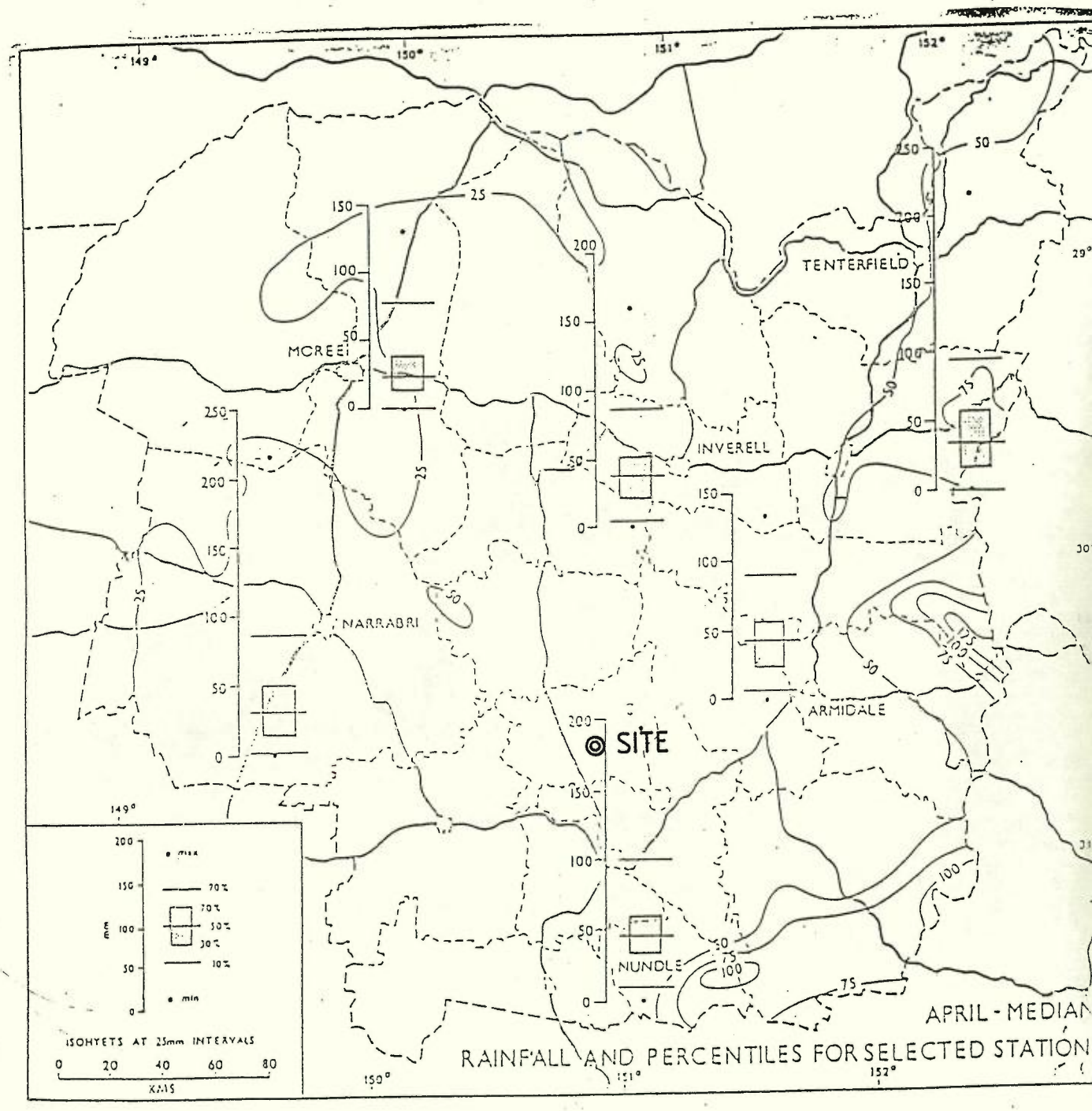

MOREE
NARRABRI
INVERELL
TENTERFIELD
ARMIDALE
NUNDLE
SITE
ISOHYETS AT 25mm INTERVALS
KMS
APRIL - MEDIAN
RAINFALL AND PERCENTILES FOR SELECTED STATION

FIGURE 24

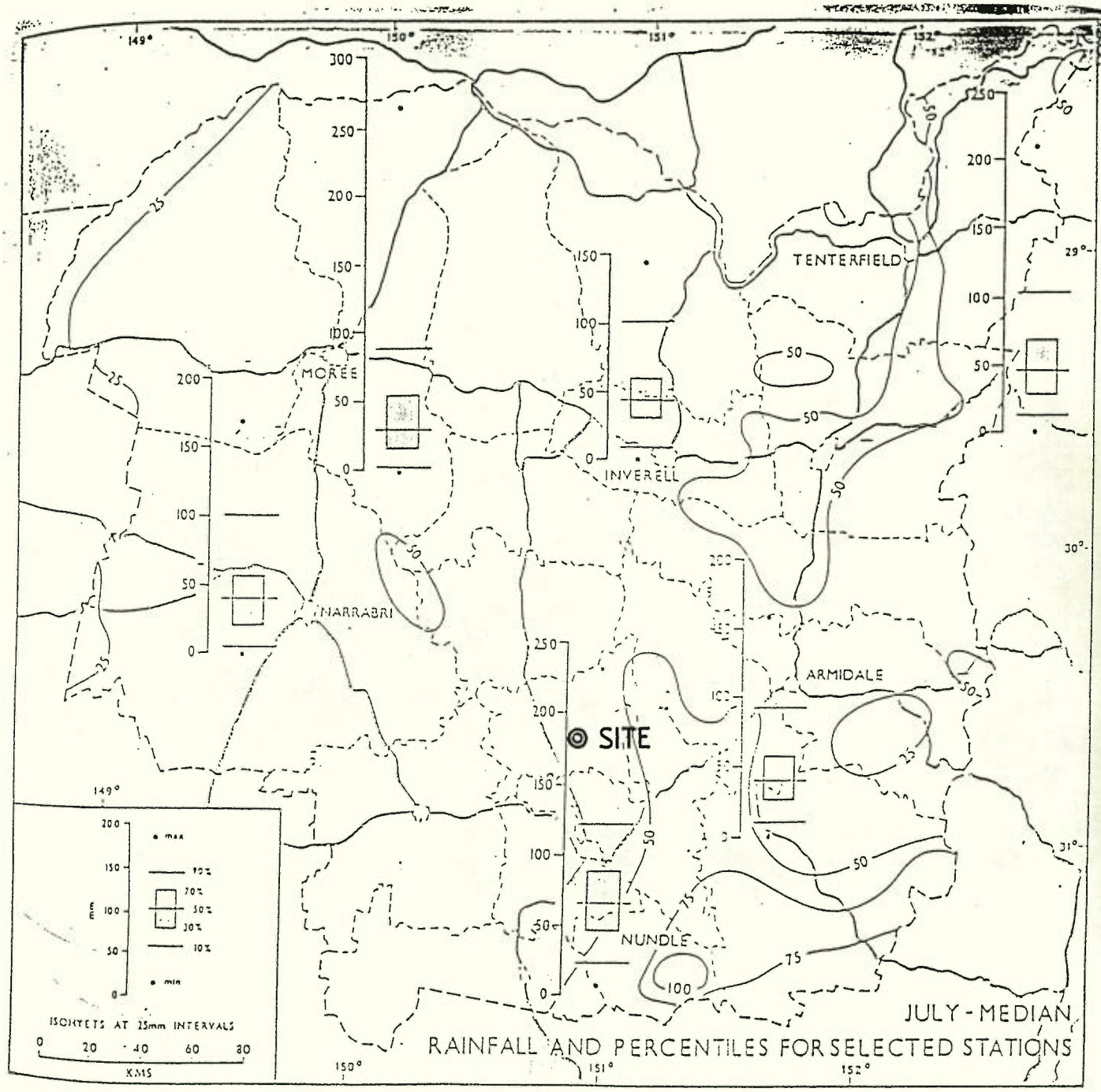

149°
150°
151°
152°
29°
30°
31°
TENTERFIELD
MOREE
INVERELL
NARRABRI
ARMIDALE
NUNDLE
SITE
JULY - MEDIAN
RAINFALL AND PERCENTILES FOR SELECTED STATIONS
ISOHYETS AT 25mm INTERVALS
0 20 40 60 80
KMS
max
90%
70%
50%
30%
10%
min
mm

FIGURE 25

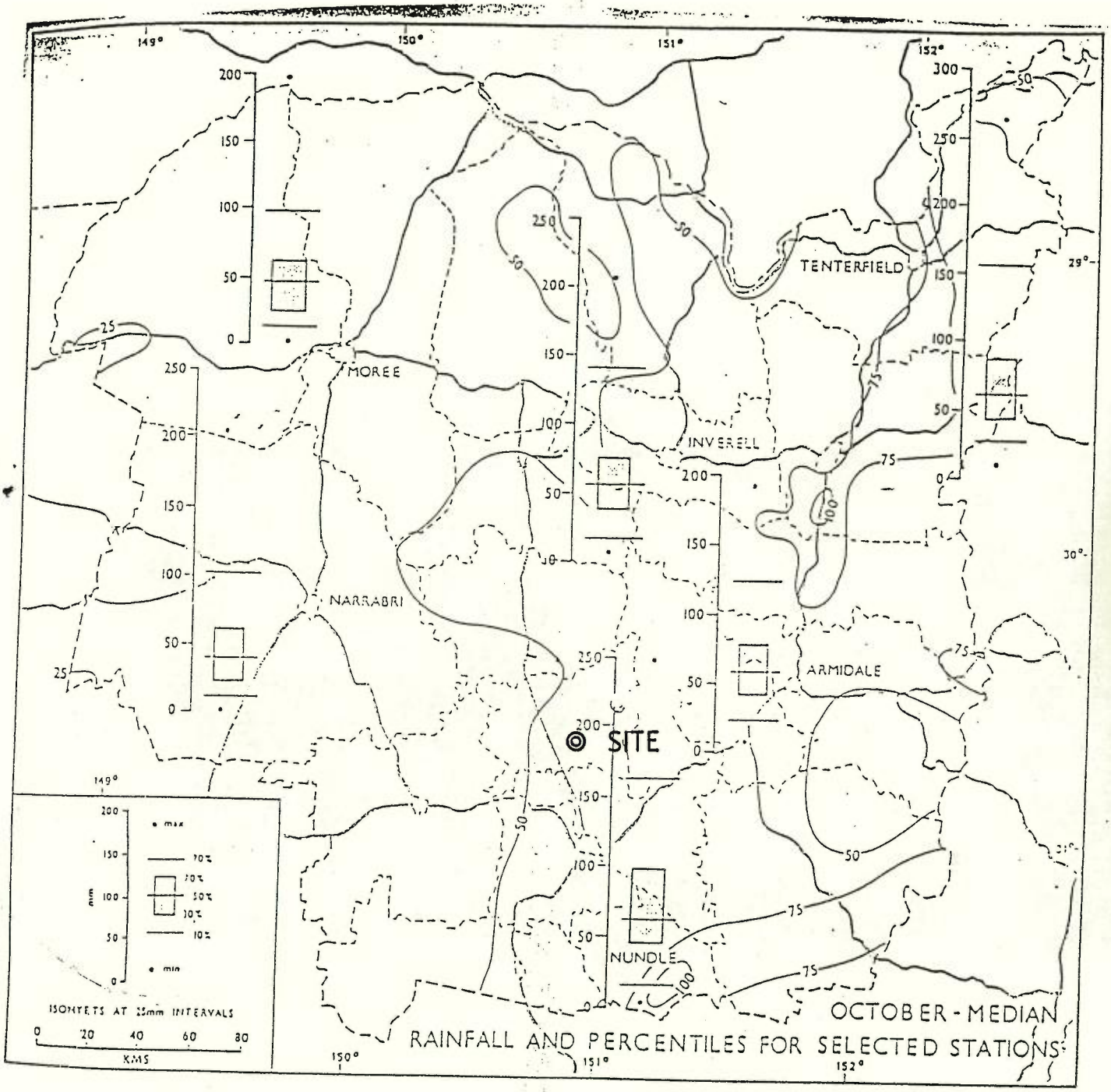
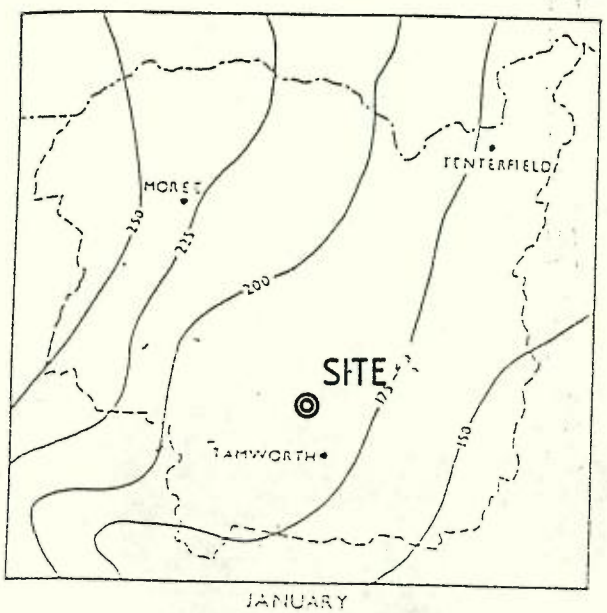
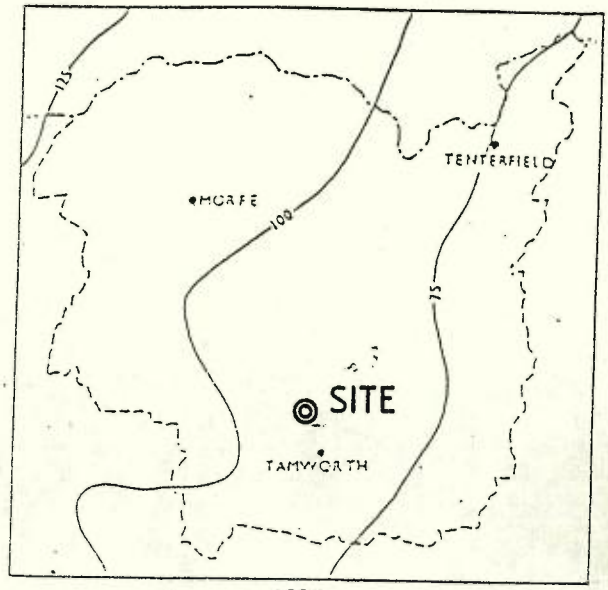

149°
150°
151°
152°
29°
30°
31°
MOREE
NARRABRI
INVERELL
TENTERFIELD
ARMIDALE
NUNDLE
SITE
OCTOBER - MEDIAN
RAINFALL AND PERCENTILES FOR SELECTED STATIONS
ISOHYETS AT 25mm INTERVALS
KMS
max
min
70%
50%
30%
10%

FIGURE 26

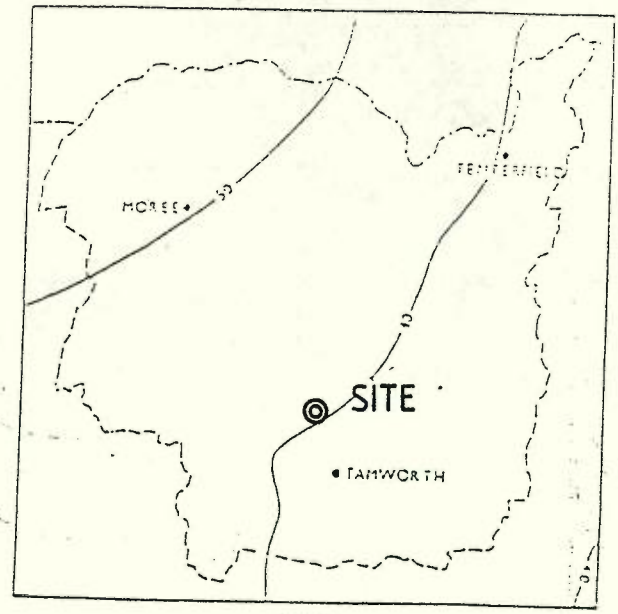
AVERAGE MONTHLY EVAPORATION(mm)
(AUSTRALIAN SUNKEN TANK VALUES)



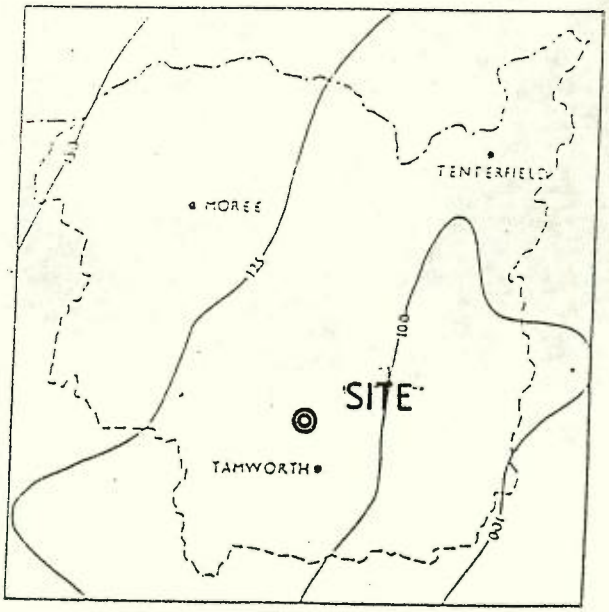
JANUARY



APRIL

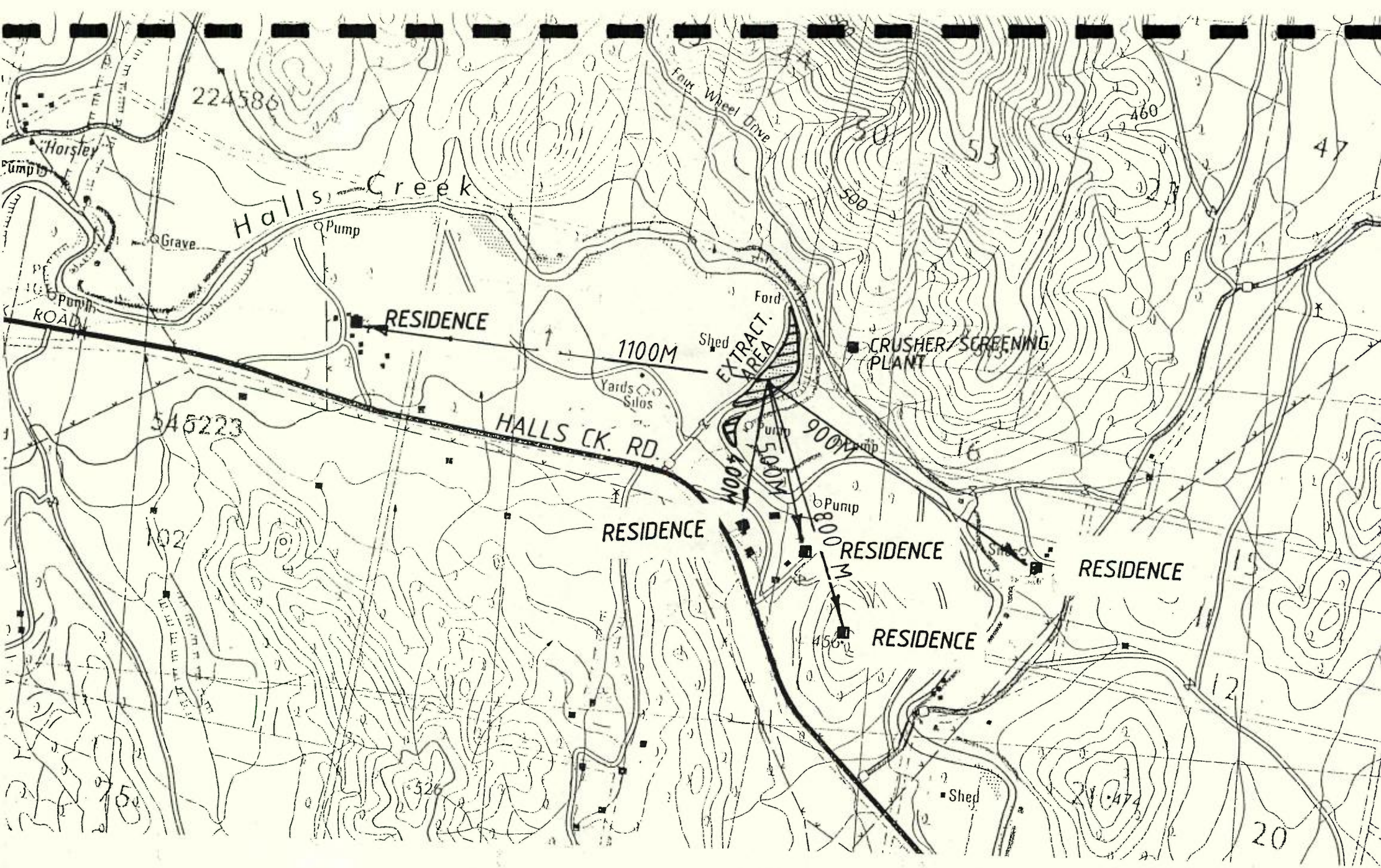


JULY



OCTOBER

FIGURE 27

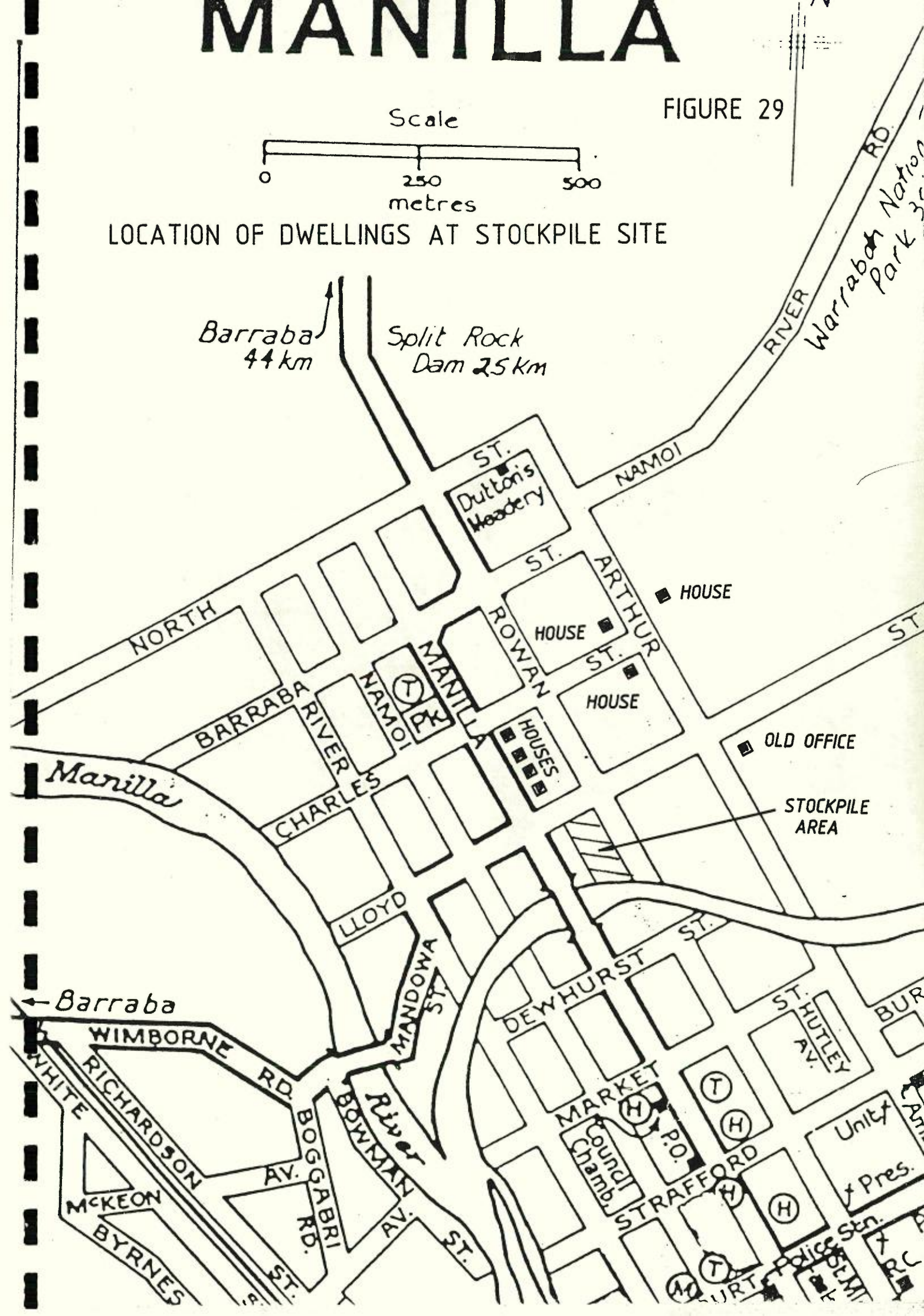


LOCATION OF DWELLINGS WITHIN AREA OF GRAVEL EXTRACTION SITE

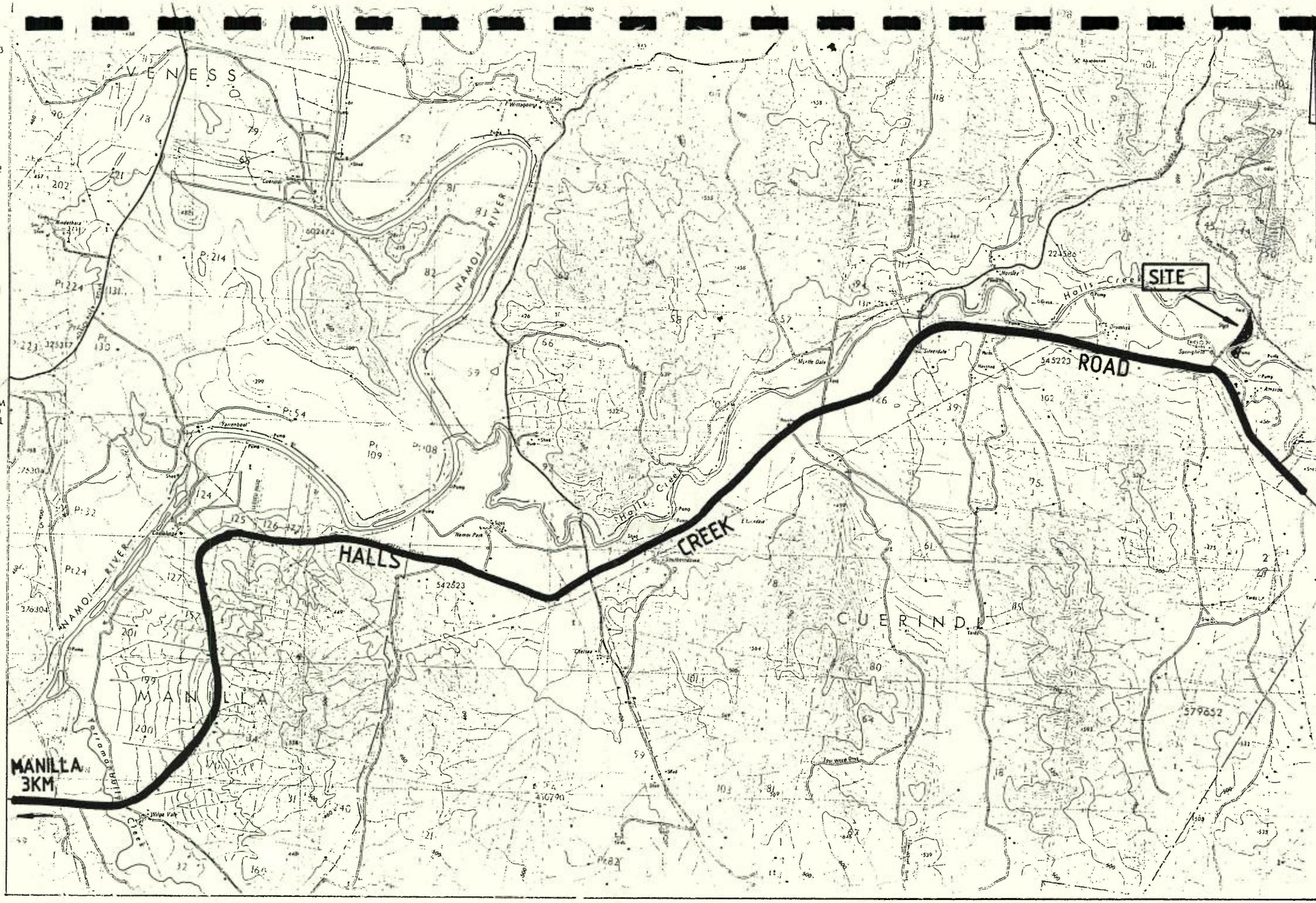
FIGURE 28

MANILLA

FIGURE 29



LOCATION OF DWELLINGS AT STOCKPILE SITE



ACCESS ROAD FROM MANILLA FIGURE 30

APPENDIX 3
Archaeology Survey

REPORT OF AN ARCHAEOLOGICAL INVESTIGATION OF A SECTION OF HALLS CREEK, FIFTEEN KILOMETRES NORTH-EAST OF MANILLA, NEW SOUTH WALES

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University of New England
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Prepared for
Terence J. Stewart Pty Ltd
143 Marsh Street
Armidale, NSW

November, 1992.

TABLE OF CONTENTS

LIST OF FIGURES

SUMMARY

This report presents the results of an archaeological survey of an area along Halls Creek, located 15 kilometres northeast of Manilla, New South Wales. No sites of Aboriginal, scientific or public significance were identified during the survey. Accordingly, the recommendations for management of the cultural resources in the survey area are as follows:

1. On the basis of the surficial evidence and the significance assessment outlined above no objection should be raised on archaeological grounds to the proposed development being undertaken in the survey area.

2. All operations should be halted if any other relics as defined under the NPWS Act (1974) are discovered. It is an offence under the Act to damage, deface, disturb or destroy any relic unless prior written consent has been given by the Director. If other relics are discovered the Armidale District Office of the New South Wales National Parks and Wildlife Service should be contacted immediately and work on that section of the development should be halted until clearance has been given by NPWS.

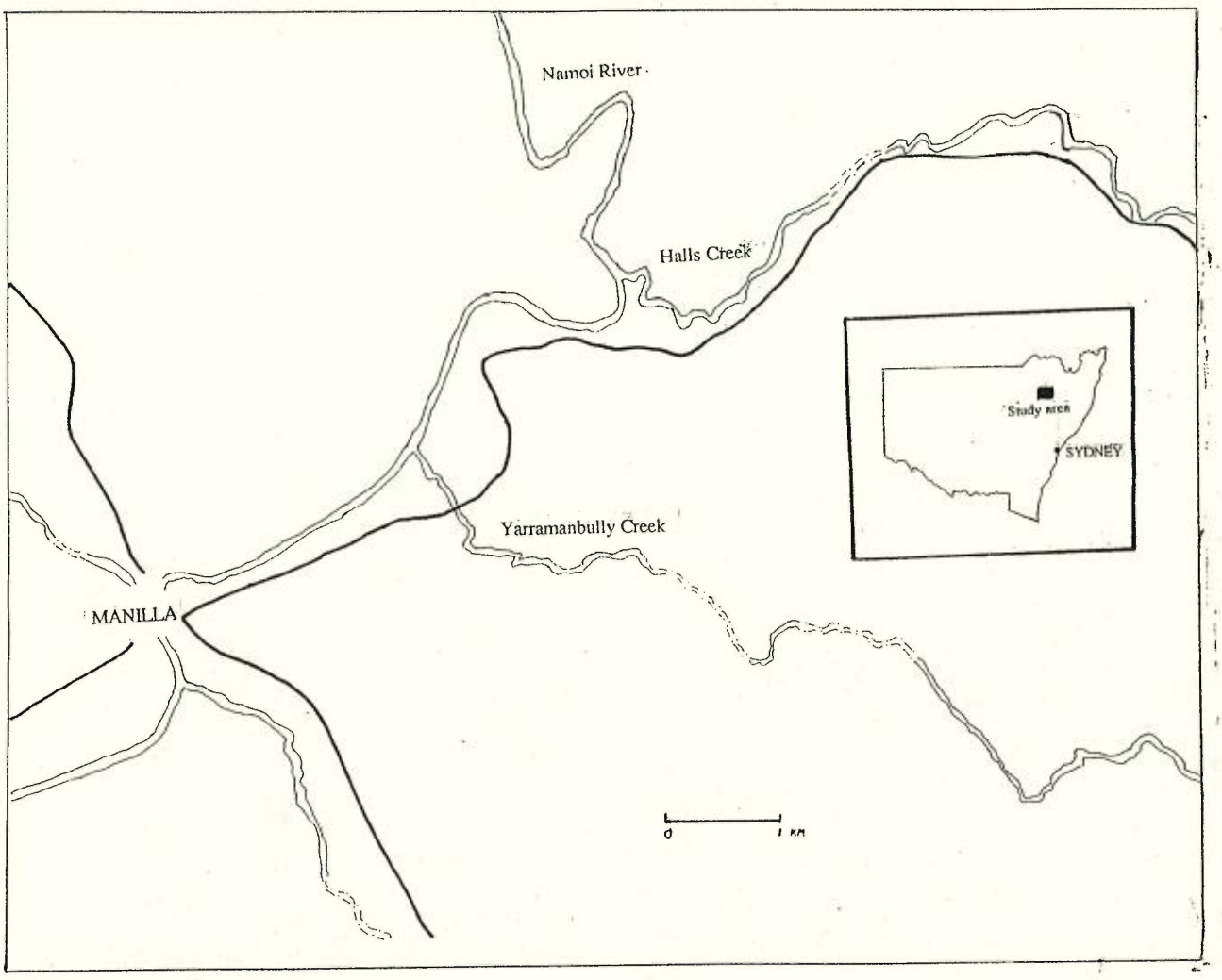


Figure 1
Location of survey area

1. INTRODUCTION

This report presents the results of an archaeological survey of an area along Halls Creek, located 15 kilometres northeast of Manilla, New South Wales (Figure 1). The survey area measures approximately six hectares. The survey area is at the intersection of two properties and covers parts of Portion 1, Parish Cuerinoi and Portions 16 & 50, Parish Fleming, County Darling, Manilla.

2. PROPOSED DEVELOPMENT

The survey was commissioned by Terence J. Stewart Pty Ltd on behalf of the owner of the principal property involved in a proposed development application to extract gravel from this section of Halls Creek. The archaeological survey was conducted as part of an environmental impact study associated with the development application.

If the development application is approved there are several activities which could affect archaeological material in the area. These include:

* the ongoing quarrying of the creek itself
* the establishment of a crusher
* the use of access routes between the quarry sites and the crusher
* the impact of bulldozing upon other adjacent areas
* the possible realignment and widening of existing access roads

In terms of the archaeology in the areas where these activities occur, the potential to substantially affect, if not destroy, the archaeological record is high. There are five principal areas which would be impacted if the proposed development application was approved. These are:

* a section on the eastern bank and creek, at the southern end of the survey area. This section measures approximately 20 x 70 metres.
* a section on the western side of the creek at the northern end of the survey area. This section measures approximately 150 x 35 metres.
* the area on the eastern side of the creek where the crusher would be located.
* access routes between the proposed extraction areas and the crusher.
* an access road along the western bank of the creek which may need widening.

The principal proposed extraction areas are illustrated in Figures 2 and 3. The access road which may need widening is illustrated in Figure 8.

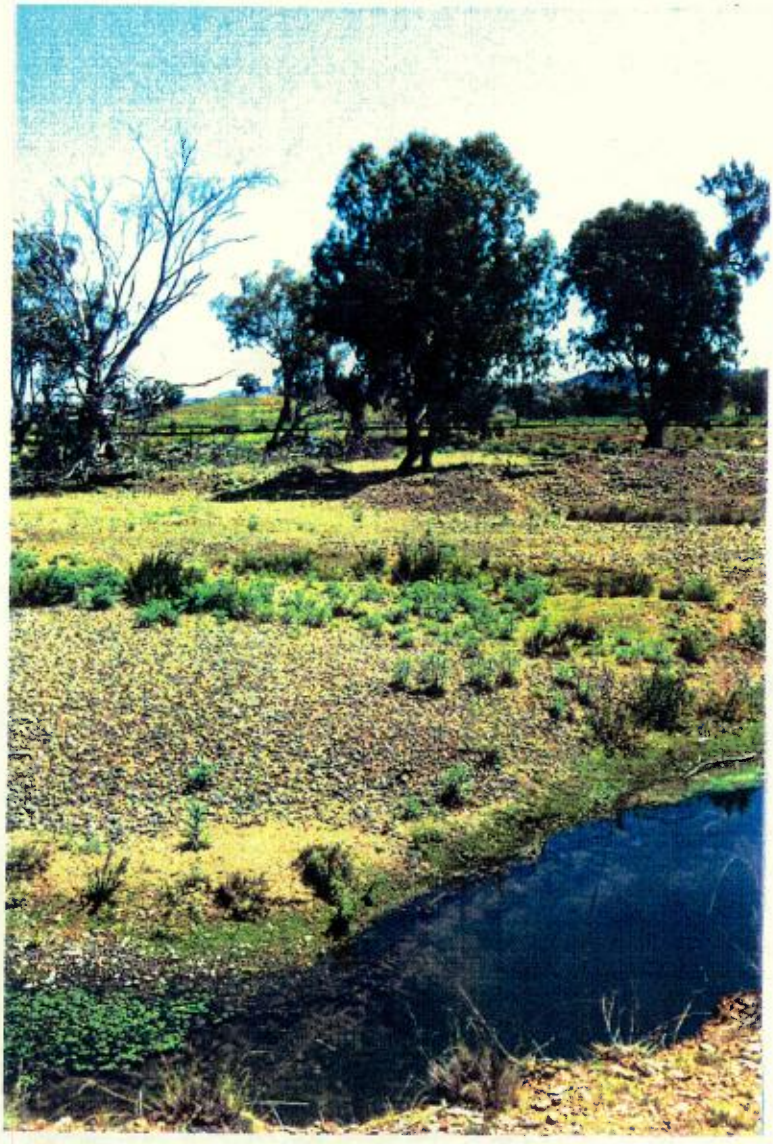


Figure 2

Proposed extraction area, northern end of creek

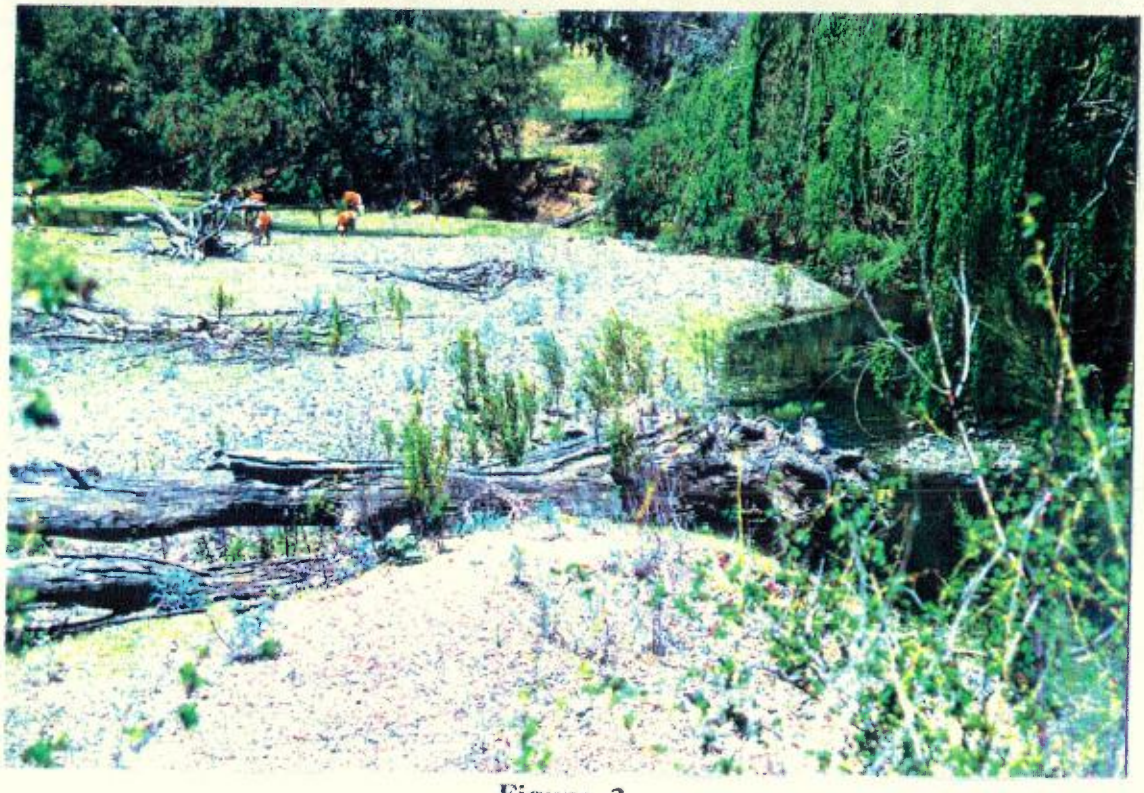


Figure 3

Proposed extraction area, southern end of creek

3. THE SURVEY BRIEF

The brief was received from Terence J. Stewart Pty Ltd on behalf of the owner of the principal property involved in a proposed development application. Within the constraints of this report, the brief was interpreted as follows, to include:

* a review of the literature and Aboriginal site records for the area
* the implementation of a survey strategy to identify the range of existing archaeological sites.
* the identification of potential sites within the study area which may be affected by the proposed development.
* liaison with the local Aboriginal Land Council to determine their interest in the study area.
* advice on preferred management options for any artefacts found within the literature or during the survey.
* supplying a record of the above, including National Parks and Wildlife Service recording forms, for identified sites.

4. THE STUDY AREA

4.1 General

The survey area is located at 953998, Manilla Sheet 9036, New South Wales, scale 1:100,000. This is fifteen kilometres north-east of Manilla, along the Halls Creek road. A small access road from Halls Creek road runs directly onto the survey area itself, which encompasses approximately six hectares.

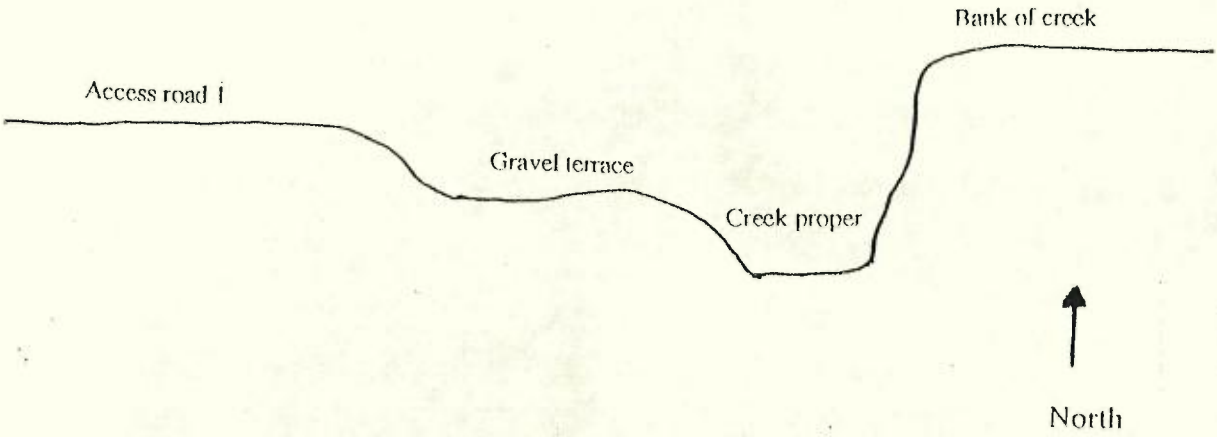
4.2 Geology

The survey area is located in Paleozoic basement rock, which includes greywackes, cherts, volcanics and sandstones, and it is probably only twenty kilometres from outcrops of Bundarra granite. The area is also extremely close to the Peel Fault System, which delineates the western edge of the New England Tablelands. It is encompassed within the Tamworth Belt which lies between the Peel Fault in the east and the Mooki Fault zone in the west (Harrington 1977).

Soils in this area are predominantly duplex red brown earths, which are suitable for cereal grain production or forage crops. They are often associated with alluvial soils, gleyed solodic soils and lithosoils (Geological series Sheet SH 56-9). The study area is fairly typical of the kind of country which supports red brown earths: these generally develop on undulating to rolling surfaces (McGarity 1977,61). Such soils are often characterized by duplex or gradational profiles and this can be seen in the soils of the study area.

The creek bed divides naturally into two zones (see Figure 4). These are the creek proper which is the more permanent waterway and the extended gravel terraces adjacent to the creek proper which are also intemittantly incorporated into the creek itself (see Figure 3). The creek proper and the gravel terraces adjacent to it contain small pebbles of various types of cherts (red, black and green), quartz, quartzite and some greywacke (see Figures 2 and 3). This material is coherent but heterogeneous and exhibits conical fracture patterns due to river tumbling (N. Cook, Department of Geology, pers. comm.).

The subsoil of the study area (as evidenced by that along the creek banks) shows layering due to variable deposition of the original parent material. McGarity (1977,61) states that gravels are sometimes associated with red brown earths and this association is true of the study area.



Not to scale

Figure 4

Section view of creek proper and adjacent terraces

4.3 Topography

The wider region surrounding the study area is mainly unforested, though some woodland exists to the east. The immediate country surrounding the survey area includes a wide range of topographic features, including ridges, slopes, terraces, riverbank and river bed (see Figure 5). Sections of land adjacent to both eastern and western banks of the creek have been ploughed and a series of small undulating hills are located immediately to the north and north-east of the survey area.

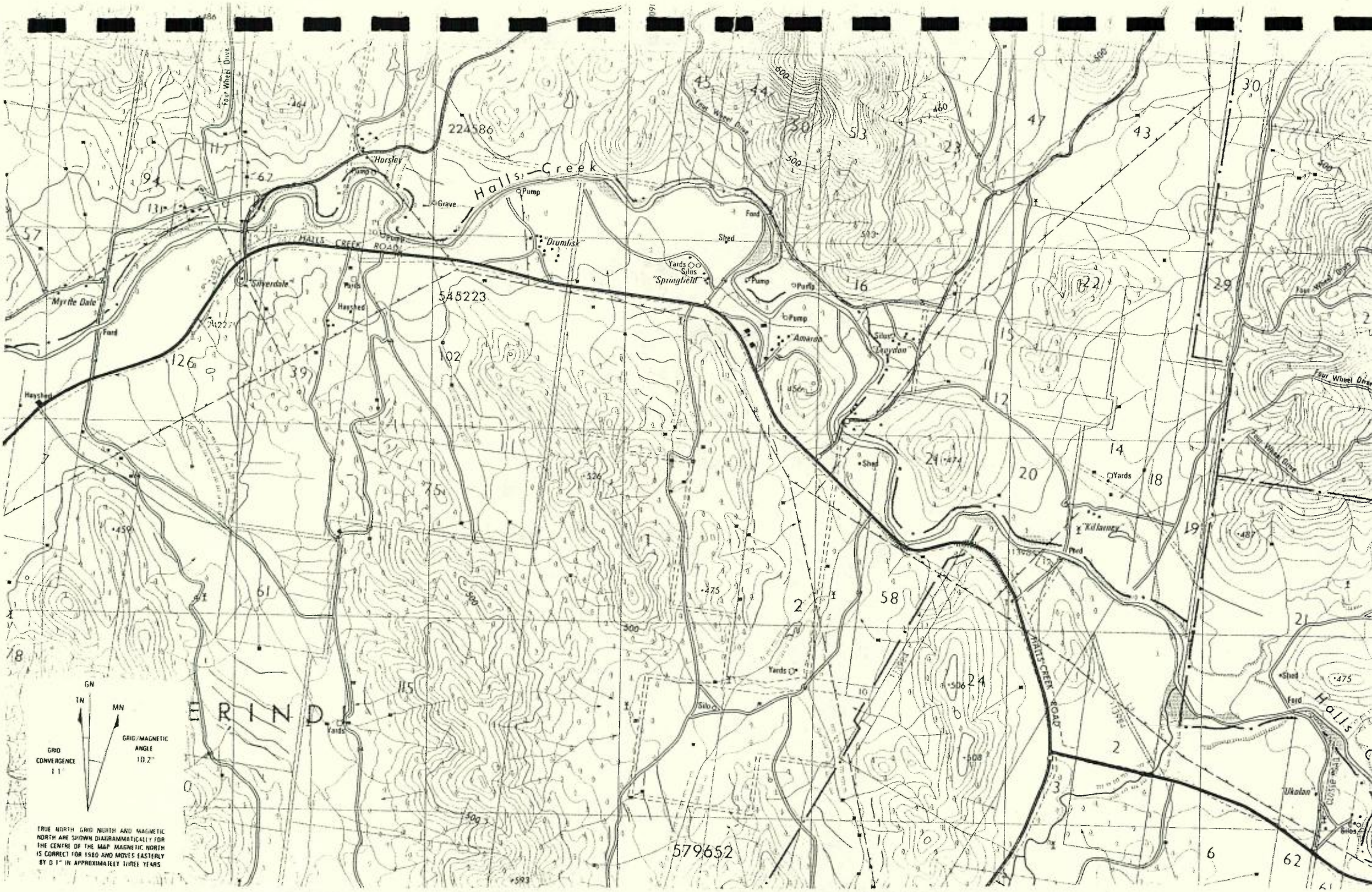


Figure 5

Topographic map of region.

MUNDOWEY 9036-I-S

4.4 Environmental zones

Any archaeological assessment of an area is tied to the environmental zones which exist within that area due to both cultural and natural factors. The cultural factor is that people in the past, as in the present, showed differing preferences for different types of environment and therefore utilized different environmental zones in different ways. A simple example of this is people walking along ridges of hills rather that the slopes. The natural factor linking archaeological assessments with environmental zones is the different types of weathering and the differing exposures that occur in different zones. Differing rates of erosion in differing environmental zones will mean that some zones will have a greater likelihood than others of exhibiting exposed material. The environmental zones in the survey area are shown in Figure 6. These are:

1) The creek proper (pebble bed).
2) Gravel terraces adjacent to creek proper (pebble bed).
3) Creek banks (woodland and/or cleared).
4) Access routes along creek banks (cleared).
5) Slopes of a small hill on eastern bank of creek (cleared).
6) Ridge of a small hill on eastern bank of creek (cleared).
7) Small dam next to hill on eastern bank of creek (cleared).
8) Ploughed field adjacent to eastern bank of creek (cleared).
9) Ploughed field adjacent to western bank of creek (cultivated).

4.5 Vegetation

The vegetation within the survey area includes stringy bark (*Eucalyptus obliqua)*, peppermint trees (*Eucalyptus radiata)*, weeping willows (*Salix babylonica)*, peppercorn trees, red river gums (*Eucalyptus camaldulensis*), river she-oaks (*Casurarina cunninghamiana)*. Identified from Cronin 1988. Fields on the western bank of the creek have been planted with lucerne crops.

4.6 Fauna

The country surrounding the survey area is extensively grazed by cattle, sheep, horses and rabbits. The survey area itself is grazed periodically by sheep and cows and a number of these were present on the October 10th and October 31st visits to the site. In addition, around 15-20 sheep carcasses occur throughout the survey area in varying states of decomposition.

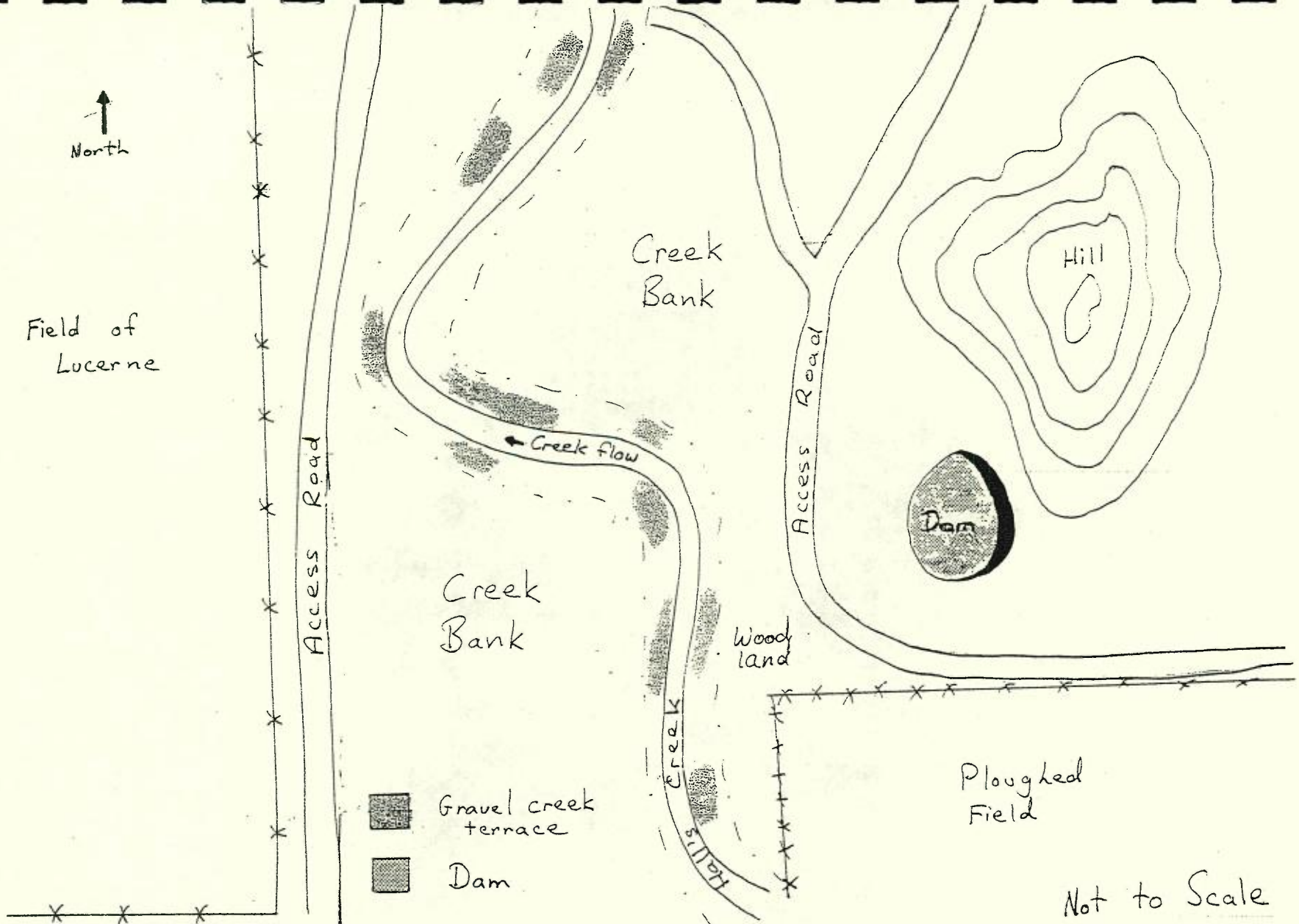


Figure 6

Environmental zones in survey area

Various species of local fauna, especially birds, were sighted within the general region (ie within a 20-30 kilometre radius of the survey area). These include Black-backed Magpies (*Gymnorhina tibicen*), crows (*Corvus orru*), Eastern Rosellas (*Platycerus eximius*), Sulpher Crested Cockatoos (*Cacatua galerita*) and the ubiquitous Kookaburra (*Dacelo gigas*). A Willy-Wagtail (*Rhipidura leucophrys*) was seen within the survey area itself and a flock of Galahs (*Eolophus roseicapillus*) were seen immediately outside of it. A carp (species unknown) with an estimated length of around 300 cms was seen in the section of the creek that was encompassed by the survey area and both Murray cod (*Maccullochella peeli*) and Freshwater Catfish (*Tandanus tandanus*) inhabited these waters in past times (H. Hall, pers. comm.).

Due to the rapid environmental and ecological changes which occurred with the occupation of this region by Europeans it is very difficult to reconstruct the range of economic resources previously available to Aboriginal people. Apart from a variety of fish and birds, the probable range of resources is likely to have included the short-necked turtle (*Emydura canni*) and various species of possums, including the Common Ringtail Possum (*Pseudocheirus peregrinus*), the Greater Glider (*Petaurus norfolcensis*) and the Common Brushtail Possum (*Trichosurus vulpecula*). In addition to this, the Eastern Grey Kangaroo (*Macropus giganteus*), the Wallaroo (*Macropus robustus*), the Platypus (*Ornithorhynchus anatinus*) and the Short-Beaked Echidna (*Tachyglossus aculeatus*) are known to inhabit the region.

4.7 Erosion

There has been a lot of disturbance in all sections of the survey area, all of which mitigate against finding artefactual material *in situ*. This is principally due to four causes. These are:

* cultivation of fields
* grazing by stock
* water movement along the creek
* water movement along the slopes of the hill

Heavy grazing by stock has also disturbed the top layers of soil in parts of the survey area. For example, the spot which is most likely within the survey area to exhibit evidence for previous occupation is a small spur over the eastern bank of the creek, vegetated with both established eucalypt and peppercorn trees. This spur is obviously a favourite resting place for sheep and the top layers of earth are covered in sheep dung and top layers of soil are greatly disturbed.

The level of the disturbance in the cultivated section of the survey area means that if any stone artefacts had been found in these areas they would be most unlikely to be *in situ*. Similarly, if burials or bora rings had been present at or near the surface they would have been discovered during the initial or subsequent cultivation of the fields.

Water movement along both the creek proper and the extended creek would make it difficult to be at all certain that any artefact found in this section of the survey area was actually found *in situ*. The area is subject to periodic flooding and the last major floods in this region occurred in the 1960s (H. Hall pers. comm.). These floods are certain to have transported some artefacts from their original locations.

5. ABORIGINAL HERITAGE

5.1. Ethnography

The principal ethnographic sources for this area are Gardner (1842), McPherson (1860) and Mathews (1917). As in adjacent regions (see Balme 1986,61 for the north-central rivers region) there is very little ethnographic information on this region.

There are various reports on the name of the group of Aboriginal people who lived in this region. Tindale's (1974) map locates this region as being within that of the Kamilaroi people. According to Bowdler's map (1983, figure 2) they were called the Gamilaroi and according to Dixon (1980, map 2), the Gamilaraay. However, Harry Hall (pers. comm.) identified the Aboriginal group in the survey area as being of the Yarramanbully tribe, who he says are now extinct. His interpretation is reinforced by local topographic terminology: there is a creek immediately outside of Manilla on the Halls Creek road which is called Yarramanbully Creek (see Figure 1). This may, of course, refer to a clan group rather than a language group and it is possible that the Yarramanbully clan existed within the Kamilaroi language group.

5.2 Previous archaeological research

The major study of previous archaeological research in this general region is that of McBryde (1974). Other academic research has been conducted by Creamer (1981), Connah *et al* (1977), Davidson (1982) and Godwin (1983). Additional information on the archaeology of the region can be obtained from site surveys associated with development applications (eg Appleton 1991; Blackwell and Geering 1981; Sutton 1988). However, none of these reports have direct bearing on the study area which is the subject of this report.

A search of the NPWS Minark computerised Sites Register (7th October, 1992) failed to reveal any sites at all in the region between eastings of 2930 and 2990 and northings of 6695 and 6005 (Manilla Sheet 9036, New South Wales, scale 1:100,000). As other sites exist in adjacent areas (see references above), this almost certainly reflects a lack of research in the study area itself rather than a lack of sites.

5.3 Oral histories concerning the region's archaeology

Because there is little archaeological and ethnohistorical research into the immediate vicinity around the study area I decided to conduct some research into the oral history

of the area. Often valuable information still exists within the living memories of local people even though it has not been formally recorded.

Accordingly, on the 31st October, 1992, I visited Henry Hubert Hall (known as Harry Hall) and his wife Leda Hall (nee Bell). They are established residents of the region and currently live in Bendemeer. Both of their families were pioneers and extensive land-holders of this general region during the period of initial European colonisation and occupation. Halls Creek was named after a colonial ancestor of Harry Hall.

I explained to Mr Hall my problem concerning the absence of information on Aboriginal sites in the study area and showed him the area on a map. During our interview he described to me a variety of both Aboriginal and non-Aboriginal archaeological sites which he had seen in the general vicinity of the survey area. Some of these (eg family cemeteries and small schools) related directly to his own ancestors and would be of great interest to historical archaeologists. However, my own survey brief focussed on Aboriginal rather than historic sites and during our conversation I concentrated on the former rather than the latter.

Mr Hall identified the following range of sites within the region:

1) Stone scatters, isolated artefacts, knapping floors.
2) Sites where quandong seeds were ground.
3) Stone axe quarries.
4) Scarred trees.
5) Carved trees.
6) Burials.
7) Axe grinding grooves.
8) Rock painting sites.
9) Stone arrangements.

This formed the basis for my predictive model for archaeological sites in the study area (see Section 5.5). However, the range was increased by reference to other types of archaeological sites found within this general region in New South Wales (see Figure 7, also Connah et al 1977; Mathews 1917; Bowdler 1983) to include:

1) Stone fish traps.
2) Bora grounds.

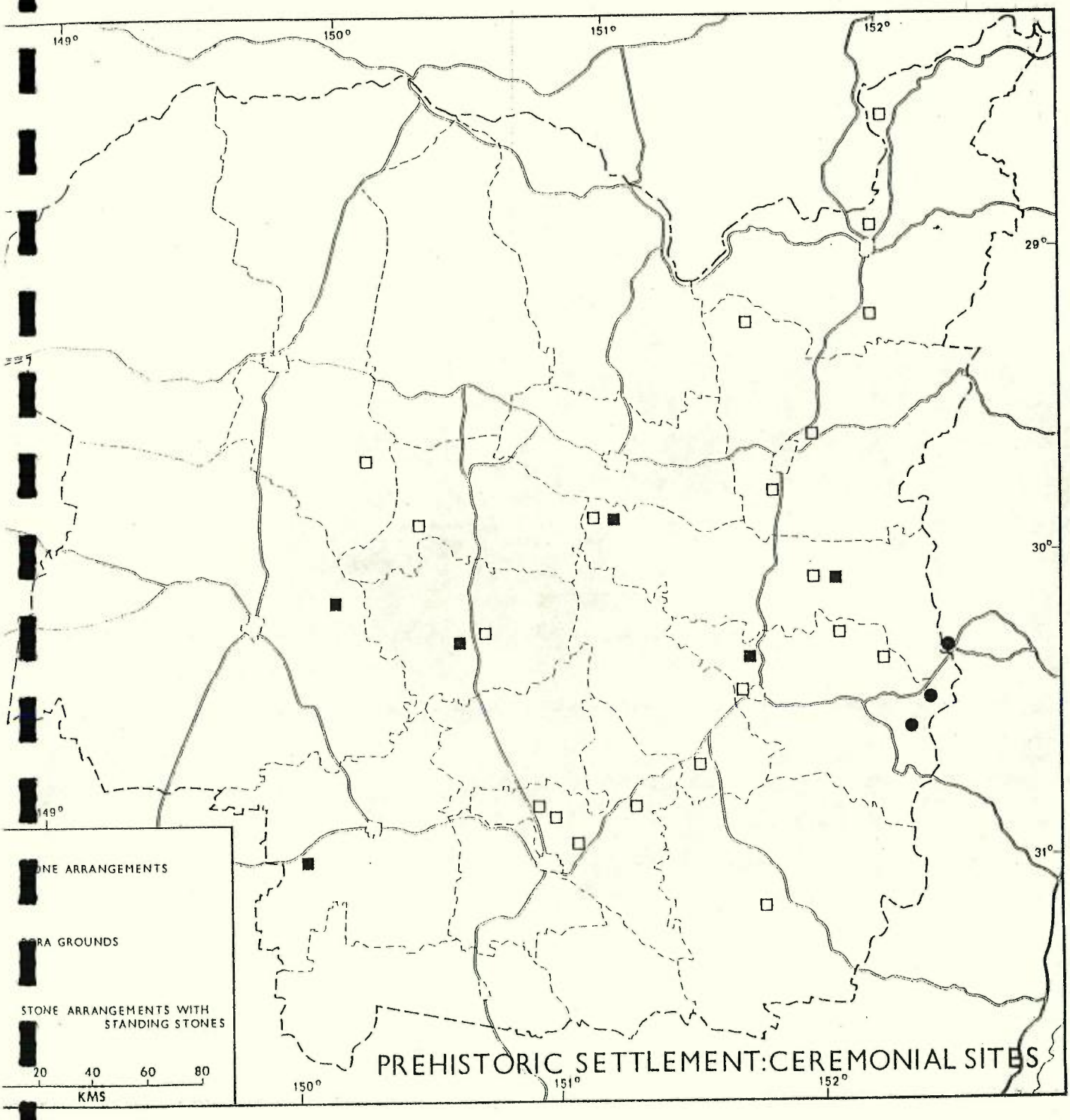


Figure 7

Location of ceremonial sites in general region

(After Connah et al. 1977,15)

In addition to this, sites of mythological significance to Aboriginal people also have the potential to occur in this region. This sites may be either natural features in the landscape or may be sites which have been modified by people in the past.

5.4 Predicted model for archaeological sites in the study area.

A prediction of the type of archaeological sites which might occur in the study area was made on the basis of ethnographic research, previous archaeological finds, oral histories of the general region and the environmental terrain of the study area.

I will use an example to clarify this. Earthen bora grounds were once widespread in New South Wales (Bowdler 1983,43) and were also found in the general New England region (see Figure 7). They also occurred within the country of the *Kamilaroi* people (Mathews 1917; Morwood and Fillery 1976). On the grounds of the ethnohistoric and archaeological evidence they might, therefore, be expected to be a potential site type within the study area. However, bora grounds were eliminated from the range of predicted sites on the basis of the environmental terrain within the study area. Bora grounds usually occur on the level low-lying country which is conducive to their construction and, as Appleton (1991,9) notes, such topographical units are often the first to be cultivated. The survey area contains such units but it has been extensively disturbed by cultivation and grazing. If a bora ground had once occurred in this area it would have been either destroyed by cultivation or preserved through avoidance.

The predictive model for this study suggests that following types of sites might occur within the survey area:

1) Stone scatters, isolated artefacts, knapping floors.
2) Sites where quandong seeds were ground.
3) Scarred trees.
4) Carved trees.
5) Burials.
6) Axe grinding grooves.
7) Stone arrangements.
8) Stone fish traps.
9) Mythological sites.

These site types are not mutually exclusive: as Bowdler (1983,43) notes many of these broad categories may be contained in a single site. For example, a stone arrangement may also have mythological significance or a rock art site may also have artefactual

evidence for occupation. And some site types (eg carved trees and burials) can be expected to co-occur.

Stone artefact scatters

This type of site can range in size from an isolated stone artefact to an extensive scatter of a wide range of artefact types. This may be either evidence for a knapping floor resulting from stone being worked in a particular spot or a general artefact scatter which may contain flaked or ground artefacts and hearth stones. This material may or may not be associated with other cultural remains such as ochre, charcoal, shell or bone.

Artefact scatters may occur as surface concentrations of material or as stratified deposits which may also be dateable. Raw material may be local or exotic and can be used to provide evidence for such things as population movement and exchange systems. An artefact scatter does not necessarily imply that people actually camped on the site, but it does show that people were moving through that particular terrain.

Quondong seed grinding sites

Two stands of quondongs within this region were described by Mr Hall. He showed me grindstones around fifteen to twenty cms in length which are imbued with a reddish lustre from the grinding process which are associated with these stands. Some of these stones also have notches knocked out of them. I would expect that quondong seed grinding sites would possibly also have evidence of pestles used in grinding.

Scarred trees

These are trees from which bark has been removed for a variety of purposes such as for manufacturing containers, shields, canoes, etc. Harry Hall described one tree in the region with a canoe sized scar which also had small hole drilled in the base of the tree. He also describes scarring at various heights made for the removal of possums from the tree. Making toe-holds in order to climb a tree can also produce scarring. Scars can vary in dimensions according to the purpose for which the bark was removed. Scarring caused by humans can often best be distinguished from natural scarring by the presence of axe scars on the exposed wood.

Carved trees

McBryde (1974) describes carved trees as those which have designs carved into the bark or heart-wood. Carved trees are associated with burials in various part of Australia though Meehan (1971,71) states that the co-occurrence of carved trees and burials was largely confined to south-western, south-eastern Australia and Cape York. Bell (1979) recorded this association at both Trangie and Weemabah and near the Murray River, Bunbury and Vasse in Western Australia trees near graves were marked with notches, circles or lines (Meehan 1971,70). In some cases burials the location of burials have been indicated because of their association with carved trees (see Balme 1986).

This association between carved trees and burials is also likely to have occurred in the general region of the survey area. Morwood and Fillery (1976) state that the practice of carving trees was a trait of the *Kamilaroi* and that carved trees are often associated with either bora grounds or burials. Fraser (1882,229; quoted in Meehan 1971,70) also noted that the *Kamilaroi* marked the bark of trees that stood near burials.

Apart from this, two carved trees from the Armidale region are held in the Armidale Folk Museum. Mr Hall described one carved tree in the region with notches methodically placed around the bole of the tree. He did not know the significance of the markings but suggested that it was part of some kind of signifying practice.

This is certainly true in other parts of New South Wales. Dunbar (1943,146; quoted in Meehan 1971,70) refers to this practice on Yanda station in western New South Wales. He notes that bark was removed from a tree south of a grave and that designs similar to the cicatrices on men's chests were marked on the tree. He states that 'aged aborigines (sic) declared that they could identify the man who was buried nearby whenever one of these trees was located'.

Burials

Burial sites are sometimes found eroding from the banks of creeks, as at Robinvale in Victoria. These sites are always of importance to Aboriginal people and any disturbance of such sites would normally be strenuously opposed. These sites are also important to archaeologists, especially physical anthropologists. In some cases (eg Pardoe 1988) important information can be obtained merely from the location of such sites and such analyses need not involve actually handling sensitive material.

Axe grinding grooves

Axe grinding grooves are normally found in sandstone slabs, often associated with small waterholes near permanent or semi-permanent water sources (see Bowdler 1983,43). These are places where the edges of stone, or sometimes steel, axes have been ground either for initial sharpening or for re-sharpening. Mr Hall describes a portable stone which was found in this region, of about 300 cms length, which contains a series of parallel grooves which he feels are the result of stone axe being ground.

Stone arrangements

Stone arrangements occur throughout Australia and are of cultural significance to Aboriginal people. Bowdler (1983,43) identifies them as occurring on the eastern edge of the New England tablelands. The survey area is on the western edge of the tablelands and Mr Hall states that he has seen a number of stone arrangements in the region. His description of these arrangements is similar to that shown in Bowdler (1983, figure 14), which presumably is located on the eastern edge of the New England tableands.

Stone fish traps

Stone fish traps are found in some of the large inland river systems and also occur on the north coast of New South Wales. One of the best known of these is the series that occur at Brewarrina (see Dargin 1976). The abundance of stone material and the nature of Halls Creek itself (it has a number of shallow, rapid-like sections) made it possibly suitable for the manufacture of stone fish traps.

Mythological sites

These are natural features of the landscape which possess special cultural significance to Aboriginal people due to their role in local Aboriginal mythology. These sites may or may not be associated with ceremonies and many of these sites are unmodified features of the environment, for example trees, hills or waterholes (see Lewis and Rose 1988). Such sites may also be sites which have been modified by humans (eg stone arrangements, earthen bora rings or rock art sites). Mythological sites can only be identified by local Aboriginal consultants.

5.5 Consultation with Aboriginal Land Council

The survey region currently comes under the juristriction of the Northern Region Branch of the New South Wales State Land Council, though there exists an initiative within the Manilla Aboriginal community to establish a local Land Council.

Mr Norman Allen of Northern Region Branch of the New South Wales State Land Council acted as Aboriginal consultant for the survey. Mr Allen found no sites of special Aboriginal significance in the survey area (see Appendix 1). His statement includes the phrase of 'special' Aboriginal significance because he believes that all of the land is of some inherent significance to Aboriginal people.

Mr Allen suggested that Aboriginal people in the past are likely to have spent much of their time along the Namoi river, which is approximately seven kilometres from the survey area, and that evidence of occupation sites would be likely to be found closer to this river. He discussed in passing the existence of a rock shelter which was a living site reputed to be located in the area north of the survey area. Mr Allen was told of that site by another Aboriginal person but has not visited that site himself. Apparently this site has not been registered on the National Parks and Wildlife Service Register.

6. CATEGORIES OF CULTURAL SIGNIFICANCE

Cultural significance is a concept used to identify and assess attributes which make a place of value to society (Kerr 1985,3). Significance can generally be assessed in terms of a place's aesthetic, historic, scientific, public or Aboriginal importance. Such categories are not mutually exclusive. For example, many sites which are of archaeological/scientific significance will also be of significance to Aboriginal people and may well have the potential to be of educational significance to the public.

6.1 Aboriginal significance

Aboriginal significance can only be assessed by Aboriginal people. It can also be related to public or aesthetic significance. Sites of significance to Aboriginal people can be with either natural features in the landscape or sites which have been produced by the actions of people in the past. Both sacred and secular (restricted and public) sites can be of Aboriginal significance.

6.2 Aesthetic significance

This relates to the formal or aesthetic qualities of a site or place which make it visually pleasing (Kerr 1985,10-11). Aesthetic significance can be assessed in terms of individual elements such as the unity of scale, materials, texture and colour present and the degree of contrasting elements which may or may not be intrusive or disruptive, or a whole landscape setting in which each of these elements are combined to produce an overall impression. Of importance in assessing aesthetic significance is the degree to which a place has a relationship between its parts and the setting which reinforces the quality of both (Kerr 1985,11). Aesthetic significance can also be seen to be part of Aboriginal or public significance and as such is perhaps best be measured by individual response (Bowdler 1983,39).

6.3 Historic significance

Historic significance relates to the European period of occupation of Australia. Such significance is normally identified with an historic figure, event, period or activity. A site may have historic significance because it either typifies or is atypical of past practices. (Guidelines to the Burra Charter in Kerr 1985, 26; Pearson 1984, 32)

6.4 Scientific significance

In the context of Australian Aboriginal sites scientific significance is largely synonymous with archaeological significance (Bowdler 1983,39). This is generally based on the ability of a site to answer research questions, some of which may be applicable beyond the context of the single site being studied (Schiffer and Gummerman 1977; Pearson 1984). Bowdler (1983,39-40) identifies two components to scientific significance: the research potential of the site itself and its representativeness of sites known elsewhere. Scientific significance also encompasses the potential of the site to provide information relating to anticipated future developments in archaeological research.

6.5 Public significance

Public significance lies mainly in the potential of a site as an educational or tourist resource. If a site which is of public significance is threatened this will be indicated by the public reaction (Bowdler 1983,39). Public significance is also related to aesthetic significance. As Pearson (1984,31) notes, public significance may change over time in tandem with changing attitudes to a particular site. Sometimes this will be a reflection of changing academic interests or of publicity focussing on a site.

7. FIELD INVESTIGATION

7.1 Survey strategy

It was practical to survey the proposed extraction areas and immediate environs intensively, rather than to survey only a sample of the area, since the area is relatively small. Therefore the entire survey area was searched for sites. One hundred metres each side of Halls Creek was surveyed as well as two off-site transects along an access road and along the crest of a small hill on the eastern side of the creek.

The type of environment is relevant to site location, preservation, exposure etc (see Section 4.4) and is thus integral to surveying strategy used in an archaeological assessment of an area. For example, open sites are most likely to be located on the crests of hills, especially when they are near permanent or semi-permanent water sources. As Byrne (1981) notes in steep terrain archaeological sites may be located almost exclusively on the flat areas along ridges since Aboriginal people were presumably bound by the same topographic constraints as other people.

7.2 Survey methods

The study area was systematically surveyed on foot over a period of three days. The primary archaeological survey was conducted on 10th October, 1992, by Claire Smith and Heather Burke. Both are post-graduate students with the Department of Archaeology and Palaeoanthropology, University of New England, Armidale. A further survey was conducted by Claire Smith and Andrew Jackson, an under-graduate archaeology student, on 31st October, 1992. A survey by Claire Smith and Norman Allen , the representative of the Northern Region Branch of the New South Wales State Land Council, was conducted on 14th October, 1992.

Fieldwork on 10th and 14th October took place in sunny conditions with excellent light. Fieldwork on 31st October 31st was conducted under slightly overcast conditions. Over the three occasions archaeological visibility ranged from good to excellent. The area of approximately six hectares took nine person hours to survey.

The primary locus of the survey was the creek bed which includes the proposed extraction sites. This divides naturally into the creek proper and adjacent terraces within the wider banks (Figure 4). These would also once held water and are still theoretically subject to intermittent flooding, though the last major floods to affect this

area probably occurred in the 1960s (H. Hall pers. comm.). The width of the extended creek (ie creek proper and adjacent terraces encompassed within the wider banks) ranges between thirty and sixty metres.

One hundred metres each side of the creek proper was surveyed. Each side of the creek was divided into eight transects, each of 300 metres length. All transects were surveyed at ten-fifteen metre intervals and areas between these intervals were systematically scouted.

All trees within the survey area were inspected for evidence of scarring or carving. Surface visibility within the survey area varied according to the transect and ranged from 10%-100%.

The northern extent of the survey area is bounded by a deep gully on the eastern side of the creek, immediately past access road two. The southern extent of the survey area is approximately twenty metres past a barricade constructed of various metal and other types of rubbish which is located on the western bank of the creek.

In addition to this, off-site transects were surveyed along an access road and along the crest of a hillock on the eastern side of the creek. I decided to survey the two additional off-site transects because I was concerned that we had not found any sites in the main survey area and I wanted to place these results within a broader environmental context. Open sites - knapping sites, artefact scatters and isolated artefacts - are likely to be located on the crests or ridges of hillocks near permanent or semi-permanent water sources and I anticipated finding at least some artefactual evidence on the crest of the hillock. And access roads usually provide high archaeological visibility and may have material eroding from side banks.

7.3 Description of transects

Transects 1-5

Transects one to six were located within cropped fields on the western side of the creek. Surface visibility ranged between 10%-20%. These fields contained almost no stone which is out of character with the surrounding country and the stone has probably been systematically removed by farmers. One established eucalypt stands in transect two. It is not scarred or carved.

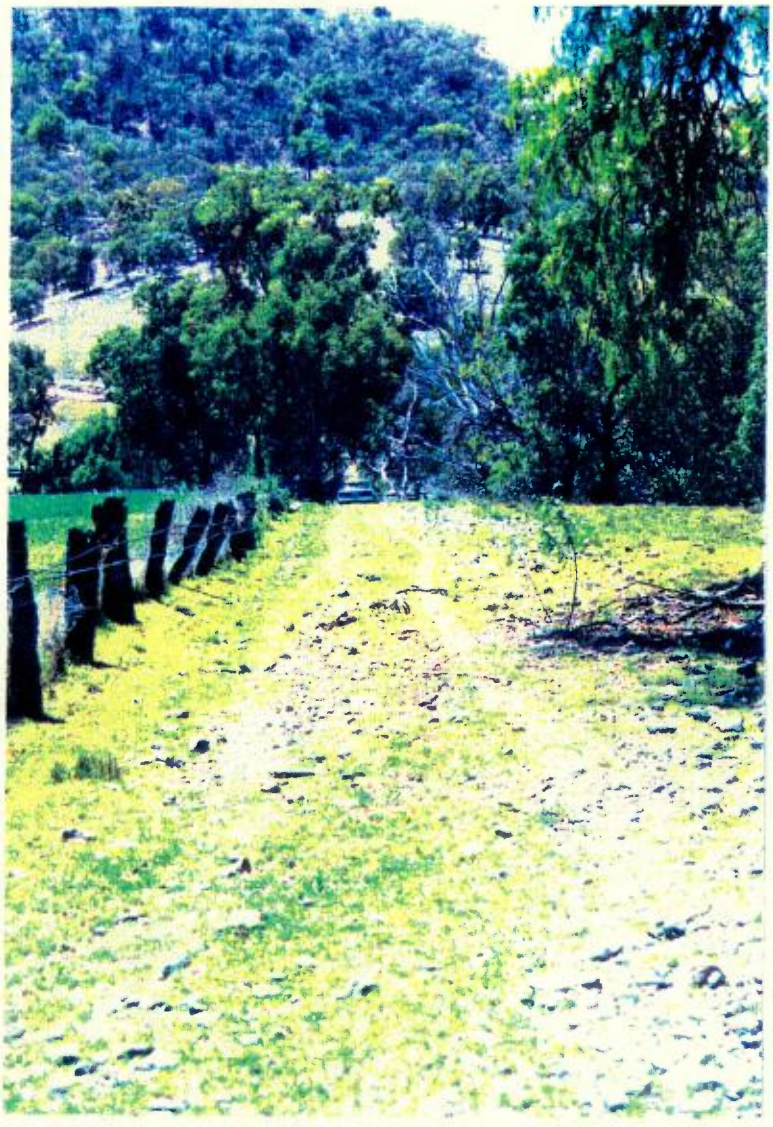


Figure 8
Access road on western bank of Halls Creek

Transects 6-8

Transect six included the major access road on the western side of the creek from the Halls Creek Road (see Figure 8). Surface visibility in this transect ranged from 20%-50%.

Transects seven and eight were along the sections next to the creek proper, with transect eight being adjacent to the creek. These areas are themselves subject to intermittent flooding. These transects included the high banks of the extended creek and terraces above it. The banks were examined closely for evidence of archaeological or biological material eroding from them. None was found, though it is interesting that a small section of transect nine has evidence of white pipe clay eroding from a steep vertical face of bank: this may have been used by Aboriginal people in the past for body

painting or other forms of art. Surface visibility in these transects ranged from 40%-90%.

Transects 9-10

Transect nine is located immediately next to the eastern side of the creek and generally includes the eastern banks of the extended creek and the terrace immediately above the creek. The eastern banks of the creek were examined closely for evidence of archaeological or biological material eroding from them. None was found.

Transects nine and ten include access road two on the eastern bank which provides vehicular access to the creek itself. This road was systematically examined for artefactual or biological material eroding from the small banks on each side. None was found. Surface visibility in these transects ranged from 10%-30% on grassed areas to around 90%-100% on the road itself.

Sections of these transects were located within ploughed but uncropped fields which themselves were full of gravel. Surface visibility in these fields was around 90%-100%.

Transects 11-12

Transects eleven and twelve include the proposed location for the crusher (see Figure 9). This is located in an area which has already been cleared and which is at the base of the exposed slopes of a small hill. It is approximately twenty metres from the eastern bank of the creek. At this point the bank has a steep vertical face. Large quantities of gravel in clearly deposited layers are eroding from this section of the bank but no artefactual material was identified. Surface visibility in these transects ranged from 20%-100%.

Sections of these transects were located within ploughed but uncropped fields at the southern end of the survey area which themselves were full of gravel. Surface visibility in these fields was around 90%-100%.

Figure 9
Proposed location of crusher

Transects 13-16

These transects included the proposed location of the crusher on the eastern bank, a small dam, a small hillock immediately adjacent to this site and access road three. This road was systematically examined for artefactual or biological material eroding from the small banks on each side. None was found. Occasional concentrations of stone material were dotted across the hill on small rises and were probably concentrated in these areas due to the combination of water movement, gravity and disturbance from stock. None of these small concentrations of stone showed evidence of artefactual material. Surface visibility in these transects ranged from 50%-100% on eroded areas to 0%-20% on

grassed slopes of the hillock. Sections of these transects were located within ploughed but uncropped fields at the southern end of the survey area which themselves were full of gravel. Surface visibility in these fields was around 100%.

Transect 17

This was an off-site transect extending along access road three, which is located on the eastern bank, winding north. This road was systematically examined for artefactual or biological material eroding from the small banks on each side. None was found. There were, however, a number of pieces of stone which had been cut artificially by tractors or vehicles: one larger piece of quartz was able to be con-joined into its former shape. Surface visibility in this transect ranged from 90%-100%

Transect 18

This was an off-site transect along the ridge of the small hillock on the eastern side of the creek. Surface visibility in this transect ranged from 10%-30%. Vegetation in this transect included two trees, the fruit of which was traditionally eaten by Aboriginal people.

7.4 Effectiveness of survey strategy

I am satisfied that the most appropriate survey of methods were used and I believe that the results of the survey are representative of visible archaeological sites within the study area.

It should be noted, however, that the results of any archaeological surface survey can only be representative of the visible archaeological record rather than the existing archaeological record.

8. RESULTS OF THE ARCHAEOLOGICAL SURVEY

8.1 Aboriginal artefactual material

No Aboriginal sites were recorded in the survey area. This includes all of the site types outlined in Section 5.4.

8.2 Historic artefactual material

Historic artefactual material was recorded in a levy bank on the south-western side of Halls Creek. This includes discarded material such as old tank stands, plates, sections of corrugated iron, bottles etc.

9. ANALYSIS OF RESULTS

9.1 Aboriginal artefactual material

This section considers in detail the question of why no relics were found in the study area during the survey. There are two aspects to this issue. One is the absence of specific site types and the other is the question of whether it is in itself significant that no relics were found.

Sone artefacts are one of the most common materials found in archaeological surveys. The absence of this material in the survey area is likely to be at least partly due to the nature of the available local raw material. This material is coherent but heterogeneous. It is full of micro-fractures that makes it unsuitable for making stone artefacts (M. Morwood, pers. comm.). Such stone tends to fracture along the lines of the micro-fractures. Apart from this, it would be very difficult to recognise within Halls Creek itself chert, quartzite and greywacke artefacts as they are viewed against a background of chert, quartzite and greywacke pebbles.

The absence some other site types may also be due to the absence of suitable material. For example, the presence of stone quarries is dependent on the presence of outcrops of suitable stone within the survey area. Similarly, no suitable shelters or art sites were located in the survey area due to the absence of suitable geological material.

The absence of some site types may be due to their relative rarity within the region and a subsequent low probability of their being found in the survey area. Such sites would include quondong trees and associated artefacts, quarry sites and, possibly, burials.

The absence of some site types may be due to taphonomic processes in the survey area as outlined in Section 4.7. Such sites would include stone arrangements, burials, bora grounds, carved or scarred trees and, possibly, stone fish traps. The area has been extensively disturbed by cultivation and grazing and any sites which previously existed on these areas are unlikely to have survived.

The other issue to be considered is the value of negative evidence. Is the absence of Aboriginal artefactual material in the study area significant in itself?

As noted in Section 5.3, a search of the NPWS Minark computerised Sites Register (7th October, 1992) failed to reveal any sites at all in the region between eastings of 2930 and 2990 and northings of 6695 and 6005. This is in spite of their having been surveys (eg Blackwell and Geering 1981) conducted within the area designated in the search. Combined with the failure to find artefactual evidence in this study, this might suggest that Aboriginal occupation of the area in the past may have been minimal.

However, I do not believe this to be true. I feel the answer lies with the paucity of research conducted in the region and, in the case of the specific survey area, with the nature of the immediate environment. The study area is not especially conducive to occupation as the ground is full of gravel and there are few spots where it is comfortable to sit or sleep. The geographically small focus of the study is also likely to be a contributing factor to the absence of artefactual material.

I feel that it it highly unlikely that Aboriginal people did not travel through this area in the past, though it is possible as Mr Allen, the Aboriginal consultant suggested, that their more permanent occupation sites were closer to the permanent water source of the Namoi river, which is approximately five kilometres from the study area.

9.2 Historic artefactual material

Historic artefactual material was recorded in a levy bank/rubbish dump located on the south-western side of Halls Creek. Material found at this site includes discarded objects such as old tank stands, plates, sections of corrugated iron, bottles etc. None of these objects would contain a great deal of information for historical archaeological studies.

SIGNIFICANCE ASSESSMENT OF STUDY AREA

10.1 Aboriginal significance

There are no sites of Aboriginal significance in the study area (see Appendix 1). However, there is a feature of the landscape which may have been of interest to Aboriginal people in the past is a small section of transect nine which has evidence of white pipe clay eroding high up from the bank. This clay may have been used by Aboriginal people in the past for painting on various media (body art, rock art etc.). I discussed this with Norman Allen who was the Aboriginal consultant for the survey and he did not think the clay was of special significance to Aboriginal people.

However, it is unlikely that the clay would be impacted by the proposed development. It is situated in alluvial soil in a steep vertical bank on the western side of the creek approximately two-to-three metres above ground level.

10.2 Aesthetic significance

Aesthetic significance in an archaeological assessment relates to the aesthetics of sites recorded. No Aboriginal sites were recorded. The historic site recorded is not of aesthetic significance.

10.3 Historic significance

Historic artefactual material was recorded in a levy bank/rubbish dump located on the south-western side of Halls Creek. It is located well to the south of the proposed zone of impact. I do not understand this site to be of special historical significance, nor would I expect it to be so. The site itself is not especially unique and as far as I have been able to ascertain it is not associated with any place, person or event of historical significance. Nor is it a place which is itself inherently significant. The site does not appear to be of historic significance

10.4 Scientific significance

In spite of intensive surveying no sites of scientific/archaeological significance were located in the study area.

10.5 Public significance

The survey area is located on private land which is not open to the public. Therefore, its potential as an educational resource to the public is low. It is unlikely to be used for public education, exhibit or enjoyment or to be of benefit to local tourism.

11 RECOMMENDATIONS

No sites of Aboriginal, scientific, historic or public significance were identified during the survey. Accordingly, my recommendations for management of the cultural resources in the survey area are as follows:

1. On the basis of the surficial evidence and the significance assessment outlined above no objection should be raised on archaeological grounds to the proposed development being undertaken in the survey area.

2. All operations should be halted if any other relics as defined under the NPWS Act (1974) are discovered. It is an offence under the Act to damage, deface, disturb or destroy any relic unless prior written consent has been given by the Director. If other relics are discovered the Armidale District Office of the New South Wales National Parks and Wildlife Service should be contacted immediately and work on that section of the development should be halted until clearance has been given by NPWS.

APPENDICES

NEW SOUTH WALES STATE LAND COUNCIL - NORTHERN REGION BRANCH

143 Loder Street
QUIRINDI NSW 2343
PHONE: (067) 46 1668
FAX: (067) 46 2525

Claire Smith,
Archaeology Department,
U.N.E.,
ARMIDALE. N.S.W. 2350.

Dear Claire,

RE: PROPOSED GRAVEL CONSTRUCTION SITE AT HALLS CREEK MANILLA, PART OF PORTIONS 1, 16 AND 50 SURVEYED 14TH. OCTOBER, 1992.

There are no sites of special Aboriginal significance in the proposed area.

Yours faithfully,

NORMAN J. ALLAN,
CO-ORDINATOR,
NORTHERN REGION BRANCH.

Date: 15th. October, 1992.

APPENDIX 2

Copies of this report were supplied to the following:

* T.J. Stewart Pty Ltd (five copies, including three for National Parks and Wildlife Service, New South Wales).
* Mr Norman Allen, representative of the Northern region branch of the New South Wales State Land Council.
* Mr Harry Hall, consultant on local history.
* The Department of Archaeology and Palaeoanthropology, University of New England, Armidale, NSW.

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APPENDIX 4
Geology Report

THE HALLS CREEK AGGREGATE DEPOSIT

1. LOCATION

The Halls Creek Aggregate Deposit is located approximately 6 km east of the junction of Halls Creek and the Namoi River at Grid Reference 947010, Mandowey 1: 25000 Sheet 9036-1-S. The Deposit is situated predominantly along the northwestern side of the fluvial channel.

2. COMPOSITION

The Deposit consists of a series of longitudinal gravelly bars within a braided stream. The bars contain a range of clast sizes ranging from 20cm to 2mm diameter. The average size is about 4cm.

The gravel clasts have been sourced from the Lower to Middle Palaeozoic Woolomin Group rocks and consist of chert, jasper, metabasalt, cleaved argillite and metagreywacke. These rock types are indurated. Some sand-sized particles are quartz and feldspar derived from the weathering of the Late Palaeozoic Bundarra Plutonic Suite of granites.

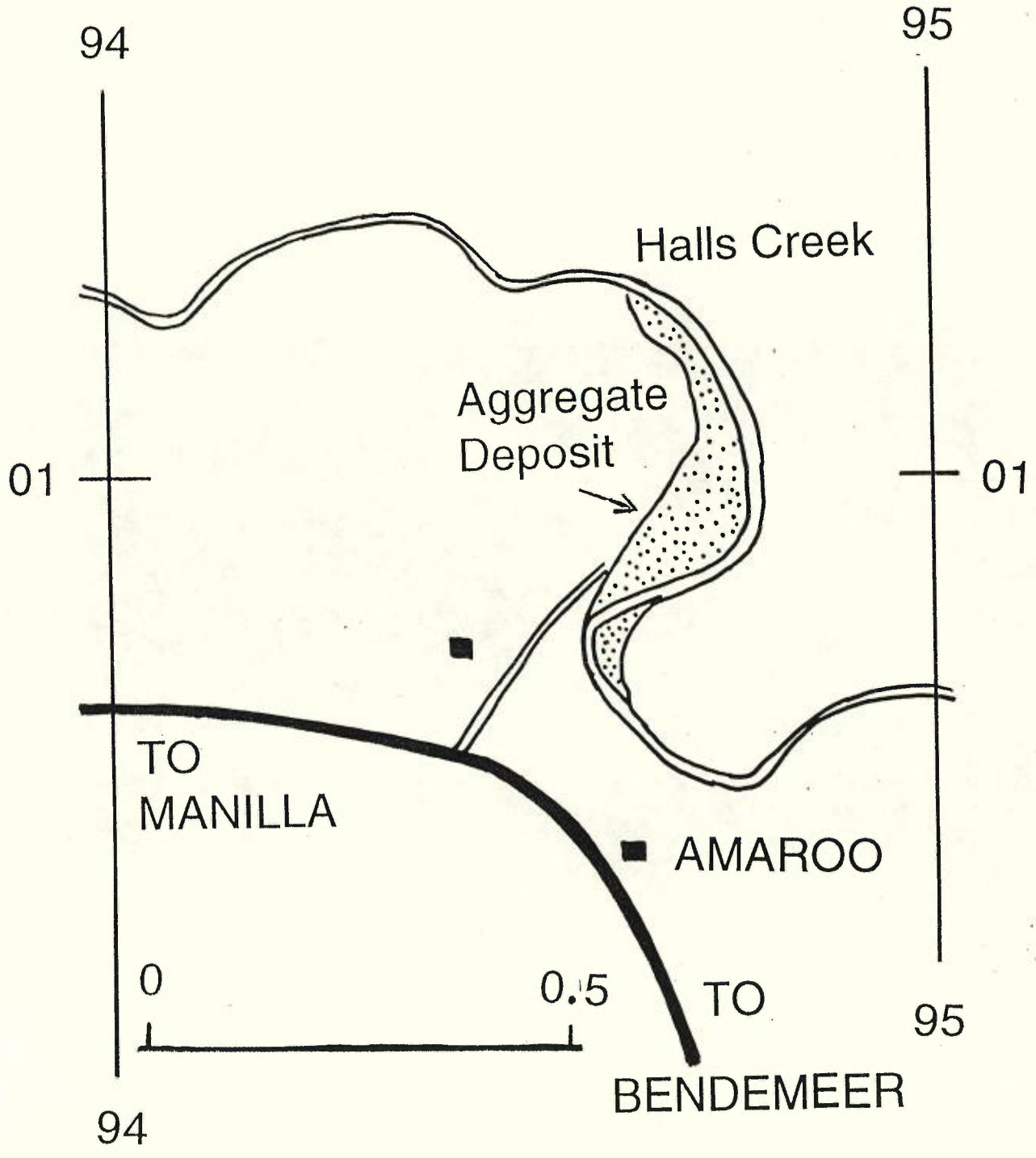
3. RESOURCE

The deposit extends for approximately 400m and varies in width from 16 to a maximum of 42m. Over the 400m length the elevation of the deposit falls about 6m. The thickness of the deposit above the water level on 29th July 1992 is arranged in three one-meter high steps or terraces of varying width.

Five profiles were measured along the length of the deposit and calculations of the gravel resource gave an indicated volume in excess of 30000m^3.

Additional resources of approximately the same volume are located below the water level. The average volume per linear meter of the deposit is approximately 75m^3.

The creek continues upstream for almost 30km. Elevations in the headwaters are about 1000m whilst at the deposit the height is about 400m. For many kilometres upstream of the deposit the creek contains numerous deposits of aggregational gravel bars.


94
95
Halls Creek
Aggregate
Deposit
01
01
TO
MANILLA
AMAROO
0
0.5
TO
BENDEMEER
95
94

4. ENVIRONMENTAL IMPACT

a) The environmental impact of removing the aggregate from the longitudinal bars at a rate of 200-500 tonnes per month would be minimal.

b) Whilst aggregate is removed from above the water level no siltation will occur.

c) As the gravel bar is aggrading, that is accumulating vertically, material removed from the recommended downstream initial site, it will be replenished with new gravel during peak flood events. This sediment will principally come from within the 400m length of the gravel bar.

d) Overall the morphology of the creek is very stable and it will continue to remain so regardless of the removal of gravel aggregate at the proposed rate.

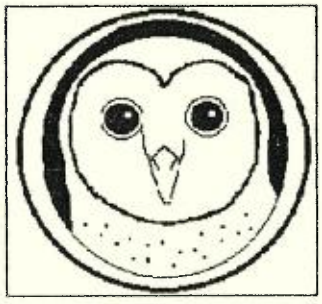
e) The slope of the sandy loam bank at the edge of the creek adjacent to the gravel bar will not be affected during normal flow conditions, and the most likely effect during flood events willl be reduced erosion owing to the increase in the crosss-sectional profile.

Peter G. Flood

Associate Professor Peter G. Flood
Geology Department
University of New England
Armidale, NSW 2351
30th July, 1992

APPENDIX 5
Flora and Fauna Report

DAVID PAULL, BSc & Associates
ENVIRONMENTAL CONSULTANTS
PO BOX 817,
ARMIDALE, N.S.W.
ph(067)711333



Environmental Impact Assessment,
Fauna & Flora Surveys

ENVIRONMENTAL IMPACT ASSESSMENT (FAUNA & FLORA) OF EXTRACTIVE OPERATIONS TO BE CARRIED OUT AT "CROYDON", HALL'S CREEK, MANILLA SHIRE.

Prepared for T. J. Stewart Pty Ltd

on behalf of Fynred.

19th December, 1992.

1. DESCRIPTION OF SITE

(a) General

Hall's Creek , a tributary of the Namoi River, mianders it's way through the western foothills of the Moonbi Range to join the Namoi near Manilla. This region is characterised by an undulating topography which flattens out as you come towards the Namoi. The creek itself varies considerably in depth and width ranging from substantial pools to shallow, fast flowing areas broken up by the rocky substrate. The northern side of the creek is characterised by steep eroded banks while the southern side is characterised by flat, rocky banks. The alluvial bank conditions are due to periodic flooding of the creek and are typical of small, meandering waterways At the proposed extraction site there is a substantial area of deposited rocky substrate on the southern/eastern side of the bend with eroded banks on the northern/western side, up to 3 metres high. This highlights the propensity of this section of the creek to deviate from it's current position although the creek itself at the site is presently a series of shallow pools.

(b) Vegetation

The foothills in the Hall's Creek area are characterised by low, grassy woodland, though most of the lowland areas have been cleared for agricultural purposes. These woodland communities are characterised by several endemic plant species, particularly two of the tree species, *E. mannifera* subsp. *elliptica* and *E. bridgesiana* subsp. *malacoxylon*. Other tree species recorded in the area were *E. conica, E. radiata,* and *E. blakleyi.*

The riparian vegetation community along Hall's Creek were characterised by the following tree species; *E. mannifera, E. bridgesiana, Casuarina cunninghamiana, Schinnus areira* (Pepper Tree) and *Salix babylonica* (Willow Tree). The understorey is mainly dominated by introduced weeds, predominantly *Verbascum virgatum, Argemone mexicana,* and *Commelina benghalensis.*

Aquatic plants in and along the creek were mainly *Juncus sp* and a small-leafed floating hydrophyte.

(c) Faunal Species Detected at Hall's Creek, (16-17 December)

Due to limited time available to undertake extensive surveying, faunal diversity presented here is certainly an underestimate of all species utilising the riparian habitat of Hall's Creek. However, the creek and both banks of the development area were thoroughly searched during the day and night and all species observed or detected are given below. Further searches were made upstream and downstream of the development site to pay particular attention to the platypus and frog species.

Birds

Phalacrocorax melanoleucos	Little Pied Cormorant
Phalacrocorax carbo	Great Cormorant
Pelecanus conspicillatus	Australian Pelican
Ardea novaehollandiae	White-faced Heron
Platalea regia	Royal Spoonbill
Threskiornis spinicollis	Straw-necked Ibis
Chenonetta jubata	Wood Duck
*Anas supersiliosa**	Black Duck
*Accipiter fasciatus**	Brown Goshawk
*Hieraaetus morphnoides**	Little Eagle
Aquila audax	Wedge-tailed Eagle
Falco cenchroides	Australian Kestrel
Burhinus magnirostris	Bush Thick-knee
Coturnix pectoralis	Stubble Quail
Vanellus miles	Masked Lapwing
*Charadrius melanops**	Black-fronted Dotterel
Ocyphaps lophotes	Crested Pigeon
Geopilia striata	Peaceful Dove
Cacatua rosiecapilla	Galah
Cacatua galerita	Sulphur-crested Cockatoo
Cacatua pastinator	Little Corella
Alisterus scapularis	King Parrot
Platycercus eximius	Eastern Rosella
Dacelo novaeguineae	Laughing Kookaburra
*Halycon sancta**	Sacred Kingfisher
*Ceyx azurea**	Azure Kingfisher
*Merops ornata**	Bee-eater
*Eurystomas orientalis**	Dollarbird
*Hirundo neoxena**	Welcome Swallow
*Cecropis nigricans**	Tree Martin
Anthus novaeseelandiae	Richard's Pipit
Coracina novaehollandiae	Black-faced Cuckoo-shrike
*Lalage sueurii**	White-winged Triller
Microeca leucophaea	Jacky Winter
Falcunculus frontatus	Crested Shriketit
Pachycephala rufiventris	Rufous Whistler
*Myiagra inquieta**	Restless Flycatcher
Rhipidura fuliginosa	Grey Fantail
Rhipidura leucophrys	Willie Wagtail
*Malurus cyaneus**	Superb Fairy Wren
*Sericornis sagitattus**	Speckled Warbler
*Gerygone olivacea**	White-throated Warbler
Acanthiza nana	Yellow Thornbill
Acanthiza chrysorrhoa	Yellow-rumped Thornbill
Climacteris picumnus	Brown Treecreeper
Philemon citreogularis	Little Friarbird
Philemon corniculatis	Noisy Friarbird
*Lichenostomus penicillatus**	White-plumed Honeyeater
*Lichenostomus fuscus**	Fuscous Honeyeater
*Plectorhyncha lanceolata**	Striped Honeyeater
Dicaeum hirundinaceum	Mistletoebird
*Pardalotus striatus**	Striated Pardalote
Aegintha temporalis	Red-browed Firetail
Poephila bichenovii	Double-barred Finch
Grallina cyanoleuca	Magpie-lark
Artamus cyanopterus	Dusky Woodswallow

*Cracticus nigrogularis**	Pied Butcherbird
*Gymnorhina tibicen**	Magpie
Corvus coronoides	Australian Raven

Most the abovementioned species were confined to or dependent on the creek and the surrounding vegetation for their survival. Species marked with an asterisk were observed to be breeding within the area of the development site. Searches were not made of the surrounding woodland areas, but it is apparent that there is a high avian diversity and density in the area, probably for many more species than is recorded here. Of particular interest is the Azure Kingfisher, *Ceyx azurea,* it's occurence at Hall's Creek is an unusually western location for this species and the presence of Bush Thick-knees, *Burhinus magnirostris*, a bird threatened with extinction in New South Wales and listed on Part 1 of (Interim) Schedule 12 (NPWS Act, 1974). Further discussion of these sightings is made in the threatened species section.

Reptile List

Anomalopus leuckartii	Legless Lizard
Eulamprus quoyii	Eastern Water Skink
Tiliqua scincoides	Eastern Bluetongue
Chelodinia longicollis	Snake-necked Tortoise

Cloudy and rainy conditions at the time of surveying meant that this class of animals were poorly under-recorded.

Amphibian List

Litoria peronii	Peron's Tree-frog
Limnodynastes fletcheri	Marsh Frog
Limnodynastes terriginaea	Northern Banjo Frog

Amphibian species in the area are also probably under-recorded though the three species identified were common at the development site. The presence of *Limnodynastes fletcheri* is an interesting eastern record for this species which is mainly confined to the river systems of the arid and semi-arid regions. Several tadpoles were also detected in the later stages of metamorphoses. These were probably *L. fletcheri.*

Mammal List

Ornithorhynchus anatinus	Platypus
Trichosurus vulpecula	Common Brushtail
Macropus giganteus	Eastern Grey Kangaroo
Wallabia bicolor	Swamp Wallaby
Hydromys chrysogaster	Water Rat
Pteropus scapulatus	Little Red Flying Fox
Chalinolobus sp	Wattled Bat
Vulpes vulpes	Fox
Oryctolagus cuniculus	Rabbit
Equus caballus	Horse
	Sheep, Cow

Platypus were recorded further downstream of the development area. Information from local residents suggests that this species breeds in Hall's Creek, (presence of juvenile animals). Further discussion of this species will be made in the Threatened Species section. It is probable that more bat species also utilise the riparian habitat of Hall's Creek though their identification is not possible without sonar sound recorders or harp traps. Further discussion of bats in the area will also be made later in this report.

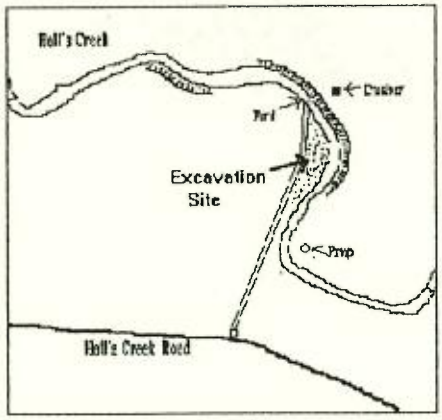
(d) Human Impact

Most disturbance in the area has been caused by agricultural usage in surrounding lands. Extensive clearing of surrounding woodland habitat has occured over a long period of time but substantial areas of woodland still remain. The riparian vegetation community has been isolated from nearby native communities and has suffered considerable encroachment by introduced trees and weeds. However, most faunal species which utilise the creek are present at good numbers and there is a high level of species diversity.

Other impacts are mainly due to the utilisation of the creek by stock and other feral animals, ie rabbit and fox. Carp are also present in the deeper and more sheltered pools. Despite this the creek itself seems to be in relatively good condition, levels of invertebrates in the water are high, small native fish are also present.

2. CONDITIONS AS OUTINED IN SECTION 4A OF THE EPA ACT (1979)

(a) Extent of Habitat Modification



Extraction of Rocky Alluvia
Mining operations will remove the extensive rocky bank on the eastern side of the creek. This will alter the natural flow of the river to some extent as well as remove much of the creek substrate from the area. The material is to be moved across the creek at a ford to be processed at a crusher on the other side of the creek.
The area of the bed to be excavated is about 300m by 10-80m. Some tree removal is envisaged.

Prossessing of material in crusher
Processing will be completed within a year. The crusher site will be connected to a main road via a transport road.

(b) Sensitivity of Protected Species to Habitat Modification

Extractive activities can have a number of adverse effects on freshwater habits including increased turbidity and siltation, destruction of banks and weedbeds, effects on channel stability as well as the possibility of chemical pollution. However at Hall's Creek only some sedimentation effects are envisaged. Sedimentation has the potential to reduce the supply of invertebrate benthic food to animals such as the platypus by smothering the substratum with fine particulate matter. A similar effect can be caused by the removal of bank vegetation which can quickly lead to bank erosion.

Section 4A, EPA Act, 1979 states that significant effect on the local fauna will result if there is "any adverse effect on the survival of (a) species of protected fauna or population of that fauna."

Planned operations are likely to disturb some local frog, reptile and bird species, particularly those which were found to be breeding in the area. There were many Bee-eaters utilising the eroded bank on the other side of the creek and Black-fronted Dotterels were using the rocky bed as a breeding area. Many other birds were nesting in nearby trees. However most of these species are common throughout the Hall's Creek area and the scale of operations is not great in relation to other available habitat. The effects on some species is unknown, such as *Limnodynastes fletcheri,* due to gaps in the current knowledge on these species. A discussion of some species of concern which are known from the area are given below in sub-section (g). No mammals were found to be nesting or had shelters in the area of operations though judging by the amounts of macropod and possum pellets found that section of the creek is well utilised.

Most fauna disperses readily along watercourses however there may be a dispersal block during the time of operations especially if trucks are utilising a creek crossing. Such activity may also alter water quality in the local area.

The degree of impact of operations such as those proposed for Hall's Creek are dependent on the scale and duration of operations. In this case the duration is relatively short (<1yr) and the scale is also quite small (<1km). The effects on populations of local fauna may not be great for these reasons. It is likely that the physical nature of the creek will be altered, becoming wider and deeper in the excavation areas. Some river realignment will occur easing erosion pressures on the steep bank side of the creek while not adversely affecting the suitability of these banks as wildlife habitat. It would take an unknown but considerable time for any alluvial deposit to once again build up in the areas affected by operations. The opposite bank was thoroughly searched and no platypus burrows were detected.

(this sub-section also deals with sub-sections (c) and (d) of Section 4A).

(e) Proposal to Ameliorate Impact

Recommended impact mitigation steps for extractive operations in freshwater bodies are given in Section 3.

(f) The area of the proposed development is not currently being assessed for wilderness under the Wilderness Act 1987.

(g) Threatened Species

Platypus, *Ornithorhynchus anatinus*
This animal is not currently listed on Schedule 12 but it's conservation status is currently under review. Little has been documented on the range and ecology of this animal . An area, such as Hall's Creek, where these animals are breeding may be significant for local populations. However, as already stated, no burrows were found along the section of bank where operations are proposed. That section of the creek was generally unsuitable for platypus habitation due it's shallow and intermittent nature.

Platypus are particularly sensitive to siltation and bank erosion. However in this instance, siltation levels are not expected to be high and there should be an easing of erosion pressure on the steep banks due to river realignment. Erosion though is best prevented by the planting of riparian vegetation.

Hall's Creek is a dispersal and breeding area for this species and operations may temporarily block it's dispersal given the creek is prone to water-level fluctuations. This impact may be negligible if the short duration of operations and the small scale in relation to the home range of these animals is taken into account The dispersal ability of platypus in Hall's Creek may be enhanced given the physical changes to the creek likely upon completion of operations. Platypus also prefer to forage and breed in larger pools and these animals have been known to occur in areas where extractive activities have occurred in the past. The effects on local platypus would require further monitoring.

Bush Thick-knee, *Burhinus magnirostris*
A small group of these birds was observed further up along the creek on the other side of the bank. This species is considered very rare in New South Wales and are not previously known from the area. The proposed development will not significantly affect the habitat of this species though activities such as crusher operation and truck activity are likely to disturb this bird from the area. It is known that this species utilises riparian habitats. This record requires further monitoring by National Parks and Wildlife.

Bats

There are a number of bat species which may occur in the area, some of which are considered to be rare or vulnerable. No bat roosting sites were detected at the development site. Operations in the area cannot be considered a threat to any of these species.

There are records of species listed on Schedule 12 from north-western slopes region, however they are considered unknown or non-breeding vagrants in the Manilla/Hall's Creek area. None of these species were detected at the development site.

Square-tailed Kite, *Lophoictinia isura*
Painted Snipe, *Rostratula benghalensis*
Turquoise Parrot, *Neophema pulchella*
Swift Parrot, *Lathamus discolor*
Regent Honeyeater, *Xanthomyza phrygia*
Painted Honeyeater, *Grantiella picta*
Koala, *Phascolarctos cinereus*
Squirrel Glider, *Petaurus norfolcensis*

3. RECOMMENDED IMPACT MITIGATION CONDITIONS

The following are ways to help improve the environment upon completion of operations;

* Tree planting should be undertaken around exposed banks and the perimeters of the excavation area. It is suggested that local tree and shrub species should be used and it is best to plant in clumps around exposed edges. However, willow seems to be the most effective bank stabiliser species. More information about tree-planting can be obtained from local offices of the Forestry Commission, Greening Australia or Landcare Group.

* The creek bed should be left as flat as possible with no extracted material to be stored near the river or on floodprone land. Some drainage access for the creek should be kept throughout operations. Any settling ponds should be also located away from floodways. Snags within a waterway should not be removed but can be stored for later replacement. Disturbance to the surrounding habitat should also be kept to a minimum.

* Operations which may affect platypus populations should have follow-up monitoring undertaken.

4. SOURCES

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* Ford, H.A. and McFarland, D. (1991:08:01) "Faunal Survey of New England III. Birds". *Memoirs of the Queensland Museum* 30(3):381-431.

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* NSW National Parks & Wildlife Service, (1992) "Draft Management Plan for the Platypus (*Ornithorhynchus anatinus*) in New South Wales". *Species Draft Management Plan No. 6.*

* Strahan, R.(ed). (1983) The Australian Museum Complete Book Of Australian Mammals, A&R Publishers.

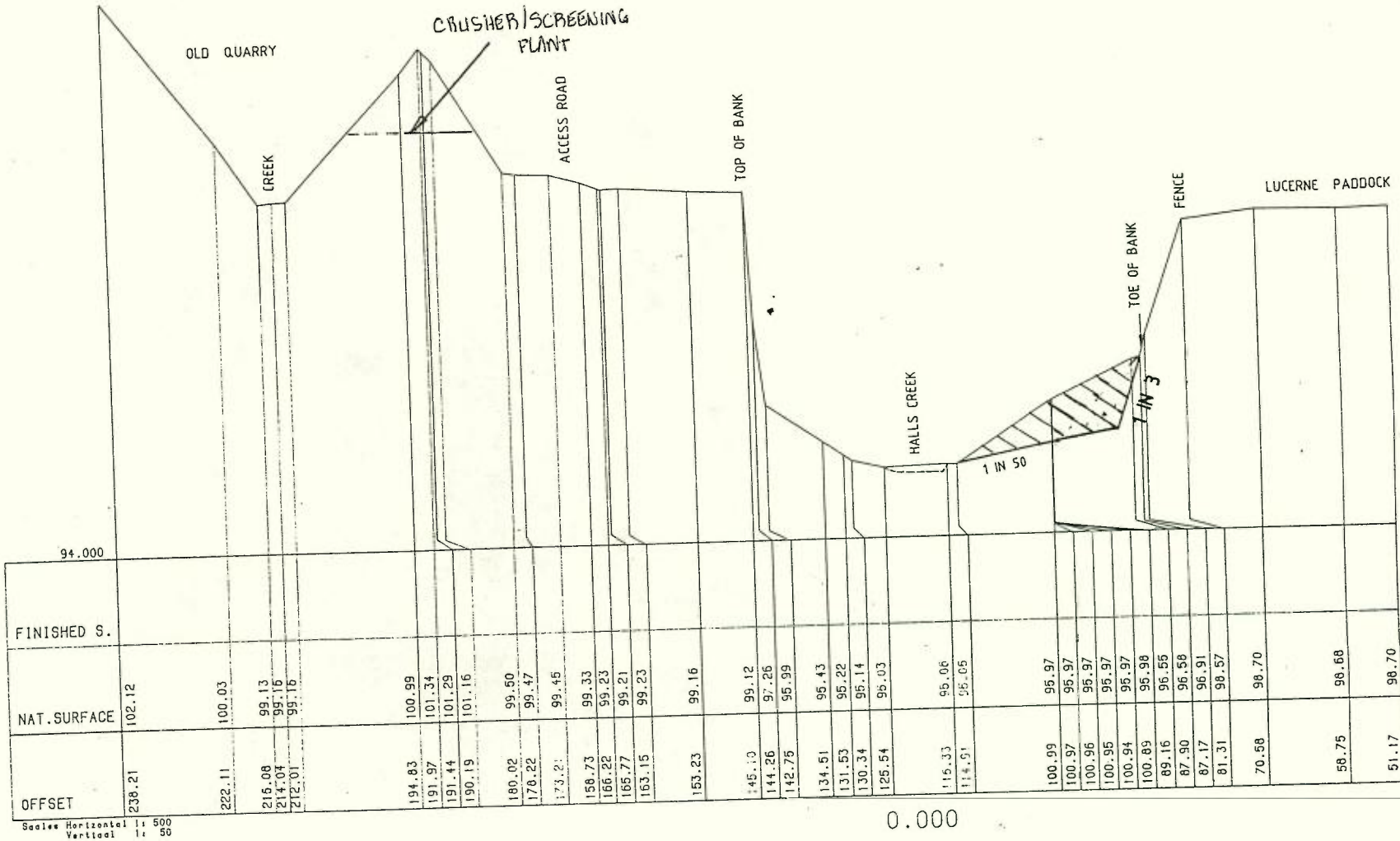
* Triggs, B. (1984) Mammal Tracks and Signs: A Fieldguide for South-east Australia. Oxford University Press, Australia.

* Tyler, M.J. (1989) Australian Frogs. Viking O'Neil, Penguin Books

* Tyler, M.J. (1992) The Encyclopedia of Australian Animals: Frogs, A&R Publishers.

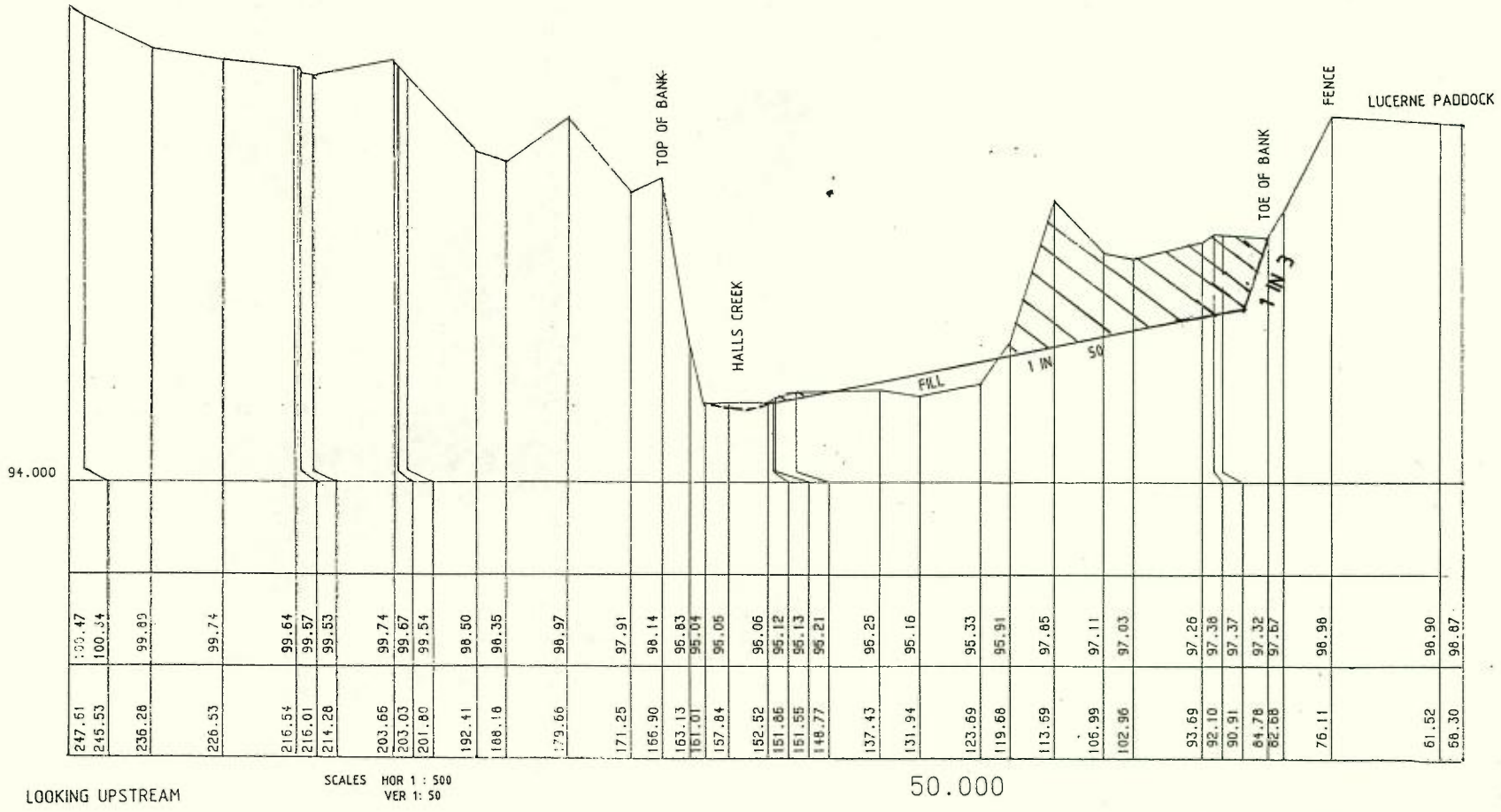
* Webster, R. & Menkhorst, P. (1992) "The Regent Honeyeater (*Xanthomyza phrygia*): population status and ecology in Victoria and New South Wales" *Arthur Rylah Institute for Environmental Research Technical Report Series* No. 126.

APPENDIX 6
Diagrams of Proposed Development



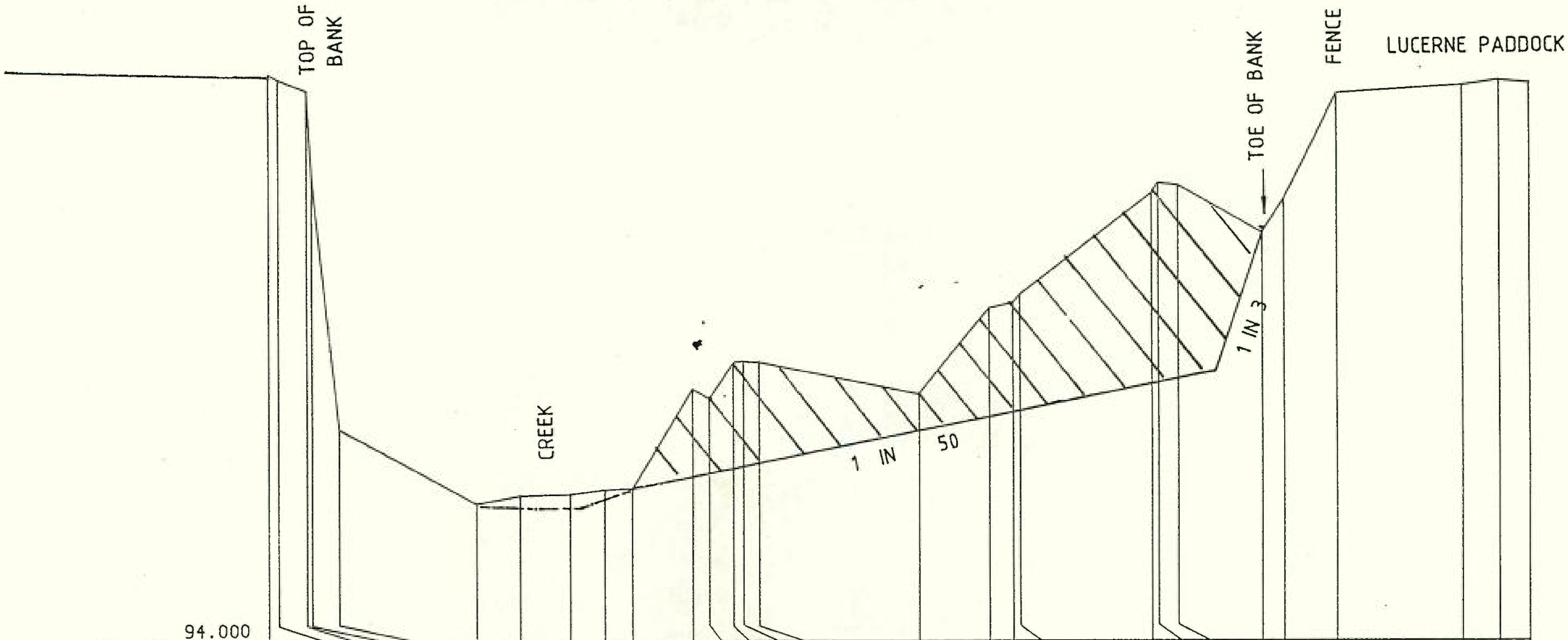
CROSS SECTIONS

FIGURE 1



CROSS SECTIONS

FIGURE 2



OFFSET	NAT. SURFACE	FINISHED S.
173.61	99.50	
172.68	99.44	
169.92	99.33	
169.43	98.49	
166.81	96.03	
153.47	95.31	
149.24	95.40	
144.40	95.41	
141.07	95.45	
138.44	95.47	
132.60	96.44	
131.00	96.34	
128.68	96.68	
127.67	96.70	
126.15	96.69	
110.43	96.38	
103.68	97.21	
101.40	97.26	
100.73	97.34	
87.97	98.34	
87.33	98.44	
85.41	98.42	
77.25	97.95	
75.14	98.28	
70.02	99.31	
57.84	99.38	
54.31	99.43	
51.42	99.41	

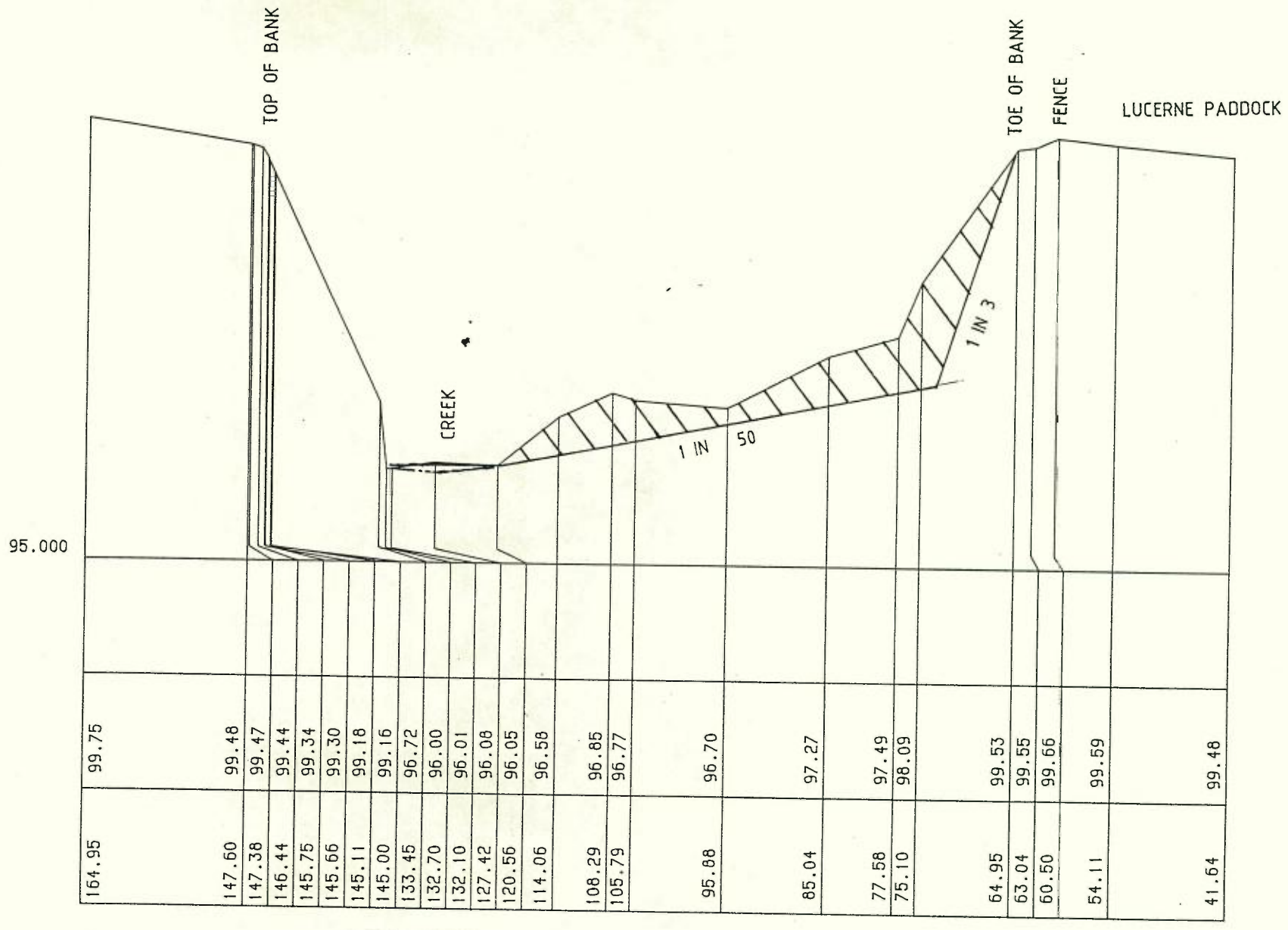
Scales Horizontal 1: 500
Vertical 1: 50

100.000

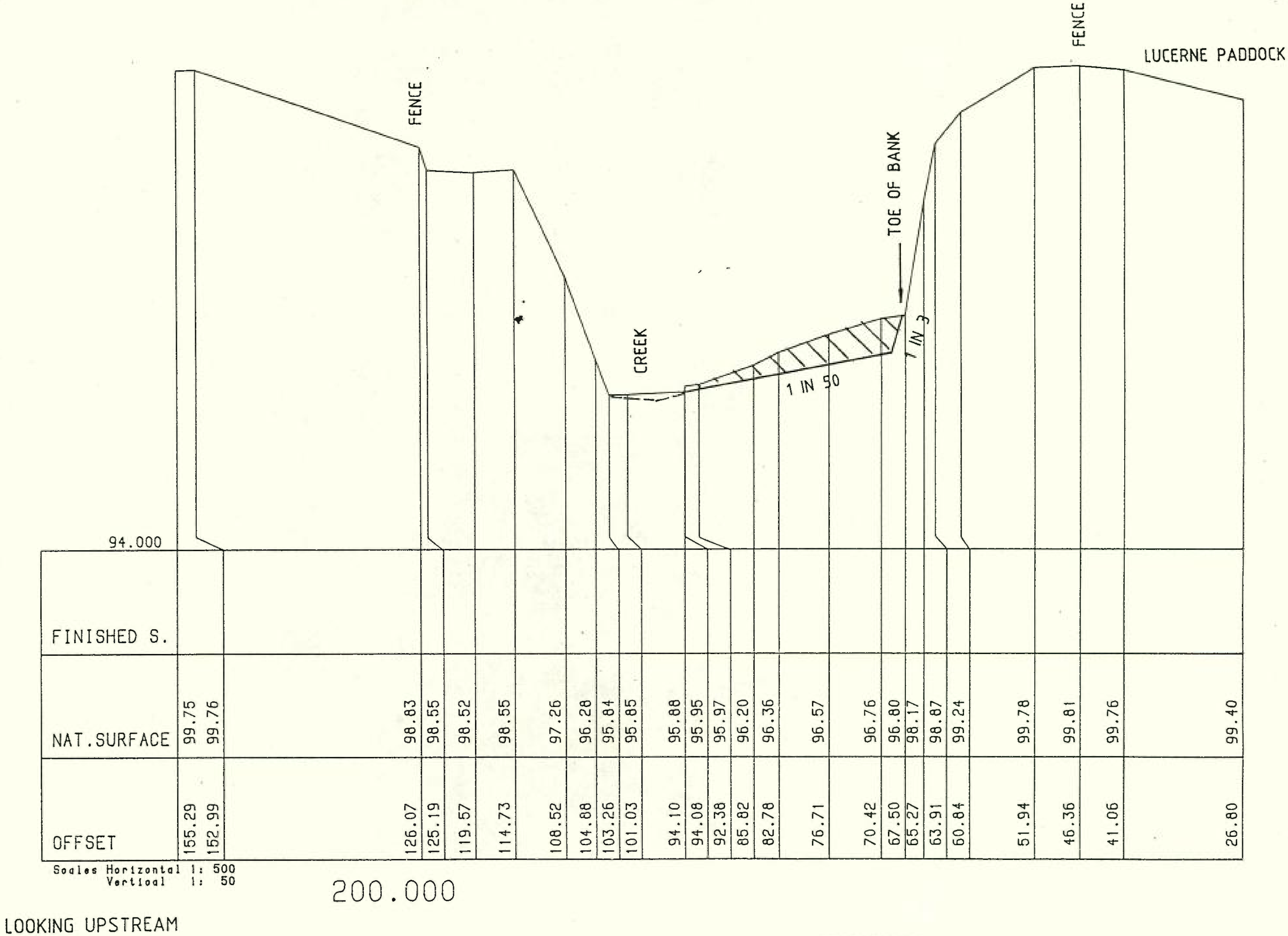
LOOKING UPSTREAM

CROSS SECTIONS

FIGURE 3



CROSS SECTIONS FIGURE 4



CROSS SECTIONS FIGURE 5

CROSS SECTIONS

LOOKING UPSTREAM

250.000

94.000

SCALES HOR. 1: 500
VER. 1 : 50

139.02	99.66
131.49	99.68
114.29	99.39
101.63	99.27
91.26	99.38
82.54	98.86
76.80	98.45
69.91	97.89
65.01	97.28
58.54	96.98
54.95	96.75
48.40	96.47
47.51	96.26
46.70	95.91
43.76	95.91
42.49	95.91
37.73	95.91
37.06	96.62
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34.09	99.68
30.77	99.73
26.35	99.77
23.47	99.68
12.03	99.32

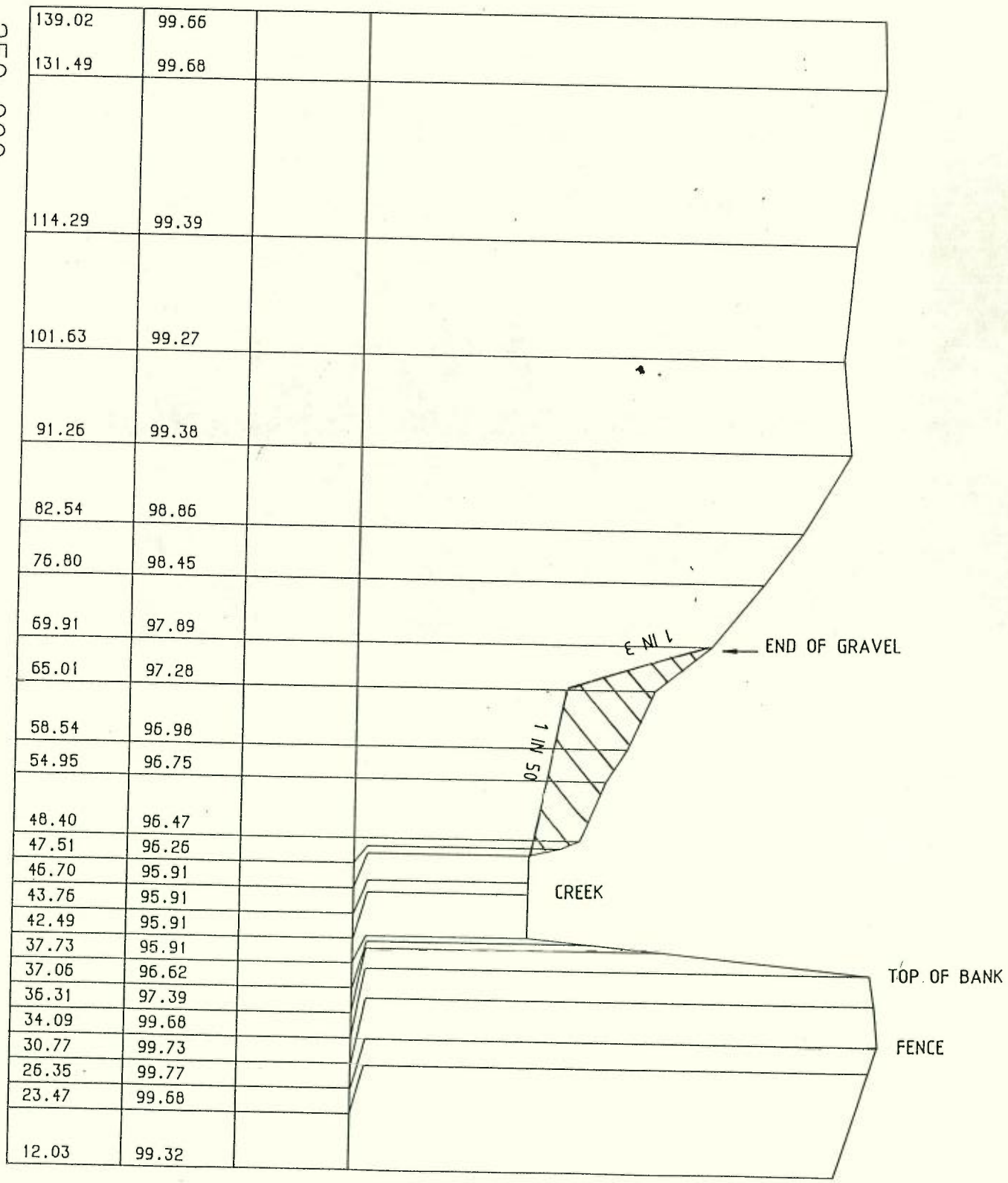
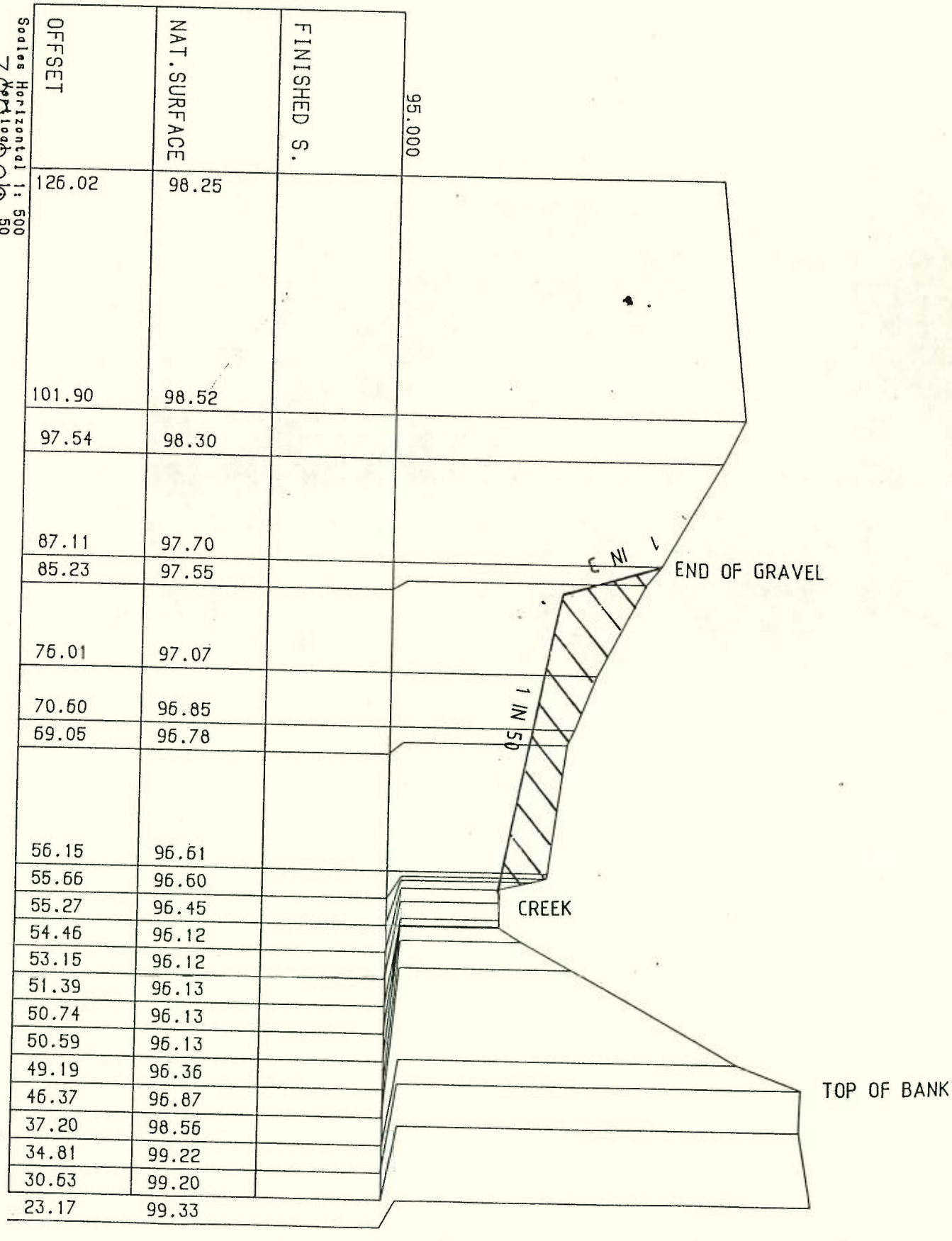


FIGURE 6



LOOKING UPSTREAM

CROSS SECTIONS

FIGURE 7

METHOD OF REVEGETATION

TREES RANDOMLY MIXED ON 4M. GRIDS

PLANT STABILISING GRASSES WHERE POSSIBLE ON BANK FACE

SMALL SPECIES NEAREST BANK

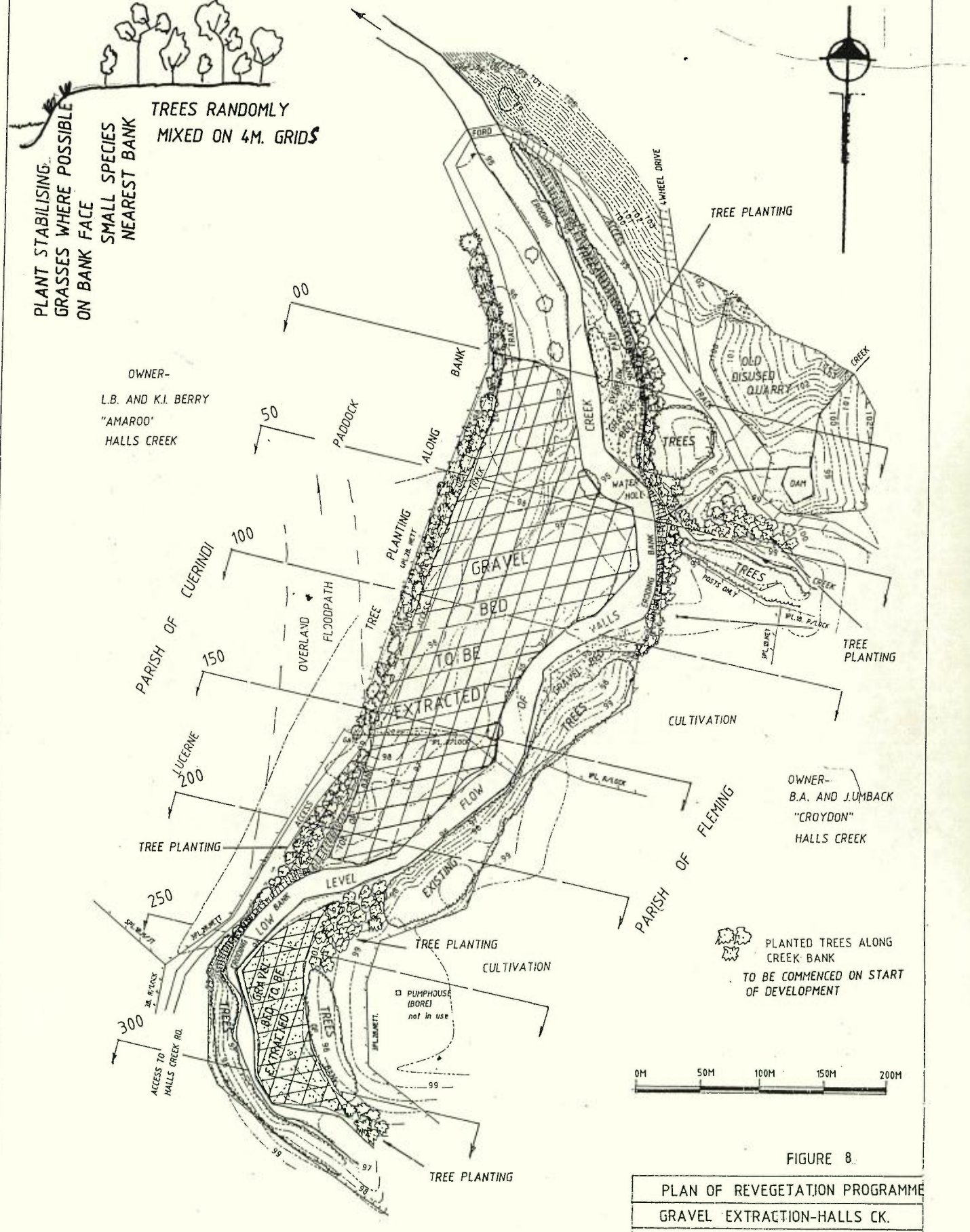
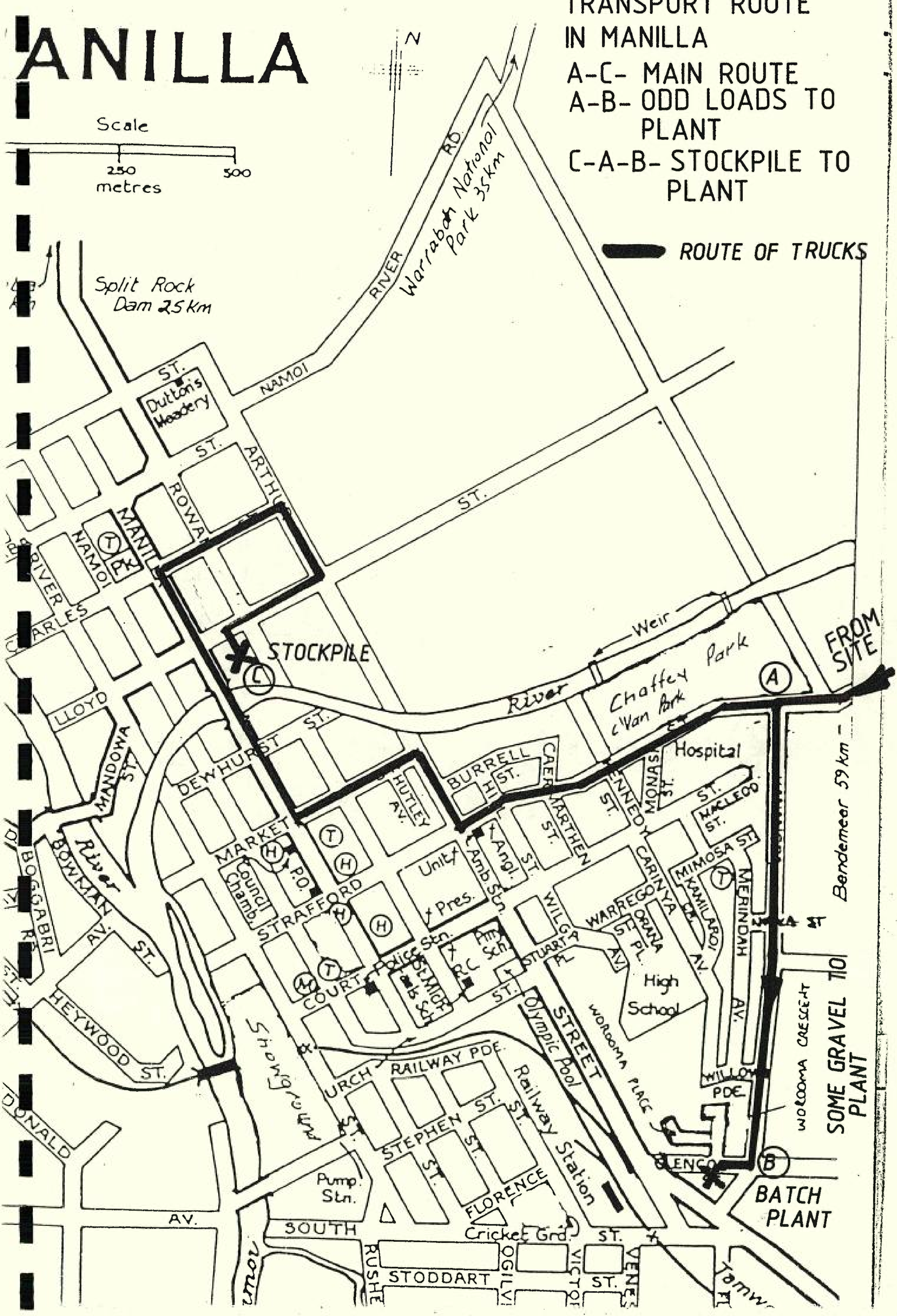


FIGURE 8.

PLAN OF REVEGETATION PROGRAMME
GRAVEL EXTRACTION-HALLS CK.
CONTOUR INTERVAL- 500MM.
FYNRED PTY.LTD.
T.J.STEWART & CO.- CONSULTING SURVEYORS-ARMIDALE NSW REF-5876

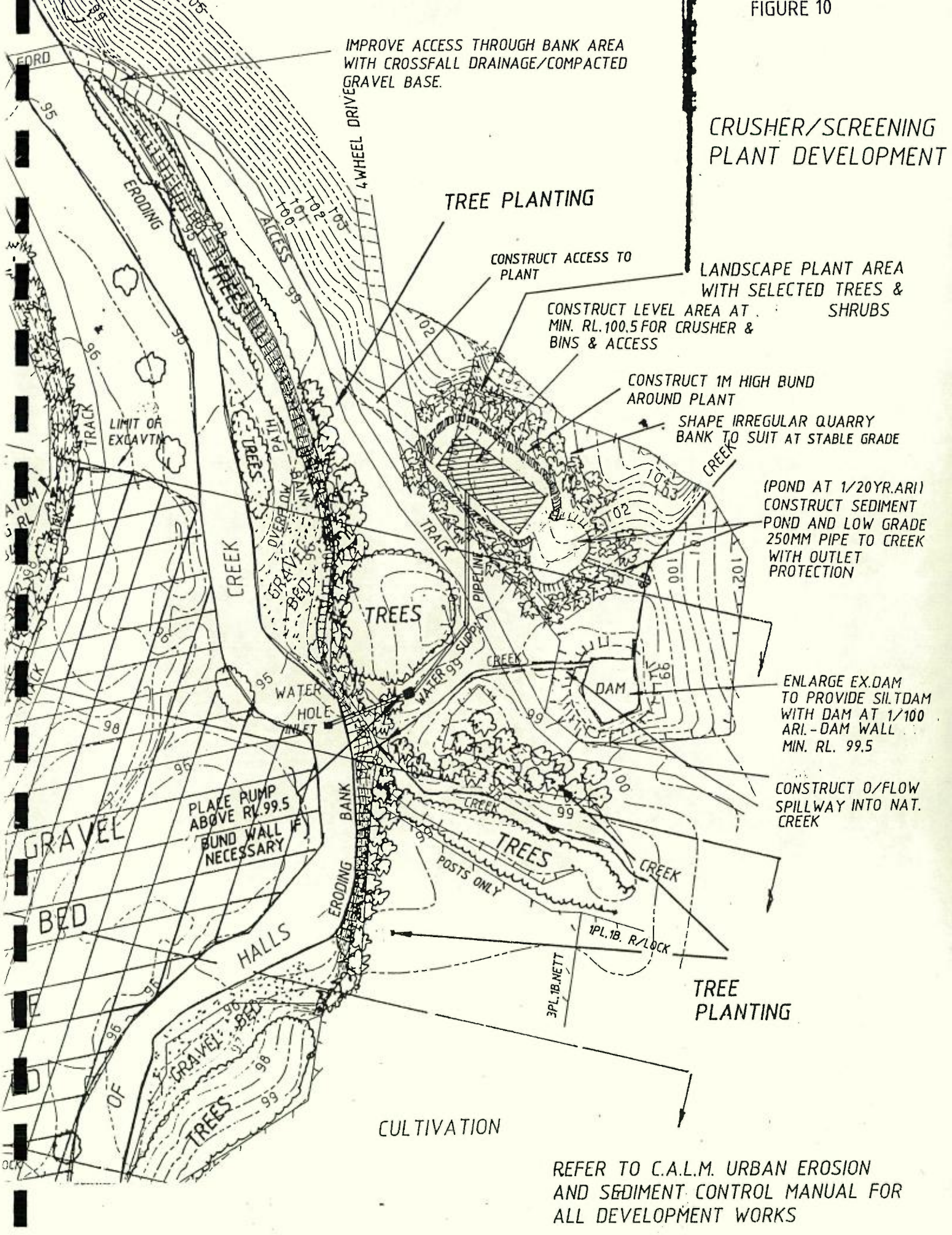
FIGURE 9

TRANSPORT ROUTE
IN MANILLA
A-C- MAIN ROUTE
A-B- ODD LOADS TO PLANT
C-A-B- STOCKPILE TO PLANT



MANILLA
Scale
250
500
metres
N
ROUTE OF TRUCKS
Split Rock Dam 25 Km
Warrabah National Park 35 Km
NAMOI RIVER RD.
STOCKPILE
Weir
Chaffey Park
River
C'Van Park
Hospital
FROM SITE
Bendemeer 59 km
High School
SOME GRAVEL TO PLANT
BATCH PLANT
Railway Station
Olympic Pool
Cricket Grd.
Pump Stn.
Police Stn.
Council Chamb.
P.O.
Unity
Pres.
Amb Stn.
Angl.
R.C.
Prim. Sch.
Showground
Dutton's Meadery
ARTHUR ST.
ROWAN
MANILLA
NAMOI
RIVER
CHARLES
LLOYD
MANDOWA ST.
DEWHURST ST.
MARKET
STRAFFORD
COURT
HUTLEY AV.
BURRELL ST.
CAERMARTHEN ST.
KENNEDY ST.
MONASH ST.
CARINYA
MIMOSA ST.
MACLEOD ST.
KAMILAROI
MERINDAH AV.
WARREGO AV.
ORANA PL.
WILGA
STUART PL.
STREET
WOROOMA PLACE
WOROOMA CRESCENT
WILLOW PDE.
GLENCO
RAILWAY PDE.
CHURCH ST.
STEPHEN ST.
FLORENCE
SOUTH
STODDART ST.
RUSHE
OGILVIE
VICTORIA
VENESS
HEYWOOD ST.
DONALD
BOWMAN
BOGGABRI RD.
AV.
A
B
C
T
H
M

FIGURE 10



REFER TO C.A.L.M. URBAN EROSION AND SEDIMENT CONTROL MANUAL FOR ALL DEVELOPMENT WORKS

MATERIAL FLOW DIAGRAM

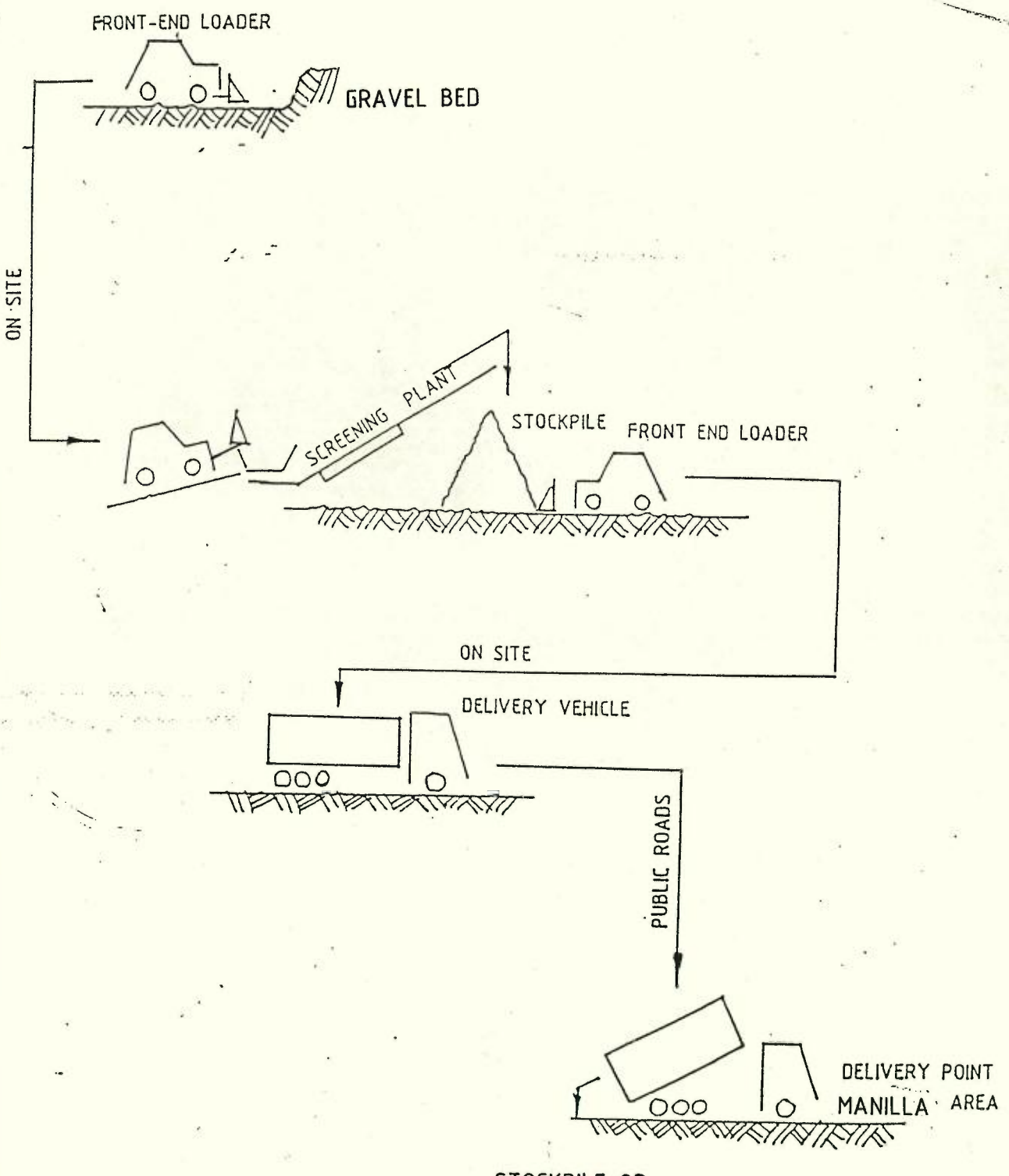


FIGURE 11

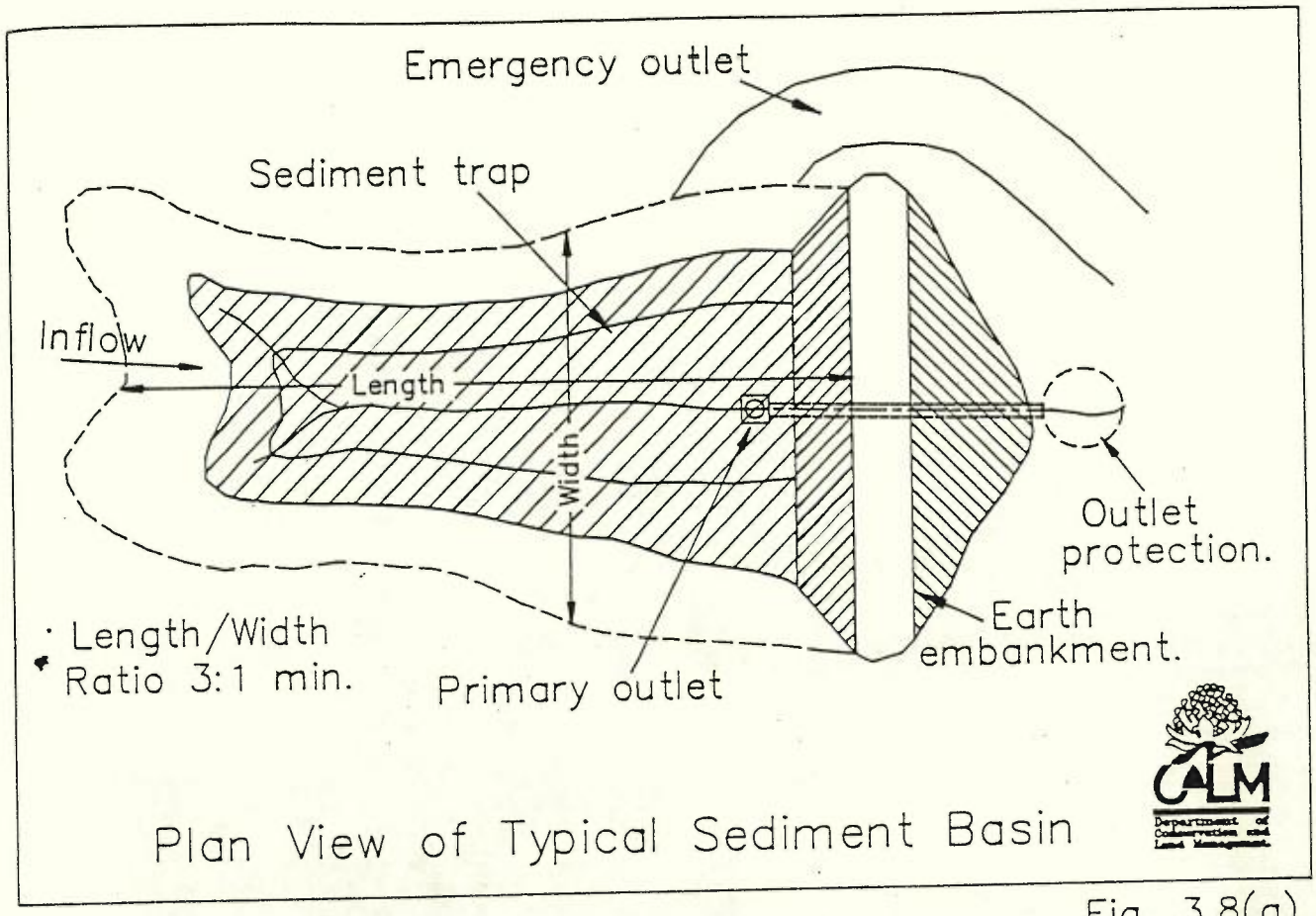


Fig. 3.8(a)

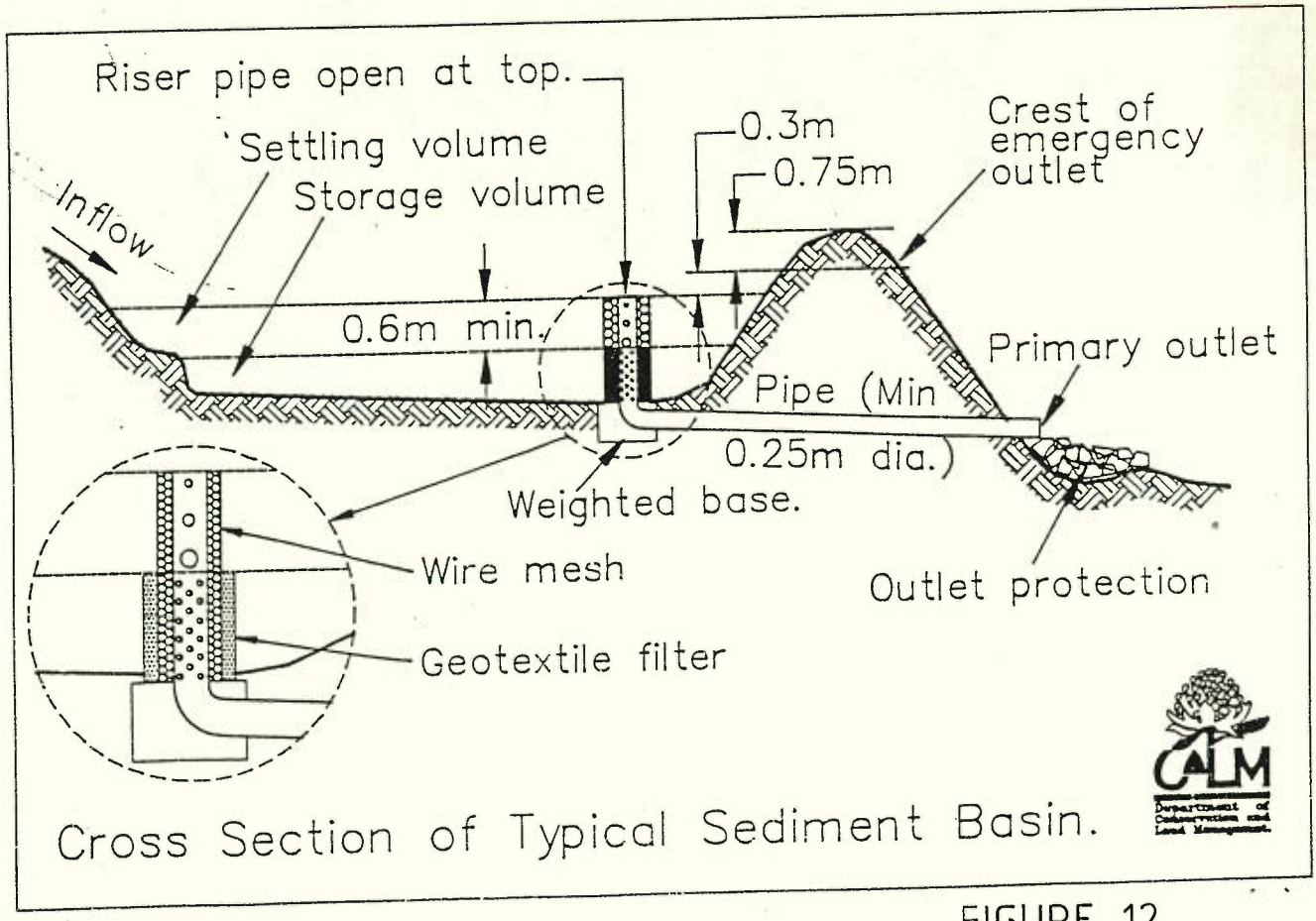


FIGURE 12

APPENDIX 7
Consultation Response
Government Authorities

NSW
NATIONAL
PARKS AND
WILDLIFE
SERVICE

Terence J Stewart Pty Ltd
143 Marsh Street
ARMIDALE 2350

Our reference: SE:DP
Your reference:

Dear Sir

Re: Development Application Including Environmental Impact Statement to Extract Gravel at Halls Creek, Manilla - Portion 1, Parish Cuerinoi and Portions 16 & 50, Parish Fleming, County Darling, Shire Manilla

Thank you for your letter of 4th August 1992 and the opportunity to make initial comments on the above proposal. Your letter states it is only an initial enquiry. I therefore offer the following comments and would appreciate the opportunity to comment further once more detail on the effects of the proposed activity are known.

With respect to Aboriginal sites I have searched our District records and advise there are no known sites at this locality. However I advise that you commission a qualified archaeologist to carry out an archaeological reconnaissance of the two sites as the proximity of the sites to the river increases the likelihood of artefacts being found.

With regard to native fauna I once again advise you to carry out a fauna survey of the area with particular attention to the amphibians, reptiles and the potential effect on platypus.

Having not inspected the site the vegetation is unknown and should also be

..../2.

Armidale District
87 Faulkner Street
Armidale
PO Box 402
Armidale 2350
Fax: (067) 71 1894
Tel: (067) 73 7211

Head Office
43 Bridge Street
Hurstville NSW
Australia
PO Box 1967
Hurstville 2220
Fax: (02) 585 6555
Tel: (02) 585 6444

assessed. Once more detail such as roadworks, specific extraction areas, washing/water use and runoff are known an Officer of the Service will inspect the site at a mutually agreeable time.

Yours faithfully

R. W. LEGGAT
Officer-in-Charge
Armidale District

2nd September 1992

Terence J Stewart Pty Ltd
P O Box 212
ARMIDALE NSW 2350

Facsimile: (067) 52 4919
Telephone: (067) 52 9781
Ext: 739
Contact Name: S Johnson
Our Reference: 632954

19th October 1992

Dear Sir

Re: **Development Application including Environmental Impact Statement to extract gravel at Halls Creek, Manilla - Portion 1, Parish of Cuerindi and Portions 16 and 50, Parish of Fleming, County of Darling, Shire of Manilla**

Your Reference: 5876

1. GENERAL

(a) In response to your letter received 7th August 1992 the following comments and matters to be addressed are provided to assist you in the preparation of the E.I.S.

(b) The Department has responsibility to ensure that any development does not detrimentally affect surface and groundwater quality and quality, nor diminish the ecology of our river systems. Additionally we need to consider the effects on the stability of the river and possible flooding problems.

2. LEGISLATIVE FRAMEWORK

(a) Under Section 3A of the Rivers and Foreshores Improvement Act a permit is required for any excavations or constructions between the banks or within 40 metres of the banks of any defined watercourse. The Department will not issue a permit for extractive industries unless Council has given Development Consent or has ruled that Existing Use Rights apply.

(b) Extractive Industries within the riverine zone often require some tree destruction. Under Section 21D of the Soil Conservation Act an authority is required before damaging or destroying trees between the banks or within 20 metres of the banks of a prescribed stream.

2/....

(c) A license under Part II of the Water Act may be required if the proposal involves pumping from the creek for washing or other purposes. Details to be included in the E.I.S. should be:-

(i) location and size of pumps
(ii) details of water usage
(iii) estimation of water quality and,
(iv) details of any associated works e.g. storage and drainage

(d) Water resource management in New South Wales is the responsibility of the Department of Water Resources. The principal legislation is the Water Administration Act, 1986. The objects of the Act are:-

(i) to ensure that the water and related resources of the State are allocated and used in ways which are consistent with environmental requirements and provide the maximum long-term benefit for the State and for Australia; and

(ii) to provide water and related resources to meet the needs of water users in a commercial manner consistent with the overall water management policies of the Government.

(e) If the proposal involves discharging "dirty" water back into the creek an Authority under the Clean Waters Act may be required. Details of the requirements for a license should be obtained form the local office of the Environmental Protection Authority.

3. GRAVEL EXTRACTION

(a) Resource

The E.I.S. should state the calculated size of the resource and the percentage of this resource that is planned to be extracted. This should include an indication of the rate at which the gravel will be extracted on a monthly/yearly basis.

(b) Method

The E.I.S. must contain a detailed management plan that outlines the following:-

(i) Estimated rate of removal
(ii) Bed slope controls, bed-rock outcrops and the estimated particle size grading.
(iii) A detailed surveyed plan of the site including cross sections at 50 metre intervals. These cross sections must indicate conditions before and after extraction.

3/....

(iv) The excavations shall commence at the downstream end of the site and continue in an upstream direction at a slope no further than one part vertical in 50 parts horizontal. This same slope must also be maintained from the waters edge back to the limit of excavations, perpendicular to the flow of Halls Creek.

(v) The side batters of the excavation should not exceed one part vertical to 3 parts horizontal. When operations approach the upstream end of the gravel deposit, some care should be taken to minimise the risk of the remaining resource being washing away during flood events by maintaining the working face at no steeper than one part vertical to 4 parts horizontal.

(vi) Maximum depth of excavations shall not be below the normal flow level of Halls Creek immediately adjacent to the excavation.

(vii) Any stockpiles of gravel and/or topsoil, both prior to and following crushing, are to be placed above the 1 in 100 year flood level and located so as to not impede or divert surface flow. The stockpiles should be protected from erosion using the Soil Conservation Service standard erosion mitigation conditions.

4. FLOODING

The E.I.S. should provide:-

(a) The location of the course of high and normal flow channel(s).

(b) Description of the bed and bank stability at the site of the development as well as upstream and downstream.

(c) Anticipated effect of the proposal on flood flows.

(d) Available floodwater levels, velocities and extent of inundation at and adjacent to the site.

(e) An assessment of the likelihood of sedimentation or siltation of the channel downstream from the site.

5. BUFFER ZONE

To protect the stability of the river and to redress the river ecology it is important to:-

(a) Revegetate a buffer zone on the landward side of the site with a diversity of appropriate native species such as:-

Callistemon sp. (Bottlebrush), *Leptospermum* sp. (Tea tree), *Casuarina cunninghamiana* (River Oak) and locally occurring *Eucalyptus* species.

(b) Provide a detailed revegetation plan.

4/....

6. SURFACE AND GROUNDWATER QUALITY

(a) An assessment of the impact of the proposal on surface and groundwater quality and aquatic ecosystems and details of provisions to prevent contamination (for example fuel spillage).

(b) Provisions to prevent any potentially turbid or contaminated runoff from the extraction site or access road being allowed to enter Halls Creek.

7. REHABILITATION

Detail measures proposed to progressively rehabilitate the site so that the ecology of the riverine environment can re-establish. A revegetation plan should be part of this exercise.

I hope these guidelines are of assistance to you.

Yours faithfully

Stuart Johnson

Stuart Johnson
Environmental Officer
Barwon Region

Telephone: (067) 851304

Reference: RSVK:RF:P110A

Your Reference: 5876

Reply to: THE SHIRE CLERK,
P.O. BOX 102,
MANILLA. N.S.W. 2346.

Fax. (067) 851981

27 August 1992

THE COUNCIL OF THE SHIRE OF MANILLA

Terrence J. Stewart Pty. Limited,
P.O. Box 212,
ARMIDALE NSW 2350

Attention - Mr. T.J. Stewart

Dear Sir,

Fynred Pty. Limited - Gravel Extraction at Halls Creek, Manilla

I refer to your letter dated 4th August, 1992 seeking Council's requirements for the preparation of the necessary Environmental Impact Statement and advise Council's major concern at this stage would be the impact on both the road network and the residential area in the neighbourhood of the storage site in North Manilla. The potential for disruption and damage caused by truck movements requires your attention in the Statement. Council would be pleased to assist with any specific data you may require in this regard.

Council has assumed that the requirements of the E.P. and A. Act and Regulations and the Director of Planning's requirements will ensure the broader environmental issues are addressed.

Thank you for this opportunity to comment and I look forward to your future communications.

Yours faithfully,

(G.N. Shanley)
SHIRE CLERK

F1

DEPARTMENT OF
CONSERVATION AND
LAND MANAGEMENT
118 Manilla St
Manilla NSW 2346
Phone (067) 85 1203
Fax (067) 85 1568

Mr. T.J. Stewart
Terence J. Stewart Pty. Limited
Post Office Box 212
ARMIDALE NSW 2350
22nd October, 1992

your ref:5876/our ref:M152

Dear Sir,

Re: Gravel Extraction on Halls Creek Road
by Fynred Pty Ltd.

As the extraction occurs within the river bank of Halls Creek, the application will require an Assessment under the River Foreshores and Improvement Act 1948. The authority which covers this legislation is the Department of Water Resources.

However there remains other areas of concern which are of interest to our Department.

Firstly provision of adequate access tracks is important to both Fyrned Pty Ltd from a business point of view and our Organisation from an erosion point of view. I have enclosed a brochure titled Guidelines for the Planning, Construction and Maintenance of Tracks.

Please use these standards for construction of the access roads as we perceive them as minimum guidelines.

Secondly of note is the proposal to crush on site.

May I assume screening plant, equipment power and other related necessities will be on site as well?

This being the case we would like to see a plan showing the layout and how you would be handling any temporary stockpiles, screen residues and other debris which may not be required for use. This area will probably require some form of erosion and sediment control. It is difficult to determine what will be required until the plan is handed to us.

Finally the area 20m on either side of the stream bank and including the stream would come under section 21D of the Soil Conservation Act. Any disturbance of these would require a permit.

I hope this is of assistance to you and that you are able to address our concerns. If you require any further details you are welcome to contact this office by phone or fax.

C.J. Chubb
District Manager

GUIDELINES FOR THE PLANNING, CONSTRUCTION AND MAINTENANCE OF TRACKS

INTRODUCTION

Access tracks or trails of a basic engineering standard are widely used on the grazing and timbered lands in New South Wales. They form a network through State Forests, National Parks, private property and Crown Lands. They are commonly used for logging access, fire management, stock movement and recreation. They also provide access to power and water supply lines.

These tracks tend to follow the natural landforms with construction usually consisting of minimum earthworks and culverting. The track surface is rarely gravelled, and maintenance is often left until the surface has severely eroded and access is restricted.

Erosion associated with the tracks can:

- be a major factor in destroying trafficability and create safety problems
- contribute to inferior water quality and the sedimentation of streams.

By constructing the track surface with outfall drainage and trafficable cross banks, it is possible to reduce erosion damage and maintenance needs. Establishing and maintaining vegetation on the tracks can further reduce erosion.

These guidelines outline the principles of planning, constructing and maintaining tracks to minimise soil erosion and to control runoff.

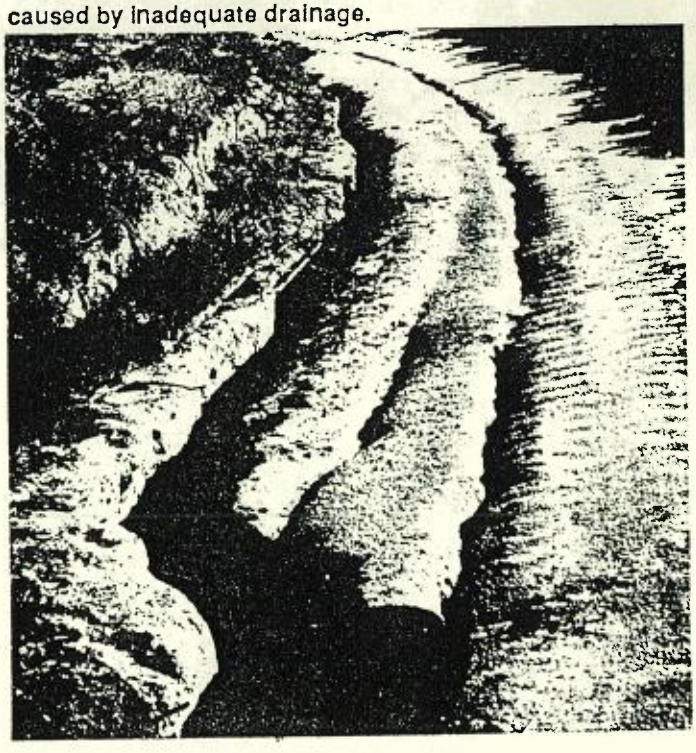
Consideration of erosion control measures at the planning and construction stage will reduce the cost and increase the effectiveness of track maintenance programs.

The guidelines are based on the understanding that there is a very wide variation of geology, soils, topography, vegetation and climate not only over the State but also within the length of a single track. Such variations make it impossible to provide recommendations which can be applied to all situations. Where special erosion problems occur on specific tracks, consult the Soil Conservation Service.

Definitions of terms used in these guidelines have been included at the end of this leaflet.

PLANNING

Erosion of low standard tracks can very quickly destroy the trafficable surface and yield significant amounts of sediment to streams. By carefully considering the following



Above: Trafficability is seriously impaired when undrained low standard roads become eroded. ***Below:*** Deep rill erosion caused by inadequate drainage.

Some material in this pamphlet was originally published in the 1984 Soil Conservation Service of NSW pamphlet "Guidelines for the Planning, Construction & Maintenance of Trails".

points at the planning stage, you can ensure that construction will minimise erosion and reduce maintenance needs.

- Purpose of the track or trail
- Type and volume of authorised traffic
- Type and volume of possible unauthorised traffic
- Soil erosion hazards present along the track
- Drainage line crossings
- Topographic restrictions (steep slopes, rock outcrops, swampy areas, etc.)
- Potential mass movement areas
- Vegetation types, density and size
- Feasibility of proposed construction—should an alternative site be examined?

Consider alternative routes for the proposed track in the office and the field using all available information. Aim to limit soil and vegetation disturbance when you select the route. Wherever possible, construct the track simply by slashing or blading the surface vegetation. Avoid blading soil except where it is necessary to build a track bench on sideslopes, to form drainage line approaches or to make rough surfaces trafficable.

LOCATION

Site tracks so as to reduce the risk of sediment entering drainage lines and generally keep them well above flood levels. Keep them far enough from a stream to allow an effective vegetation buffer to contain any sediment flowing from the track.

Avoid physical features which may indicate the possibility of mass movement problems such as:

- high "erosion hazard" soils — Class C and Class D (refer to end section, Definitions)
- slopes with steps, clay beds, hummocky topography.

Crossing of long, steep unstable slopes, especially where bedrock is highly weathered, is not recommended. Avoid opening up moisture laden footslopes.

Gully erosion affecting access as a result of poor track or trail location.

GRADES

Tracks should have at least a slight grade to allow free surface drainage and to avoid excessive ponding in wheel tracks.

Steep gradients, limiting the options for non-erosive track drainage, are reached well before those limiting the passage of most four-wheel-drive vehicles. Sections of ineffectively drained tracks can quickly become untrafficable, especially if located on Class B, Class C or Class D soils.

Generally the grade of a track should be less than 10°. However, short lengths of steeper grade may be needed to negotiate difficult sections or to take advantage of favourable terrain and may therefore be acceptable in these circumstances.

In designing sections with grades exceeding 10°, note that effective, easily trafficable cross banks can be built only on tracks to approximately 12° grade. Sections steeper than 12° will require special drainage works.

Where it is necessary for grades to exceed 15° on Class A and Class B soils and 12° on Class C soils, gravelling and more sophisticated road drainage will be required.

Tracks in Class D soils should avoid sloping land.

SURFACE DRAINAGE

Effective surface drainage is required on tracks and trails to control runoff, preventing it from concentrating and reaching erosive speeds. A number of techniques can be used to provide surface drainage.

Crossfall Drainage

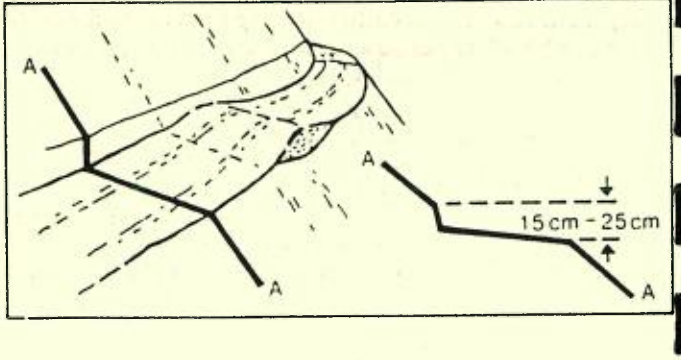
There are two forms of crossfall drainage — outfall and infall (refer to section on Definitions). Outfall drainage is preferred and should be used except when:

- fill batters are unconsolidated and likely to erode
- fill batters exceed 1.5 m in height.

In these situations, use infall drainage. Table drains, batter drop down drains and culverts will also be required. Without adequate culverts, table drains quickly erode, often endangering the trafficability of the track.

Outfall drainage is often sufficient to ensure control of runoff. This form of drainage reduces runoff along the track, directing it across the surface and over the track batter. The low fill batters associated with this standard of track can often withstand the dispersed flow of outfall drainage.

Figure 1. Outfall surfacing of the road should be used instead of infalling.



To ensure effectiveness of the outfall, remove any earth windrow which develops at construction on the downslope side of the track. Closing tracks in wet weather will keep wheel ruts from forming and will help maintain effective outfall drainage.

Cross Banks

Where runoff cannot be controlled simply with outfall drainage, use cross banks to baulk runoff and direct it across the track surface. Correctly located and built, these banks give easily trafficable, effective, cheap, long-term and low maintenance track drainage.

CROSS BANK CONSTRUCTION

On new tracks or those affected by erosion, build cross banks at the spacing indicated below.

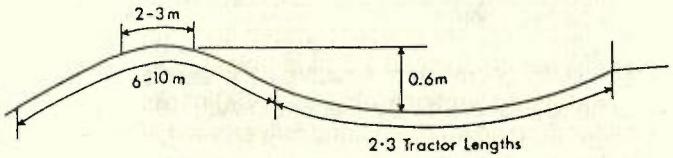
Cross Bank Spacing

Road Grade	Soil Class A	Soil Class B	Soil Class C
Up to 8°	70 to 90 m	60 to 70 m	20 to 30 m
8° to 12°	60 to 70 m	50 to 60 m	■
12° to 16°	40 to 60 m	■	■
16° to 20°	30 to 40 m	■	■
20° to 22°	20 to 30 m	■	■

Note 1. ■ indicates that tracks should not be constructed on these soil types within the slope range.
Note 2. Where tracks are constructed on slopes exceeding 12°, permit only light and infrequent traffic.

Notwithstanding the above guidelines, the stability of the track in operation will eventually dictate the need for variations in the location and spacing of cross banks.

Figure 2. Dimensions of cross banks.



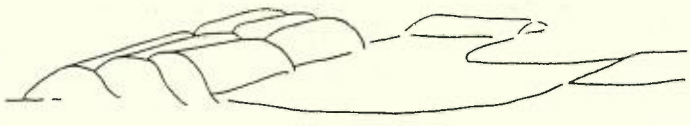
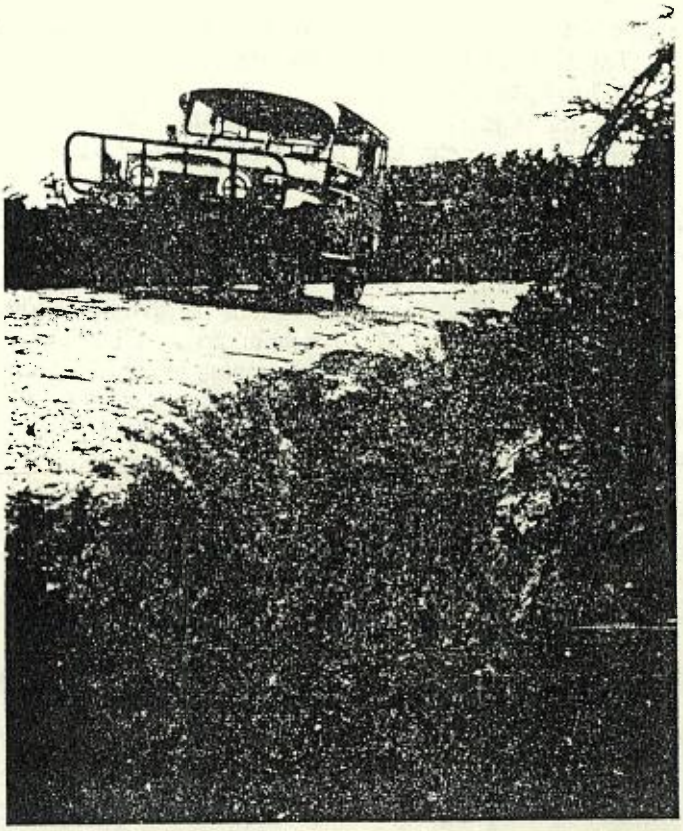


Figure 3. Cross bank during construction.

Figure 4. The bank of earth resulting from the spillway clearing can be left to act as a silt trap and water spreader.



Gullying of table drains is a serious erosion problem and a danger to road users.

Consider the following points in choosing sites for cross banks:

- recommendations for spacing tempered by experience and the existing condition of the trail
- location of stable and clear outlet points
- location of short sections of flatter track grade allowing cross bank construction on a generally steep trail.

Trafficable cross banks can be comfortably negotiated and provide effective drainage when sited and built correctly.

Select a suitable outlet point for the bank, one that is not blocked by a stump or rock. Site the outlet so that runoff will spill into undisturbed vegetation and cannot flow back onto the track.

Rip the roadline to a depth of 20 to 30 cm for a distance of one or two tractor lengths back from the chosen outlet point. Then push the loose earth down the roadline into a bank, commencing at the uphill side of the road and working across the outlet side. A long, shallow excavation for the bank is preferred to a short, deep excavation.

Sufficient loose earth must be used to give the required dimensions (Figure 2) after shaping and compaction. Depending on the size of the machine being used, up to eight bladefuls of earth may be required (Figures 3 and 4). Ensure that the crest width dimensions are long enough to ensure comfortable vehicle access over the cross bank. The channel depth dimensions are essential to prevent runoff from overtopping the bank.

Cross banks are most effective if constructed with only a slight angle to the track obtaining a grade of approximately 1:20. This ensures that runoff does not pond in the bank channel.

The bank can be shaped with the tractor blade, and the entire length of the bank should be track or wheel rolled to obtain maximum compaction and a smooth, even bank.

A sweep with the blade will clean loose earth from the channel of the bank. The small bank of earth resulting at the outlet can often be left as a silt trap and water spreader. Push this earth only just far enough so that draining water can clear the track effectively.

If you have to fill an eroded table drain to build a bank, compact the bank at that point with extra earth to allow for slumping and to cope with the concentrated runoff in the table drain.

EARTHWORKS

When constructing tracks, disturb the soil and vegetation as little as possible both on and adjacent to the track. Construct the track to follow the contour of the land as much as possible to reduce the amount of cut and fill.

To minimise the area of disturbed soil exposed, batters to 1.5 m should be cut vertically. Vertically cut batters may suffer from initial slumping but will generally stabilise with follow-up maintenance. Cut batters higher than 1.5 m may require special stabilisation measures including laying back, revegetation and drainage.

Fill batters on all soil classes should be no steeper than 2:1 and flatter where possible to encourage natural revegetation and to effectively accept seed and fertiliser. Batters higher than 1.5 m on Class B, C and D soils may require special stabilisation works such as drop down drains, hay mulching, etc.

Do not incorporate vegetation debris in fill batters as this results in poor compaction with hollows and slumping occurring as the vegetation rots.

"Borrow" areas should not, for preference, be located near drainage lines or streams because of the danger of sediment polluting the stream. When necessary, "borrow" areas should be limited in size, worked in such a way to reduce the danger of sediment leaving the borrow pit and revegetated progressively as the pit is worked out.

Wherever practicable, stockpile topsoil and litter (free of timber debris) in a recoverable position for respreading over disturbed areas. This material contains valuable seed and nutrients which will greatly assist revegetation.

TIMBER DESTRUCTION

Limit clearing to 0.5 m on either side of the track. Where extra clearing widths may be needed such as to allow the sun in to keep the trail dry, clear by felling rather than dozing to limit the amount of soil disturbance.

DRAINAGE LINE CROSSING

Drainage lines should be crossed with fords, culverts or bridges. Do not use log dam crossings as they obstruct flood flows and can create turbulent flow and erosion.

Fords are preferable to culverts or bridges as they cost less and often can be built with little disturbance to the stream bed and banks. Do not use fords where the stream has a deep cross-section requiring considerable excavation to provide approaches to the crossing.

Culverts should never be used where debris blockages are likely.

Lay culverts if they must be used as close as possible to the natural alignment of the drainage line to avoid diverting the flow into the stream banks or creating scour of the drainage line.

Keep soil and vegetation disturbance to a minimum. You may need to reseed disturbed areas to protect them from erosion.

Do not dump timber, scrub, soil or debris in drainage lines, but stack them well above flood levels.

Minor drainage lines may require culverting, but shallow depressions and swampy areas may be stone paved or corduroyed with timber.

Where trees have to be destroyed or injured in the bed or within 20 m of the banks of prescribed streams as defined in the Soil Conservation Act, 1938, an authority from the Catchment Areas Protection Board is required. Applications **must** be lodged with the Board prior to destruction or injury to allow assessment of the proposal. Authorities may be issued with appropriate conditions controlling the manner and extent of the operation.

Note: The maintenance of tree cover on certain land is covered by law. Such land has been mapped throughout the State and is called "protected land".

- Any land within a notified catchment area which has a slope generally greater than 18°
- Any land in or within 20 m of the bed or bank of any part of a river, stream, lake, lagoon or swamp, etc., or
- Any land which is environmentally sensitive or affected by or liable to soil erosion, siltation or land degradation

is probably listed as protected land.

REVEGETATION

The amount of revegetation works required on disturbed areas will vary as follows:

- No revegetation required — forest litter and native flora will provide natural vegetation and stabilisation.
- Short-term revegetation — provided by annual grasses (e.g., wimmera ryegrass) or cereals (e.g., rye, corn, oats or millet) and fertiliser. Long-term stability will be provided by forest litter and native flora.
- Long-term revegetation — using perennial grasses and clovers, with or without a cover crop such as oats, cereal rye, corn, millet and fertiliser.
- Use of sod or other vegetative material in specialised situations.
- Use of shrubs and trees such as some silver leafed poplars and shrub willows in situations such as those requiring de-watering or those affected by unstable soils.

When revegetation is considered necessary, do it immediately following the disturbance while the soil is still loose, irrespective of the growing seasons.

You may need to apply a maintenance dressing of fertiliser and seed.

MAINTENANCE

It is essential that a sound cover of vegetation and/or forest litter develops on the surface of the track, on batters and on the approaches to drainage line crossings.

Frequent maintenance is essential, especially in the early years after construction, to ensure effective erosion control and track stability.

Inspect all tracks at least annually and following heavy traffic usage or exceptionally heavy rainfall, to determine maintenance requirements.

Restrict destruction of vegetation to the removal of excess vegetation preferably by slashing or spraying. Avoid unnecessary grading or blading to reduce soil disturbance.

Encourage outfall drainage by removing any windrow along the outside edge of the trail.

The location, spacing and size of cross banks should always be studied when considering the maintenance program. A sound guide to bank spacing will be indicated by the distance water runs on a track before rilling commences. Cross bank outlets should permit the free flow of water.

Examine the outlets of culverts, drains, etc., at each maintenance inspection and, if necessary, correct problems.

Leave material slumping from cut batters untouched if it does not unduly restrict the operating width of the trail. If it is necessary to remove material, take care to avoid undercutting the toe of the batter.

Do not remove any more timber and scrub than is necessary to maintain safety on the track. Fell timber rather than bulldozing it. If practicable, leave stumps intact. This is especially important above cut batters and adjacent to, and in, drainage lines.

Do not dump timber, scrub, soil or debris in drainage lines. These materials should always be stacked well above flood level.

Remove debris deposited near drainage line crossings during maintenance.

The use of outfall surfacing and cross banks largely eliminates the need for blading the surface of the road, itself a disturbance and creator of an erosion hazard. The stabilised road surface and protective vegetative cover on the bank outlets combine to reduce road erosion.

CONCLUSION

If you apply these guidelines of track design and maintenance, access should be available at all times.

The use of crossfall surfacing and trafficable cross banks offers a cheap and easy method of controlling runoff and erosion on low standard roads. Their use will help ensure that roads remain trafficable and that vehicles will not be hindered or halted by surface rilling and table drain gullying.

DEFINITIONS

Batter

The face of an embankment or cutting, produced as a result of earthmoving operations involving cutting and filling.

Batter Drop-down

A constructed and stabilised drain to carry runoff down the track batters, typically down the line of greatest slope.

Cross Bank

A hump of earth constructed across a track so that runoff is effectively diverted from it.

The cross bank is formed by digging a trench up to 20 to 30 cm deep on a graded line across the track, using the excavated earth to form a bank on the down slope side.

The gradient of the trench should be enough to provide adequate drainage. If the gradient is too steep, it will speed the flow of water and this can cause erosion. A gradient of approximately 1:20 is recommended.

Consolidate the formed bank and shape it with batters no steeper in relation to the track surface than 1:5.

Cross banks are designed to handle larger flows than cross drains.

Cross Drains

Drains of various forms that baulk the flow of water down a track and divert it across the track's surface. The capacity of the drain is defined by its cross-section.

Cross drains are designed to handle smaller flows than cross banks but larger flows than can be controlled by crossfall drainage.

Crossfall Drainage

Drainage which occurs when the surface of a track has sufficient cross slope to cause water to flow across and off the surface, rather than along it. Where the water flows into the hillside, it is termed INFALL. Where flow is away from the hillside, it is termed OUTFALL.

The cross slope required to achieve such drainage is 1:25. For safety reasons the maximum crossfall used should generally not exceed 1:10.

Culvert

A pipe or similar structure used to direct water under the track.

Earth Windrow

Ridge of soil created due to spillage at the edge of a bulldozer blade during earthmoving operations. Windrows may build up along the edge of tracks during their construction and maintenance. This may prove useful in directing runoff to a stable outlet in which case it is called WINDROW DRAIN. However, in other circumstances it may prevent runoff leaving the track, causing erosion.

Erosion Classes in Relation to Soil Types

Class A — Low Soil Erodibility. Brown and red soils derived from finer sediments and metasediments.

Class B — High Soil Erodibility. Red soils on fine granites, fine sandstones and basalt.

Class C — Very High Soil Erodibility. Grey and yellow soils derived from granites, sediment and metasediment, especially coarse grained types.

Class D — Extreme Soil Erodibility. Unconsolidated sediment. As a general rule, tracks should not be built on Class D soils.

Mitre Drain

A drain to conduct runoff from the shoulders of a track to a disposal area away from the road alignment.

Table Drain

The side drain of a road running adjacent to and parallel with the shoulders and forming part of the road formation.

Track

A road of basic construction standards which closely follows the natural landform and is constructed with a minimum of culverts and earthworks. The surface is rarely gravelled and receives little maintenance. Construction standards provide for intermittent, but reliable, loaded four-wheel-drive travel in fair weather conditions and generally at low speeds. More extensive use, or use during wet conditions, may lead to rapid deterioration of the track.

Written by Chris Marshall, District Soil Conservationist, Bathurst
Edited by J. Alice Hofler
Ventura conversion by Maura Boland

FURTHER INFORMATION

For further information, consult your nearest Soil Conservationist. Regional Soil Conservation Offices are listed below.

Head Office

Zenith Centre, Tower A, 2nd Floor,
821 Pacific Highway CHATSWOOD 2067
P.O. Box 198 CHATSWOOD 2057
Phone: (02) 413 5555

Northern Region

Parry Shire Building, 468-472 Peel Street
P.O. Box 601, TAMWORTH 2340
Phone: (067) 66 7977

Eastern Region

254 Hannell Street
P.O. Box 488G, NEWCASTLE 2300
Phone: (049) 62 2433

South East Region

NSW Government Offices, 159 Auburn Street
P.O. Box 390, GOULBURN 2580
Phone: ((048) 21 9413

Western Region

Hay Street, P.O. Box 77
CONDOBOLIN 2877
Phone: (068) 95 2313

Riverina Region

NSW Government Offices, 43-45 Johnston Street
P.O. Box 10, WAGGA WAGGA 2650
Phone: (069) 23 0400

Macquarie Region

Cnr Anson and Kite Streets,
P.O. Box 53 ORANGE 2800
Phone: (063) 63 8278

North East Region

Cnr Clyde and Forth Streets,
P.O. Box 177, KEMPSEY 2400
Phone: (065) 62 1391

Department of Mineral Resources

NEW SOUTH WALES GOVERNMENT

85 FAULKNER STREET
ARMIDALE NSW 2350
PO BOX 65
ARMIDALE NSW 2350
TELEPHONE (067) 737 122
FACSIMILE (067) 711 387

Mr T J Stewart Pty Ltd
PO Box 212
Armidale NSW 2350

Our Ref: WJS:L92/

Dear Sir,

RE: Proposed gravel extraction at Halls Creek, Manilla - EIS.

I refer to your letter 4th of August 1992 regarding the preparation of an environmental impact statement (EIS) for the above proposal.

As you may be aware, gravel is not a mineral under the Mining Act (1992), and the Department of Mineral Resources has no statutory control over the mining of it other than ensuring safety of mining operations under the Mines Inspection Act (1901). The Department has technical expertise in this material and is the accepted Government authority on its exploitation and development. Full details of the planned method of extraction, staging, and rehabilitation measures should be included in the EIS.

Attached is a list of the issues that should be addressed in the preparation of an EIS.

If you have any questions about this matter, do not hesitate to contact Jim Stroud in the Department's Armidale office.

Yours faithfully,

S L Lishmund
for Director-General

N.S.W. DEPARTMENT OF MINERAL RESOURCES - NORTHEASTERN REGION

EIS Assessment for Extractive Industries - Geology and Engineering

All Environmental Impact Statements for Extractive Operations should contain the following geological and engineering information: (a) a Resource Assessment; (b) an Extraction and Treatment Plan; (c) a Rehabilitation Plan; and (d) a Viability and Marketing Assessment.

Resource Assessment

The Resource Assessment must be sufficiently detailed and illustrated to establish:

- The characteristics of the deposit -location, geology, extent, and internal variations in grade/ quality
- The quantity of material to be extracted.
- Whether other potentially recoverable commodities occur at the site, and whether they can be stockpiled for later recovery

Documentation must be sufficient to justify the above claims and must include a discussion of the assessment methods and results (including reference to any relevant reports).

Extraction and Treatment Plan

The Extraction and Treatment Plan must be sufficiently detailed and illustrated to establish:

- Proposed methods of extraction, plan of operation (including staging)
- Rate of extraction.
- Expected life of the operation.
- Disposal methods for solid and liquid wastes.
- Location and size of stockpiles.
- Transport routes.
- Expected noise, vibration, dust, and visual impacts and proposed measures to minimise these impacts.
- Any likely cumulative impacts of the proposed operation when considered together with similar operations in the vicinity.

Rehabilitation Plan

The Rehabilitation Plan must be sufficiently detailed and illustrated to establish

- Rehabilitation procedures, both during and after completion of extraction operations.
- A proposed final land form and site use
- Present day cost of final rehabilitation.Whether the proposed rehabilitation plan will prevent or inhibit future extraction of any commodity for which recovery is not currently proposed.

Documentation must be sufficiently detailed and illustrated to afford comparison of the existing site with the site as envisaged after the proposed rehabilitation.

Viability and Market Assessment

The Viability and Market Assessment must show:

- That the expected products are marketable.
- That the operation will be sufficiently viable to save the local community needless disruption from commencing then prematurely closing an operation.
- That the operation will be sufficiently profitable to pay for rehabilitation. * Alternative sources, their availability, and market acceptance.
- Justification for the proposal - the need for the proposed operation in a local, regional, or broader context.
- Justification for not utilising or stockpiling all potentially recoverable commodities (where relevant).

Documentation in Environmental Impact Statements

Required documentation can be provided in supporting documents accompanying an EIS, rather than in the EIS, provided that: (a) the EIS adequately summarises and cross-references data in the supporting documents; and (b) the supporting documents meet all of the above requirements.

WARNING - Expect close public scrutiny and prepare carefully!

NSW FISHERIES

Our ref CHM 892 NAMOI
Your ref 5876

T J Stewart Pty Ltd
PO Box 212
ARMIDALE NSW 2350

24 August 1992

Dear Sir

Re Proposed Sand and Gravel Extraction - Halls Creek Manilla

Thank you for referring the preparation of the Environmental Impact Statement (EIS) for the above proposal to NSW Fisheries.

Please find enclosed a copy of the NSW Fisheries publication 'Freshwater Habitat Management Guidelines', this should be referred to in the preparation of the EIS.

Your attention is drawn to Section 2 which deals with the importance of freshwater habitats and the legal and management requirements of NSW Fisheries. Section 3.8 deals with extractive industries and this should be addressed in the EIS. Section 4 deals with the information required in an EIS by NSW Fisheries to make a confident assessment of the probable impact of a proposal on aquatic environments.

For further liaison with NSW Fisheries regarding this matter please contact Mr Neil Hughes, Biologist (Habitat Management) NSW Fisheries, Central Region on (049) 821232.

Yours faithfully

Neil Hughes

N F Hughes
for
R A Claxton
Director NSW Fisheries

CENTRAL REGION
Brackish Water Fish Culture Research Station — Taylors Beach Road — Post Office Salamander Bay NSW 2301
Telephone: (049) 82 1232 • **Facsimile:** (049) 82 1107

SECTION 2

Important Freshwater Habitats

2.1 WETLANDS

Wetlands are important ecosystems for fish, invertebrates, plants, birds and man. Wetlands are natural flood mitigation devices (i.e. they act as "sponges"); they absorb, recycle and release nutrients; they are filters to improve water quality, and they increase the productivity of associated aquatic and terrestrial ecosystems.

Freshwater wetlands provide feeding, spawning and nursery areas for many species of freshwater fish. Wetland fish play an important role by converting resources at the base of the food chain into food for higher trophic levels. Unfortunately dam construction and other water management practices, such as the construction of levees and weirs, have reduced the frequency and level of inundation of freshwater wetlands and flood events, necessary in the successful spawning and rearing of many fish species (e.g. Murray Cod).

There are several types of freshwater wetlands in the State, ranging from seasonal freshwater swamps (e.g. Belmore Swamp) to billabongs (e.g. upper Murray River) and shallow inland lakes (e.g. Lake Cowal). Freshwater wetlands can be characterised by trees (such as paperbarks), rushes and reeds, or floating and submergent aquatic plants. Most freshwater wetlands in Australia are dry for some period, and productivity actually falls off if water levels are not allowed to fluctuate. Farm dams and larger water storage areas form artificial wetlands.

2.1.1 Legal Requirements

a. Many coastal freshwater wetlands are protected by State Environmental Planning Policy No. 14 – Coastal Wetlands. This policy provides that draining, leveeing or filling of these wetlands is a Designated Development requiring an Environmental Impact Statement under the provisions of the Environmental Planning and Assessment Act.

b. Sections 90 E–L of the Fisheries and Oyster Farms Act deal with dredging and reclamation. Before carrying out or authorising dredging or reclamation works, public authorities must notify (and local government authorities and individuals must obtain the consent of) the Minister for Agriculture and Rural Affairs.

In the case of individuals, consent may also be obtained from either

(i) the Crown Lands Office

or (ii) another public authority (excluding local government authorities).

A person not complying with these or any other requirements (refer to Appendix 1) is liable to prosecution for a breach of the Act and may be required to provide compensation for any work done illegally.

2.1.2 Management Guidelines

a. Drainage, leveeing or filling of any freshwater wetland must not be permitted.

b. Wherever possible freshwater wetlands must be zoned for protection. It is recommended that they be zoned Environmental Protection Zone Wetlands–7(a). This zoning must be accompanied by a planning instrument which restricts potentially damaging activities.

c. Water management regimes for wetland areas must be such that they are replenished every 1–2 years and should remain continuously inundated for a minimum of 4 months.

d. Ephemeral wetlands must not be continuously inundated for more than four years as a result of water management practices. They should not be used as off river storages or sedimentation ponds for extractive industries.

e. Natural rates of filling and drying should be simulated i.e. rapid filling and slow drying.

f. Water management regimes and wildlife allocations must take account of fish breeding seasons and other habitat requirements.

g. Dry beds of wetlands must not be cropped.

h. Stock must be excluded from sections of shoreline on a rotational basis if damage is occurring.

2.2 FLOODPLAINS

Floodplains are important habitats for fish and yabbies and are found associated with most rivers. They are of variable width, and on the western plains of the state they are extensive and can remain inundated for many weeks. When they are inundated there is a nutrient release and plankton development. Fish spawning and larval rearing success increases and yabbies burrow out of the flood plain to travel the waterway usually in roe. In addition, there is a recharge and flushing of wetland systems and increased movement of fish in and out of wetlands. Source pollutants can also be diluted and flushed.

Prior to river regulation, floods usually occurred annually in the September–November period but over the last 30 years the frequency has been reduced. When warm spring floodwaters spread out over the floodplain, which has been dry since the previous year, a large plankton bloom is initiated. This plankton is an extremely important food resource for fish, particularly juveniles.

Some species of fish such as silver and golden perch, bony bream and spangled perch can spawn on the floodplain. Eggs are laid and the pelagic larvae develop rapidly. The dynamics of the plankton blooms are such that small zooplankton is available after the eggs hatch, with larger forms becoming available later in the flood peak when the fish have grown.

When flood peak waters have receded and the floodplain soils are moist, the yabbies burrow back into the soil for protection until the next flood. The recent practice of using the floodplains for a crop after the flood waters have receded is of concern as the activity may be ploughing

up the burrowing yabby. Consequently floodplain cropping is not favoured, as the impacts of this on the yabby population have not been established.

2.2.1 Legal Requirements

a. Under Section 29 of the Fisheries and Oyster Farms Act a person can be penalised for obstructing the free passage of fish, including floodways, anabranches and effluents. Developments must not interfere with floodway access.

2.2.2 Management Guidelines

a. Floodplains must not be affected in any way that interferes with the free flow of water across them during floods. Levee construction must at all times be minimal and restricted to the protection of urban areas.

b. Water management regimes must be such that floodplains are inundated every 2-3 years.

c. Floodplains that are cultivated must be planted with species tolerant of flooding to prevent deterioration of water quality and possible fish kills.

d. Toxic wastes and chemicals must not be stored on floodplains.

e. Tailings dams associated with extractive industries require levee banks and raised roads to prevent wash out in floods of up to 1 in 100 year return. Tailings dams must not be constructed in floodways.

2.3 RIPARIAN VEGETATION

The vegetation lining rivers and creeks (riparian vegetation) stabilises riverbanks and stops erosion and subsequent siltation. A vegetated buffer strip will also filter out pollutants, such as pesticides and fertilisers, from surrounding lands.

Rivers are dynamic entities and changes in channel morphology will occur even under natural conditions. However, these changes can be minimised by maintaining suitable vegetative cover along the banks. The roots of trees bind and stabilise the soil, helping to retain the general channel shape including such features as pools, riffles and backwaters.

Overhanging trees can provide, either directly or indirectly, shelter, food and breeding sites for fish. Streams with well developed riparian vegetation generally have a higher productivity than those devoid of trees along their banks. Material falling from trees provides food for aquatic insects which in turn provide food for fish. Overhanging trees provide shade which lowers water temperature (often critical for fish survival) and can, by a dappling effect, camouflage fish from predators.

Some fish will lie next to the bank in shade for shelter and to avoid currents. Logs and debris provide fish with not only shelter and a substrate for food, but they are also breeding sites for some species of fish (e.g. river blackfish and Murray cod).

Native trees are preferred to exotic species such as willows which tend to spread and choke waterways. The deciduous leaf fall is not as efficiently converted by stream organisms as the gradual leaf shed and harder leaves of eucalypts, casuarinas and other natives. Willows and other exotic species with dense canopies also prevent an understorey of shrubs, reeds and grasses from forming.

2.3.1 Legal Requirements

a. Under Section 21C of the Soil

Conservation Act it is illegal to cut down, lop, top, remove or injure any tree within 20 metres of the bank of a prescribed stream, on land in excess of 18 degree slope and on mapped environmentally sensitive land without a permit.

2.3.2 Management Guidelines

a. Wherever possible a 30m buffer zone must be established such as a Foreshore Protection Zone 7(f). This zoning must be accompanied by a planning instrument which restricts potentially damaging activities.

b. If riparian development occurs (e.g. extractive industry, bridge construction), the minimum amount of vegetation must be disturbed and the area must be later rehabilitated with native vegetation. Initial bank stabilisation may require the use of non-native species (refer to 3.3.2 - Revegetation).

c. Where approved, only trees which are undercut and in immediate danger of collapse or those substantially obstructing water flows and causing deflection into an actively eroding bank are to be removed.

d. Where approved, trees must be cut off at stump level and the roots left in the ground.

e. Where approved, trees must be felled away from the river to prevent bank damage during removal. (If any trees are accidentally felled into the river they must be removed immediately without damage to the bank.)

f. The planting of willows must be discouraged as they grow towards the water, form breakaway channels and can eventually collapse the bank. Willows spread vegetatively to the extent that stream access is restricted and they can form islands midstream causing bank erosion.

g. In order to promote growth, stock must not have access to rehabilitating areas.

h. Where approved, trees must only be lopped for stock fodder when an area is officially drought declared.

2.4 INSTREAM MACROPHYTES

Macrophytes (i.e. aquatic plants other than microscopic algae) have many useful roles in aquatic systems. They are nutrient sinks and nutrient sources; they act as physical filters; they stabilise sediments; they activate sediments (i.e. provide oxygen) and they provide habitats for fish and other aquatic organisms.

Fringing, floating and submerged aquatic plants provide shelter and food for some freshwater fish, particularly juveniles. They form migration corridors for diadromous species and may be critical factors in the recruitment success of some species of fish such as Australian bass.

2.4.1 Legal Requirements

a. Sections 90 E-L of the Fisheries and Oyster Farms Act deal with dredging and reclamation. Before carrying out or authorising dredging or reclamation works, public authorities must notify (and local government authorities and individuals must obtain the consent of) the Minister for Agriculture and Rural Affairs.

In the case of individuals, consent may also be obtained from either

(i) the Crown Lands Office

or (ii) another public authority (excluding local government authorities).

A person not complying with these or any other requirements (refer to Appendix 1) is liable to prosecution for a breach of the Act and may be required to provide compensation for any work done illegally.

2.4.2 Management Guidelines

a. All fringing, floating and submerged aquatic plants must be left undisturbed.

b. In the case of larger macrophyte beds a 50 m buffer area must be established to protect these beds.

c. Important macrophyte areas can be protected by designation as Environmental Protection Zones, Wetlands – 7(a) or Foreshore Protection Zone 7(f). This zoning must be accompanied by a planning instrument which restricts potentially damaging activities such as extractive industries and dredging operations.

2.5 STREAM CHANNELS

In many rivers, deep pools provide important fish refuge areas. As the flow in the river decreases with the onset of summer, fish retreat to these pools to wait for the return of high flows during winter and spring. Even after prolonged droughts, provided these refuge areas are available, fish will rapidly recolonise a river. Pools also help cold water species such as trout survive in the deeper, colder water during summer. Channel components such as undercut banks (particularly if the top of the bank is well vegetated with grasses or other ground cover), rock ledges, boulders, weed beds, backwaters and deep pools all offer shelter sites for fish.

2.5.1 Legal Requirements

a. Sections 90 E–L of the Fisheries and Oyster Farms Act deal with dredging and reclamation. Before carrying out or authorising dredging or reclamation works, public authorities must notify (and local government authorities and individuals must obtain the consent of) the Minister for Agriculture and Rural Affairs.

In the case of individuals, consent may also be obtained from either

(i) the Crown Lands Office

or (ii) another public authority (excluding local government authorities).

A person not complying with these or any other requirements (refer to Appendix 1) is liable to prosecution for a breach of the Act and may be required to provide compensation for any work done illegally.

For more legal requirements see the particular sections which relate to those activities proposed to be undertaken in or adjacent to stream channel areas.

2.5.2 Management Guidelines

a. Channel morphology must not be altered, particularly the pool–riffle ratio and the siting of deeper refuge pools.

b. Riparian vegetation must be maintained to minimise changes to channel morphology.

c. Stream clearing and desnagging must be kept to a minimum.

d. Channelisation of waterways must be avoided.

2.6 STREAM SUBSTRATES

The existence of different substrates such as silt, sand, gravel, pebbles and boulders are important to the reproductive success of some species and subsequently the carrying capacity (i.e. number of fish per hectare of water surface) of the waterway. The small spaces between rocks and gravel provide important shelter, not only for small fish but also for benthic and free swimming aquatic insects.

Both the type of substrate and the area of submerged stream bed help determine the food production capabilities of a stream. In general a stream with a sand or mud substrate is much less productive than a stream with a gravel substrate. Studies have shown that there can be many more aquatic invertebrates in streams with gravel beds than in streams with sand substrates.

Spawning success in many fish species depends almost entirely on the availability of suitable spawning sites. For example, trout and Macquarie perch lay eggs in gravel beds. Blackfish lay their eggs in hollow logs or among gravel, Murray cod on logs or other silt free surfaces, and catfish build nests.

2.6.1 Legal Requirements

a. Section 56 of the Fisheries and Oyster Farms Act prohibits the destruction of gravel trout spawning beds.

b. Sections 90 E-L of the Fisheries and Oyster Farms Act deal with dredging and reclamation. Before carrying out or authorising dredging or reclamation works, public authorities must notify (and local government authorities and individuals must obtain the consent of) the Minister for Agriculture and Rural Affairs.

In the case of individuals, consent may also be obtained from either

(i) the Crown Lands Office

or (ii) another public authority (excluding local government authorities).

A person not complying with these or any other requirements (refer to Appendix 1) is liable to prosecution for a breach of the Act and may be required to provide compensation for any work done illegally.

2.6.2 Management Guidelines

a. Diversity of substrates should be maintained.

b. Important gravel bed areas must be identified and protected by zonings and by placing conditions and requirements on potentially detrimental upstream and adjacent activities.

c. Stream substrates should be protected from unacceptable siltation.

destroyed. A minimum of one such tree, large crowned where possible, shall be retained every 15 m on each side of the stream.

h. All trees less than 60 cm in diameter at a height of 1.3 m above the ground must be retained.

i. No timber processing area, log or sleeper dump is to be located within 20 m of the bank. Ideally these should be placed on ridge tops.

j. On agricultural land soil conservation measures, including land capability assessment, animal management, contour cultivation and reduced tillage, must be adhered to in order to prevent erosion.

3.8 DREDGING, RECLAMATION AND EXTRACTIVE INDUSTRIES

Dredging and mining can have a number of adverse effects on freshwater habitats. There can be an increase in turbidity and siltation and productive areas such as weedbeds and riffle areas can be destroyed or smothered with silt. Important fish refuges such as deep holes may be infilled. Reclamation completely destroys fish habitats, and may affect associated channel stability. Activities such as goldmining can additionally increase the levels of heavy metals in rivers.

3.8.1 Legal Requirements

a. Under Section 29 of the Fisheries and Oyster Farms Act a person can be penalised for obstructing the free passage of fish.

b. Section 32 of the Fisheries and Oyster Farms Act prohibits the placing of any structure, including a dredge, on a recognised fishing ground.

c. Under Section 33 of the Fisheries and Oyster Farms Act a person is guilty of an offence if found in possession of dynamite and explosive substances of if he/she is responsible for any explosion injurious to fish. Blasting is not unlawful if it is in pursuance of a permit from the Minister and is in accordance with the conditions of the permit.

d. Under Section 34 of the Fisheries and Oyster Farms Act a person can be penalised for introducing any substance injurious to fish into any waterway.

e. Sections 56 of the Fisheries and Oyster Farms Act prohibits the destruction of trout spawning gravel beds.

f. Sections 90 E-L of the Fisheries and Oyster Farms Act deal with dredging and reclamation. Before carrying out or authorising dredging or reclamation works, public authorities must notify (and local government authorities and individuals must obtain the consent of) the Minister for Agriculture and Rural Affairs.

In the case of individuals, consent may also be obtained from either

(i) the Crown Lands Office

or (ii) another public authority (excluding local government authorities).

A person not complying with these or any other requirements (refer to Appendix 1) is liable to prosecution for a breach of the Act and may be required to provide compensation

for any work done illegally.

g. Large-scale dredging is classified as a Designated Development under the Environmental Planning and Assessment Act and applicants must first consult with the Director of the Department of Planning with respect to the form and content of the document.

h. Tailwaters or wash water should be ponded to allow sediment to settle, and the resulting quality of the discharge must comply with the requirements of the Clean Waters Act.

i. Under the terms of the Crown Lands Act an Interim Quarry License may be issued for small-scale (removal of less than 500 tonnes of material) maintenance dredging of existing access channels to jetties, etc.

j. A permit is required under Section 23A of the Rivers and Foreshores Improvement Act to undertake excavation within 40m of the bank of any stream, river or creek. Applications are made to the Department of Water Resources for this permit in non-tidal waterway areas.

3.8.2 Management Guidelines

a. Removed sand, gravel and topsoil must not be stockpiled near the river or on floodprone land. Any extraction contemplated within the river bed must be referred to NSW Agriculture & Fisheries and this must be carried out in such a manner as not to destroy the pool to riffle ratio, destabilise the banks, or alter the stream morphology or flow patters significantly.

b. Where dredging is intended to provide fill for development of low-lying or floodprone land, the applicant must fully investigate possible alternate fill sources and the environmental consequences of reclamation.

c. Settling ponds must not be established on existing watercourses or lagoons (whether permanent or ephemeral) and no entrained silt is to be returned to the waterway. Ponds must be located away from floodways.

d. The applicant must provide specific details of proposed disposal areas for dredged and excavated material before commencing any excavation or construction work. Stockpiling of material on a floodplain must not be permitted.

e. At the completion of work, the bank of the dredged area must be battered to a slope not exceeding 25 degrees and rehabilitated with native vegetation. All obsolete plant, buildings and surplus material must be removed from the area, and under no circumstances is to be disposed of into the dredged area.

f. Instream timber (essential cover and feeding areas for fish) should not be removed from the steam, but where necessary large snags should be stored and returned parallel to the bank in an area of slackwater as part of the rehabilitation process.

g. A buffer zone of at least 50 m must be placed around instream macrophytes (aquatic plants).

3.9 ROAD AND BRIDGE CONSTRUCTION

Roads and bridges can restrict stream

Your Reference: 5876
Our Reference: AAD(S)
Contact Officer: Terry Faint

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT
25 - 27 Fitzroy St
PO Box 535
Tamworth NSW 2340
Phone (067) 66 3711
Fax (067) 66 3805

Terence J. Stewart Pty Limited,
Consulting Surveyors & Planners,
Registered Valuers,
P.O. Box 212,
ARMIDALE NSW 2350

Dear Sirs,

Re: DEVELOPMENT APPLICATION INCLUDING ENVIRONMENTAL IMPACT STATEMENT TO EXTRACT GRAVEL AT HALLS CREEK, MANILLA - PORTION 1 PARISH OF CUERINDI AND PORTIONS 16 AND 50, PARISH OF FLEMING, COUNTY OF DARLING

I refer to your letter of 4th August, 1992 requesting advise as to our requirements and other matters we wish addressed in connection with the above proposal.

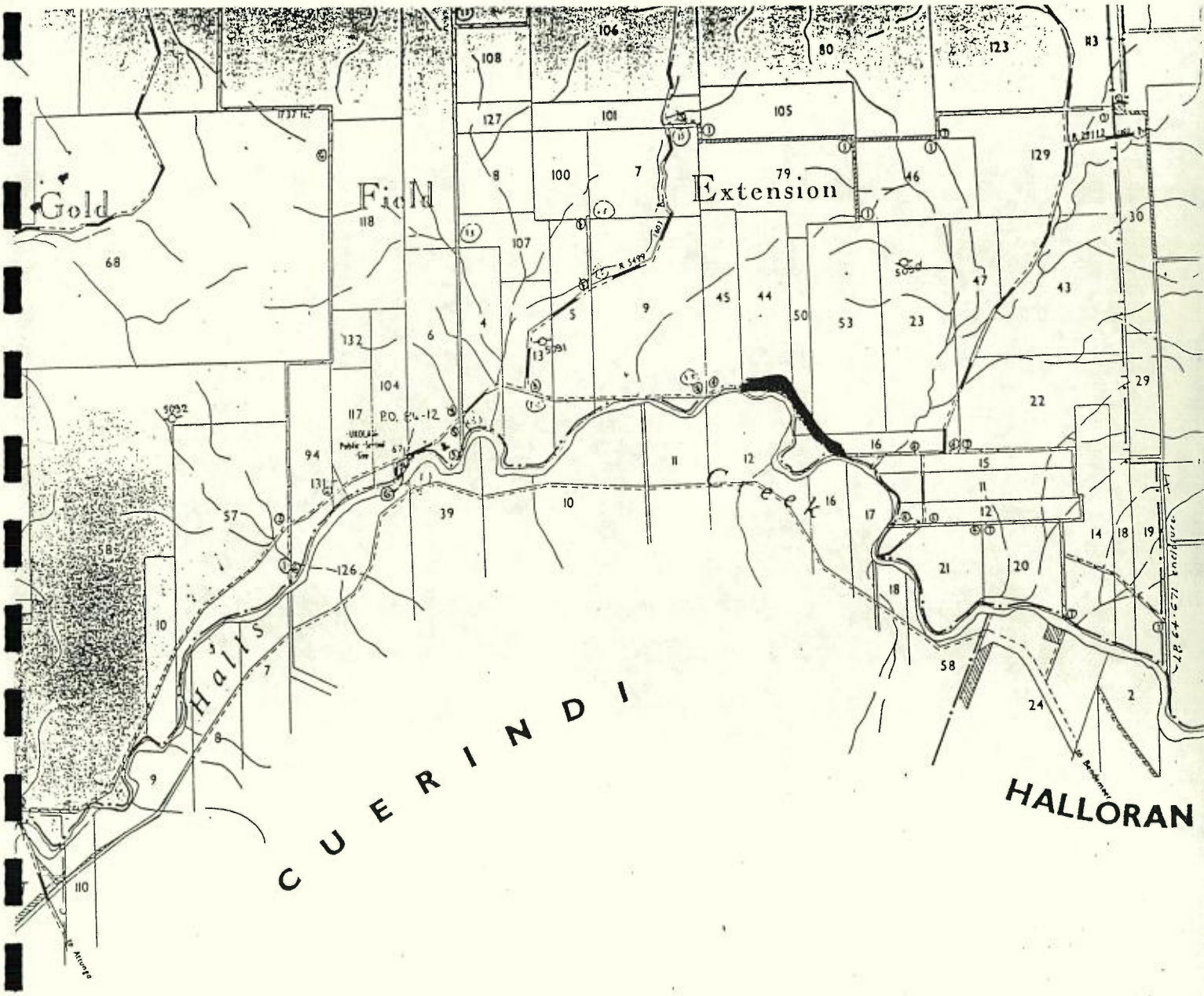
I have enclosed a diagram of part of the Parish of Fleming on which I have indicated the position of a Crown Road within portions 50 and 16.

Providing the removals in no way effect the Crown Road there are no requirements which this Department wishes to address.

Yours sincerely,

T.J. Faint 10.8.92

T.J. Faint,
for Regional Director



Pencil Notes

(1)

(2)

Roads and Traffic Authority
North Western Division

278.5351
Mr Copper - 681407

T J Stewart Pty Ltd
Consulting Surveyors
PO Box 212
ARMIDALE NSW 2350

111 Brisbane Street
Tamworth
New South Wales 2340
Telephone (067) 66 5322
Facsimile (067) 66 7018
PO Box 530
Tamworth NSW 2340
DX 6144
Telex 63251

PROPOSED GRAVEL EXTRACTION QUARRY, POR 1, PARISH OF CUERINDI AND POR 16 & 50, PARISH OF FLEMING, COUNTY OF DARLING. SHIRE OF MANILLA. E.I.S. PREPARATION.

Dear Sir

Further to your letter of 4th August 1992 regarding the above development, I advise that the issues of concern to the Authority in preparing an Environmental Impact Statement for this development are as follows;

a). TRAFFIC GENERATION.

* The anticipated number of vehicle movements, both truck and light vehicles should be determined and information provided on;

  - daily volumes of heavy vehicles
  - daily volumes of light vehicles
  - concentration of vehicles in peak periods
  - location of proposed access to the public road system

* The routes proposed to be utilised by haulage or transport vehicles and an indication of existing traffic volumes.

* The anticipated destinations of haulage/transport vehicles.

b). EXISTING ROAD CAPACITIES.

* Consideration needs to be given to intersection capacities along the route and the site access point from public roads.

* Intersection/access points with public roads should generally conform to NAASRA, Guide to Traffic Engineering Practice, Intersections at Grade. The treatment type is dependent on traffic volumes. Adequate sight distance should be maintained.

c). ENVIRONMENTAL ASPECTS, NOISE ETC.

* The proposed hours in which haulage vehicles will be operating and possible escalation of traffic noise, particularly through residential areas.

* Consideration of precautions for haulage vehicles to prevent loose materials or excess dust emanating from the load and affecting road users or dust affecting adjacent houses.

d). FUTURE DEVELOPMENT

* Consideration of possible future plans for escalation of the development, if any.

e). UPGRADING OF FACILITIES.

* The developer may be required to contribute to the upgrading of the public road system to accommodate the development.

It is noted that the development as currently proposed is of a relatively small scale but the impact, if any, of these issues should be considered.

Should you require further information please contact Mr G Copper.

Yours faithfully

R G Wood
Zone Manager.

11/8/92

EPA

Environment
Protection
Authority
New South Wales

1st Floor
NSW Government Offices
85 Faulkner Street
PO Box 494
Armidale
NSW 2350

Telephone .067. 73 7133
Facsimile .067. 72 9851

T J Stewart
Consulting Surveyor
POBox 212
ARMIDALE NSW 2350

Our Reference: 250396 A1
ROH:ROH
Your Reference: 5876

Contact: Robert O'Hern

10 SEP 1992

Dear Mr Stewart

Re: Proposed Gravel Extraction at Halls Creek, Manilla

We refer to your letter requesting the Environmental Protection Authority's (EPA) requirements for an Environmental Impact Study (EIS) into the extraction of gravel from Halls Creek approximately 17km North-East of Manilla. We offer the following comments for your consideration.

Noise:

The EIS should identify all the plant to be used on the site and assess the likely noise level output from the site. The hours of operation should be stated for separate or individual processes.

The EIS should identify all those residences within a 2 km radius or any that may be impacted on by noise generated by operations within the pit or any transport from the site.

Should blasting be proposed a detailed assessment will be required, to demonstrate that the processes will meet the EPA's guidelines.

Air:

Dust is the most likely air impurity to be emitted from the site during excavation and transport. The EIS should address those methods to be implemented in order to limit dust movement off site and identify those areas at risk.

Water:

The EIS should detail those methods to be implemented in order to prevent sediment, oils, greases etc leaving the site and the methods to be put in place to ensure the site is rehabilitated on completion and the site remains in a stable condition.

Statutory:

The proponent will require approval from the EPA prior to work commencing. Approval is normally conditional and would normally follow after Council determination.

The proponent may also be required to obtain an annual licence once regular operations commence.

General:

The EIS should ideally provide maps and plans with sufficient detail to enable the EPA to fully assess the project and its implications.

Yours faithfully

Simon Smith

SIMON SMITH
Regional Manager Northern Tablelands
for Director-General.

10 September 1992

[CORRESP\ROH\FYNREDPL.WP]

State Pollution Control Commission

New South Wales
Government Offices
85 Faulkner Street
Armidale, N.S.W. 2350
P.O. Box 494
Armidale, N.S.W. 2350

Our reference: SSS:jh

Your reference:

Telephone: (067) 73 7133
Fax: (067) 72 9851

17 DEC 1991

Mr T. Stewart
P.O. Box 212
ARMIDALE NSW 2350

Dear Sir,

Re: EIS requirement Gravel Pit

Thank you for your enquiry regarding the Commission's requirements to be advised in an EIS for a proposed gravel quarry.

Noise:

The EIS should identify all the plant to be used on the site and assess the likely noise level output from the pit. The hours of operation should be stated for separate or individual processes.

The EIS should identify all those residences within a 2 km radius or any that may be impacted on by noise generated by operations within the pit or any transport from the site.

Should blasting be proposed a detailed assessment will be required to demonstrate that the processes will meet the Commission's guidelines.

Air:

Dust is the most likely air impurity to be emitted from the site during excavation and transport. The EIS should address those methods to be implemented in order to limit dust movement off site and identify those areas at risk.

Water:

The EIS should detail those methods to be implemented in order to prevent sediment, oils, greases etc leaving the site and the methods to be put in place to ensure the site is rehabilitated on completion and the site remains in a stable condition.

Statutory:

The proponent will require approval from the Commission prior to works commencing. Approval is normally conditional and would normally follow after Council determination.

The proponent may also be required to obtain an annual licence once regular operations commence.

General:

The EIS should ideally provide maps and plans with sufficient detail to enable the Commission to fully assess the project and its implications.

Questionnaires which may assist in our determinations are enclosed for your completion where appropriate.

Yours faithfully

R.J. Whyte,
for Secretary.

Per:

enc.

[EISCOOKS.LTR]

Information to be Supplied with Application

Where relevant:

1. Air Pollution

1.1 Details of the process generating the air impurities to be discharged.

1.2 Description of the proposed installation, modification or replacement or alteration of the type of materials or fuel used in the process.

1.3 Quantity of products to be produced annually (tonnes).

1.4 Quantity of raw materials to be processed annually (tonnes).

1.5 Site plan showing location of plant and details of discharge points of air impurities with regard to location, height, gas composition or type, exhaust volume and velocity.

1.6 General arrangement drawings and/or piping and instrumentation drawings of plant affected.

1.7 Details of proposed air pollution control equipment, including all points of discharge, complete with arrangement drawings and specifications if possible.

1.8 Details of the gases to be exhausted both before and after treatment, with regard to the following items, where applicable:

- 1.8.1 Volumetric flow rate
- 1.8.2 Temperature
- 1.8.3 Composition
- 1.8.4 Concentration of particulate matter (including dust) and size range
- 1.8.5 Proposed outlet velocity
- 1.8.6 Humidity

1.9 Quantity of:

- 1.9.1 Coal or carbonaceous material;
- 1.9.2 Raw materials and products which are in powered form; and/or
- 1.9.3 Organic liquids.

to be handled or stored (tonnes stored and/or tonnes handled per year).

1.10 Capacity, location and type of petroleum product storage tanks (cubic metres).

1.11 Details of hydrocarbons and/or organic solvents, likely to be emitted by or used in the process, with regard to the following items:

1.11.1 Type of solvents or hydrocarbons
1.11.2 Consumption rates.

1.12 Details of fuels to be burnt with regard to the following items:

1.12.1 Source and type(s)
1.12.2 Consumption rate(s), kg/h - include both normal operation and design maximum
1.12.3 Sulphur content(s) specification, maximum where applicable.

1.13 Proposed chimney height/s if available.

1.14 Topography map of area if available.

1.15 Details of buildings and structures within a 30 m radius of the exhaust points and at a greater distance where an effect on the dispersion characteristics of any stack to be erected is likely.

1.16 Details of any odours likely to be emitted by the processes, whether offensive or not and of control measures proposed. Advise of an odour threshold value of materials handled in the process where known.

1.17 Evidence that any necessary approval required under the Local Government Act, 1919 and/or the Environmental Planning and Assessment Act, 1979 has been obtained. Do not delay unduly the submission of your application for this purpose. We will accept this information when it becomes available, but may not approve the application until we have it.

1.18 What is the estimated total cost of the proposed installation, modification, replacement etc (excluding the cost of buildings, site preparation and land)/

1.19 What is the estimated cost of air pollution control equipment proposed? Break down if possible into:

1.19.1 Capital cost
1.19.2 Installation cost
1.19.3 Design and commissioning costs.

1.20 Do you hold a Pollution License for the premises?

If YES - 1.21.1 Under what category?
1.21.2 Will the present license category change due to the operation of the plant or equipment which is the subject of this application?

If NO - You should apply for a license at least 1 month before the plant commences operation.

Information to be Supplied with Application

Where relevant:

2. Water Pollution

2.1 Details of the processes generating the wastes to be discharged or irrigated.

2.2 Description of the proposed installation, construction or modification.

2.3 A locality plan and contoured site plan showing the waste discharge point(s) (and the area proposed for irrigation, if applicable) in relation to the principal buildings, the boundaries of the premises, any public roads or places and any natural or artificial waters.

Note: 2.3.1 To facilitate the necessary inspection of the proposed site it is essential that the boundaries of the site and the proposed location of the treatment units, outfall pipeline and entire disposal area if applicable be properly marked.

2.3.2 Plans and maps must be drawn to a suitable scale on material suitable for a permanent record.

2.4 Plan and section drawings (general arrangements only of the proposed works, including inlet and outlet arrangements and details of any baffles proposed for any ponds.

Note: Reinforced concrete details and structural details are not required.

2.5 A longitudinal section along the outfall drain, pipe or diffuser.

2.6 Details of the treatment methods proposed, including method and site of disposal of sludge or other solid wastes.

2.7 A schematic flowsheet of the treatment and disposal processes proposed for all wastes.

2.8 Estimated average volume of wastes to be discharged or irrigated in Kilolitres/day plus estimated average volume or mass of solids to be disposed of per annum.

2.9 Estimated maximum volume of wastes to be discharged of irrigated in litres/day.

2.10 Proposed method of measurement of volume of wastes to be discharged or irrigated.

2.11 Details of major items of equipment, such as aerators, oxygen transfer efficiency, sprays, pumps etc.

2.12 In the case of industrial and commercial premises, a drainage diagram and in the case of a residential development or municipal sewerage scheme a sewerage compilation plan.

2.13 A statement of the quality of the wastes before treatment and the source of the information in terms of the following characteristics (if relevant):

2.13.1	Temperature
2.13.2	pH
2.13.3	BOD^5 at 200^c
2.13.4	Suspended Solids (non-filtrable residue)
2.13.5	Faecal Coliforms
2.13.6	Radioactivity
2.13.7	Oil, Grease and Floating Solids
2.13.8	Infectious or Contagious Materials
2.13.9	Restricted Substances (as per Schedule 2 of Clean Waters Regulation, 1972)
2.13.10	Nutrient Content (N and P)

2.14 An estimate, showing the basis of the estimation, of the quality of the wastes after treatment as in (10) above.

2.15 Estimated dates of commencement and completion of proposed works.

2.16 If a stagewise development is envisaged, details of how the proposed works have been designed to cater for this. The applicant should request stagewise approval if he requires it.

2.17 Details of the proposed spray rotation and resting period programmes, if applicable.

2.18 Details of the soil profile of the areas proposed for both irrigation and solids disposal, if applicable.

2.19 Details of the water table depth for the area proposed for effluent and/or waste disposal, if applicable.

2.20 Details of types of pastures or crops likely to be grown on, or animals utilising, the area proposed for irrigation and long term management, if applicable.

Information to be Supplied with Application

Where Relevant:

3. Noise Pollution

3.1 Site Details

A description of the area, such as: "Heavy industrial with no residential homes existing or planned within one kilometre", or "Light industrial with residential homes on three boundaries", or "Medium industrial adjacent to heavy road traffic, with residences on opposite sites", etc.

A site plan drawn to scale showing distances between plant (both proposed and existing) and residential areas (both existing and approval future developments) or isolated residences within the likely area of noise impact.

3.2 Contour Plan

If the site is particularly undulating and the topography may affect noise propagation.

Building layouts, and general description of building construction around major noise sources. Whether such buildings are closed and mechanically ventilated or open and naturally ventilated, whether doors and loading bays are normally open or normally closed while the enclosed noise producing equipment is in operation.

3.3 Times of Operation

A schedule of anticipated operating times of major items of plant and equipment.

A schedule of times of proposed truck movements in and out of the premises and the proposed access routed through any adjacent residential areas.

3.4 Present Background Noise Levels

Measured background noise levels at affected residences at proposed times of operation particularly those times when differences between the plant noise and the background noise will be greatest. This is usually in the evening, at night or early in the morning. Calculated background noise levels (given, for instance, AS1055) will not normally be accepted, since these tend to be higher than actual measured background levels in many instances. If statistical measurements are made,

the L90 taken over a period of at least 20 minutes will be taken as the background noise level for that particular time or day or night.

If the measured background noise level is less than 30 dB(A), then 30 dB(A) may be assumed to be the present background noise level. When there are different shift operations, the comparison with background noise should be made for each shift.

3.5 Noise Control Measures

The means proposed to contain or control noise from each major noise source including details on such matters as the materials and thickness or enclosures, construction and height of screen walls, insertion loss of silencers and times of operation.

3.6 Noise Level Prediction

Either the should pressure level at a preferred measurement distance or the sound power level, in "A: weighted decibels and, preferably, octave band levels for each major noise source after any specified acoustic treatment. Wherever possible, a measurement position should be outside the near acoustical field for the particular source.

If tonal components are expected to be prominent at any nearby noise sensitive area, then one-third octave band data are required to describe adequately the contribution from all noise sources.

The predicted (L10) cumulative dB(A) level at any nearby residential premises, due to all noise sources located on the premises, shall be estimated. This shall take account of all noise sources which may reasonably be expected when the plant is fully operational, and should include reference to any future plans the company may have for later expansions which may cause or increase noise.

Where blasting is to occur, details of the predicted overpressure levels (db/Lin) and peak particle velocity (mm/sec).

A noise level contour plan of the surrounding area for large developments where topography and/or permanent structures could have a substantial effect on the propagation of noise to surrounding residential or other noise sensitive areas. This should include noise from adjacent premises.

3.7 Assessment of Noise Impact

A description of the effect of predicted noise levels on people in nearby residential areas, schools, hospitals, offices, shops, neighbouring vacant land, recreational or other noise sensitive areas, including noise from adjacent premises.

3.8 Times of Operation

The environmental impact of noise from industrial or other noise-generating operations depends to a large extent on the level of background noise in the area. The same noise made at night may have a greater impact than if it is made during the day. This is because the background noise level at night is usually lower, and an intruding noise is more easily noticed. Consequently, the times of operation are of great importance in assessing the noise impact of a proposal.

It is not necessary for the times of factory operation to be limited, so long as the Commission's criteria of acceptable noise levels can be net (see chapters 19, 20 and 21 of the Commission's "Environmental Noise Control Manual". However, approval usually is made conditional on times of operation being limited to those stated in the application. Applicants should therefore ensure that the times stated reflect their requirements accurately and cover emergencies and all other likely eventualities.

If at a later date, the applicant wishes to extend the approved times of operation, a further application must be lodged with the Commission.

Please note that extension of times of operation into the quieter periods of the night will generally require the installation of more effective and therefore more expensive noise control equipment. Commonly, for each further 5 to 10 decibels reduction of noise, the cost of noise control equipment may double. The applicant may therefore need to balance the commercial return from extended hours of operation against the cost penalty of more expensive noise control equipment, or seek a better location for the plant if noise control measures are not practicable.

OUR REF: GN-69 Pt4 EISDAL

YOUR REF: 5876

PUBLIC WORKS

HUNTER & NEW ENGLAND REGION

Mr T.J. Stewart,
Terence J. Stewart Pty Ltd,
PO Box 212,
ARMIDALE NSW 2350

Carl Peterson
Tel. 684230
Fax. 684236/3

21 August 1992

Dear Terry,

DEVELOPMENT APPLICATION INCLUDING ENVIRONMENTAL IMPACT STATEMENT TO EXTRACT GRAVEL AT HALLS CREEK, MANILLA PORTION 1, PARISH CUERINDI & PORTIONS 16 & 50, PARISH FLEMING, COUNTY DARLING, SHIRE MANILLA

Ref.: Your letter dated 4 August 1992.

Further to your above referenced letter, you are advised that the proposed development is not considered likely to affect the Department's interests.

However, it is noted that Halls Creek flows into the Namoi River which in turn flows into Manilla Weir, the source of Manilla's water supply. It is suggested that this matter be addressed as part of the EIS to ensure the proposed activity does not adversely affect Manilla's water supply.

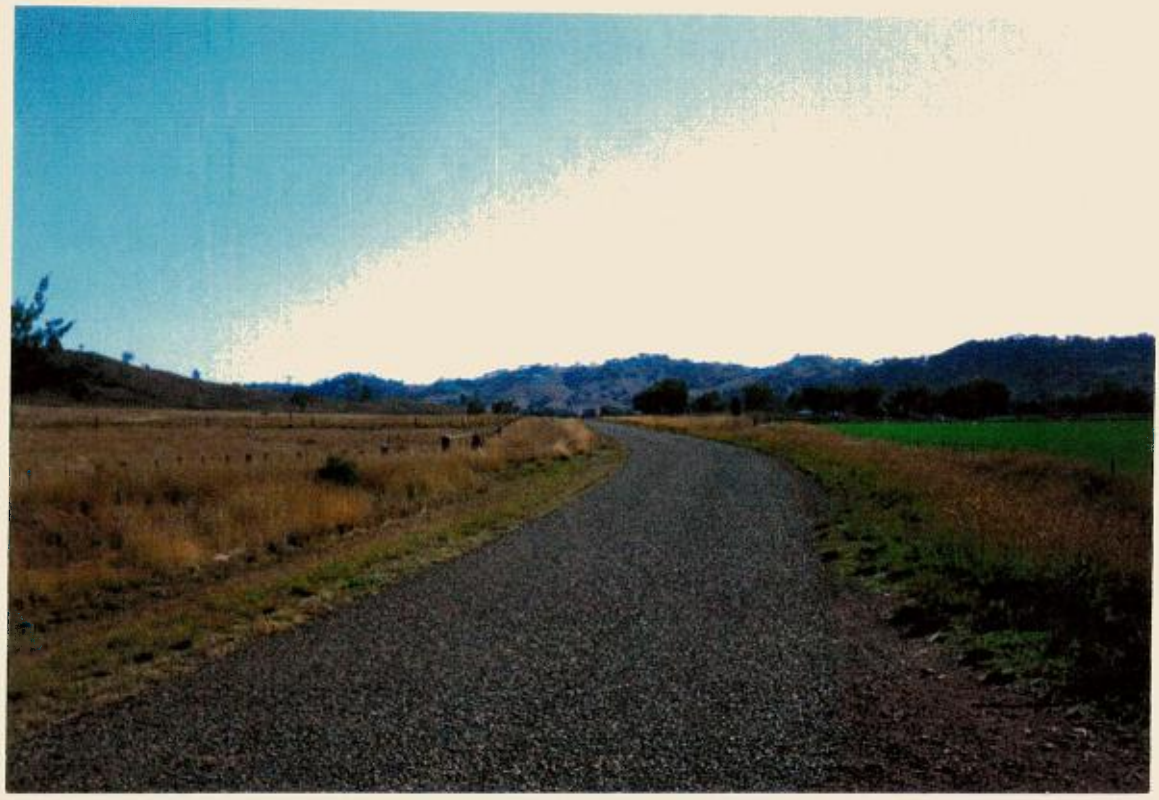
Yours faithfully,

C. Peterson

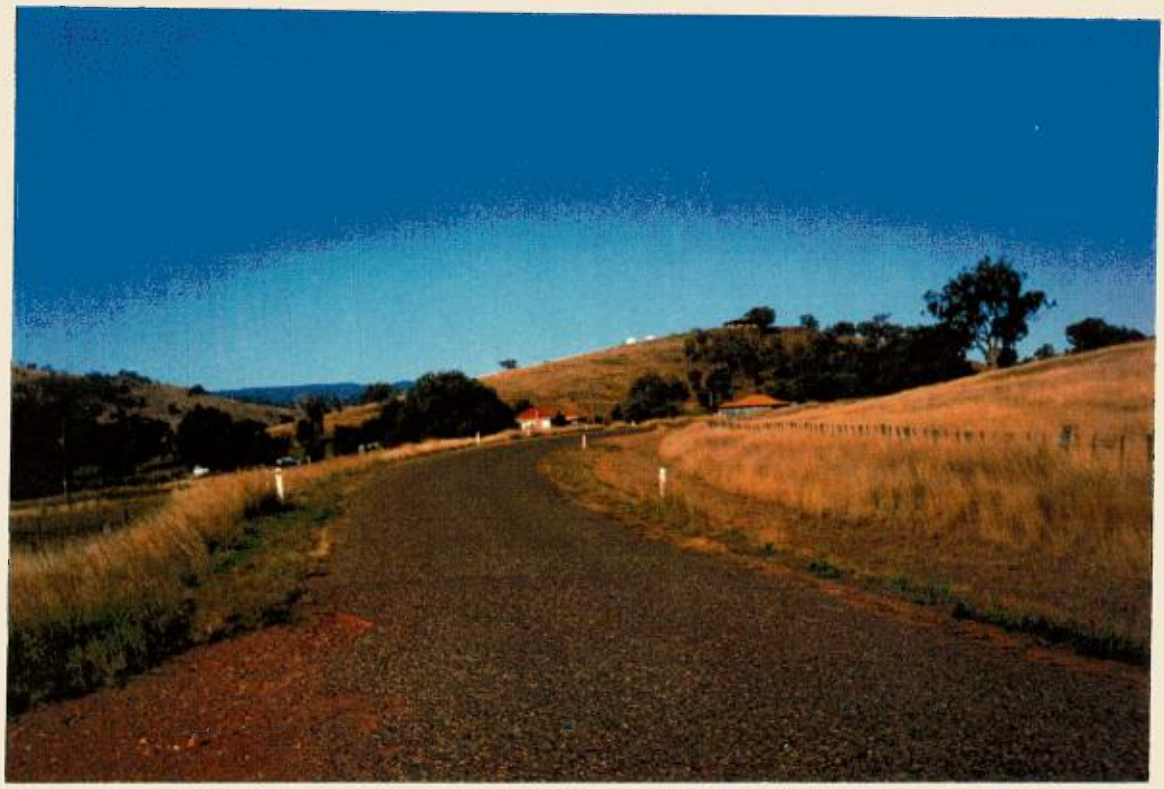
for

D.J. Pryor,
Manager,
Hunter & New England.

APPENDIX 8
Photographs

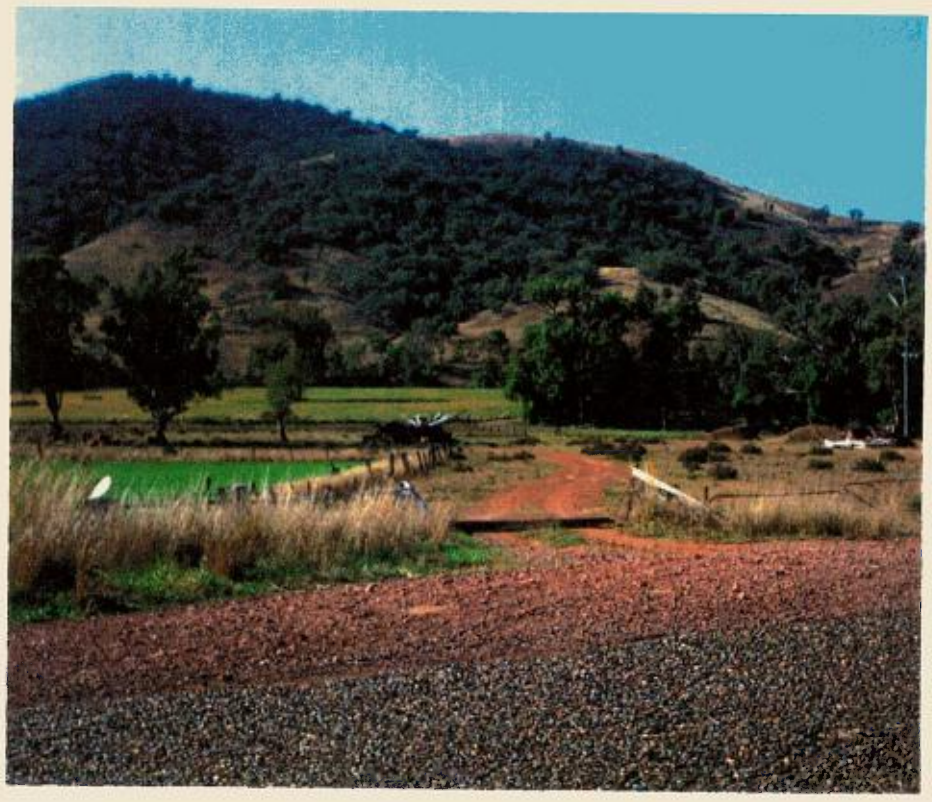


8.1 WEST SIGHT DISTANCE AT ENTRANCE/EXIT TO GRAVEL SITE



8.2 EAST SIGHT DISTANCE AT ENTRANCE/EXIT TO GRAVEL SITE

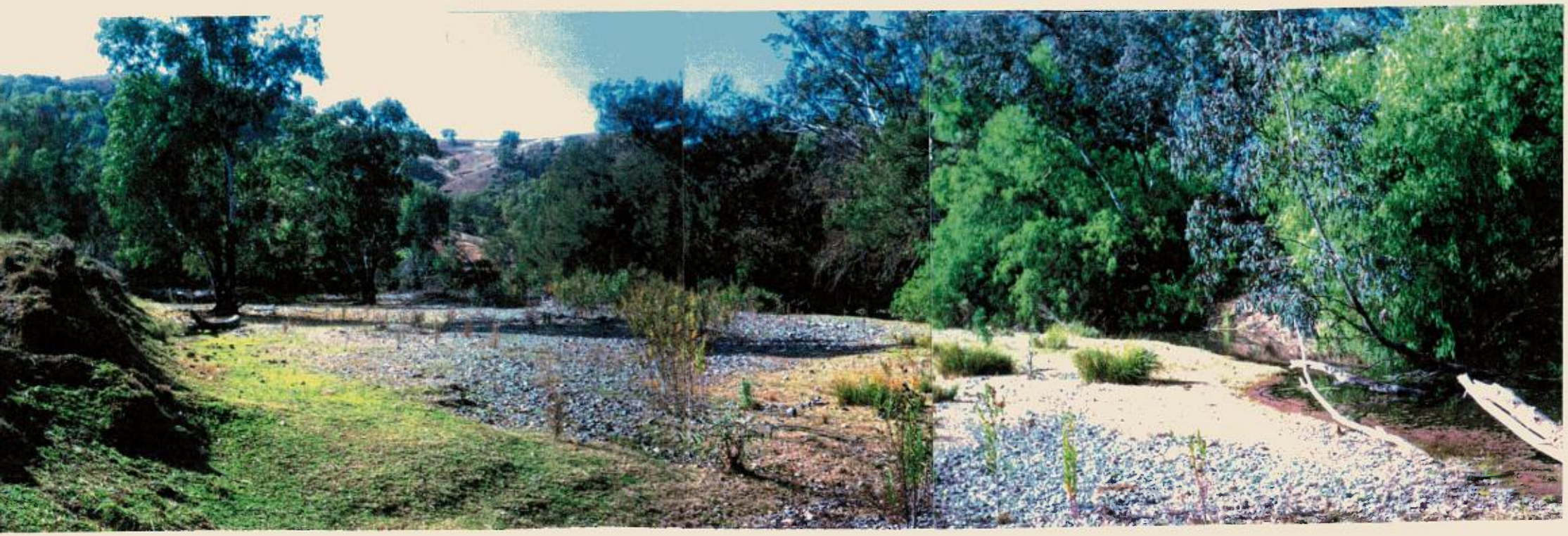
8.3 FORD ACCESS HALLS CREEK AND
EXISTING ACCESS TO EACH SIDE CREEK



8.4 ACCESS TO GRAVEL AREA FROM HALLS CREEK ROAD

8.5 EXISTING DAM AT SCREENING PLANT SITE

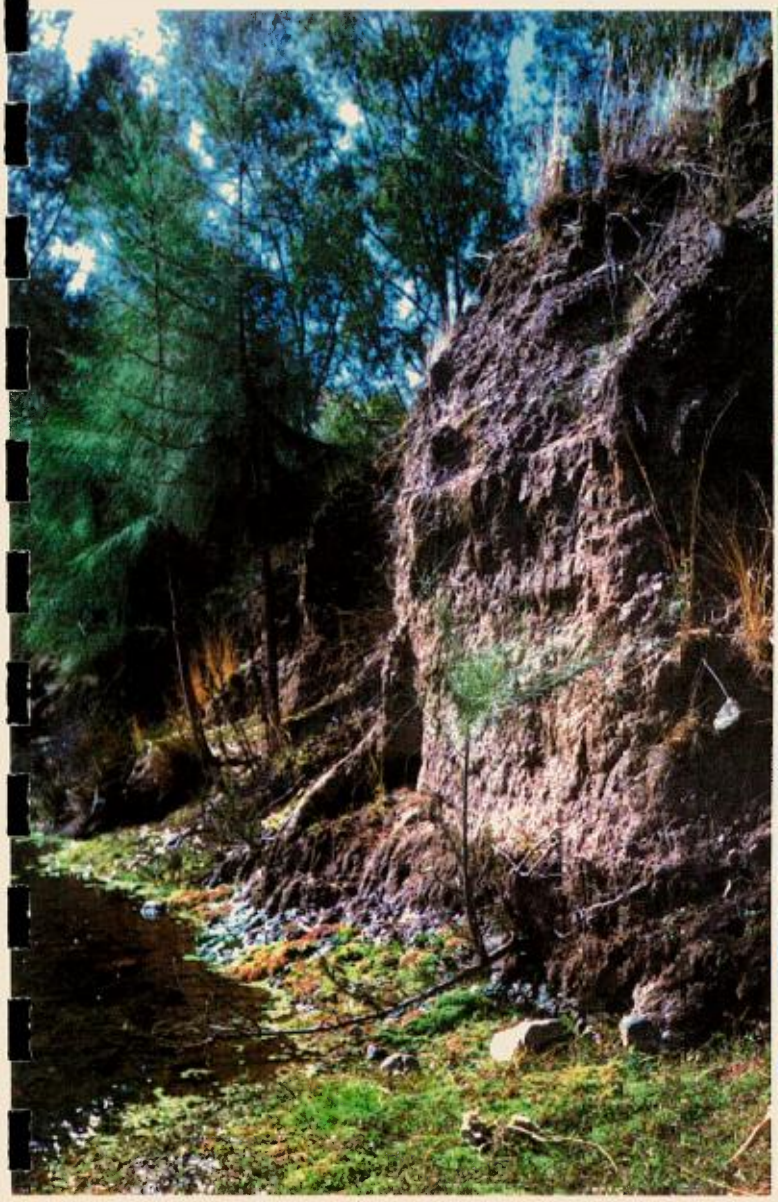
8.6 SOUTH GRAVEL BED ON EAST SIDE OF HALLS CREEK
LOOKING NORTH



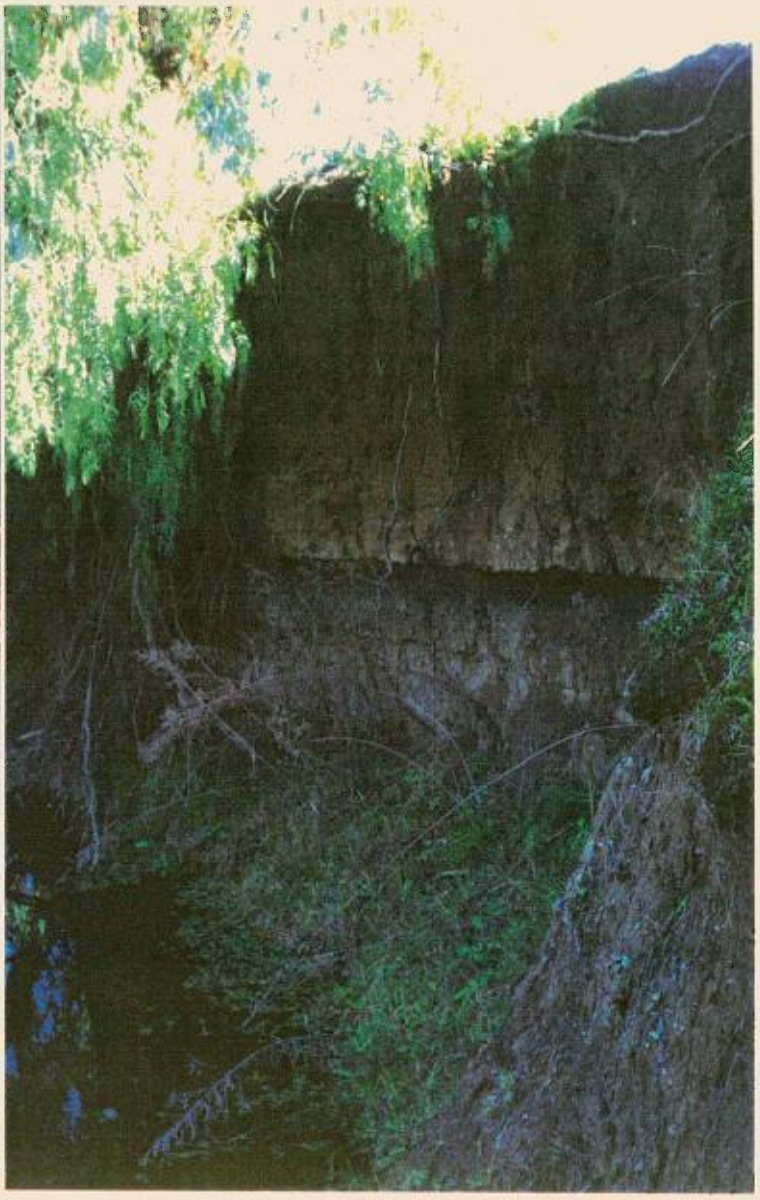
8.7 PART NORTHERN GRAVEL BED LOOKING NORTH FROM SOUTH END

88 PANORAMA VIEW OF CRUSHER SITE SHOWING OLD QUARRY

89 PANORAMA VIEW OF NORTH GRAVEL BED



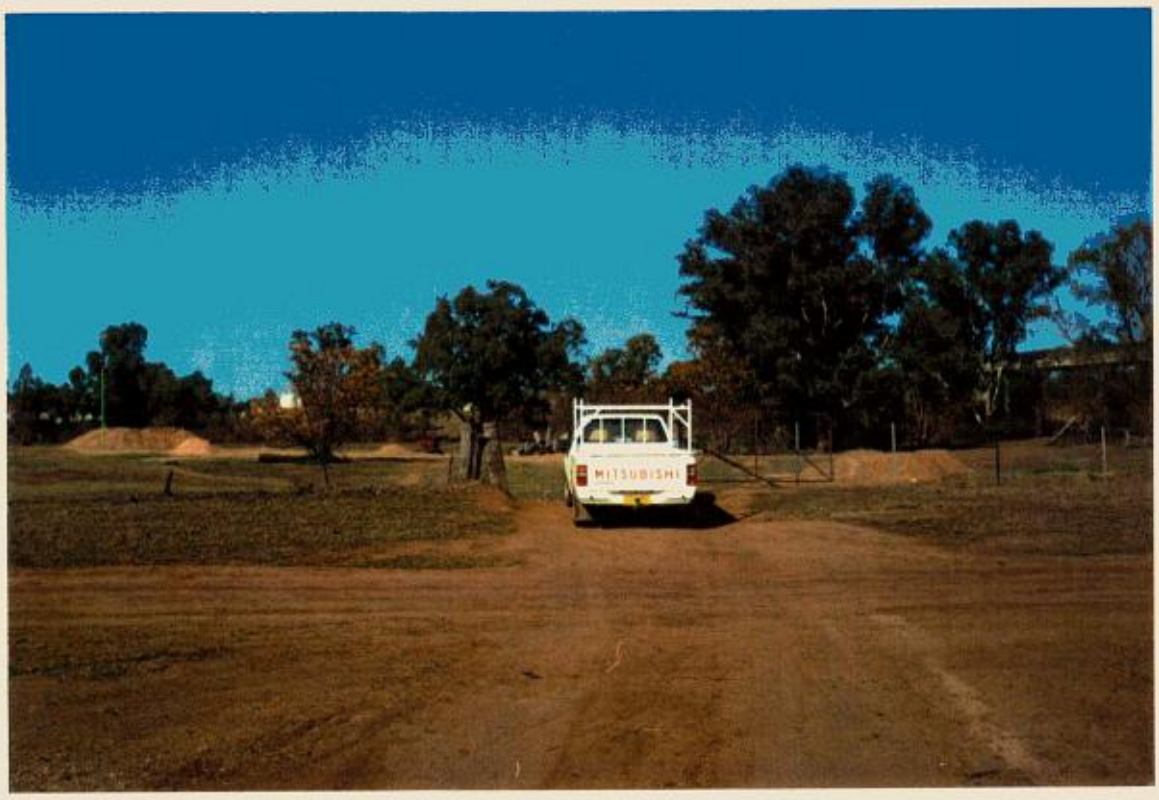
8.10 BANK EROSION ON EAST SIDE



8.11 BANK EROSION ON WEST SIDE

8.12 YUMP SITE IN HALLS CREEK

8.13 STOCKPILE SITE - LLOYD STREET, MANILLA



8.14 ACCESS TO STOCKPILE SITE
LOOKING NORTH