Report to the
Honourable Bob Carr
Minister for Planning and Environment

An Inquiry pursuant to Section 119 of the
Environmental Planning and Assessment Act, 1979,
into a development application

EXTRACTION OF SAND FROM THE COLO RIVER
AND PROCESSING OF SAND ON PORTION 37,
LOWER COLO ROAD, COLO

John Woodward, Chairman
COMMISSIONER OF INQUIRY
September 1985
TO: MINISTER FOR PLANNING AND ENVIRONMENT

On 18th January 1985, you directed that an inquiry be held in accordance with Section 119 of the Environmental Planning and Assessment Act 1979, by a Commission of Inquiry with respect to a development application to dredge sand from the Colo River adjacent to portion 37, Lower Colo, in the Shire of Hawkesbury. You commissioned me to conduct the inquiry into the proposed development and to report my findings and recommendations to you.

The public inquiry was held at Sydney commencing on 30th July, 1985. During the course of the inquiry adjournments were granted to allow certain parties further time to prepare their submissions to the inquiry.

Field visits were conducted in the presence of the parties to the proposed dredging site on the Colo River, to adjoining lands and to nearby properties held by objectors to the development and to other vantage points in the area.

The public sessions of the inquiry concluded on 14th August 1985.

This report is made to you pursuant to the provisions of the Act and sets out my findings and recommendations on the issues raised during the course of the inquiry. The report should be read in conjunction with the documents tendered to the inquiry and referred to in this report. The submissions are listed in a Schedule of Documents submitted to the inquiry appended to this report and are available to you.

I have no connection with or relationship to any party making a submission to this inquiry, including the Government departments and authorities which made submissions to the inquiry.
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1. INTRODUCTION AND BACKGROUND

Bate Walls Pty Limited is seeking development approval to dredge sand from the Colo River in the Shire of Hawkesbury. The Company has, for many years extracted sand from Portion 37 and claims existing use rights to do so. The proposal under consideration in this Inquiry is for present extraction of sand on Portion 37 to be replaced by river dredging. The proposed extraction area in the river is adjacent to Portion 37 and is confined to a section of the river within the projected boundaries of Portion 37. (See figure 1.) Dredging is expected to continue for three years. A further dredging proposal beyond the extended boundary of Portion 37 has been foreshadowed by the Company but no development application has as yet been lodged in respect of that "Stage 2" proposal.

The Company has not previously dredged the river. Its operations have been confined to a land based extraction on the river flats comprising part of Portion 37. Although there is some evidence that previous limited dredging occurred in the river during the 1950s, in practical terms, this proposal represents the first proposed sand dredging operation on the Colo River. Sand dredged from the river would be processed through a new and larger sand washing plant based on Portion 37 and transported by truck via Lower Colo Road, West Portland Road, Blaxland Ridge Road to Putty road and to various markets within the Sydney region.

The Colo River is a tributary of the Hawkesbury River and forms part of the Hawkesbury/Nepean River system.

The present uses of the lower reaches of the Colo are recreational including boating and fishing. In regional reports and studies referred to later in this report prepared by or on behalf of the Department of Environment and Planning, the lower reaches of the Colo River are proposed for future recreational uses and the upper reaches for conservation. The river is seen as a future recreational attraction for the increasing population of Western and North-Western Sydney.

The lower reaches of the Colo are, in the area around Portion 37, in a well conserved condition. Small scale farming and orchards have been established along the river banks. Some damage has occurred to the river bank but the river retains much of its scenic and natural character. Attractive mingling of rural and natural bushland landscapes are scenic features of the lower reaches of the Colo River.

The National Trust has classified the Colo River as part of the Upper Hawkesbury area. The proclamation made on the 24th January 1983, lists important features of landscape.

* Cultural valley - historic routes and early 19th Century buildings.
Scenic values including rural, natural and river scenery.

Recreation for the Sydney region.

Bate Walls Pty Limited, in support of its dredging proposal, had an Environmental Impact Statement ("E.I.S.") prepared by Webb McKeown and Associates Pty Limited. The E.I.S. was publicly exhibited. A number of objections were raised to the development.

The Minister for Planning and Environment directed under Section 88(3) of the Environment Planning and Assessment Act 1979 that an inquiry be held in accordance with Section 119. The Minister will determine the development application pursuant to Section 89 of the Act.
.2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed dredging operation of the Lower Colo and the processing plant to be located on Portion 37 are described in detail in the publicly exhibited E.I.S. prepared for the Applicant Company by Webb McKeown & Associates Consulting Engineers.

The proposal involves dredging, processing and transportation of medium to coarse sand in the Sydney market. The proposed river based extraction will supersede the present land based operation on Portion 37 which is to be phased down as soon as dredging from the river is established. Bate Walls Pty Limited propose to dredge approximately 150,000m$^3$ (240,000 tonne) of sand per year from the Lower Colo adjacent to Portion 37. The life of this proposed dredging operation is three years.

A further development application is foreshadowed by the Applicant Company for dredging up stream for 3km and down stream for 0.8km from Portion 37. If this extension (Stage 2) was to be approved the life of the dredging operation would extend to six years and an estimated 1.5 million tonne of sand would be extracted. The application for proposed Stage 2 operation had not been lodged at the date of completion of the hearings in relation to this public Inquiry. The Applicant indicates that an application would be made after Stage 1 was established and operational.

The natural sediment of the river which is to be dredged will not be replenished for many years. It is estimated that after about six years the available material will be exhausted and no further dredging would occur in these areas for some 50 years.

The area to be dredged is shown on Figure 1 attached. Cross sections are shown on the E.I.S. of the river extraction area and the limits and depths of the proposed dredging are set out. (See figure 4).

The E.I.S. proposes controls which, the Applicant claims, are designed to ensure the stability of the existing river banks and provide an acceptable final ecology for the river after dredging is completed.

These controls are:

* No dredging within a strip approximately 10m wide measured from local mean high water mark adjoining the alluvial river banks.

* Maximum excavation slopes to be one vertical to four vertical.
* Maximum depth below mean low water mark not to exceed 9.5m.
* No dredging within 3m of existing weed beds.

Dredging will be undertaken with a cutter-suction dredger. The Applicant has chosen this type to minimise turbidity. Any turbidity, it is claimed, will be "totally insignificant". (Page 18 E.I.S.). Any spillages or leakages which may occur in the engine room are to be fully contained. It is proposed that they will be removed and rectified as they occur. The dredger will be powered by a 320kw diesel motor and will be capable of pumping 125m³ of solids per hour. The delivery line will be 150mm diameter and will be lowered to the bed of the river where necessary. Measures are proposed to control noise, and noise levels outside the engine room are estimated not to exceed 70dB(A).

The processing plant is to be located within Portion 37. Use is to be made of some existing facilities in relation to current processing of sand extracted from Portion 37. These facilities include the sedimentation pond and access road. In other respects the sand and processing plant is generally a new one compared with the existing plant on Portion 37. (See figure 2).

The establishment of the processing plant will include:

* A settling pond.
* A conveyor to move extracted material to a screen.
* A screen to remove oversize material.
* A classifier to remove charcoal and volatile solids.
* A cyclone for de-watering and removal of fines.
* A conveyor for stockpiling.
* A stockpile capable of holding 3,000m³ that is, one weeks supply of processed sand.
* A sedimentation pond of at least 25,000m³.
* A weighbridge.
* Access and service roads.
* Supplementary mineage plant (Pumps, compressors, etc.).

It is proposed to pump dredged material to shore for processing on Portion 37. Slurry from the dredge will be settled prior to delivery via a hopper and conveyor to a screen to remove
oversized material and then on to the classifier. The classifier will be of the "hindered settlement" type with capacity to process 80 to 100 tonne per hour. The cleaned slurry from the classifier will then pass through a cyclone to remove the majority of water. The processed sand is to be conveyed to a stockpile for drainage and later for road transport to markets.

All effluent and surface run off is to be discharged to the existing sedimentation pond. It is expected to settle and filter through the lagoon walls to the river. The pond will be periodically cleaned by dragline if necessary. Sediment removed will be dried and transported to markets.

The processing plant is to be located in an area subject to flooding. During a 100 year flood this part of the Portion 37 will be covered by about 8m in depth of water with velocity in the order of 1.0m per second. Electric motors will be capable of easy and quick removal.

The Applicant Company proposes to rehabilitate the existing site of land based extraction on Portion 37 and to rehabilitate the area of the proposed processing plant at the completion of dredging operation. Some rehabilitation work on Portion 37 has recently been undertaken in the lead up to the public Inquiry. Also, planting of shrubs and trees has been undertaken along the area of the Lower Colo River bank at Portion 37 which was previously illegally breached by the Applicant Company.

The Applicant Company proposes to complete rehabilitation of the area disturbed by the present land based operation. This will include the planting of trees and shrubs to screen the processing plant. The existing lagoon is to be fenced to prevent stock access and the shores planted with native species. The river bank is being regenerated.

Following the end of dredging, the processing plant will be dismantled and removed and the area rehabilitated. The sedimentation pond will be rehabilitated as a lagoon. The Applicant claims that the controlled dredging operation is designed to provide a final river bed profile suitable for recolonisation by aquatic flora and fauna. It is therefore proposed that the dredged area will be allowed to rehabilitate by natural means. A monitoring programme of ingrowth of macrophytes in the disturbed area is planned and small areas of weed will be transplanted to increase the rate of recolonisation in accordance with the requirements of the Fisheries Division of the Department of Agriculture. No discharges to the river are proposed. No waste material will be deposited in the river.

Processed and dried material will be transported to markets by truck. Fifteen trucks will make three round trips per day. The present land based operation has, on average, gener-
ated about sixty truck movements per day over the last four years. The proposed developments will increase this figure by 50% to ninety truck movements per day. The normal route for trucks transporting material from the site will be via Lower Colo Road, Portland Road and Blaxland Ridge Road to main road 503 (Putty Road). Traffic from the site will be a significant percentage of local traffic on Lower Colo Road, West Portland Road and Blaxland Ridge Road - up to about 70% but an insignificant percentage of the traffic on main road 503 - about 5%. Traffic from the existing land based operation has contributed substantially to volumes on these roads over recent years. The increase therefore in traffic caused by the proposed operation will be 33% for Lower Colo Road and 1.6% for main road 503.

The hours of operation will be confined between the following hours:

a. Truck loading and transportation - Monday to Friday 0600 to 1800. Saturday 0600 to 1200.

b. Dredging and screening - Monday to Friday 0700 to 1800. Saturday 0700 to 1200.

No dredging or processing will be undertaken on Sundays or public holidays.

The proposed operation will provide full-time employment for 23 persons. The present land based operation has provided employment for an average of thirteen persons over recent years.

The sand in the river is of a high quality and coarse grading. The E.I.S. indicates the following end uses:

Asphalt manufacture
Concrete and tile manufacture
Volatile sand and water treatment
Spun concrete pipe manufacture
Nursery propagation and landscaping
Filter medium - subsoil drainage
Chemical concrete manufacture
Playing field construction

The E.I.S. indicates, based on research, a demand well in excess of 1,000 tonne per day for these uses and a strong preference for the material from this deposit. Substantial supplies of sand of the specification found in the Lower Colo can only be gained from other sources well outside the Sydney region. Transportation savings are therefore estimated at $2.4 million p.a.

The area for the proposed dredging operation is under the control of the crown and the Applicant is seeking a permissive
occupancy for use of the river bed for dredging operation. The Applicant Company has contractual rights to the use of Portion 37 which is in private ownership. A Crown Reserve extends along the river bank of Portion 37 to a depth of 30.48m and the Crown's approval for the use of this land in relation to both dredging and sand processing would be required.

The proposed development is more fully described in the E.I.S. which has been publicly exhibited prior to the Inquiry.
3. **LAND USE CONTROLS AND EXISTING USE RIGHTS**

Portion 37 and the adjacent section of the Lower Colo River are affected by the Hawkesbury Local Environmental Plan 1984. Portion 37 is zoned rural 1(b1). Clause 9 of the L.E.P. provides that extractive industry is a permissible use with consent. Other clauses of the L.E.P. have bearing on this development application. The proposed development is within an environmental protection area as defined by clause 34 of the plan. Provisions of this clause relate to the appearance and impact of development and the retention of vegetation. Sub-clause 34(3) provides that "In relation to an application for consent to development ... the Council shall ... consider that amenity of the area and may, as a condition of its consent, require the development to comply with all or any one or more of the standards prescribed by Clause 33 for development within the Escarpment Preservation Area".

Clause 35 concerns the development of flood liable land. The clause deals generally with requirements regarding buildings on flood liable land. The processing plant and the delivery line from the dredge to the plant fall within this clause. Clause 35(1) provides that "Except as provided by sub-clause (11), a building shall not be erected on any land lying at a level below the one in ten year flood frequency level at the appointed day for the area in which the building is to be located or on any other land which, in the opinion of the Council, was liable to flooding at any time before the appointed day."; and clause 35(11) provides that "Flood liable lands may, with the consent of the Council be developed for the purposes of agriculture, caravan parks, public conveniences, forestry, open space, picnic grounds, amenity grounds, State Emergency service establishments, roads or for purposes ancilliary thereto only where development for those purposes is permissible under clause 9."

Extractive industry is not included as one of the purposes for which flood liable lands may be developed with the consent of the Council under clause 35(11). The E.I.S. shows a new processing plant, which is substantially different from the existing plant on site and is to be located within the area of Portion 37 affected by periodic flooding. The E.I.S. states that "Most of Portion 37 to the north of Lower Colo Road is subject to overbank flooding once in three years on the average. Velocities are of the order of 1.0 to 1.5m/s and depths range up to 10m over the land area. The flow record at Morans Rock Gauging Station, and the area the flood frequency curve produced by the PWD at this location and at Lower Portland were used to calibrate a one dimensional hydraulic model of this reach of the river. Flood levels at these locations and in a shed on the site were used to develop a flood profile for the March 1978 flood. This had a recurrence interval of the order of once in one hundred years and attained a level of 12m AHD at the site. The calibrated model was then used to examine current and post-dredging flood conditions."
In addition, for the 1978 flood, a series of coloured aerial photographs taken near the peak of the flood were examined. These showed the site under water, and also indicated from a difference in colour of the floodwaters, that velocities were low across the site and it was essentially a backwater area at that stage of the flood."

Whether clause 35 extends to the lands forming the river bed adjacent to Portion 37 was not raised in the Public Inquiry.

The river adjacent to Portion 37 is unzoned but subject to planning controls pursuant to clause 32 of the L.E.P. Extraction is permissible from the river with consent. The river bed is also within an environmental protection area and is subject to the provisions of clause 34 of the plan.

Hawkesbury Shire Council has placed a draft local environment plan upon exhibition which relates to lands including Portion 37. The draft plan proposes to restrict existing use rights on Portion 37 (and other lands). An intention of the draft L.E.P. is to limit the existing use rights to a part of Portion 37 shown on the map attached to the plan. The draft L.E.P. is subject to legal challenge at the time of the Inquiry. The Applicant Company claims existing use rights in Law to extract and process extracted material on Portion 37. A judgment has been handed down by the Supreme Court in favour of the Applicant's predecessor which has some bearing on a claim for existing use rights over Portion 37.

The present proposal to dredge the river involves in practical terms, a trade-off by the Applicant of its claims for existing use rights to extract on Portion 37 (or on part of Portion 37) in return for consent to dredge the river for a period of three years. If consent was to be granted to dredge the river as sought, the applicant has stated that the land based extraction on Portion 37 will be closed down and existing use rights over Portion 37 will be surrendered. The right to process sand on Portion 37 is to be retained by the Applicant until such time as the foreshadowed Stage 2 dredging operation is completed. The Applicant estimated that 90,000 tonne or about 8 months supply of sand remained to be extracted from Portion 37 before the sand resources on that land were exhausted. The Applicant has asserted existing use rights to extract sandstone from Portion 37. Reference to a claim for existing use rights to extract from the river was made by the Applicant during the course of the Inquiry.

The Applicant however, acknowledges that a permissive occupancy subject to conditions from the Crown would be required to extract the river and to cross the Crown Reserve along the river bank. Approvals would also be required from the State Pollution Control Commission under the Clean Waters Act. The consent of the Minister for Public Works is required for extraction from the river under Section 23 A of the Rivers and Foreshores Act.
The applicant submitted to the Inquiry that S.E.P.P. No.1 would apply to the proposal to site the processing plant in flood liable land within Portion 37. The Applicant also proposed that the processing plant could be re-located within Portion 37. No proposal however, was put to the Inquiry for a re-location of this existing use right for sand processing on Portion 37.

The bed of the river adjacent to Portion 37 is Crown Land. The Crown Reserve to a depth of 100' or 30.48m runs along the river banks of Portion 37 (See figure 5.) Part of the land between the Crown Reserve and the river bank is claimed by the Crown as accreted land, (See figure 5). A permissive occupancy 1982-1 Windsor was granted to Bate Walls Pty Limited for the purpose of initial investigation (exploratory studies and planning with a view to extraction). The area of the Crown Land Reserve was marked out on the site for inspection of the parties to the Inquiry by the Crown Lands Office. The existing sedimentation pond on site and the proposed sedimentation pond were seen to encroach substantially on to the Crown Reserve. The existing sedimentation pond is therefore, within the Crown Reserve without authorisation.
4. REGIONAL CONSIDERATIONS

The Hawkesbury/Nepean River system of which the Lower Colo forms part, has become in recent years, a focus of regional and environmental concern reflected in a number of regional studies, reports and investigations and more recently, in an announcement of a proposed regional environmental plan.

A number of studies have been prepared, exhibited and submissions received in respect of them. An on-going process of assessment and further refinement through studies of this river system and its catchment is being undertaken within the government in consultation with specialist bodies.

Reference is particularly made in this report to certain of these documents which have relevance to the Colo River. These include:

i  the Hawkesbury/Nepean Valley Report (1983) which concerned environmental and recreataional issues in the valley;

ii  the Sydney Extraction Industry Report (1984) which looked at existing and potential sources of sand and other materials in the Sydney region and projected demands for those materials;

iii  The North-West Sector Study (1984) which identified part of the north-west sector of Sydney as the most feasible for medium term urban development. The Hawkesbury/Nepean, including the Colo River pass through the north-west sector of Sydney. With increased population, continuance of and the quality of this river system is seen as a crucial issue by the Study;

iv  on the 10th July 1985, the Minister for Planning and Environment announced the preparation of a regional environmental plan for the river system. The objective of the plan is to establish a framework for planning and management decisions in the valley. Issues of water quality, recreation, environment and scenic amenity and extractive activities are to be addressed;

v  as part of the regional environmental plan a study is being undertaken jointly by the Department of Environment and Planning, the State Pollution Control Commission, the Department of Agriculture (Fisheries) Division and the Hawkesbury Agricultural College.
The focus of this study is directed towards:

a. macrophytes and their dependence on sediment depth in terms of distribution, species and density (this is an issue before this Inquiry.)

b. invertebrates and their association with shallows, with and without macrophytic growth and with previously dredged areas (also an issue before this Inquiry.)

c. fish and their dependence on various habitat types, particularly shallow regions.

The objective of the study is to formulate guidelines regarding extraction and appropriate rehabilitation. The study is expected to be complete by mid-1986.

The Hawkesbury/Nepean Valley Report and the North-West Sector Study identified the river as a major recreational asset. The studies and reports referred to above made the following points:

* The lower reaches of the Colo are suitable for informal recreational use and the upper reaches for intermediate and formal conservation areas.

* Long term recreation should be dominant land use of the river foreshore below Wallacia.

* The Hawkesbury/Nepean and its tributaries, including the Colo River, will be a primary recreation attraction for the increasing population of Western and North-Western Sydney.

* Extractive industry is not compatible with recreational use. Extraction from the river bed does not improve the river's attributes for recreation. Extraction reduces a river's scenic diversity and value for small boating.

* The Colo River and surrounding areas, because of lack of public areas and few facilities is under-utilised as regards recreation.

* The outstanding natural scenery of the Colo, including the Hawkesbury/Nepean, is one of the major attractions in Western Sydney.

* The area has tourist potential. Protection of the overall environmental quality is essential in the long term interests of tourism.

* The Colo River is one of three regional landscapes of distinctive visual significance in the North-West and West. The other areas are the Hawkesbury/Nepean and the Lapstone Monocline.
* Assets worth preserving include:

- Extensive natural areas occurring on the plateaux where indigenous vegetation is relatively undisturbed;
- Rural landscapes in the valley which are more open with a patchwork quilt effect of small paddocks under intensive cultivation.
- Extraction is seen as incompatible because of visual and noise pollution. Caution should prevail until it can be shown that significant environmental and economic benefit may be gained from extraction.
- The MacDonald Wilderness area which includes virtually all the Northern catchment of the Colo River is situated on the opposite river bank to Portion 37. It is identified as having high conservation value.
- Large scale sand extraction from the Colo River should not be permitted, as hydrological effects of extraction on the bed and banks of the river are largely unknown due to a lack of research on sediment transportation and channel characteristics of the river. Before any large scale extraction could proceed, a full study on the hydrodynamics of the river system needs to be completed in conjunction with similar suggested studies for the Hawkesbury River. In the meantime, no extraction should be allowed except limited remedial dredging, and then only if it can be demonstrated that the benefits to be obtained from extraction (costs saved by reducing the likelihood of floods) exceed the costs of the operation. At the present time, the main purpose of any dredging in the Colo should not be commercial extraction of the sand resource.

The National Trust has classified the Colo River as part of the Upper Hawkesbury area. The proclamation made on the 24th January 1983, listed the following features of the Colo landscape:

- cultural values with historic routes and early 19th Century buildings.
- scenic values including rural, natural and river scenery.
- recreation for the Sydney region.

A Wild and Scenic Rivers Committee was established in 1982 by the then Minister for Planning and Environment to report on the feasibility, development and implementation of the wild and scenic rivers system. In October 1984, the Committee recommended a protective scheme, and identified the Colo River, amongst others, as warranting detailed consideration as a wild and scenic river. The recommendations are currently under consideration.
The Sydney Extractive Industry Study identified the sediments of the river to be of high quality course grained sand and fine grained gravel. The sand is suitable for general construction use and specialist applications as proposed by Bate Walls Pty Limited. The sand deposits are of significance for the Sydney region.

Forecasts are made for three types of sand; medium-coarse grained, fine-medium grained and fine-medium "fatty" sand (sand with a high clay content). Two possible growth paths are projected: the first (no growth) assumes that production remains at its current level; while the second assumes a growth rate of two percent compounded annually, which encompasses population projections. The production of medium-coarse sand for the Sydney region is expected to average between 2.75 and 3.0 million tonnes per annum. If the sand from the Colo river is fully utilized it would have the potential of meeting all of Sydney's medium-coarse sand requirements for approximately seven years.

In 1983-84, over 90% of Sydneys' requirements of medium-course sand came from the Hawkesbury/Nepean River and its Flood Plain. Millions of tonnes of medium-course sand still remain and it is predicted that these resources will continue to be the major source of medium-course sand in the region. These resources will be sufficient to meet the majority of Sydney's requirements of medium-course sand for many years to come.
5. ISSUES AND COMMENTARY ARISING FROM SUBMISSIONS

Various issues are raised by the proposal for a river based extraction by dredging the river adjacent to Portion 37 and for an expanded sand processing plant on part of Portion 37. These issues are commented upon in the E.I.S. prepared for Bate Walls Pty Limited by Webb McKeown & Associates and also addressed in submissions by parties to the Inquiry.

I have commented below on the more important issues related to whether this project should or should not receive development consent. Reference may be made to particular submissions for more detail of the views expressed by each party including the Applicant Company.

5(a) Land Use Controls

The processing plant associated with this application to dredge the lower reaches of the Colo River is to be located on part of Portion 37 which is flood liable. This situation is clear from the Applicant's E.I.S.

The submissions by the Hawkesbury Shire Council and the Department of Environment & Planning state that this part, i.e. the processing plant of the development, is a prohibited use under clause 35(11) of the Hawkesbury Local Environmental Plan 1984. The Applicant in its submissions to the Inquiry proposed three means of overcoming the problem identified by the Council.

1. An alternative location for the processing plant on Portion 37. However, no detailed proposal and environmental assessment of an alternative location within Portion 37 was put to the Inquiry. It is doubtful whether any other flood free part is suitable.

2. The existing use rights in law claimed by the Applicant to extract and process sand on Portion 37. The Applicant relies on a judgment of the Supreme Court of New South Wales in the Council of the Shire of Colo v. Martin Bros. Soil Pty Limited & ORS, CA 98 of 1979 ED1541 of 1978 on appeal from a judgment of Mr. Justice Needham.

The Council sought, before Needham J., a declaration that the use of various parcels of land including Portion 37 for purposes of soil and sand extraction was prohibited. His Honour made a declaration in respect of the other lands, but refused in respect of Portion 37. The issues upon which the judgment turned were related to lack of evidence of user, onus of proof and interpretation of various statutory provisions. The issues of statutory interpretation and onus of proof, were also the subject of the Court of Appeals consideration and judgment, in which the Court by majority decision found for or against the Council.
It is not a function of this Commission of Inquiry to determine the validity of claims for existing use rights over Portion 37 or part of Portion 37. However, I am not satisfied that the judgments referred to put the issue of existing use rights conclusively beyond contention. I note that Needham J. stated that "I think it is probably better to say that the first defendant is using part of Portion 37 for the same purposes as that for which it was used prior to the 8th June 1962. It is being conceded that no consent was required to the extraction of sand prior to 8th June 1962." The Court of Appeals' judgment did not canvass the detailed evidence related to the claim for existing use rights on Portion 37 or part of it.

I note that on inspection of Portion 37, Mr. Bate referred to a fenced area of Portion 37 which is used for grazing purposes upon which a homestead is located. He indicated that area had not been extracted before, but, he considered it available for future extraction if his dredging proposal was refused. The area concerned is high ground with a homestead and appears unlikely to have been replenished from time to time by floods so that extraction in the past is unlikely to have occurred on this section of Portion 37. The question raised therefore in my mind is whether or not existing use rights attach to Portion 37 in part or in whole.

Since the Court Judgements, the Environmental Planning and Assessment Act has been enacted. Sections 106, 107, 108 & 109 and the regulations thereunder, have bearing on claims for existing use rights. As a new and increased processing plant is proposed they also have relevance to the proposal.

The processing plant proposed in the development application by Bate Walls Pty Limited, varies significantly from the existing processing plant on Portion 37.

I note the provisions of Section 107(2) of the Environmental Planning Assessment Act relating to continuance on existing use may have some bearing on this aspect of the development proposal.

The intrusion of the existing sedimentation pond on to the Crown Reserve and the need for Crown authorisation for it's continued use may have bearing on the existing use claims. The Crown may require the sedimentation pond to be removed.

I am not satisfied, in all these circumstances, that consent to this development application should be granted on an acceptance of existing use rights claimed by the Applicant. It is questionable whether the Minister could lawfully consent to the development on this basis.

3. The Applicant submitted that an objection under S.E.P.P. No.1 could be used to overcome clause 35 (11) of the
L.E.P. No objection has, in fact, been made by the Applicant. In any event, clause 35(11) of the L.E.P. relates to purposes or uses for which development may be carried out. S.E.P. P. No. 1 of the Environmental Planning and Assessment Act relates to development standards. I am not satisfied, an objection under S.E.P. P. No. 1 is appropriate to overcome the problems of clause 35 in regard to this project.

The issue of whether "lands" in clause 35(11) includes the river bed was not canvassed in the Inquiry.

It is also noted that the delivery line transverses the river bank and the flood liable area of Portion 37. The line would also appear to be a building within the meaning of clause 35. It is uncertain whether the claim for existing use rights extends to the delivery line. No evidence was put forward to support such a claim.
(b) **Existing Use Rights**

Reference has already been made to the Applicant's claim for existing use rights to extract and process sand on Portion 37.

The proposal to dredge the Lower Colo River adjacent to Portion 37 involves a proposed trade-off of the claim for existing use rights to extract on Portion 37 in turn for consent to dredge the river. The claim for existing use rights to extract sand is to be surrendered by deed but the Applicant seeks to retain its existing use rights in respect of the processing of sand on Portion 37. The Applicant has also indicated its intention to surrender existing use rights over other lands on approval of the foreshadowed Stage 2 of the river based extraction.

Mr. Bate on behalf of the Applicant Company, stated that about 90,000 tonne of extractable sand remained on Portion 37 largely in an area hitherto not extracted and used for agricultural purposes. The quantity would represent approximately 8 months supply of sand. All extractable sand would then be exhausted on Portion 37 although the Applicant claims existing use rights to extract sandstone from Portion 37. It is not clear whether existing use rights which may be established in law would extend to this previously undisturbed area of Portion 37.

On the evidence put before this Inquiry, and weighing the environmental issues involved by the proposed river based extraction, I am not satisfied that the benefits from the termination of the sand extraction on Portion 37 (or on Portion 73) would outweigh the environmental disadvantages of a first ever river based extraction on the Colo River. The realities are that the sand resource on Portion 37 is nearly exhausted and substantial amounts of rehabilitation have already been undertaken. Further, the extent of the resource on Portion 73 and the strength for the claim for existing use rights on that Portion remain uncertain.

The strength or otherwise of the existing use rights may also be effected by the intrusion of the sedimentation pond on the ground reserve and the need for Crown Lands Authorisation to its continued use. It is far from certain that authorisation would be forthcoming to allow the existing extraction to continue on Portion 37 as presently operated.

In all these circumstances, the proposed trade-off by the Applicant Company, in my view, in unacceptable.
5.(c) **Regional Issues**

The Colo River is of great scenic and environmental importance. It rises in the Great Dividing Range and flows towards the south east to join the Hawkesbury River at Lower Portland, some eighteen kilometres upstream from Wisemans Ferry. The Colo Valley forms part of the Sydney Basin geological structure and the major rock outcrops are primarily Hawkesbury sandstones.

The Hawkesbury Shire Council, in its submission, commented upon many outstanding attributes of the Colo River. These are also referred to in various regional studies and reports. A major contributing element of the landscape is the rugged escarpment of the valley which provides spectacular river scenery worthy of conservation for both visual and environmental reasons. The valley is basically a deeply dissected plateau with a meandering river confined within steep sandstone cliffs. As such, views are generally enjoyed from the upper slopes and ridges extending down into the valley. Narrow alluvial flats border the river in most sections and have provided a base for the establishment of agriculture. In most areas a narrow strip of river bank vegetation has remained and the natural vegetation of the sandstone cliffs and ridges has been left almost untouched.

The river itself contains a series of shallows and pools which provide a contrasting colour and texture to the water's surface that is both tranquil and aesthetically pleasing. The area is generally very quiet and peaceful making it extremely attractive for its residents and tourists.

The natural attributes are, in many ways, complemented and strengthened by man-made elements. The lower reaches of the river have been farmed since the early 1800's and today support a mosaic of citrus orchards and grazing lands which contrast with the thickly forested upper slopes and ridges which frame the valley.

Although the importance of the area for agriculture has reduced over the years, it still remains the predominant land use of the flood plain. The Hawkesbury Shire Council noted that recently, there has been an increase in the number of residents utilising the area for retreats and some rural residential living. However, settlement still remains sparse and scattered. The agricultural pursuits carried out on the river flats have contributed significantly to the natural beauty of the area.

The Council's submission and the regional studies and reports state that, the Colo River is one of the last major rivers within New South Wales that is relatively untouched by man-made development. Its importance is increased by its location relative to the Sydney metropolitan area and its traversing of the Wollemi National Park, the second largest national park in the State.
The Colo River is also within the Upper Hawkesbury Landscape Conservation Area as defined by the National Trust. This classification identifies the valley as an area of high scenic quality where the combination of rural practices and river scenery has created a distinctive landscape worthy of protection for present and future generations. It is claimed that the Valley is, to a large extent, a unique landscape. Unlike the MacDonald Valley with its gently undulating landscape or the Hawkesbury River Valley with its extensive flood plains, the Colo Valley consists of narrow fertile flats backed by steep sandstone cliffs.

The Council submitted that the Valley has increased in importance as a recreational resource for the Sydney area over the years; this being emphasised by the recent proclamation of the Wollemi National Park and the classification of the Valley for landscape conservation. Canoeing and fishing are quite common along the Colo River although its major attraction is for passive recreation.

The section of the Colo River proposed for extractive operations adjoins Portion 37 in the Parish of Meehan and lies approximately 4.5km upstream of the confluence of the Hawkesbury and Colo Rivers. Adjoining land to Portion 37 is generally used for agricultural purposes or retains much of its natural vegetation. The Council submitted that as such, extractive operations within the river would tend to alienate this area from surrounding land and thus destroy the continuity and tranquility of the river environment.

The Colo River Valley is scenically very attractive and environmentally important. A number of parties including Council, the Lower Colo Action Group, The National Trust and the Department of Environment and Planning said that the complex of natural and human attributes should not be compromised or degraded by incompatible extractive operations.

The numerous reports, studies and investigations referred to in this report under "Regional Considerations" strongly establish the Colo River as one of regional significance in terms of both conservation values and recreational uses.

The Department of Environment and Planning, in its submissions concluded from the various documents referred to that commercial extraction of sand from the Colo River is incompatible with the recreational opportunities currently offered by the river and that the scenic beauty of the river valley should be preserved in its existing state. The Department submitted that the majority of
the Sydney medium coarse sand requirements would be met from the Hawkesbury/Nepean River and its flood plain for many years to come.

The recommendations from the Sydney Extractive Industry Study for the Colo River (Section 7.2.7, Page 78) state:

"no extraction should be allowed except in limited remedial dredging, and then only if can be demonstrated to be economically workable (e.g. in terms of costs saved by reducing floods) and environmentally acceptable. The main purpose of such dredging should not be the extraction of the sand resources."

Bate Walls Pty Limited submitted that although all the reports and studies quoted by the Department of Environment and Planning emphasise conservation and recreational values of the Colo River, the Department failed to demonstrate how a three year dredging operation (possibly extended to six years) would detract from these values. The dredge itself was comparable in appearance to a houseboat. It would not obstruct the river. The dredging operation was of short duration (maximum of six years). The Applicant challenged the statement that:

"the Colo River is one of the few relatively undisturbed rivers in the Sydney Region."

It acknowledged that the Upper Colo was essentially undisturbed. However, the Applicant claimed it was not correct to say that the Lower Colo River remained in an undisturbed state. The area around Portion 37 had been farmed since the early Nineteenth Century and extensive clearing has been carried out. The local environment has significantly changed over time.

The Applicant questioned the Department and other parties' assertions that the river based extraction would deter other uses such as recreation and tourist activity in the area. The six year proposed life, Stage 1 and 2 and the rehabilitation of the already disturbed part of Portion 37, indicated there would be no conflict. The proposed dredging operation and continued use of Portion 37 for sand processing could in no way be seen to intrude on the MacDonald Wilderness area which extended to the opposite river bank. That bank
of the river was in private ownership and there was no suggestion that the dredging operation would have any adverse impact on the sandstone formation of that bank. The Applicant asked how a three to six year dredging operation affected the "Wild Area" which in itself was very extensive. The Applicant suggested that the lower reaches of the river would no way be seen as a "Wild River". It argued that the proposal did not introduce a new activity to the area. Sand extraction has been taking place on Portion 37 since prior to 1962.

I am of the view after considering all the submissions made to the Inquiry, and the inspections of the lower reaches of the Colo River, that the Applicant Company has undervalued the Lower Colo in its submission to the Inquiry. It is true that the riverside lands of the lower reaches of the Colo are more disturbed than the upper reaches in the sense that they have been subject to small scale farming including orchards for many years. The Applicant, however, in my view, has not given sufficient weight to the conservation values of the lower reaches nor to the attractive landscape which offers a blend of natural qualities and small scale rural activity.

One cannot comment on the Colo River as a whole as it was not subject to detailed consideration before this Inquiry. However, from my inspections of the Lower Colo and from the submissions made to the Inquiry, I am of the view that the Lower Colo River is of regional significance to Sydney in terms of conservation values and recreational uses. I do not find the introduction of the first ever dredging operation into the river as compatible with these qualities of the river. The lower river, from inspection and evidence submitted to the Inquiry, is in remarkably good condition. Water quality is high. The river banks are in good condition with the exception of the area which was illegally breached by the Applicant Company on Portion 37 in 1982.

The issue of precedent has been raised by a number of parties to the Inquiry. It is claimed that if this dredging operation is approved it will provide a precedent for further approvals up and down the river either by the present Applicant or other applicants. BateWalls Pty Limited has already foreshadowed a Stage 2 operation up and down the river from the boundaries of Portion 37. However, the Company asserts that after six years, that is if Stage 2 was approved, it would be off the river and Portion 37 rehabilitated. While appreciating that each development application needs to be treated on its merits, an approval of Stage 1 will, in my view,
provide a strong basis for the Applicant and other parties to argue for development consent on an incremental basis in regard to further separate and limited dredging operations up and down the reaches of the Lower Colo. The isolated and limited dredging operation proposed by this application could then, over time extend to extensive dredging of the lower reaches of the river. The potential for this to occur would be reinforced by approval of Stage One.

The regional studies and reports referred to identify further need for information about the river and potential impact of dredging upon it. These studies are an on-going process.

Webb McKeown and Associates stated in their submission on behalf of Bate Walls Pty Limited that the Sydney Extractive Industry Regional Environmental Study recommends that until detailed studies result in the development of generally acceptable parameters for dredging, it seems appropriate to continue current practice and consider extraction proposals on their merits. The recommendation referred to is contained in Section 7.2.4 (Page 75) of the Study and relates to "Hawkesbury/Nepean River dredging". This recommendation does not apply to dredging from the Colo River.

The recommendation for the Colo River is found in Section 7.2.7 (Page 78) and states that "... no extraction should be allowed excepting limited remedial dredging, and then only if it can be demonstrated to be economically workable (e.g. in terms of costs saved by reducing floods) and environmentally acceptable. The main purpose of such dredging should not be the extraction of the sand resource."

One difficulty is that all the regionally based studies and reports, with a few exceptions, do not provide detailed information relevant to the Lower Colo River. There is a tendency to consider issues in terms of the Hawkesbury/Nepean Valley without specific focus. Apart from the distinction between the conservation values of the Upper Colo and recreation uses and potential of the Lower Colo, there is little hard information from these studies and reports about the Lower Colo.

The S.P.C.C. sees the need for greater understanding of the interactions of water quality, productivity, salinity and tidal behaviour associated with deepening the river system by sand extraction. But its reference is to the Hawkesbury River system as a whole. Unless detailed information is produced from these studies applicable to the Lower Colo River, the difficulty of adequately assessing the compatibility of dredging the river while maintaining the environmental qualities, of the lower reaches, and hence their regional significance will continue. This information would be relevant to either a remedial or commercial dredging operation.
In summary, therefore, I accept the regional significance of the Colo River. Its regional significance extends to the lower reaches. The lower reaches retain an attractive landscape of both natural and rural landscapes. Dredging the river is not compatible with these values.

The longer term effects on the river, notwithstanding the E.I.S. and supporting data produced by the Applicant's consultants, remains uncertain.

The proposed river based extraction is an isolated proposal, which is likely to lead to a further proposal to dredge the lower reaches of the Colo River. The Applicant has foreshadowed a Stage 2. The cumulative impact of a Stage 2 has not been addressed, nor of other dredging operations that may emerge for the Lower Colo.

River based extraction adjacent to Portion 37 would introduce a new location and would be contrary to regional consideration which supports a concentration in particular locations (e.g. Penrith Lakes). The application is premature in that the information based on environmental assessment for a coordination of extraction activities does not, at this time exist, for the Lower Colo River.

The proposed development is likely to interfere with the natural values of the river and river banks, and visual and recreational values and in this sense diminish their regional significance.
5 (d) Impact on the River

The Applicant has proposed a number of measures to minimise impact of the dredging operation on the river.

It proposes to set dredging limits at least 3m clear of the aquatic weed beds and 10m clear of local mean high water mark adjoining the alluvial river bank. A section would be marked out with buoys before extraction.

Maximum depth below local mean low water mark will not exceed 9.5m. Any transgression could be overcome by pumping sand back. A dredge ladder could be limited in length to ensure extraction did not go beyond 9.5m.

The Applicant contends that water quality will not be affected because of the coarse nature of the sediment, the very low fines content and the use of a cutter-suction dredge. Water quality in the Lower Colo is presently high.

River bank erosion is not considered a problem by the Applicant. The 10m set back of dredging operations and the final batter which will not exceed one vertical to four horizontal, it is claimed, will avoid damage to the river bank. The Public Works Department consider a 1 in 6 batter is needed.

The river bank was previously illegally breached by a dragline operation undertaken by the Applicant Company. No permission was sought by the Applicant under Section 23A of the Rivers & Foreshore Improvement Act 1948. The Applicant claimed that the action was undertaken innocently, in ignorance of the applicability of provision of this Act to the river bank of Portion 37. A Crown Reserve estimated for a depth of 30m extends along the river at Portion 37. The Applicant has reconstructed the breached bank in accordance with the requirements of the Public Works Department and the Crown Lands Office. The Public Works Department submitted the reconstruction and regeneration of the river bank has been completed by Bate Walls Pty Limited in a satisfactory manner.

The E.I.S. asserts that no existing bank erosion problems exist due mainly to the well vegetated nature of the banks and the sandstone bedrock exposure on the river banks opposite Portion 37. In addition, the river is tidal in this reach and has much greater in bank hydraulic capacity, than reaches of the river upstream. The comments about existing stability of the river banks is borne out by inspection of the river in this area, with the exception of the restored section of bank which is experiencing slumping and the revegetation cover of the restored bank is of different species to the undisturbed area of bank. A major flood in 1978 caused minor slumping of the river bank on the downstream edge of the site where overload flow rejoins the river. This area has now been naturally revegetated.
The Environmental Impact Statement states that the only section of the river bank that could be threatened in a major flood is the restored section of the river bank. Once plantings are established this threat is considered by the applicant to be removed. The proposed dredging operation, according to the Environmental Impact Statement will slightly reduce flood levels over a shorter distance, but it is claimed the impact will not be significant. Most of Portion 37 to the north of Lower Colo Road is subject to over flooding once in three years on average.

The Environmental Impact Statement states that the dredged material from the river bed will take about 50 years to replenish through siltation deposits. It is not considered that changes in sediment transport within the river and scour potential up stream and downstream will be significant.

The dredging operation will not increase salinity penetration, according to the Environmental Impact Statement. Tests on the river indicate salinity is low. The removal of sand will not significantly increase the tidal prism nor will it create a salinity trap.

The impact on aquatic flora and fauna is considered in the Environmental Impact Statement to be acceptable provided controls in the Environmental Impact Statement are adhered to.

No waste will be discharged to the river. The Environmental Impact Statement expects no pollution to occur to the river by either the dredging or the land based processing operations. The dredge will be of the cutter-suction type and will be constructed to a high standard to reduce probability of pollution from any mechanical or hydraulic parts. The cutter-suction dredge will reduce turbidity to the immediate vicinity of the dredge head. The applicant's claim that the nature of the bed material, with generally less than 0.29% fines, will also ensure that turbidity is not a problem.

The Fisheries Division of the Department of Agriculture submitted its interests in the lower Colo river include the commercial fin-fish and prawn fisheries as well as the oyster industry further down the river.

The Department identified various adverse environmental impacts that could be caused by dredging the Colo river bed in the area proposed. These include loss of river bank stability, loss of beds of aquatic plants and
deterioration of river quality. Any one of these impacts could have substantial deleterious effects. River bank collapse would destroy much of the riparian vegetation and cause widening and shallowing of the river channel. Each change would have major impact on the aquatic biota.

The Department, in its submission to the Inquiry, commented:

"Beds of aquatic plants, generally dominated by the submerged macrophyte *Vallisneria gigantea*, are a major feature of the local aquatic environment. Research on the ecological role of these beds is incomplete, but it seems beyond doubt that they are of critical importance as stabilisers of the river bed; as shelter, habitat and food resource for a major proportion of the river's aquatic life; as a migration corridor for the young of important fish species; and as assimilators of nutrients. Dredging can readily cause the direct destruction of these plant beds. Indirect destruction of plant beds on a broader scale is likely to occur if river bank slumping, increased suspension of fine stream-bed particles, or increased water temperature result from dredging. Turbidity from suspended particles can be due to design or operation of the dredge itself, or to treatment wastes. A long-term increase in water temperature is feasible as the result of extensive bank collapse, with widening and shallowing of the channel allowing increased solar radiation of the water body.

Direct effects of dredging on aquatic fauna would be limited to destruction of stream-bed animals within the site. These animals could be expected to re-colonise the site after the completion of dredging, although the rate at which this would occur is unpredictable. Indirect effects would be far more widespread, severe and long-lasting after occurrence of any of the environmental changes referred to earlier. It is believed that the valuable recreational fisheries, and the commercial fisheries for prawns and fin-fish, are vulnerable to such environmental changes.

In general, the proposal will not have a direct effect on the areas of responsibility of the Fisheries Division if the various environmental changes referred to can be avoided. If these environmental changes did follow dredging, the effects on fisheries, and aquatic habitats and their biota could be extensive and serious. Such matters as hydrological and sedimentological calculations, maintenance of stream bank stability, control of dredging and preservation of water quality are largely the responsibility of other authorities."

The Division of Fisheries questioned the desirability of the proposal to dredge the lower Colo river, but nevertheless would not oppose the issue of an approval if the Commission of Inquiry was satisfied:

(1) The major environmental changes referred
to above will not occur.

(ii) The approval to operate a dredge in the Colo river will create a precedent.

(iii) The demand for and general shortage of the resource, justifies conduct of the proposal.

(iv) The operators have readily available the necessary expertise and finances to carry out the operation in an efficient manner.

(v) Operations are adequately supervised and will be terminated immediately if conditions imposed are violated.

(vi) A bond of sufficient magnitude is deposited to allow rectification of environmental damage should the latter occur.

(vii) Dredging in the area can be reconciled with current "Class P" classification of the Colo river under the Clean Waters Act.

"It is considered that further applications for dredging on the Colo river can be anticipated in the future and in view of this it would be desirable if a study was commissioned to examine the general question of dredging on the river system to avoid the problem of examining individual applications on an ad hoc basis."

The S.P.C.C. expressed its opposition to "approvals" being issued on an ad hoc basis for dredging on Hawkesbury/Nepean river and its tributaries. The S.P.C.C. was more concerned with the cumulative impact of a number of dredging proposals, which, in themselves, may have little adverse environmental impact.

"The basis for concern is related to the effects of dredging on:

(i) the nutrient assimilation capacity of the river being reduced as a result of deepening with consequent water quality problems.

(ii) increased salinities resulting from changed hydraulic and tidal behaviour.

(iii) reduction of productivity of the river system as a result of reduction in extent of shallow areas.

The Commission and other organisations are undertaking
detailed studies of the Hawkesbury river system to enable a greater understanding of the interactions of water quality, productivity, salinity and tidal behaviour associated with the deepening of the river systems by sand extraction. Until the results of these studies are available, the Commission expressed opposition in principle, to further development consents being granted for sand extraction.

The Colo River may not be particularly important in the Hawkesbury system in relation to the above matters, but at this stage the Commission does not fully understand the interactions and considers that a conservative approach should be adopted.

The Commission anticipates that the results of the studies will indicate that a programme of sand extraction can be implemented in the Hawkesbury/Nepean/Colo systems. This programme would be dependent on controls on permitted sewage discharges to the river, retention of identified valuable shallows and an assessment of salinity effects to be integrated both in time and area having regard to these and other factors. There are no sewage outfalls upstream on the Colo River.

The S.P.C.C. commented that:

"The E.I.S. concludes that investigations carried out for the proposal indicate that the impact of the operation upstream and downstream in the river will be limited to a relatively short distance and will be of insignificant nature. However, the issue of the cumulative effects of this and other proposals is not addressed. Indeed, it is suggested in the E.I.S. that any future proposals be assessed on their individual merits. Linked with this statement is the contention that approval for this proposal will not establish a precedent. In this regard, the Commission's experience is to the contrary."

Longworth & McKenzie on behalf of the Lower Colo Action Group has questioned the stability of the reinstated river bank. They indicate two attempts to reinstate the bank. Initially river type sand was placed or left at a lower level and then the indurated type material from Portion 37 was placed on top. They acknowledge the upper layer of material is well compacted. However, no information is available for the lower material. The consultants are of the view it is river sand. This, it is claimed, is susceptible to basal sapping with consequent upper bank collapse.

At the reinstated section of bank and upstream of the proposed dredging, the river will tend to return to its normal bed character if sand is extracted in excess of the rate of nourishment. This is, of course, proposed. Consequently it is expected
that the bank sand (and the base of the reinstated bank) would move back into the bed of the river where it has been extracted, with consequent bank collapse even though the top of the reconstructed bank has been properly constructed.

No evidence has been given to the Commission to suggest that this is not a correct assessment of the effect of dredging, as proposed, the consultants submitted.

The Colo River Action Group consultants contended that a flood chute would be caused by the past land based extraction on Portion 37 in conjunction with the proposed river extraction. It was considered that in all probability scour out of the sedimentation ponds and wash away of land based equipment and stockpiles would occur in a flood.

Longworth & McKenzie considered that turbidity would be caused both by the proposed dredging and by return flow from the settlement pond system direct to the river. They claim the ex-filtration mechanism proposed in the Environmental Impact Statement has not worked elsewhere. Turbidity occurred during previous river extraction (when the bank was breached).

The Public Works Department made the following points:

* The Department has considered the likely impact on river processes of the proposed dredging of sand from the Colo river in terms of its responsibilities under Section 23A of the Rivers and Foreshores Improvement Act (1948) as amended.

* The Department's assessment has relied on the engineering information contained in the Environmental Impact Statement and field inspections. The Department considers the engineering consultants who prepared the Environmental Impact Statement, Webb McKeown and Associates, to be competent in this field and to have adequately addressed the important aspects of river processes likely to be affected by the proposal.

* The Environmental Impact Statement indicates that as a result of the proposed dredging:-

(i) flood levels would be reduced upstream of Portion 37;
flood velocities would be marginally reduced across the floodplain of Portion 37, and would be in the range of 1.2 to 1.7 m/s during a flood of 1% probability;

(iii) the dredged hole would intercept sand transported by flood flows and would take about 50 years to fill with sand after extraction;

(iv) the river bed downstream of the extraction area would scour by an average annual rate of 0.03 m extending for a distance of 600 m downstream of the dredged reach.

* The overall conclusion that can be drawn from these studies (i.e. Environmental Impact Statement) is that significant adverse effects are not anticipated. The Department considers that, from a river processes viewpoint, the site is less sensitive than many others currently dredged in the State's rivers.

* The suggestion by Dr. S. Riley (for the Colo River Action Group) that a flood channel might be scoured across Portion 37 is not consistent with:

* the aggradational history of the site;

* the lower flood flow velocities over the area compared with those in the channel (1.7 m/s compared with 3 m/s, Figure B5 in the Environmental Impact Statement) and the decreasing overland flow velocities downstream (1.68 m/s down to 1.13 m/s). These results indicate that sand deposition would be expected;

* the contours of the site (Figure 10, Environmental Impact Statement);

* the behaviour of flood flows over levees elsewhere.

Some reworking of the area by floods, involving areas of deposition or scour, are to be expected as has occurred in the past, but large scale deleterious scour is of low probability.

* In consideration of bank stability aspects, general principles suggest that a reduction in sand transport, as a result of interception of sand by the proposed dredged hole, is more likely to lead to a deepening and narrowing of the river in the reaches upstream and downstream of the site, rather than to bank erosion.
The provisos to this are that the dredged hole has adequately gentle batters and an offset from the bank. The Department's experience suggests that a 10m offset, 1 in 6 batters and a maximum depth of 10m are unlikely to lead to bank erosion at the subject site.

* If extraction was approved, the Department would require detailed survey monitoring of river cross-sections, extending along the river from 2.5kms upstream of Portion 37's upstream boundary to 3kms downstream of Portion 37's downstream boundary. In view of the number of sections that would be required, resurvey at six monthly intervals (and after floods) is a reasonable time between surveys.

If unforeseen changes occurred during monitoring, then these would be readily identified from the survey results and remedial action would be directed to be taken.

* In respect of the reconstructed river bank, the restoration proposal was devised by consulting engineers engaged by Bate Walls in accordance with Public Works Department requirements. During this time, the Department was in consultation with Hawkesbury Shire Council and the Crown Lands Office. The restoration represents the best practicable result in the circumstances existing at the time, and was achieved without direct cost to the State.

The design and standard of construction are adequate to ensure that a stable structure has been achieved. Minor fretting on either side of the embankment does not endanger its stability or serviceability in view of the wide crest. The river side of the embankment will eventually revegetate and develop an appearance similar to the undisturbed banks elsewhere on the river. The constructed batter on the lagoon side of the bank is to a gentle 1 in 6 grade and there is no danger in the minor infiltration flow erosion that has occurred."

The Department of Public Works was also of the view that the potential impact of salinity penetration was negligible.

Travers Morgan on behalf of the applicant company commented in relation to the S.P.C.C.'s concerns that removal of shallows would decrease both the water velocity and the attached aquatic plant community, thereby
decreasing the rate of nutrient removal. Travers Morgan stated:

"This, (the S.P.C.C.'s concern), does not appear to be particularly relevant to the proposed activity in the Colo River. The existing aquatic plants (Ribbon Weed Beds and their associated plant species) would act as the prime assimilators of any nutrients discharged upstream. The dredging proposal will not result in the loss of any of these beds, and there will be no significant change in water velocity as a result of dredging. The capacity of the Colo River to absorb nutrient input would therefore be relatively unaffected. The only reduction in capacity to assimilate nutrients may be due to the loss of any microscopic algae attached to the sediment in the centre of the river bed. This would be lost during dredging and any recolonisation would depend on the degree of light penetration to allow regrowth. In any case, the problems occurring in the Hawkesbury river and other areas referred to by S.P.C.C. are due to excessive nutrient discharges from sewage works. There are no major sewage discharges in the Colo River and the nutrient levels in the river are normally quite low.

Similarly, the primary productivity of the river would be unlikely to be affected if the weed beds are maintained intact. The light dependent microscopic algae attached to sediment in the centre of the river bed will be lost, but as most primary production of attached plants occurs in the macrophyte beds which grow in shallow, protected areas along the river edge, it is unlikely that this loss would be of significance."

The Crown Land Office which has administrative responsibility for the river bed and bank including the Crown Reserve along the river at Portion 37 expressed the following concerns about the proposed dredging operation:

* The rehabilitation carried out on the reformed bank of the river has subsequently deteriorated and will require additional work. The stability of the reformed bank and its revegetation are now matters of concern. Significant sections of the bank on the landward side have slumped apparently due to infiltration from the river. The stability of the riverfront bank is also suspect as evidenced by a number of Casuarinas having slumped into the river. These stability problems appear to be the result of the steep gradients adopted for the reformed section of the river bank (and maybe settlement and runoff). The Biological Consultants in the E.I.S. (Page C-21) further identify the need to recontour batters below the waterline in this area so that weed beds have a greater success in recolonising.

* Originally the Reserve has a shallow gradient with a small sand spit and consequently, had the potential to provide ideal access to and from the river. However, in the course of reconstructing the section of the river bank that was breached, the sandy spit has been covered and the batters of the banks reformed at a much steeper gradient. This has been detrimental to the recreational potential of the Reserve and the Crown Lands Office will
be seeking the provision of shallow grading to provide safe public access to and from the river.

Table 9 of E.I.S. indicates infiltration into the sedimentation pond occurs due to tidal action. Although it is stated that during ebb tide exfiltration from the pond is significant, it is not stated whether infiltration will affect the capacity of the pond to accept the volume of slurry generated when the plant is operating at full capacity. As the date included in Table 9 was only based on part of a tidal cycle, conclusions drawn from this data could be questioned.

The effect of infiltration into the sedimentation pond on the stability of the banks has not been addressed.

Transportation of materials from the site is expected to account for some 70% of all traffic over the 4km of unsealed Blaxland Ridge Road. The road traverses undisturbed Crown Land and is notorious for severe dust generation. Potential adverse impact caused by dust on roadside bush vegetation has not been addressed.

The E.I.S. states that removal of fines from the sedimentation pond may be required. However, the proponent fails to state what is to be done with these fines.

It is claimed that the proposal will have no impact on the aesthetic or scenic value of the area. The validity of this statement is questionable if one takes into account the number of heavy vehicle movements to be generated by the proposal (90 truck movements per day).

The submissions made to this Inquiry on potential impact on the river by various parties represent a range of conflicting views of qualified consultants and differing views by Public Authorities reflecting their statutory and administrative roles.

I have carefully considered the applicants supporting experts' opinions in regard to bank stability, salinity, penetration, turbidity, and the ecology of the river. I have noted the Applicant's arguments that there will be no measurable effect of salinity penetration, and that references to the Hawkesbury/Nepean have little application to the Lower Colo adjacent to Portion 37. On the issue of bank stability, the Applicant has argued that the site of Portion 37 has historically been subject to a natural process of river deposition, that the "engineered" reinstated bank is capable of withstanding flood; that dredging will not undermine it; that it has already withstood a bankfull flood in November 1984. No flood chutes were formed in the 1978 major flood and the river banks at that time stood up remarkably well. They have argued that the sedimentation pond will not involve direct discharge to the river and refer to the past 2½ years of its operation.
The cutter-suction dredge with 10m set back from the river bank at local mean high water mark would ensure no turbidity and no bank instability.

From the submissions made to the Inquiry and my inspections, I am of the view that the Lower Colo including the section adjacent to Portion 37 is a river of regional significance to the Sydney region. This significance must be seen in both conservation and recreational values. The lower reaches, although disturbed along the river flats by small scale and sparse farming activity is a highly scenic area reflecting harmonious natural and rural landscapes. The lower reaches of the river itself are remarkably preserved and the water of very high quality. In these circumstances applicants such as Bate Walls Pty Ltd need to establish that a first ever river dredging operation, can be operated without likely adverse environmental impact on the river. I do not, in the circumstances of this application consider that in relation to river bank stability, turbidity and impact on the ecology of the river, they have discharged this obligation.

A number of control measures were proposed by Webb McKeown & Associates to overcome or mitigate adverse impacts. These include the cutter-suction dredge, no dredging within a strip of 10m wide measured from local mean high water mark adjoining the alluvial banks, maximum excavation slopes of one vertical to four horizontal, maximum depth below local mean low water mark not to exceed 9.5m. No dredging within 3m of existing weed beds.

These and other control and monitoring measures which form part of the proposal would require, in the highly sensitive environment of the Lower Colo and this particular site, a very strict complianc. An Applicant needs a proven management performance in meeting and abiding by environmental controls and a high degree of supervision by monitoring authorities. I am not satisfied that, in this case, those responsibilities will be discharged on a virtual day to day basis.

Experience shows, born out by submissions to this Inquiry, that it is very difficult to control and enforce environmental safeguards in relation to commercial extraction operations. Control of this Applicant's dredging operation would be difficult. Constant supervision and monitoring would be required to ensure compliance. I am not satisfied the time and resources available to the Public Authorities could ensure that high level of supervision. Nor does the record of the Applicant inspire confidence. The Applicant cut through the river bank in 1982-3 to allow a dredge to be taken into a hole dug by a dragline. This was done without permission, in breach of Section 23A of the Rivers and Foreshores Improvement Act, (1948) through a Crown Reserve, without even a cursory environmental assessment of likely impacts and without development consent. Under threat of legal action, the Applicant has reinstated the breached bank to the Department of Public Works requirements. These actions followed refusal of a development application by Hawkesbury Shire Council to enter the river in 1979. Mr. Bate stated that he was unaware of the Crown Reserve and that the breaches of Section 23A were
not carried out with intent. He and his company were ignorant of it provisions. I note in this regard that the breach occurred in 1982-3 and that in the copy of the judgment submitted to the Inquiry by the Applicant (Council of the Shire of Colo and Martin Bros. Soils Pty Limited & ORS No.1541 of 1978 Mr. Bate being a Director of the first defendant) his Honour considered the question of whether the sand extraction of Portion 37, at that time, was unlawful in that it contravened the provisions of Section 23A of the Rivers and Foreshores Act (1948). Presumably, those provisions of that Act was argued in the proceedings in which Mr. Bate was a party. I find it surprising, then that in 1982-3 he is unaware of the statutory provisions. On the other hand, I have considered the significant effort that Mr. Bate has made to rehabilitate the extracted areas of Portion 37, although I have noted that this work has been undertaken only in recent months in the lead up to this Inquiry. However, in all these circumstances, I am not satisfied, that, even if the control measures proposed were adequate, strict compliance would be adhered to and adequate supervision and monitoring of the dredging would be undertaken to ensure controls were met.
5.(e). **Noise**

The locality around Portion 37 presently enjoys low background noise levels. Bate Walls Pty Limited through its consultants, Webb McKeown & Associates, have proposed a number of measures to mitigate noise impact. Operating hours are restricted, the processing plant is located to utilise topographical features of the site to reduce noise impact. Noise proofing insulation and silencing are proposed on plant and machinery.

The E.I.S. set out noise levels that may be experienced at local residences:

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<th>0600-0700</th>
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<tbody>
<tr>
<td>YANNAMEENA</td>
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<td>46</td>
</tr>
<tr>
<td>BUCKENBAH</td>
<td>27</td>
<td>44</td>
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<tr>
<td>RYAN RESIDENCE</td>
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<td>40</td>
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<tr>
<td>McDOUGAL RESIDENCE</td>
<td>24</td>
<td>34</td>
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</table>

The E.I.S. asserts noise levels generated by present truck usage is comparable to those which will occur from the new proposal. However, the number of truck movements will increase by an average of 30 per day. Reconstruction and sealing of Lower Colo Road from the site up to West Portland Road will reduce noise from trucks, particularly empty trucks returning to the site. There are no specific measures to reduce noise applicable to the current operation (it has never received development consent). Whether the current operation is licensed under the Noise Act by the S.P.C.C. is not known.

The S.P.C.C. considered the 0700 hours starting time for truck movements more appropriate. The Applicant conceded this time change.

The Commission considered the background noise level of from 30 to 38 dB(A) would be more often closer to 30 dB(A) than 38 dB(A). The operation's noise level is up to 46 dB(A) and does not meet the Commission's criterion of background level plus 5 dB(A). Unless reduced to this order the S.P.C.C. could not support the proposal.

The Commission queried noise measurement from truck movements. The increase in truck movements may cause a major noise problem. It should be examined, because of its non-continuous nature, with L eq measurements and not L10 18 hour measurements. The Applicant's noise consultants, Wilkinson Murray have not used L10 18 hour, or L eq measurements. They considered peak levels of truck passbys at nearest residences and compared these against the design goal of 55 dB(A) for 0700-1800 hours. Their approach takes account of intermittency of truck noise by assessing the resultant noise against an assumed background noise level, after operations commence plus 15 dB(A).
The Applicant's consultants concede that the commonly accepted method in Australia of settling noise design goals is to consider the background noise plus 5 dB(A). Here they seek to rely on the S.P.C.C. recommended limits to background noise levels based upon land zoning and predominant land use taken from the S.P.C.C. 's draft environmental noise control manual. Under the guidelines, the acceptable daytime limit being 45 dB(A) and a maximum limit being 50 dB(A) for rural areas. They wish to rely on this limit on the basis of the other community benefits flowing from the project and that all practical noise control measures are implemented.

All practical noise control measures have been proposed for this project. The highest resulting noise level will be 46 dB (A) i.e. 1 dB (A) above S.P.C.C. limits for rural areas. However, Webb McKeown & Associates concede there will be a significant increase in residents and river users perception of noise. These noise levels would only be experienced for about six years.

The area of the lower reaches of the Colo, around Portion 37, is a very quiet and tranquil area, notwithstanding the small scale extraction activity on Portion 37 in recent years. There is little noise disturbance from traffic. Power boats on the river are restricted to low speeds.

I am of the view that, notwithstanding the noise control measures proposed by Bate Walls Pty Limited, the projected noise levels are excessive in the circumstances of the present environment in the vicinity of this development.
Traffic flow associated with this proposal would average 90 truck movements per day transporting sand and return empty to the processing plant. Peak levels could be well in excess of this. Longworth McKenzie have estimated peaks of 130-150 movements per day. These truck movements give rise to a noise problem already referred to in this report. There is also a potential dust problem, although upgrading and sealing of local roads may overcome dust nuisance. The applicant has accepted Hawkesbury Shire Council's proposals for upgrading the local roads to be used as traffic routes and to make a financial contribution to the required works. The applicant suggests the upgraded road will provide a suitable means of access in the future to the Crown reserve adjoining Portion 37 and is prepared to dedicate part of Portion 37 for access to the reserve.

The excessive noise associated with truck movements is a serious adverse impact on the locality. Also truck movements of an average of 90 per day are likely to conflict with the existing amenity of the area along Lower Colo Road and West Portland Road and intrude on the natural and rural qualities of the locality.
FINDINGS

1. Under the Hawkesbury Shire Local Environmental Plan 1984, extractive industry on the river adjacent to Portion 37 and sand processing on that Portion are permissible uses with Council consent. (Clauses 9&32). Clause 35(1) "except as provided by sub-clause (11), a building shall not be erected on any land lying at a level below the 1 in 10 year flood frequency level at the appointed day for the area in which the building is to be located or on any other land which, in the opinion of the Council, was liable to flooding at any time before the appointed day"; and Clause 35(11) "Flood liable lands may, with the consent of the Council, be developed for the purposes of agriculture, caravan parks, forestry, open space, picnic grounds, amenity blocks, public conveniences, State emergency service establishments, roads or for purposes ancillary thereto only where development for those purposes is permissible under Clause 9." are also relevant to this development proposal.

Part of Portion 37 is flood liable. Evidence put to the Inquiry indicates on average a one in three year flood. That part of Portion 37 which, the applicant acknowledges, is flood liable is not accurately defined, but the applicant states it comprises the site or most of the site of the proposed sand processing plant.

The Hawkesbury Shire Council submitted that the sand processing plant was a prohibited use under Clause 35(11). The Council submission is based on the exclusion of extractive industries from Clause 35(11). I am not satisfied that the proposed use is "prohibited" by reason of sub-clause 35(11) of the L.E.P.

Clause 35 needs to be read as a whole and also within the context of the L.E.P. Clause 35 (1) contemplates uses other than those stated in Clause 35 (11). However given the evidence in the E.I.S., about flooding on the processing site, it may be that consent should not be granted under Clause 35. That decision would turn upon detailed information about flooding.

This development application and the supporting documentation does not address the issues of buildings, (sand processing plant and delivery line), in terms of Clause 35. The flood liable sections, within which the delivery line and processing plant are located, are not accurately defined in area and flood frequency. The Environ-
mental Impact Statement states that "most of Portion 37 to the north of the Lower Colo Road is subject to overbank flooding once in 3 years and the average velocities are of the order of 1.0 to 1.5m/s and depths range up to 10m over the land area. In this regard, the proposal does not meet the requirements of Clause 35. The applicant referred to alternative locations on Portion 37 for a processing plant, but none were put before the Inquiry.

It may be that, reading Clause 35(1) and 35(11) together, the consent authority may not approve a building or buildings (that is, the processing plant and the delivery line) as they are located in flood liable land, notwithstanding that extractive industry is a permissible use with consent under Clause 9 of the Hawkesbury Shire L.E.P. 1984. The detailed information is not before the Inquiry to determine sections of Portion 37, if any, that may fall within a 1 in 10 year flood, although the Environmental Impact Statement indicates that the site of the processing plant, or at least most of it, is within a one in three year flood area.

On the other hand, I am unable to support the applicant's submission that the issue may be resolved by lodgement of an objection under State Environment Planning Policy No.1. In my view, that policy, which relates to development standards, is not appropriate to resolve problems related to a development application which go to the issues of purpose or use. No objection under S.E.P.P.: No. 1 has, in any event, been lodged.

In these circumstances I do not think development consent should be granted to this application.

2. The applicant seeks to rely upon existing use rights in law in respect of both sand extraction and processing upon Portion 37. The applicant tendered two judgements:

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<tr>
<th>Court of Appeal</th>
<th>Judgement Details</th>
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<tbody>
<tr>
<td>Supreme Court of New South Wales</td>
<td>Council of the Shire of Colo v. Martin Bros., Soil Pty Ltd &amp; ORS of 1978</td>
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C.A. 98
E.D. 1541
No. 1541
The application submitted two proposals arising from its existing use claims:

(a) The applicant seeks to trade off its existing use rights to extract on Portions 37 and 73 in exchange for a development consent to extract from the river. Existing use rights to extract would be legally surrendered over Portion 37 upon "Stage One" approval and over Portion 73 on "Stage Two" approval. Existing use rights to process sand on Portion 37 would be retained for the life of Stage one and Stage two (6 years) and Portion 37 would be rehabilitated. A Stage 11 Environmental Impact Statement and development application have not been lodged.

(b) The applicant seeks to rely on the existing use rights to process sand through the new plant on Portion 37 to overcome the problems of approval under the Hawkesbury Shire L.E.P. referred to above.

Although certain benefits, particularly the rehabilitation work proposed, flow from the proposed tradeoff, I am not satisfied that the benefits outweigh the environmental disadvantages of river based operation. I note that limited supplies of sand remain to be extracted from Portion 37. The applicant refers to about 8 months supply (90,000 tonne) at the time of the Inquiry. It is not this Inquiry's function to determine whether and to what extent existing use rights exist in law. My reading of the two judgements is that the issues are far from conclusively determined. A number of questions arise: Interpretation of the judgements, the judgements precede the introduction of the Environmental Planning and Assessment Act; the extent of any existing use rights over Portion 37; issues of proof. It is noted that the north west section contains a farmhouse and fenced off paddock and does not appear to have been previously extracted. It is unlikely that, prior to 1962 (the relevant date) this particular area of Portion 37 was extracted and then left for future extraction of further sand deposition by inundation from time to time. This is the area in which the applicant has its remaining sand supply on Portion 37. No evidence of prior sandstone extraction was put before the Inquiry. Do existing use rights extend to stone extraction as claimed by the applicant? It is far from clearly established and in any event, should be resolved, if disputed by the Land and Environment Court. It is probable that the applicant company has established existing
use rights to process sand in respect of the existing plant. However, I am not satisfied that the Applicant has established existing use rights in respect of processing on Portion 37 which, given Section 107 and Section 108 of the Environment, Planning and Assessment Act and the relevant regulations, would enable consent to an expanded processing plant proposed within the flood prone section of Portion 37. The E.I.S. (Page 9) sets out the existing equipment and plant and the new proposed plant and facilities. There is considerable difference between the two. Whether the criteria for an approval for the new plant could be successfully met in respect of the new plant based on existing use claims is far from clear on the evidence.

Therefore, in weighing the balance of the merits of the proposal against the adverse environmental impacts likely to be caused by a first ever river based extraction by dredging in the lower reaches of the Colo, I am of the opinion, that proposed benefits from a trade-off of existing use rights over Portion 37 at this time, do not justify a consent for river based extraction. Nor do I consider the existing use claims would provide a sufficient basis upon which the determining authority ought put aside the planning provisions relating to flood liable lands, and acquiesce in a new sand processing plant being established on Portion 37.

Although this proposal pertains to Portion 37 and the Colo River the question of other adjoining portions to which the Applicant claims existing use rights arose during the course of the Inquiry. The portions are Portions 37, 67, 68, 73, 118, 122, 125 and 184, Parish of Meehan, County of Cook, being subject of the decision by the Court of Appeal in January, 1980. There was no suggestion that existing use rights to these portions would be relinquished in conjunction with those pertaining to Portion 37.

Any "trade-off" between the river and land-based operations would therefore resolve only a part of the potential long-term extractive operations and their environmental consequences.

3. The Colo River (including the lower reaches) is an area of high environmental and scenic qualities. The Colo River is relatively undisturbed. The lower reaches present an attractive blend of natural and rural landscapes. Small scale farming and orcharding along parts of the lower river flats are not obtrusive
and have little or no serious impact on the river. The Colo River, including the lower reaches, is likely to become an increasingly important recreational asset for the expanding population of Sydney's West and North-West.

The Colo River, including the lower reaches, is of regional significance in terms both of its conservation qualities and existing and future recreational uses.

Commercial extraction of sand is not compatible with regional significance of the river. The proposed extraction could in no way be seen as comparable with remedial dredging contemplated by the Sydney Extractive Industry Study.

The proposed first ever dredging operation (in practical terms) is an isolated development with a limited term (3 years with a possible extended operation for an additional 3 years). It may, notwithstanding that development proposals need to be dealt with on their respective merits, lead to further applications by either the Applicant or other potential operators. In these circumstances, the cumulative environmental impact of dredging of the lower reaches would need to be investigated so that the Bate Walls Pty Limited proposal, could be assessed in the context of potential cumulative impact and the issues of co-ordinating, staging and overall management arrangements and controls addressed. This has not been done.

The regional reports and studies referred to in this report and submissions to the Inquiry foreshadow detailed study and investigations in relation to regional considerations of the Colo River and the impact of extractive activities on the Hawkesbury/Nepean River Valley system of which the Colo River is a tributary. These studies and investigations are not yet concluded. In this respect this proposal is considered premature.

Portion 37 has added significance by reason of the Crown Reserve along its frontage to the river. There are a few places on the Lower Colo providing opportunity for public access. The sedimentation pond of the proposal intrudes on this Crown Reserve.

The proposed development is likely to interfere with the natural values of the lower reaches of the river, and the river flats and Crown Reserve adjacent to Portion 37. It is likely to intrude on the scenic qualities and recreation uses of the river and diminish its regional significance.
4. The sand which would be obtained from the Colo River is a coarse grained, high purity silica sand especially suited to a number of specialist applications. Although the Colo River sand could provide a useful source of coarse grained sand for construction and specialist applications, coarse grained sand of a similar quality can be economically obtained from a number of alternate sources.

The sand resources of the Hawkesbury/Nepean River approach the Colo River sand in coarseness and in the past, the Hawkesbury/Nepean River sand has been used for a number of specialist applications. In addition, sand of a similar coarseness to the Colo River sand is produced at the Penrith Lakes Scheme by blending sand with fine crushed gravel. The high quality sand resource of the Neunes Plateau provides another alternative to the Colo River sand. For sometime, it has been economic to import this resource into the Sydney Region for the manufacturing of construction sand products and filter sand. Potential also exists for extracting medium-coarse sand from Maroota and the Somersby Plateau.

Sand similar in quality and end use applications to that which could be obtained from the Colo River, can be economically obtained from other deposits.

I am, therefore, satisfied that existing and alternative sources of medium-coarse sand are available to meet market demand within the Sydney Region in the short to medium term as indicated by the Sydney Region Extractive Industry Study. That demand may be met without extraction from the Lower Colo River. Some penalties may be involved in terms of transport costs, but from the evidence, these do not outweigh, on balance, the adverse environmental impacts likely to be caused by a first ever dredging operation of the Lower Colo River.

Deposits in other parts of the Sydney Region, and on its fringe, include land based deposits. These may be less vulnerable to environmental problems, than the Lower Colo River although they may not be as conveniently located. The Applicant, it is noted, claims existing use rights to extract sand over other portions in the Hawkesbury Shire which may involve potential land based extraction.

5. The proposed dredging of the Lower Colo River adjacent to Portion 37 is a large scale extractive operation, although it only involves a 3 year life. The measures proposed by the Applicant to minimise impact on the river based extraction (dredging limits at least 3m clear of aquatic weed beds, 10m clear of local mean high water mark and maximum dredging depth of 9.5m) on the river itself and its banks do not, on the evidence put to the Inquiry, conclusively
overcome potential adverse environmental impact.

River bank stability remains an issue of considerable uncertainty added to by the Applicant's illegal breach of the river by dragline operations in 1982 and the subsequent enforced re-statement of the bank to Public Works Department requirements. There is evidence of continued slumping. The Applicant's consultants acknowledge that until vegetation is established on the restored section of the bank, it could be under threat from a major flood similar to that which occurred in 1978. Vegetation is not yet established although considerable progress has been made.

The Applicant proposes river bank batters of one in four, but the Public Works Department recommend one in six.

Webb McKeown and Associates are confident that turbidity will be contained within an area around the cutter dredge. Inspection of river and other evidence raises questions about the extent of turbidity that may occur. It is acknowledged by all parties, that turbidity would have an adverse impact on river bed plants which are considered critical to river stability.

On the issue of the impact of the proposed dredging operations, the submissions to the Inquiry reflect conflicting views of expert consultants and of Public Authorities with varying statutory and administrative functions. From my inspection of the river and careful consideration of the submissions I am not confident that adverse impact on the river, will not occur. Two key areas of uncertainty are instability of the restored bank from dredging and the impact of dredging on the aquatic plants of the river bed. Other concerns expressed by the State Pollution Control Commission and the Fisheries Division may be resolvable by appropriate control measures strictly complied with.

The potential for adverse impact on the river needs to be weighed against the present high quality of the lower reaches, the present stability of its river bank (except the uncertainty of the restored section), the natural and scenic qualities of this stretch of this river, and its regional significance. This places, in my view, a high onus on the Applicant to establish that the river will not be detrimental effected by the proposed dredging. I do not think the Applicant has met those standards in its E.I.S., supporting information and submissions to this Inquiry.

6. A substantial section of Portion 37 is flood prone (One in three years, according to the E.I.S.) The suitability of the site for a processing plant involving
components such as delivery lines, conveyors, screening equipment is not adequately addressed by the E.I.S. The Applicant acknowledges warning times for floods are short. Electric motors are to be easily removed for this reason. There is a likelihood of plant equipment including the dredge being washed down river in a flood. A delivery pond is to be established about 15m² with a small bund or levee around to prevent overland flow entering the pond. The evidence suggests floods would inundate the delivery pond. The feed hopper is about 2.5m high and of similar width and breadth. The oversized screen - 2.5m high, 3m long and 2.5m wide. The cyclone - 3m high tapering from 0.75m at the top to 0.2m wide at the base. The base would be suspended about 5m above the ground. The total height would be 8m. The stockpile has three days supply, about 3000 tonne. All these may be effected by flood flows. The impact of a flood, in washing parts of plant down the river or upon ponds and stockpiles, is not adequately addressed.

The plant, involving a substantial up-grading and expansion of the existing meagre plant on site, would have a substantial visual impact.

7. The proposed river based extraction would require stringent implementation of control measure and very careful monitoring. Good management of the dredging operations would be essential to avoid adverse impact on the river.

The E.I.S. claims that impact on the river may be contained within acceptable environmental limits provided the controls proposed are adhered to.

In this regard, the Applicant Company's past performance in extraction on Portion 37 has bearing. Also relevant is the feasibility of regular supervision by public authorities to ensure control measures and conditions of any development consent are met.

I am not satisfied that, given the Applicant's past performance, in particular on Portion 37, and the illegal breach of the river bank, strict control will be maintained over the life of the dredging proposal. I am not confident that with the limited staff and time resources available to the public authorities, the required degree of supervision and monitoring would be carried out to ensure controls were adhered to and adequately monitored on a strict basis.

I cannot, therefore, with reasonable confidence be satisfied that the control and monitoring measures will be adhered to at all time, in respect of the proposed development.
8. The location of the sedimentation pond within the river bank Crown Reserve is unacceptable. It is not consistent with the recreational potential of the Reserve. The Crown Lands Office proposed recreational uses for the Reserve. This Reserve is one of the few on the lower reaches of the Colo and provides opportunity for public access to the river bank.

9. Noise generated by the proposed operation is excessive. The Applicant's consultants acknowledge that all practical noise control measures have been proposed. Background noise levels are particularly relevant as far as this proposed development is concerned. The tranquil environment of the river and surrounding areas is one of its significant environmental features. An operational noise level of 46 dB(A) in the context of a background level of 30 to 38 dB(A) (closer to 30 dB(A), according to S.P.C.C.), in the circumstances of the local environment at Lower Colo River is, in my view, excessive.

10. Truck traffic movements averaging 90 per day and peak at higher figures, are in conflict with the tranquil river environment of the area. The truck movements are a significant contributor to excessive noise associated with the project. They also intrude upon the natural and rural qualities of the local environment of the Lower Colo River.

On the basis of the comments within this report and the findings referred to, it is recommended that this development application be refused.
RECOMMENDATION

* The development application by Bate Walls Pty Limited to dredge sands from the lower reaches of the Colo River adjacent to Portion 37, parish of Meehan County of Cook, Shire of Hawkesbury and to process sand on Portion 37 be refused for the reasons set out in this report.
APPENDIX 1

LIST OF APPEARANCES

Bate Walls Pty Limited
   Mr. J. E. M. Bate, Director.
   Dr. S. Webb, Webb McKeown & Associates.

Department of Mineral Resources
   Mr. I. B. L. Paterson, Acting Senior Geologist.

Department of Environment and Planning
   Ms. S. Holliday, Head, Planning Division (South).

State Pollution Control Commission
   Mr. W. Train, Executive Engineer.

Crown Lands Office
   Mr. R. Walker, Chief Resources Officer.
   Mr. A. Leard, Regional Manager, Metropolitan Lands Office.

Hawkesbury Shire Council
   Mr. G. M. McCully, Shire Clerk.
   Mr. M. Coulter, Executive Planner.

Colo River Action Group
   Ms. G. Whitmont.
   Mr. E. Johnstone, Director, Longworth & McKenzie.
   Dr. D. James.
   Mr. P. McClellan, Barrister. (Instructing Solicitor:
      Mr. D. French of Speed & Stracey)

Nature Conservation Council of N.S.W.
   Mr. J. Somerville.

Total Environment Centre
   Mr. G. Angel, Assistant Director.
Society for Growing Australian Plants N.S.W. Limited

Mrs. R. Vermeulen, Secretary.

National Trust of Australia

Mr. R. McDougall, Coastal Research Officer.
Mr. G. Quint, Snr. Research Officer.

The Hawkesbury River Association

Mr. F. Recher, President.

Department of Agriculture

Dr. J. H. Harris, Biologist, Fisheries Division.

Windsor & Colo Truck Owners Association

Mr. M. Vella, Secretary.

Walter Heller Cash Flow Finance

Mr. G. W. Bartlett, Executive Director.

Riverside Holdings Pty Limited

Mrs. B. Hincks (read by Mrs. Hincks on behalf of W. & L. Ferris).

G. A. Ellis

Mr. D. French, Speed & Stracey, Solicitors.

R. M. Mackie

Mr. R. M. Mackie.

C. Wallis

Did not appear, written submission only.

J. Hincks

Mr. J. Hincks.

W. & V. MacKay

Mrs. V. Mackay.
Dorothy Gellatly
Mrs. D. Gellatly.

Joyce Bruce
Mrs. J. Bruce.

I. T. McEwan
Did not appear, written submission only.

J. Plant
Mr. J. Plant.

A. & L. Coates
Mr. A. Coates.

A. R. & L. A. Dibben Pty Limited
Did not appear, written submission only.

Bass Sydney
Mr. P. Leuver.

Protea Australis
Mrs. R. Vermeulen (read by Mrs. Vermeulen on behalf of Mr K.C. Bottomley, Proprietor).

Department of Public Works
Mr. G. Williams.

National Parks & Wildlife Service
Did not appear, written submission only.
APPENDIX 2

SCHEDULE OF DOCUMENTS

Bate Walls Pty. Ltd. (Applicant) Submission No.1

1.1  Primary Submission - see Annexure Note.

1.2  Model of Restoration Works to Portion 37, Colo River Co-ordinated Landscapes. 1:1000.

1.3.1  Plan showing Colo River bed adjacent to Portion 37. P.S. Graham & Assocs. Scale 1:1000. Sheet 1 of 8 sheets. Ref. No. S7443.

1.3.2  "  "  "  Sheet 2

1.3.3  "  "  "  "  3

1.3.4  "  "  "  "  4

1.3.5  "  "  "  "  5

1.3.6  "  "  "  "  6

1.3.7  "  "  "  "  7

1.3.8  "  "  "  "  8

1.4.1  Plan of Stadia detail lower Colo Road, West Portland Road to Portion 37, Shire of Hawkesbury. Reduction Ratio 1:1000. Council Plan No.1208-10. Sheet No.1 of 2 sheets.

1.4.2  "  Sheet No.2

1.5.1  Co-ordinated landscapes design and construction plan showing Perspective. Dec.83. Drawing No. 4283 A.1.

1.5.2  "  Site Analysis. Scale 1:1000 A.2

1.5.3  "  Proposed Landscape Plan. Scale 1:1000 A.3

1.5.4  "  Site Sections. Scale 1:1000 A.4

1.5.5  "  Plant Schedule. Scale 1:1000 A.5

1.5.6  "  Proposed Sand Processing Area. Scale 1:1000

1.6  Letter dated 26.7.85 from Mr French of Speed & Stracey to Bate Walls requesting documents.

1.7  Letter dated 29 July, 1985, reply from Mr Bate of Bate Walls to Speed & Stracey.
Bate Walls Pty. Limited

1.8 Judgement of Supreme Court of N.S.W., 16.7.79. Needham J. Council of the Shire of Colo v. Martin Bros. Soils Pty. Limited & Ors.


1.10 Submission by Webb, McKeown & Associates.

1.11 Aerial photo, 1980

1.12 Old B & W photo - 4330B 1906.

1.13.1 Aerial photo - C.A.C.I. - 5005, 7.3.54, St.Albans, B & W

1.13.2 Aerial photo NSW 2774.121, 24.4.79, Run 33, B & W

1.13.3 Aerial photo NSW 1290.5061, Nov 64, Run 55, B & W

1.13.4 Aerial photo NSW 2315.164, 28.5.75, Run 35, B & W

1.13.5 Aerial photo NSW 1920.5013, 29.11.70, Run 4, B & W

1.13.6 Aerial photo NSW 2709.206, 22.3.78, Run 12.

1.14 Answers to Commissioner's questions on SPCC comments.

1.15 Answers to questions from Hawkesbury S.G.A.P. (10.3).

1.16 Answers to questions from Colo River Action Group (7.4)

1.17 Answers to additional questions from Colo River Action Group (7.5)

1.18 Answers to questions from D.E.P. (3.6).

1.19 Answers to questions from Hawkesbury Shire Council (6.2).

1.20 Plan of the plant Scale 1:25.

1.21 Answer to question from Jeff Hincks (21.2).

1.22 Answer to question from D.E.P. (3.6).

1.23 Amended answer to question 34(d) from Colo River Action Group

1.24 Documents from Mr Bate concerning the affidavit.

1.25 Submission in reply.
Bate Walls Pty Ltd

 Submission No.1

1.26 Letter from R.M. Mackie to Mr Woodward dated 8th August, 1985 and attached letter to Ms. Jones & Mr Mackie from Dind, Daton and Debney.

1.27 Letter to Hawkesbury Council dated 21.8.84 from Arcadia Nursery Pty Ltd.

1.28 Letter dated 28th August, 1984 from Public Works Dept. to Webb McKeown and Associates.

1.29 Confidential documents—and letter from T.Breen to Mr Bate dated 20th March, 1984

Department of Mineral Resources

 Submission No.2

2.1 Primary Submission.

2.2 Submission in Reply.

Department of Environment and Planning

 Submission No.3

3.1 Primary Submission.

3.2 Attachment A — Penrith Lakes Scheme Regional Environmental Study.

3.3 Attachment B — Sydney Region North West Sector Regional Environmental Study, Volumes 1 & 2.

3.4 Attachment C — Sydney's Extractive Industry Regional Environmental Study.

3.5 Hawkesbury/Nepean Valley Report.

3.6 Question to Bate Walls (1.18).

3.7 Additional information requested by Commissioner.

3.8 Answer to question from Hawkesbury S.G.A.P.(10.2).

3.9 Answers to questions raised by Commissioner Woodward.

3.10 Submission in reply.

State Pollution Control Commission

 Submission No.4

4.1 Primary Submission.

4.2 Report entitled Sand and Gravel Extraction in Upper Hawkesbury River.

4.3 Answer to question from Department of Agriculture and Fisheries (13.2).

4.4 Answer to question from Colo River Action Group.
Crown Lands Office  
Submission No.5

5.1 Primary Submission

5.2 Survey diagram more recent than original diagram attached to 5.1. Department of Lands N.S.W. Reduction Ratio 1:2,500. Diagram showing Marking of the boundary of 30.48 metre reservation completed 25.7.85. File No. MN 79 H 427.

5.3.1 Photo - Aerial photo Sydney 1982, 1:16,000 Colour, Run 3 6.11.82 2560 M ASL 151.45MM. NSW 3264 145

5.3.2 " " " " NSW 3264 144

5.3.3 " " " " NSW 3264 143

5.3.4 " " " " NSW 3264 142

5.4 Plan - MLO Parish of Meehan "Area of Possible Interest to N.P. & W.S. - Disposals, Conversions to be referred". Scale 1:25,000.

5.5 Plan - showing sections of Crown Land on Colo River MLO Parish of Hawkesbury, Scale 1:25,000.

5.6 Certificate of Title, vol.1252, Folio 227.


5.8 Notes spoken to in supplementary oral evidence presented by A.C. Leard.

5.9 Answers to questions from Colo River Action Group (7.7).

5.10 Answer to questions from Hawkesbury S.G.A.P. (10.2)

5.11 Answer to question from J. Hincks (21.3)

5.12 Plan showing proposed minimum 10, wide ship for access.

5.13 Submission in reply.

Hawkesbury Shire Council  
Submission No.6

6.1 Primary Submission.

6.2 Questions to applicant (1.19).

6.3 EIS Colo River - Stream Clearing GH & D.
Hawkesbury Shire Council Submission No.6

6.4 Plan - LEP 1984 draft amendment.
6.5 Plans of Shire.
6.6.1 Photo - small colour.
6.6.2 Photo - large aerial.
6.6.3 Photo - on cardboard display sheet and attached sheets "Location of Photos".
6.7 Plan showing Lower Colo Road proposed relocation. Reduction Ratio 1:1,000. Council Plan 1208-3.
6.8 Answers to questions from Colo River Action Group (7.31)
6.9 Answers to questions from S.G.A.P. (10.6)
6.10 Submission in reply.
6.11.1 Plan with attached photos sharing road realignment. Sheet 1.
6.11.2 Sheet 2.
6.11.3 Photograph legend - type of vegetation.

Colo River Action Group Submission No.7

7.1 Primary Submission.
7.2 Submission from Longworth & McKenzie Pty Ltd.
7.3 Submission from Robert Fitzell Acoustics Pty Ltd.
7.4 Questions to application (1.16)
7.5 Additional questions to applicant (1.17)
7.6 Questions to SPCC.
7.7 Questions to Crown Lands.
7.8 Opening statement.
7.9 C.V.s of technical people.
7.10 5 large colour photos on board.
7.11 13 photos colour (1 large, 12 small) on board.
7.12.1 2 large B & W aerial photos.
7.12.2 2 large B & W colour photos.
7.12.3 1 large colour aerial photo.
7.13 12 colour photos on board (1 large, 1 long, 10 small)
7.14 3 colour photos on board.
7.15 Correspondance between Speed & Stracey and Bates Walls Pty Ltd (4 letters)
7.16 Geological Survey of NSW Department of Mines by M.J. Neville.
7.17 Unanswered letter handed to Department of Public Works.
7.18 Letter from Monier to Bates Walls dated 31.7.84.
7.19 Typical Asphalt Mix Properties (from AS 2734-1984)
7.20 Grading from top soil diagram.
7.21 Envelope of River Sands collected from vicinity of Portion 37.
7.22 Letter from Prof. Gould to Mr Johnston dated 30.7.85.
7.23 Dr Riley's C.V.
7.24 R.J. Fitzell's C.V.
7.25 Extract of table D2 from A.S.
7.26 Submission by Dr D. James
7.27 Dr James' C.V.
7.28 Lower Colo River Studies (return).
7.29 Further submission.
7.30 Additional questions to Bate Walls.
7.31 Questions to Hawkesbury Council.
7.32 Submission in reply.
7.33.1 Particle size curves.
7.33.2 Particle size curves.
7.33.3 Particle size curves.
7.33.4 Envelope of river sands collected from vicinity of Portion 37 July 1985.
7.35 List of members of Group as at July 1985.
Nature Conservation Council of N.S.W.
8.1 Primary Submission.
8.2 Written comments added to primary submissions.
8.3 Answer to question from Hawkesbury S.G.A.P. (10.2)

Total Environment Centre Submission No.9
9.1 Primary Submission

Society for Growing Australian Plants Submission No.10
10.1 Primary Submission.
10.2 Question to: D.E.P. (3.8), National Trust, Crown Lands Office (5.10), and Nature Conservation Council of N.S.W. (8.3).
10.3 Questions to applicant (1.15)
10.4 Question to Fisheries Division, Department of Agriculture (13.3).
10.5 Nursery considerations.
10.6 Question to Public Works Department and Hawkesbury Shire Council.

National Trust of Australia Submission No.11
11.1 Primary Submission.
11.2 Answer to question from S.G.A.P.
11.3 Submission in reply.

The Hawkesbury River Association Submission No.12
12.1 Primary Submission.

Department of Agriculture Submission No.13
13.1 Primary Submission.
13.2 Question to SPCC (4.3).
13.3 Answer to question by Hawkesbury S.G.A.P. (10.4)

Windsor & Colo Truck Owners Assoc. Submission No.14
14.1 Primary Submission.
Walter Heller Cash Flow Finance  Submission No.15
15.1 Primary Submission.

Riverside Holdings Pty Ltd  Submission No.16
16.1 Primary Submission.

Dr. David James  Submission No.17
17.1 Primary Submission.

Mr. G.A. Ellis  Submission No.18
18.1 Primary Submission.

R. M. Mackie  Submission No.19
19.1 Primary Submission.

Christopher Wallis  Submission No.20
20.1 Primary Submission.

Jeffrey Hincks  Submission No.21
21.1 Primary Submission.
21.2 Questions to applicants.
21.3 Questions to Crown Lands Office.

William and Virginia Mackay  Submission No.22
22.1 Primary Submission.

Dorothy Gellatly  Submission No.23
23.1 Primary Submission.

Joyce Bruce  Submission No.24
24.1 Primary Submission.

Ian McEwan  Submission No.25
25.1 Primary Submission
John Plant Submission No.26
26.1 Primary Submission.

A & L Coates Submission No.27
27.1 Primary Submission.

A.R. & L.A. Dibben Pty Ltd Submission No.28
28.1 Primary Submission.

Bass Sydney Submission No.29
29.1 Primary Submission

Protea Australia Submission No.30
30.1 Primary Submission

Public Works Department Submission No.31
31.1 Primary Submission
31.2 Answers to questions from S.G.A.P. (10.6)
31.3 Submission in reply.

National Parks and Wildlife Service Submission No.32
32.1 Letter to Commissioners of Inquiry dated 8.8.85 as submission to inquiry.
I, the approximate location of Gees (Bullocks) wharf, the historic limit of navigation.

Approximate location of Gees (Bullocks) wharf historic limit of navigation.

LEGEND

Portion 37

Area of proposed dredging

SCALE

0.5km 0 1km

0 10km 20km
PLANT LAYOUT AND ACCESS ROUTES

FIGURE 2
LEGEND

- Mean Low Water (-0.30m)
- Existing profile
- Dredged profile

Adopted batter 1:4
Max. depth 9.50m below local mean low water

SCALES:
HORIZONTAL 1:1250
VERTICAL 1:500