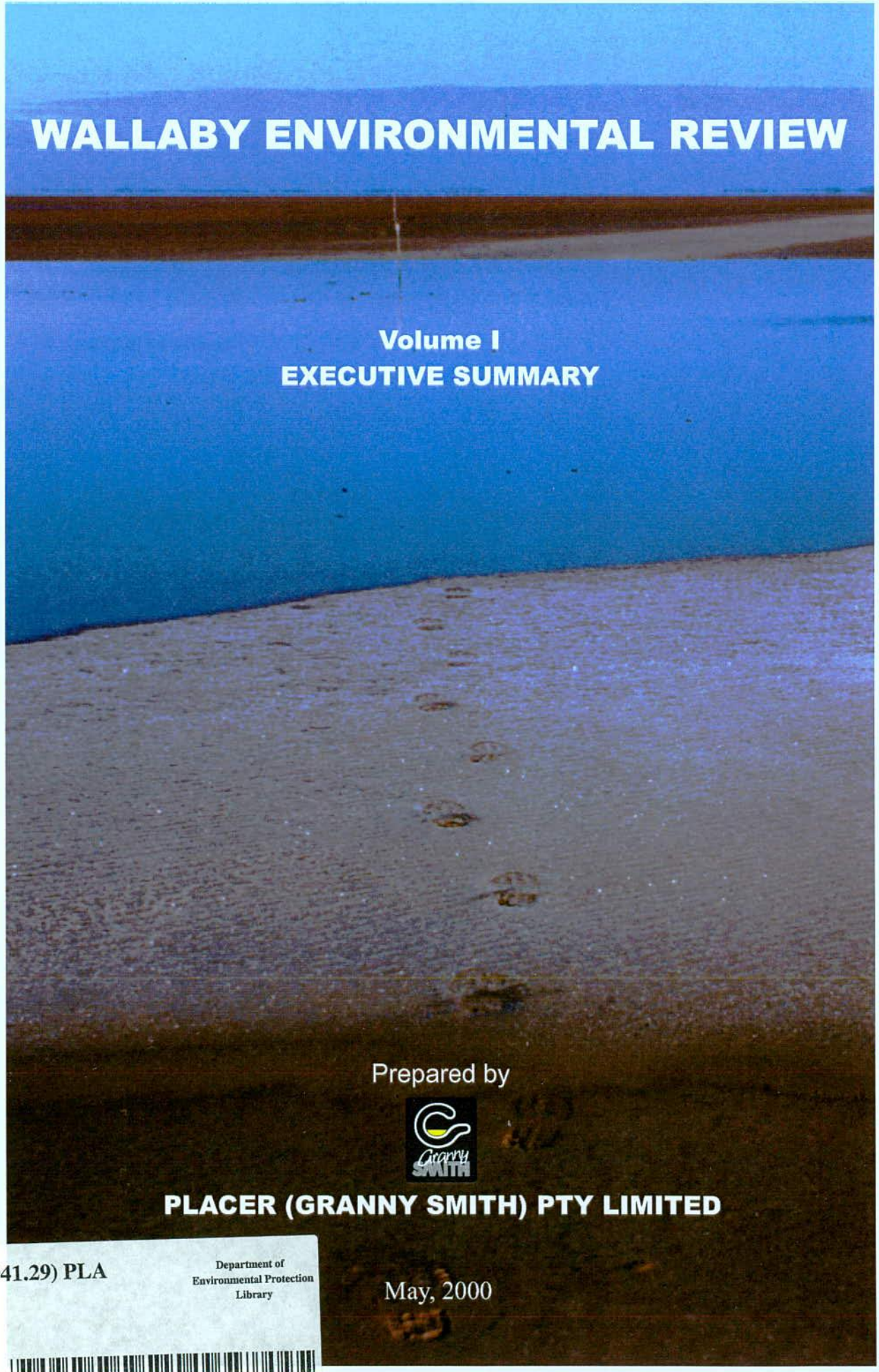
WALLABY ENVIRONMENTAL REVIEW



Volume I
EXECUTIVE SUMMARY

Prepared by

PLACER (GRANNY SMITH) PTY LIMITED

May, 2000

WALLABY ENVIRONMENTAL REVIEW

Volume I
EXECUTIVE SUMMARY

Prepared by

PLACER (GRANNY SMITH) PTY LIMITED

May, 2000

LIST OF CONTRIBUTORS

Placer (Granny Smith) Pty Limited acknowledges the following contributors to this document :

Doug Blandford	D.C. Blandford & Associates Pty Ltd (Principal Environmental Scientist)
Rory Lamont	Placer (Granny Smith) Pty Limited
Nathan Russell	Placer (Granny Smith) Pty Limited
Graham Folland	Placer Dome Asia Pacific
Julia Martin	URS Australia Pty Ltd

This page is left intentionally blank

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

This page is left intentionally blank

EXECUTIVE SUMMARY

1.0 PROJECT DESCRIPTION

Placer (Granny Smith) Pty Ltd, hereinafter called PGS, proposes to develop the Wallaby deposit by open cut mining to provide gold ore to the existing Granny Smith processing plant. The eight-year project involves the mining of approximately 40 million tonnes of ore and 400 million tonnes of waste, on-site crushing of ore, the transport of ore to the Granny Smith plant by overland conveyor, and processing the ore using standard carbon-in-pulp technology. The Project Area is located in the arid North-Eastern Goldfields Region of Western Australia, approximately 27 km south- south-west of the town of Laverton. The mine is located immediately adjacent to the northern shoreline of Lake Carey, a naturally occurring saline wetland approximately 750 km^2 in area. Project location is shown in Figure 1 and a general arrangement of the Project is shown in Figure 2.

The Proponent for the Wallaby Project is Placer (Granny Smith) Pty Limited (PGS), a wholly owned subsidiary of Placer Dome—Asia Pacific Ltd. PGS currently manages the Granny Smith Gold Mine on behalf of the Granny Smith Joint Venture (GSJV).

Placer (Granny Smith) Pty Limited (ACN 009 466 175) has its office at the Granny Smith operation. The postal address is:

Placer (Granny Smith) Pty Limited,
PO Box 33,
LAVERTON W. A. 6440

A summary of the key characteristics and components of the Proposal is presented in Table 1. A detailed description of the Proposal is provided in Section 6.0 of Volume II of the Wallaby Environmental Review prepared by PGS.

The key components of the Proposal are:

- Open-cut mine with an expected life of 8 years and mining in the order of 40 million tonnes of ore and 400 million tonnes of waste. The mining void will eventually occupy 120 hectares (ha).

- A waste dump to contain 400 million tonnes (Mt) of waste. The waste dump will be built partly on land (10%) with the majority on the margins of Lake Carey (90%) and will eventually occupy approximately 550 ha.

- Development of an access and service corridor to contain utility services such as power and water, and in particular, an overland conveyor to transport crushed ore from the mine to the existing PGS processing plant. The service corridor is approximately 11 km long and 82 m wide occupying in the order of 90 ha.

- Dewatering of areas surrounding the mine to enable mining to occur. Abstracted hypersaline groundwater will be disposed of to a series of satellite mining pits that were developed as part of existing mining in the area. For volumes in

excess of the capacity of the pits, groundwater will also be disposed to Lake Carey at a rate of approximately 80 l/s.

- Processing of ore at the existing PGS processing plant. Some modification to plant and equipment and an expansion of the existing plant's capacity from 4.5 Mtpa to 5 Mtpa will be required. Approximately 40 Mt of tailings from treatment of the Wallaby ore will be disposed of to the existing tailings storage facility (TSF) of capacity 35 Mt and to a new TSF. The new tailings storage facility will have an approximate capacity of 25 Mt and occupy 100 ha.

2.0 PROPONENT INITIATED EPS

During the early stages of planning for the Wallaby Project, it was confirmed that there were a number of environmental issues associated with Project implementation. PGS prepared a Project briefing document, and following discussions with officers of the Department of Environmental Protection (DEP), approached the Environmental Protection Authority (EPA) on the 22nd November, 1999. PGS presented to the EPA its intention to embark on a process to identify and investigate potential environmental impacts, identify and consult with all Stakeholders, and determine the appropriate environmental management requirements.

The EPA agreed with the approach put forward by PGS and its intention to assess the Project at the level of an EPS was advertised on 27 November 1999. PGS has concluded implementation of the consultation strategy outlined to the EPA and has prepared the Wallaby Environmental Review (WER). The WER is presented in three volumes. Volume I is the Executive Summary, Volume II is the main report on the proposed development, and Volume III comprises technical reports and supporting documents.

N

0 500 km

Placer (Granny Smith) Pty Limited
WALLABY ENVIRONMENTAL REVIEW
EXECUTIVE SUMMARY

Location Map

Figure 1

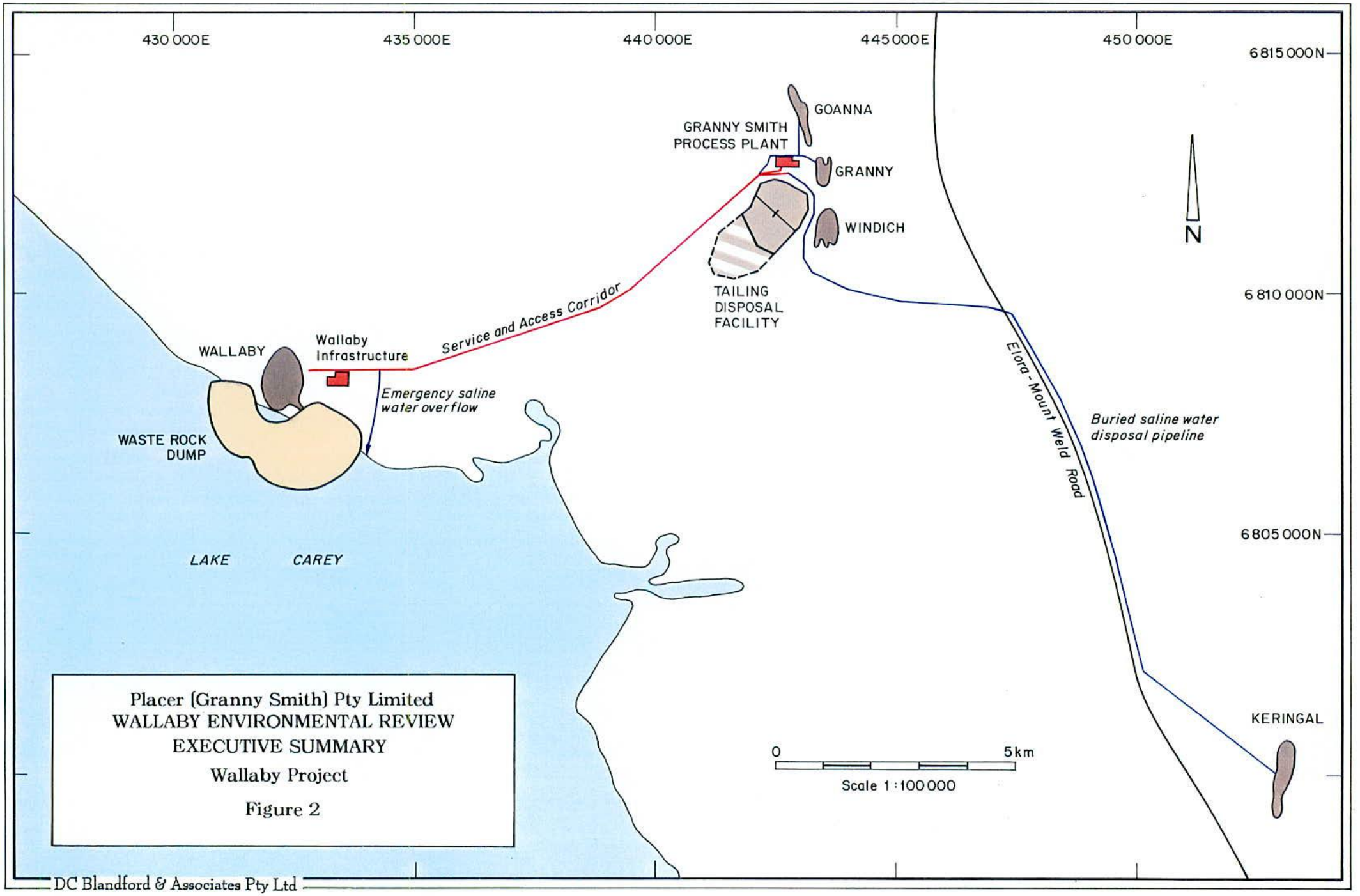

430 000E
435 000E
440 000E
445 000E
450 000E
6815 000N
6 810 000N
6805 000N
GOANNA
GRANNY SMITH
PROCESS PLANT
GRANNY
WINDICH
TAILING
DISPOSAL
FACILITY
N
WALLABY
Wallaby
Infrastructure
Service and Access Corridor
Emergency saline
water overflow
WASTE ROCK
DUMP
Elora - Mount Weld Road
Buried saline water
disposal pipeline
LAKE CAREY
KERINGAL
0
5km
Scale 1 : 100 000
Placer (Granny Smith) Pty Limited
WALLABY ENVIRONMENTAL REVIEW
EXECUTIVE SUMMARY
Wallaby Project
Figure 2
DC Blandford & Associates Pty Ltd

TABLE 1

Key Characteristics and Components of the Wallaby Project

Project Element	Description
Life of the Project	Approximately eight years
Type of Operation	Open cut pit
Final Pit Size	Estimated 1,000 m (east-west), 1,300 m (north-south), 340 m deep, an area of 120 ha
Pit Location	11 km west south-west of the PGS process plant on the northern shore of Lake Carey
Proposed Mining Rate	Approximately 100-150,000 tonnes per day
Ore Transport	11 km long overland conveyor
Processing: location technology	Existing PGS process plant with upgraded capacity from 4.5 Mtpa to 5 Mtpa Carbon-in-pulp
Solid Waste Materials: dump location dump area dump height total waste volume	 Partly on land but the majority on Lake Carey Approximately 550 ha 70 m Approximately 400 million tonnes
Tailing: Location Size of new facility yearly volume	Total storage available is approximately 60 Mt Current tailing storage facility (35 Mt) plus new storage cell (25 Mt) Approximately 100 ha Approximately 5.0 million tonnes
Water Supply: source maximum volume required maximum annual requirement	 Existing Mount Weld Borefield, Windich pit 0.75 m^3 per tonne of ore processed 3.15 Mm^3.
Pit Dewatering: maximum rate minimum rate 8-year average rate total volume abstracted	 480 l/s 165 l/s 245 l/s 62 million kl
Hypersaline Groundwater Disposal	Average 165 l/s disposal to mined-out pits, discharge to Lake Carey surface at 80 l/s
Hypersaline Groundwater Quality	Average 250,000 mg/l TDS
Access and Services Corridor: length width components	 11 km approximately 82 m (area of 90 ha) Power transmission line, conveyor, emergency haul road, raw and potable water pipelines, distribution pipeline for hypersaline groundwater

3.0 THE CONSULTATION PROCESS

During initial planning for the Wallaby Project, PGS made a decision to initiate a Stakeholder consultation and participative planning programme.

A model developed for the Wallaby Project consultation programme by PGS, required dynamic interaction between PGS decision makers, technical advisors, and a broad cross section of Stakeholders which included Government and non-Government organisations.

A Stakeholder identification process lead to the development of a Stakeholder Register and preliminary discussions were held with groups and individuals as to the style of consultation and participation preferred by the Stakeholders themselves.

Although attendances at Stakeholder meetings varied according to time and location, the following Table (Table 2) lists the Stakeholders associated with the consultation process for the Wallaby Project.

TABLE 2

Stakeholders Associated with the Wallaby Project

WA Government Departments Department of Minerals and Energy (DME) Department of Environmental Protection (DEP) Department of Conservation and Land Management (CALM) Water and Rivers Commission (WRC) Aboriginal Affairs Department (AAD)	**Mining Companies** Placer Dome - Asia Pacific Placer (Granny Smith) Sons of Gwalia Delta Gold Anaconda Mining Homestake Mining
Local Government Laverton Shire Council	**Consultants** D.C.Blandford & Associates Pty Ltd Outback Ecology Services Actis Environmental Services Dames & Moore
Aboriginal Organisations North East Independent Body (NEIB) Wongatha Community Goldfields Land Council Mount Margaret Community Cross Cultural Association Burna Yurral Aboriginal Corporation	**Other Organisations** Laverton School Laverton Police CSIRO Conservation Council of Western Australia World Wide Fund for Nature Aboriginal Cultural Materials Committee (ACMC)

Note: Attendance and participation in the Stakeholder meetings does not imply endorsement by persons or groups, of management and planning decisions.

The model developed for the consultation process for the Wallaby Project is shown in Figure 3.

WALLABY PROJECT
CONSULTATION PROCESS

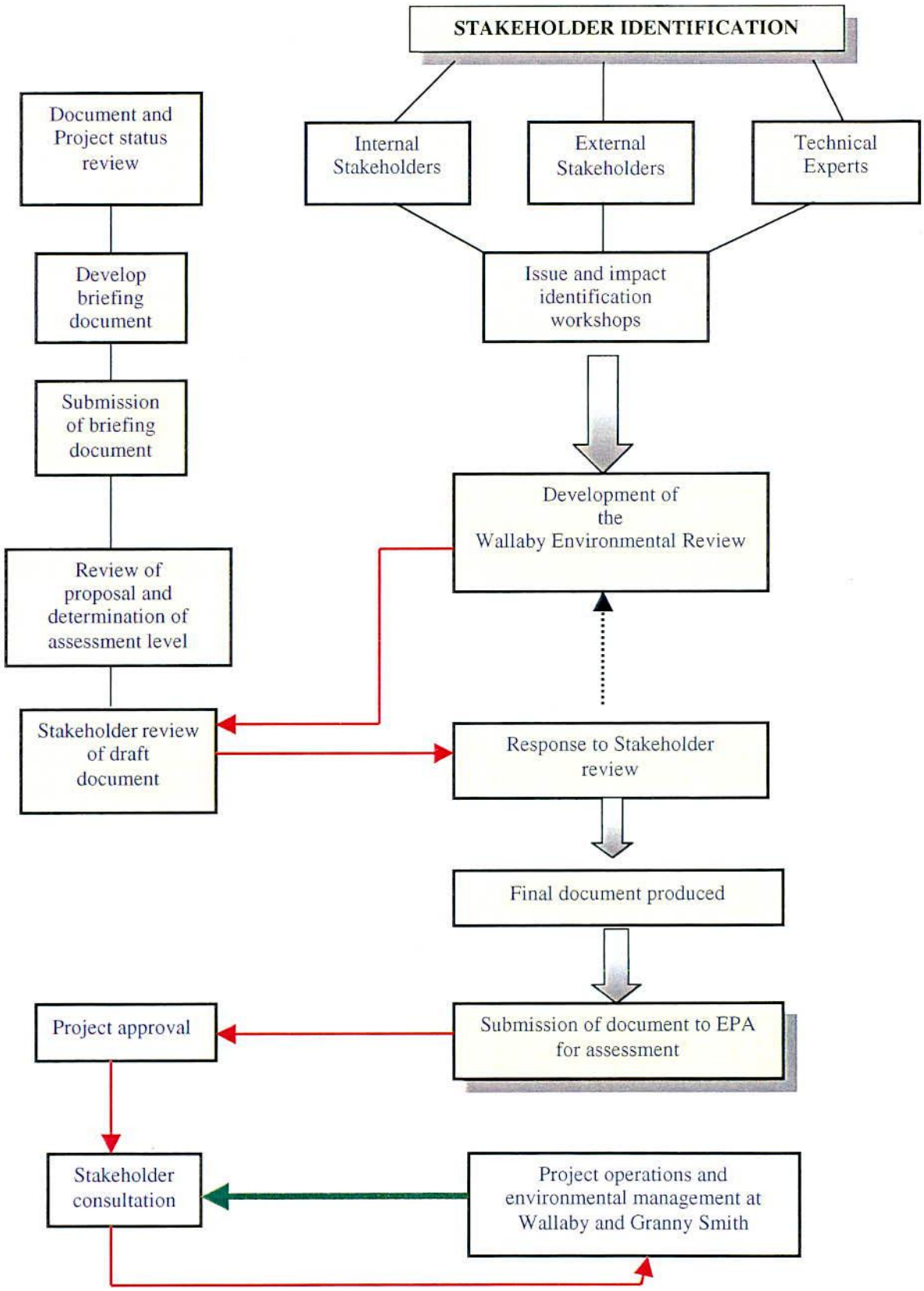


Figure 3

A summary document detailing the current knowledge of the Project Area and the predicted activities, environmental issues, potential environmental impacts and management plans was circulated to Stakeholders on the Register.

Three meetings were held during the second half of 1999. The first meeting, which included site visits and presentations by Project personnel, focused primarily on the identification of issues and impacts and the grouping of issues into categories with an indication of priorities. The second meeting presented updated baseline information and an initial assessment of potential impacts arising from Project implementation. Because the management of the discharge of hypersaline groundwater was identified by Stakeholders as a key environmental issue, this Project component was workshopped separately with a discussion on the management options available. The final meeting of 1999, which was held at Mt Margaret, the nearest community to the development, provided a forum for discussion of preferred management options that were emerging through the course of Project planning.

During each meeting, all questions were recorded and answered by the Proponent. Where questions were of a technical nature, they were forwarded to the consultants responsible for that particular Project component, for answering. This list of questions and answers was then provided to all Stakeholders on the Register as a means of confirming that all questions and issues raised were considered and dealt with in a timely and professional manner. A copy of the list of questions raised by stakeholders and corresponding answers from PGS is included in Appendix I in Volume II.

In addition to the question-and-answer format of responding to issues raised at the various consultation gatherings, PGS developed a Web Page that combined all the data and reports that were emerging through the Project investigation process. This information, which is available on the Placer Dome Web Page (www.placerdome.com), is updated as additional data are received, ensuring that Stakeholders have access to the most current data and final investigation reports.

In early January, 2000, PGS provided a Preliminary Draft Wallaby Environmental Review document to Stakeholders. This was followed by a series of small group meetings that were held in an environment and location suitable to Stakeholders to allow maximum interpretation of Project details.

An advanced Draft document was reviewed by stakeholders in March 2000 providing the basis for the final document to be submitted to the EPA for assessment.

Submission of the WER to the EPA is not the completion of the consultation process, nor is it intended to pre-empt the outcome of the EPA's assessment. However, it is appropriate that stakeholders are aware of PGS's intention to continue the stakeholder consultation process on a quarterly basis, should the Proposal be allowed to proceed.

4.0 DOCUMENT FORMAT

The Wallaby Environmental Review (WER) is presented in three volumes.

Volume I is an Executive Summary and accordingly provides a succinct Project overview. Volume II is the main report on the Wallaby Project, providing a level of detail and technical information that allows readers to develop a greater understanding of the detail included in the decision-making process. Both Volume I and Volume II present commitments made by PGS. Volume III comprises all the subject-specific reports generated as part of Placer's investigations into the Wallaby Project.

It is planned that all three volumes will be available as a CD and hard copies will be available to Stakeholders and other interested parties without access to computer facilities.

The selected presentation format achieves a number of objectives. First, it allows Volume I, the Executive Summary, to be a stand alone document with information that allows the reader to identify the key environmental issues, understand the decision-making processes, and the management practices proposed without having to address the detail behind the decision.

Second, there is a very clear requirement to set out, in a logical sequence, the four major reporting components, *i.e.,* Project description, description of the existing environment, identification of environmental impacts, and management strategies and programmes proposed for impact amelioration. Volume II is set out in a format that is designed to achieve this requirement. Part A establishes the basis of the Wallaby Project in relation to Placer's Sustainability Policy through identification of the 'Stakeholder-derived' key environmental issues. Part B provides a framework for the Project and hence the decision-making process. The key sections included in Volume II are:

- the sustainability framework underpinning the Project;
- a comprehensive Project description that links existing facilities at PGS with the specific requirements of the Wallaby Project;
- a review of waste management options including the disposal of hypersaline groundwater;
- a comprehensive description of the existing environment which includes arid terrestrial ecosystems and arid wetland ecosystems;
- a consideration of environmental impacts for the terrestrial and wetland environments;
- an environmental management programme;
- an environmental monitoring programme;
- a description of proposed future research; and

- a comprehensive description of mine closure and decommissioning requirements.

An environmental management programme (EMP) has been developed in concert with Project planning and scoping studies and is included in Volume II of the WER.

The purpose of an EMP is to avoid or ameliorate effects or impacts resulting from Project implementation and, where possible, enhance beneficial effects. The EMP takes account, not only of the effects of the Project on the environment, but also of the environmental limitations imposed on the Project by its location.

All potential and confirmed environmental impacts resulting from Project implementation have a corresponding management plan or an associated on-going research programme with a defined time-line. The purpose of these on-going research projects is to add to the present subject-specific database and to more clearly define potential environmental impacts. This is particularly so for impacts associated with the arid wetland ecosystem within the Wallaby Project Area.

5.0 KEY ENVIRONMENTAL ISSUES

The early consultation sessions, preliminary field investigations, and the initial scoping and planning studies, identified a large range of potential environmental impacts that could be expected if the Project were to proceed. This lead to the implementation of studies addressing the identified key environmental issues. These studies defined the vegetation within the Project Area and along the access corridor with particular reference to the presence of priority listed species and Declared Rare Flora, the micro-flora and-fauna of Lake Carey; the characteristics of soils and surface materials available for rehabilitation; the characteristics of the waste rock; the abstraction and disposal of hypersaline groundwater; the surface drainage management requirements along the access corridor; and the strategies and protocols required for mine closure and decommissioning.

These ranged from primary impacts such as the direct loss of vegetation, through secondary and tertiary impacts such as habitat modification and changes in biodiversity.

As the consultation and planning process advanced, Stakeholders were able to confirm that there were a number of environmental issues that should be defined as 'key issues'. These are:

- The management of hypersaline groundwater.
- The construction and operation of the access and services corridor.
- The construction and operation of the Lake-based waste rock dump.
- Mine closure and decommissioning.

Although an expansion of the current PGS process plant is proposed as part of this Proposal, the potential impacts associated with the expansion programme were not considered to be significant because impacts are essentially the same as the existing approved plant. Construction and operation of expanded plant is subject to

approval processes administered by the Department of Minerals and Energy and the Department of Environmental Protection.

The four key environmental issues are considered in greater detail below.

The Management of Hypersaline Groundwater

(a) Component Description

Dewatering of the Wallaby pit area must commence up to six months before mining commences. It is estimated that over the eight year life of the mine, the average dewatering rate will be 245 l/s for a total volume of 62 million kl. Hypersaline groundwater, with an average total dissolved solids concentration of 250,000 mg/l will be abstracted using a borefield and gathering system and discharged to the mined-out Goanna, Granny, and Keringal open pits (Figure 2) and will be discharged onto Lake Carey at a rate of 80 l/s. Combined discharge to the mined-out pits and to Lake Carey will account for the total volume of groundwater to be abstracted.

(b) Area Affected

The groundwater will be discharged to the mined-out pits and as these all contain groundwater of varying salinities ranging from 30,000 mg/l to 79,000 mg/l, the area affected is taken to be nil. However, groundwater will be discharged to Lake Carey at a rate of 80 l/s and will continue at this rate for the life of the Project. The area of the Lake expected to be impacted is conservatively estimated to be 1,500 ha, or about 2% of the surface area of the Lake. The estimated area impacted and the effects of the uncontained discharge will be the subject of a detailed investigation and comprehensive monitoring programme as outlined in Volume II. This investigation will include the assessment of similar discharges onto the Lake from nearby mining operations.

(c) Significance of Associated Impacts

The effects resulting from the abstraction and disposal of hypersaline groundwater are as follows:

- regional drawdown of shallow and deep aquifers;
- increased salinity levels in the three mined-out pits with expected concentrations in the order of 200,000 to 250,000 mg/l; and
- changes to the hydroperiod will effect the breeding cycles of micro-fauna.

A key issue within the Lake Carey wetland ecosystem is the surface water-groundwater system within the Lake sediments. PGS proposes to conduct a research programme with the objective of identifying the fate of saline water discharged to the Lake surface as described in Section 9.0 in Volume II.

The concept of significance is discussed in some detail in Section 6.1 of Volume II. Based on the given definition, the long-term impacts of discharge to the Lake are not considered significant because:

- there are no aquatic flora or fauna species unique to the saline wetland in the Wallaby Project Area or Lake Carey;
- aquatic flora and flora species present throughout the Wallaby Project Area are ubiquitous throughout the saline wetland of the Lake;
- the total area of the Lake Carey saline wetland ecosystem (750 km^2) will not be impacted;
- the localised discharge site may be affected in the short-term and is conservatively estimated to constitute an area of 1,500 ha or 2% of the surface of the Lake; and
- natural flushing of the impacted area will occur with rainfall events that fill the Lake.

is it longstanding?

Preliminary results from a programme investigating salt load and distribution in relation to the diversity of micro-flora and -fauna (currently in progress), suggests that the discharge of 80 l/s to Lake Carey may not have significant long-term impacts on the wetland ecosystem as monitoring of areas of the Lake surface, previously subjected to groundwater discharge, are returning to 'pre-discharge' conditions in terms of species numbers and diversity.

Groundwater abstraction will result in the development of a regional cone of depression. The potential impacts from regional groundwater drawdown are not considered significant because the vegetation communities within the boundary of the cone of depression are not groundwater dependent and will not be effected by the regional drawdown. In addition, there are no stock watering wells that utilise the shallow groundwater within the Wallaby Project Area. The surface extent of regional drawdown of groundwater is discussed and shown in Figures 30 and 31 in Volume II.

(d) Environmental Management

The key components of the environmental management programme relating to hypersaline groundwater are:

- all groundwater disposal pipelines will be buried to reduce the likelihood of pipeline failure;
- disposal of an average of 165 l/s out of the total 245 l/s of the discharge in mined-out pits;
- disposal of 80 l/s to Lake Carey;
- a comprehensive water balance and water quality monitoring programme for mined-out pits ;
- further investigations into evaporation enhancement in the mined-out pits;

- a comprehensive monitoring programme for the area affected by discharge to Lake Carey; and

- a suite of investigations into the quantification and management of impacts on Lake Carey including a remote sensing study, biological indicator and toxicology investigation, and further studies into salt migration within the Lake. Should the aquifer production rate be higher than predicted, studies will evaluate the potential for additional discharge options, such as pumping to other abandoned pits in the region.

The Construction and Operation of the Access and Service Corridor

(a) Component Description

The access and service corridor linking the Wallaby pit with the existing PGS processing plant will have a length of 11 km and an approximate width of 82 m. The corridor will contain power transmission lines, the overland conveyor, raw water (non-recycled borefield water) and potable water pipeline, haul road, and the buried hypersaline groundwater pipeline. The overland conveyor will be elevated up to 2 m above ground level where it crosses major drainage lines.

(b) Area Affected

The access and service corridor has a footprint of approximately 90 ha. Within this area, the vegetation can be quite sparse due to both land degradation and the characteristics of the natural vegetation communities. Vegetation surveys, carried out as part of the key component investigation have identified that 12 vegetation units occur in the corridor but these are common throughout the Wallaby Project Area and region. Although the corridor is approximately 11 km long, it is not substantially wide (82 m) and this reduces the overall fragmentation of the vegetation. The vegetation and flora survey programmes have confirmed that there is no Declared Rare Flora present along the corridor.

(c) Significance of Associated Impacts

The key environmental issue for the access corridor is the position of the corridor in the landscape. The full length of the corridor intercepts channelised and non-channelised flow of surface water runoff and has the potential to divert overland flow down slope.

A significant potential environmental impact has been identified as a result of the presence of the service corridor with impacts centred on:

- the road-shadow effect on vegetation;

- the accumulation of salt concentrated by the use of saline water for dust suppression and the consequential impacts that may occur on vegetation adjacent to the road;

- the potential impact of localised flooding on species and habitats;

- the potential for accelerated soil erosion resulting from ponding and diversion of natural flow paths;
- habitat destruction;
- increased predation opportunities; and
- increased wildlife mortality due to road kills.

It is considered that these identified impacts can be managed according to the management programme detailed in Section 7.0 of Volume II.

(d) Environmental Management

The key components of the environmental management programme are as follows:

- at stream crossings, the conveyor will be elevated to ensure that runoff generated by the 1 in 100 Average Recurrence Interval (ARI) design storm event can pass under the conveyor without impact;
- at these crossings, the haul road will not be elevated above normal construction height but will be designed and constructed to act as a floodway to accommodate the design storm discharge;
- the power transmission line will have a maintenance and inspection access track adjacent to the line and where the track crosses major drainage lines, and it will be positioned so that surface flow is unrestricted;
- the buried saline water pipeline, located adjacent to the haul road, will pass under the major drainage lines and will be located at a depth such that normal channel erosion will not expose the pipe;
- sheet flow building up against the haul road pavement will be re-diverted across the access corridor at approximately 500 m intervals, a length dictated by local road design and operational requirements as well as specific habitat management requirements;
- the sheet-flow diversion site will comprise a shallow floodway across the surface of the corridor;
- each diversion site will contain a spreader system immediately downstream of the corridor diversion site;
- the design of the spreader system will comprise spreader banks with rock-armoured level-sill outlets, designed to maintain the maximum non-scour velocity of the surface material at the sill for the duration of the peak discharge of the runoff event;
- the access corridor will cross minor streams using a series of box culvert structures designed to pass the runoff generated by the design storm; and

- macro-fauna will be able to pass under the conveyor at major stream crossings where the conveyor structure will be elevated several metres above the bed of the drainage line.

The Construction and Operation of a Lake-based Waste Rock Dump

(a) Component Description

Approximately 400 million tonnes of waste rock, generated during the life of the Wallaby Project, will be placed in a waste rock dump that straddles the northern shore of Lake Carey. Approximately 10% (55 ha) will be located on land and the remaining 90% (495 ha or 0.66% of the surface area of the Lake) located on the surface of Lake Carey. Alternative options for placement of the waste rock dump were evaluated throughout the consultation process with the final preference for placement on the surface of Lake Carey subsequently reducing impact on the terrestrial environment.

(b) Area Affected

The waste rock dump will have a surface footprint of approximately 550 ha.

(c) Significance of Associated Impacts

The effects resulting from the construction and operation of the waste rock dump are:

- loss of saline wetland habitat;
- permanent change to the local landscape;
- loss of terrestrial habitat;
- loss of fringing vegetation communities;
- modification of localised surface flow patterns on the Lake Carey playa; and
- potential movement of metals into the playa sediments.

The impacts associated with the waste rock dump are not considered to be significant due to the following:

- the dump will occupy approximately 0.66% of the total surface area of Lake Carey;
- the saline wetland habitat, buried by the dump, is not significant (approximately 4.95 km^2) or unique and is present over the 750 km^2 area of Lake Carey;
- the final dump landform, while being an addition to Lake shoreline topography, will be designed and constructed to blend in with surrounding landforms as much as possible;

- the species associated with the fringing vegetation communities (approximately 4 ha in area) have demonstrated their ability to recolonise areas of disturbance, and in addition, none of these species are unique to the dump footprint area but are widespread throughout the Wallaby Project Area; and

- while an apparent 'deeper' channel is located adjacent to the northern shoreline of Lake Carey, there are no set patterns of surface flow. Runoff to the playa surface can occur from any of the nine major catchment areas surrounding the playa, and once runoff accumulates on the surface of the Lake, surface water can be re-located according to the direction and velocity of the wind.

(d) Environmental Management

The key components of the environmental management programme are as follows:

- the dump will have two outslope designs, referred to as the pit side and the Lake side. The different outslope designs are proposed as part of a non-conventional waste dump design to create a final landform that, as much as can be practically achieved, is a stable landform, that will develop a functioning ecosystem, and blends to the greatest extent possible, with the surrounding landscape;

- the upper surface of the dump will be irregular in outline and the skyline will be broken up by using strategically placed mounds of boulders and paddock dumped waste material (see figure 4);

- Not more than 25% of the upper surface of the dump will be between 60 m and 70 m above the base of the dump;

- all berms will be level in the horizontal plane, have a backslope of 3º and will have an outer edge bund up to 1 m high for drainage control;

- all berms will have cross bunds at approximately 30 m spacing for horizontal drainage control;

- on the pit side of the dump, the first berm (primary bench) will be 20 m wide to provide a focus for vegetation establishment;

- on the Lake side of the dump, the first berm (primary bench) will be 50 m wide and will provide a focus for vegetation establishment;

- the primary bench, which will be constructed of unweathered conglomerate waste will act as a rip-rap consisting of large competent boulders to provide long term protection against Lake surface water from interacting with the dump material and subsequently compromising dump stability; and

- a rock drainage zone is proposed for the batters to dissipate surface water flow energies and subsequently protect against outslope erosion and failures.

Mine Closure and Decommissioning

(a) Component Description

The Placer Sustainability Policy underpins the requirements for mine closure and decommissioning. Accordingly, long-term stability, and a return to productivity through habitat establishment, are closure plan objectives.

(b) Area Affected

The tailing storage facility, waste rock dump, mine and associated infrastructure, and the access and service corridor are the major components needing mine closure.

(c) Mine Closure and Decommissioning Issues

The regional location of the Project imposes extreme variability of climatic parameters, particularly rainfall where the amount received, the nature of the rainfall event, and antecedent conditions all dictate the success or otherwise of the environmental management and decommissioning programme.

The mine closure issues are centered on a requirement to achieve physical stability in concert with achieving habitat restoration and productivity.

(d) Environmental Management

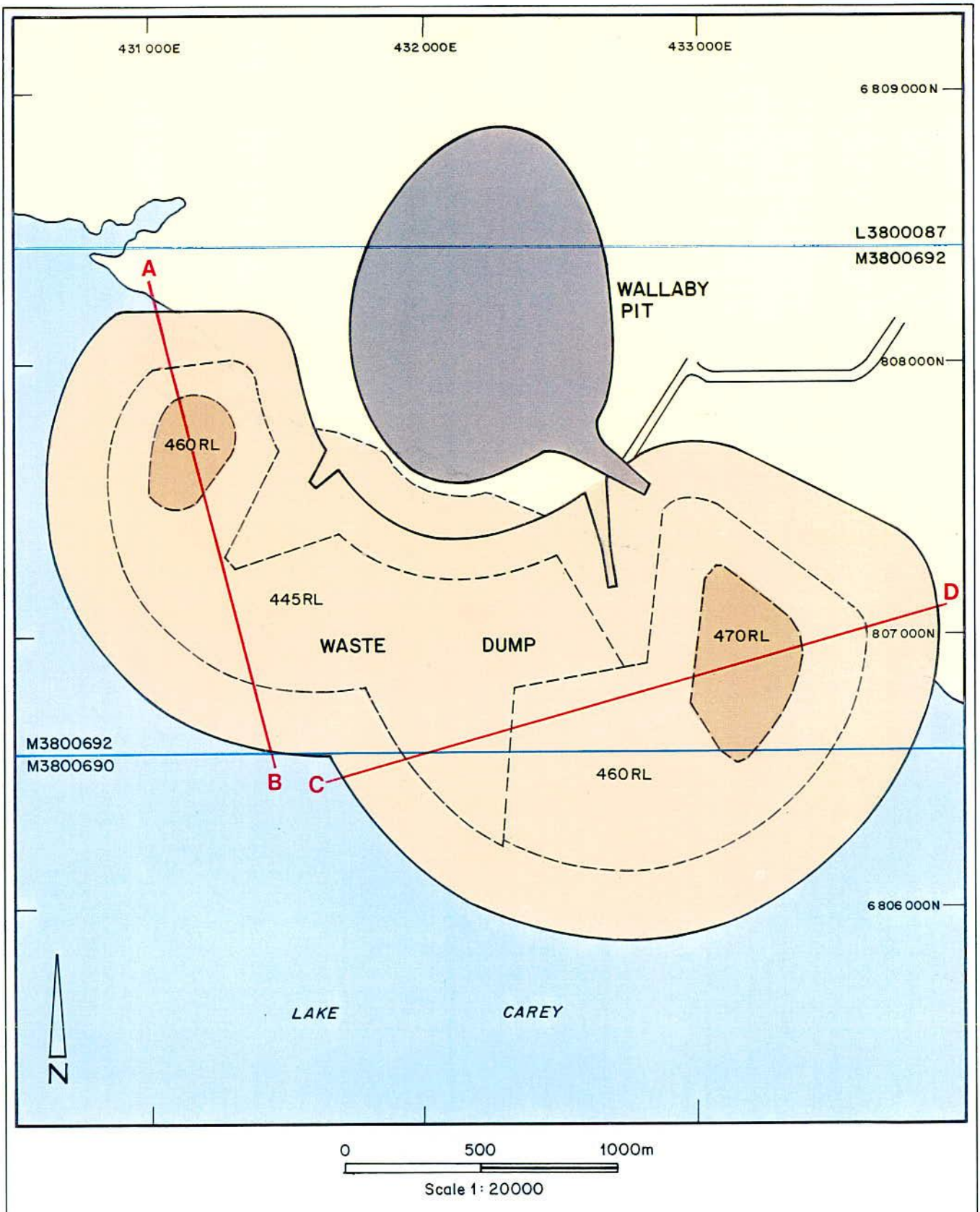
An initial Closure Plan has been developed as a part of the EMP. In addition, a preliminary mine closure and decommissioning strategy will be prepared prior to construction.

Within two years of the commencement of operations, and in association with Stakeholders detailed closure plans will be developed for the Wallaby Project as is already the case with current projects developed by the proponent. This closure plan will address the following:

- long-term stability requirements;
- re-instatement of surface drainage systems;
- rehabilitation of all disturbed areas; and
- revegetation using indigenous species as appropriate.

6.0 COMMITMENTS

PGS has developed a list of commitments to ensure the environmental impact of the Proposal is undertaken in accordance with Government requirements, Placer's Sustainability Policy, and in a manner that is considered to be environmentally acceptable to the broad stakeholder community. Table 3 lists the environmental management commitments made by PGS. There are five commitments with each assigned a topic, objective, action, and associated timing for implementation. In addition, the list of commitments details the relevant Government authority the



Placer (Granny Smith) Pty Limited
WALLABY ENVIRONMENTAL REVIEW
EXECUTIVE SUMMARY
Conceptual Waste Dump – Final Landform Design Strategy
Figure 4

Proponent is required to consult regarding the commitments and the mechanism for evidence of compliance of the commitment.

7.0 OTHER ISSUES

The key environmental issues discussed above are not the only environmental issues associated with the Wallaby Project. Stakeholders asked 176 questions about the Wallaby Project and these are summarised and presented in Appendix I of Volume II.

Many other issues are covered in detail in Volume II of the WER, which is provided to Stakeholders and available on request from PGS. All of the reports and supporting documentation associated with development of the WER will be available in Volume III, which will be in CD format and contain electronic versions of the documents.

PGS's Sustainability Policy, as presented in Figure 1 of Volume II, underpins the proposed environmental management programme.

8.0 KEY STATUTORY PROCESSES

There are a number of additional statutory processes that will apply to the development of the Wallaby Project. These include:

- Department of Minerals and Energy covering rehabilitation requirements, performance, and reporting;
- Water and Rivers Commission groundwater abstraction licensing to address abstraction and management of the groundwater resource;
- Department of Environmental Protection Works Approval to ensure the mining and processing plant are constructed in accordance with the environmental measures proposed by PGS's and relevant standards and guidelines; and
- Department of Environmental Protection licence to operate the mine, processing plant and tailings storage facilities to prevent pollution of the environment. PGS will require a licence to discharge to Lake Carey. The licence will set limits on the location, quality and quantity of abstracted groundwater discharged to the environment.

TABLE 3

Summary of PGS's Environmental Management Commitments

No.	Topic	Objective	Action	Timing	Advice*	Evidence of Compliance*
1	Environmental Management Programme (EMP).	To minimise potential environmental impacts on the Wallaby Project Area.	(1.1) Finalise the EMP as detailed in Volume II of the WER and submit to the statutory authorities for review and modification as appropriate. (1.2) Implement the EMP and update as necessary following an annual review prepared by the proponent and reviewed by the appropriate statutory authority. (1.3) Modify the EMP as appropriate.	Pre-construction and operations.	DEP DME WRC CALM	AER
2	Hypersaline Water Management.	To minimise the potential impact of abstraction and disposal of hypersaline groundwater on the receiving environment.	(2.1) Prepare a management programme for the abstraction and disposal of hypersaline groundwater that will address the following: 1) buried pipelines; 2) disposal in mined-out pits; 3) disposal at 80 l/s to Lake Carey; 4) water balance and water quality monitoring programme for mined-out pits; and 5) further studies into evaporation enhancement in the mined-out pits, and discharge response on Lake Carey such as investigations into the fate of saline water discharge. (2.2) Implement the management programme for the abstraction and disposal of hypersaline groundwater.	Pre-construction and operation.	DEP DME WRC	AER AER

No.	Topic	Objective	Action	Timing'	Advice*	Evidence of Compliance*
3	Access Corridor.	To minimise the potential impact of the access corridor on the surrounding vegetation, intercepted surface hydrology, and fauna habitats.	(3.1) Prepare a management programme for the access corridor that will address the following: 1) protection of vegetation; 2) control of surface drainage; and 3) protection of fauna habitats. (3.2) Implement the approved access corridor management programme.	Pre-construction and operation.	DEP DME CALM	AER AER
4	Waste Rock Dump.	To construct a waste rock dump that blends in with the environment and that is stable in the long-term, to minimise erosion and to minimise impacts on the saline wetland habitat of Lake Carey.	(4.1) Prepare a management programme for the waste rock dump that will address the following: 1) material characteristics; 2) cover treatments; 3) use of growth media; 4) drainage control; 5) rehabilitation methods; 6) rehabilitation monitoring; 7) performance criteria; 8) control soil erosion; and 9) minimise impacts to fauna habitats. (4.2) Implement the approved waste rock dump design and management programme.	Construction and operation.	DEP DME CALM	AER AER
5	Mine Closure and Decommissioning.	To close and decommission the mine in accordance with Government requirements, the requirements of Placer's corporate policy including stakeholder consultation, and to return the disturbed areas to a predetermined form of productivity.	(5.1) Prior to construction PGS will prepare a preliminary mine closure and decommissioning strategy that will address the following: 1) a description of Project components; 2) rationale for siting of plant and infrastructure and conceptual plans for its removal and if appropriate, retention; 3) conceptual rehabilitation plans for all disturbed areas and a process to agree on end landuse(s); 4) management of noxious materials to avoid the creation of contaminated areas; 5) description of the process to agree on completion criteria and performance criteria including a time line in which they will be developed; 6) proposed monitoring programme; and 7) preliminary performance criteria.	Prior to Construction.	DEP DME WRC CALM	AER

No.	Topic	Objective	Action	Timing	Advice*	Evidence of Compliance*
			(5.2) At least six months prior to the anticipated date of decommissioning or at a time agreed with the DEP the proponent shall prepare a final decommissioning plan designed to ensure that the site is left in a suitable condition. This Final Plan shall address: 1) removal or if appropriate retention of plant and infrastructure; 2) rehabilitation of all disturbed areas to a standard suitable for the agreed new land uses); and 3) identification of contaminated areas, including provision of evidence of notification to relevant statutory authorities. (5.3) Implement the approved mine closure and decommissioning strategy	At least six months prior to the anticipated date of decommissioning or at a time agreed with the DEP.		AER

Notes*: Annual Environmental Report (AER)
Department of Conservation and Land Management (CALM)
Department of Environmental Protection (DEP)
Department of Minerals and Energy (DME)
Water and Rivers Commission (WRC)