

# Appendix 1

## Updated Project Description

(Total No. of pages including blank pages = 26)

## 2.1 Introduction

This *Updated Project Description* for the proposed MOD4 of the Cudgen Lakes Sand Quarry (the “Modified Project”) has been prepared in accordance with the NSW Government’s *State Significant Development Guidelines – Preparing a Modification Report* (October 2022). Updates have been made to the Project Description included as Section 2 of the 2008 Environmental Assessment and reflect both MOD4 and previous modifications approved under the now repealed Section 75W of the EP&A Act 1979.

## 2.2 Outline of the Project

### 2.2.1 Objectives

The **Applicant’s** objectives for the development and operation of the Cudgen Lakes Sand Extraction Project (“the Project”) are to:

- a) provide necessary fill materials (up to approximately 2,500,000m<sup>3</sup>) required to complete the **Applicant’s** proposed development strategy for its landholdings within the Kingscliff / Chinderah / Cudgen area;
- b) recover sand resources to supply the region’s construction industry **and users of sand containing products**;
- c) provide a licenced facility capable of accepting and processing **imported materials including** non-acid generating virgin excavated natural materials (VENM), excavated natural material (ENM), **Acid Sulfate Soil Material (ASSM) or other material that meets the requirements of an applicable Resource Recovery Order and Exemption that provides for the material be received for processing or application to land / within the dredge pond**; and
- d) create a recreational lake with surrounding parkland, walkways and sporting fields consistent with the recreational and environmental land uses of the **Applicant’s** strategic development plan for its landholdings.

These objectives would be achieved by:

- i) hydraulic removal and transportation of sand from the **Extraction Area** to nominated sites (fill sites) to raise the level of the areas approved for backfilling on the subject land;
- ii) **hydraulic and/or** mechanical removal and off-road transportation of sand from the **Extraction Area** to the processing area;
- iii) progressive backfilling **portions** of the **Extraction Area** with **imported materials** followed by topsoiling to provide a surface suitable for **approved uses including** sporting fields;
- iv) concurrent production of fine-grained and blended products within the processing areas at a rate that would meet the construction industry’s requirements;

- v) progressive backfilling of the margins of the **Extraction Area** with **imported materials** to pre-determined profiles around finalised lake edges, followed by progressive landscaping; and
- vi) undertaking all activities in a manner that complies with all relevant statutory requirements and accommodates the reasonable expectations of surrounding landowners and residents.

The assessment of **additional** activities involved in raising the elevation of land would be covered in the development applications for the activities within each individual fill site.

## 2.2.2 The Application Areas

For the purposes of describing the Project, reference is made to the “**Quarry Site**” and “**Pipeline Corridors**”.

### 2.2.2.1 Quarry Site

#### Components

The **Quarry Site** comprises **Lot 21 DP 1082482** and **Lot 51 DP 1268405** together with the existing road reserve for **Altona Road** and incorporates the following main components.

- An extraction area covering an area of 43.8ha, namely the “**Extraction Area**”.
- A “**southern processing area**” south of **Altona Road** covering an area of 3.3ha.
- A “**northern processing area**” north of **Altona Road** covering an area of 2.25ha located within the **Extraction Area** and ultimately being extracted.
- The remainder of lots 21 and 51 and the road reserve.

The **Quarry Site** covers approximately 67ha, approximately 50ha of which would be **extracted or used as processing areas** during the life of the Project. The remaining 17ha would include areas around the margins of the area of **Quarry** disturbance that are included in the **Applicant’s strategic development plan for its landholdings**.

#### Land Description

The **Extraction Area** and processing areas are located within **Lot 21 DP 1082482** and **Lot 51 DP 1268405** together with the existing road reserve for **Altona Road**. Both of these lots are owned by Gales-Kingscliff Pty Ltd. The existing **Altona Road** road reserve is owned by Tweed Shire Council. The land within the proposed reserve for the realigned **Altona Road** will be transferred into Council’s ownership and the ownership of the existing **Altona Road** road reserve transferred to Gales-Kingscliff Pty Ltd following the completion of road construction.

## Boundaries

The boundaries of the Quarry Site and individual component areas have been determined in the following manner.

- The boundaries of the Quarry Site coincide with the boundaries of Lot 51 DP 1268405 and Lot 21 DP 1082482 (excluding a small area on the southeastern boundary that was included within Lot 51 as part of a boundary adjustment unrelated to the Quarry operations).
- The boundaries of the Extraction Area coincide with a 10m setback from the realigned Altona Road and the southern boundary of the Quarry Site, and a 15m setback from the western boundary of the Quarry Site.
- The northern and western boundaries of the southern processing area coincide with the northern and western boundary of Lot 51 DP 1268405.
- The northern and western boundaries of the northern processing area coincide with the northern and western limits of the Extraction Area.

### 2.2.2.2 Pipeline Corridors

#### Components

Two “pipeline corridors” extend northwards and eastwards from the Extraction Area. These are referred to as the “northern pipeline corridor” (0.8km in length) and “eastern pipeline corridor” (1.5km in length).

The pipeline corridors have been set at 20m wide to provide adequate flexibility to position the sand supply pipeline either on or below the surface and to provide access during installation and for maintenance purposes. The exact location of the pipeline within the various road easements would be discussed with Tweed Shire Council and fully addressed in all relevant permits sought from Council. The pipeline corridors effectively extend from the edge of the Quarry Site to the boundaries of the land to be filled. The pipeline corridors have been positioned within existing or proposed road alignments / reserves to avoid or minimise the need to clear any trees or shrubs. The distribution, clearing filling etc. of the sand on each fill site would be covered in the development applications for each individual fill site.

#### Land Description

The proposed northern pipeline corridor:

- commences adjacent to the northeastern boundary of Lot 21 DP 1082482 owned by Gales-Kingscliff Pty Ltd;
- then is aligned for a distance of approximately 450m adjacent to the western side of Tweed Coast Road, and then crosses Tweed Coast Road, a public road controlled by Tweed Shire Council; and
- ends just beyond the boundary of Lot 1 DP 1075645 owned by Gales-Kingscliff Pty Ltd.

The proposed eastern pipeline corridor:

- commences adjacent to the eastern boundary of Lot 51 DP 1268405 owned by Gales-Kingscliff Pty Ltd;
- then crosses Tweed Coast Road, a public road controlled by Tweed Shire Council;
- traverses Lot 1 and 3 DP 828298, Lot 26C and 26D DP 10715 owned by Gales Holdings Pty Limited, and an unformed road reserve between the eastern boundary of Lot 26D DP 10715 and Lot 11 DP 871753; and
- then crosses Elrond Drive and Turnock Street (both controlled by Tweed Shire Council) onto Lot 11 DP 871753 owned by Gales Holdings Pty Limited.

All public roads and road reserves are controlled by Tweed Shire Council.

It is noted that the alignment of the proposed eastern pipeline corridor generally coincides with the alignment of the road proposed to be constructed within the Applicant's land between Tweed Coast Road and Turnock Street, however, the precise alignment of the proposed road is subject to separate approval. Importantly, the pipeline corridor would reflect the location of an approved road reserve **should it be approved**.

### **2.2.3 Overview of the Project**

The Applicant plans to recover the sand resource within the Extraction Area over an approximately 20 year period whilst progressively rehabilitating the site to provide for the proposed sporting fields and recreational lake and related parklands and walkways south of Altona Road (realigned).

The Applicant's Project comprises seven main components.

1. Hydraulic sand extraction and transportation to approved fill sites.
2. Hydraulic and mechanical removal, processing and production of sand-based products, and transportation of these by road.
3. Receipt and, where possible, processing of VENM and ENM to yield additional products for industry.
4. Progressive backfilling of the edges of the Extraction Area with VENM and ENM unsuitable for processing.
5. Receipt and, where possible, processing of ASSM to yield additional products for the industry.
6. Receipt and internment/backfilling of ASSM beneath finalised sections of the extraction ponds and surrounding land.
7. Development of a landform consistent with the broad development strategy to be implemented by the Applicant.

It is noted that all references to sand resources or sand pumped hydraulically to fill sites are expressed in cubic metres (m<sup>3</sup>) whereas **exported** sand products or **imported materials** are expressed in tonnes (t) given they are despatched or arrive in trucks which are weighed to record tonnage.

Sand that is hydraulically extracted from the **Extraction Area** would either be pumped directly to the nominated approved fill sites or alternately, pumped to the processing area. In both cases, a tailwater return pipe would be used to return water and entrained fines to the extraction pond. Sand at each fill site would be levelled and shaped as required in accordance with the conditions provided by separate development consents issued for their development. Some **soil and sand** above the water table would also be removed using mechanical methods and transported **to the Quarry** using trucks. These materials **could** be dry screened and, in some cases, blended with washed fine sand.

Within the processing areas, sand would be washed to provide a fine-grained sand **suitable for use in construction projects, biofiltration, glass sand and other products**. Material such as clay and silt particles removed during washing would be returned via a tailwater return pipe to the extraction pond.

It is proposed that the Project would also be licensed by the **NSW Environment Protection Authority** to accept **ASSM, VENM, ENM or other material that meets the requirements of an applicable Resource Recovery Order and Exemption that provides for the material be received for processing or application to land / within the dredge pond**. All VENM/ENM would either be stockpiled in the processing area for processing or transported directly to **the Extraction Area**. **VENM/ENM would be used for stockpiled and later processing, sale, or used as backfill or placed around the finalised edges of the Extraction Area**. **ASSM** would either be placed:

- a) beneath the **extraction** pond surface in a finalised section of the **Extraction Area**; or
- b) **Within the Extraction Area** at or adjacent to the active dredge face **or at a location for later access**. This **ASSM**, suitable for use as a construction sand product, would then be passed through the dredge and processed. Clay, silt particles, and fines separated during washing would be returned via the tailwater return pipe to beneath the pond **surface**.

No contaminated materials (i.e. materials with hydrocarbons, heavy metals or biological waste) or other wastes would be accepted **into** or stored on the **Quarry Site**.

Products **exported from the Quarry** would be transported to local and regional markets by conventional road truck and trailer.

## 2.2.4 Approvals

It has been established during the preparation of this document that four approvals are required from the NSW Government and Tweed Shire Council for the Project to proceed.

- a) Project Approval **MP05\_0103B (State Significant Development under the Environmental Planning and Assessment Act 1979)**.
- b) Environment Protection Licence 12385 (Section 58 of the *Protection of the Environment Operations Act 1997*).

- c) Road Construction Permit(s) – Section 138 of the *Roads Act 1993* for road intersections (if not already constructed) and pipelines beneath Council roads and with road reserves.
- d) **Water Access Licence 40902** under Part 5 of the *Water Management Act 2000*.

## 2.3 Geology, Resources and Products

### 2.3.1 Geology

Roy (1973) described the Tweed River floodplain as a drowned river valley formed following sea level rise at the beginning of the Holocene, about 18,000 years ago. The sea level rise resulted in the landward movement of offshore marine sands and clays into the prior valley and the formation of a sand barrier. The basins behind these sand barriers progressively in-filled with estuarine material and today are relative mature floodplains. The depositional environment of the Quaternary sands is described as tidal deltaic, with the presence of shell and organic fragments throughout the sequence indicative of alternating marine and terrestrial influence during deposition (DPI, 2005).

In the area of the **Quarry Site**, fine to medium grained sands are underlain by finer grained marine silts and organic clays to about 38m depth. Basement is the Neranleigh-Fernvale Group which outcrops to the north **and southwest** of the Tweed River. The Neranleigh-Fernvale Group is comprised of greywacke, slate, phyllite and quartzite. Tertiary basalt of the Lamington Volcanics overly the Neranleigh-Fernvale beds immediately to the south of the **Quarry Site** and form the Cudgen Plateau. The basalt is fine grained and black as fresh rock, but weathers to form deep red-brown good quality agricultural soils over the Cudgen Plateau. A thin band of beach and dune sands occurs adjacent to the coastline.

### 2.3.2 On-site Resources

The principal resource within the **Extraction Area** is fine-grained sand with a **thin** overlying layer of loamy sand. The data relating to the sand resource is drawn from a range of geological investigations that have been undertaken since 1985 for various proposals and the current Project proposed by the **Applicant**. These investigations are presented in the **Compilation of Geological and Resource Data relevant to the Proposed Sand Extraction Proposal on Lot 21, DP 1082482 and Lot 2, DP 216705 at Cudgen, New South Wales, RWC May 2008**.

Data from drilling logs and previous resource studies indicate the base of the sand resource slopes northwards away from its edge on the Cudgen Plateau rapidly increasing to a depth of approximately 20m. The maximum resource depth on the **Quarry Site** is 22.5m at the northern side of the **Extraction Area**.

The sequence within the **Extraction Area** comprises a thin, organic rich, sandy topsoil layer within the upper 0.3m which is underlain by between 0.5m and 1.0m of loamy sand except in the northwestern corner of the southern **section of the Extraction Area** where it may approach 3m in thickness. The remaining profile consists of fine grained sand with a particle size between 150 and 600 microns. The sand has a 'silica' content (SiO<sub>2</sub>) of between 91.7% and 94.8%, a shell content (CaCO<sub>3</sub>) of approximately 0.02% to 1.88% and is relatively high in iron oxides (0.67% to 0.95%). The proportion of fine materials (<75µm) is comparatively low and typically <2%.

The in situ quantity of sand (including silts and coarse shell) within the Extraction Area (prior to commencement of operations) is approximately 7,238,000m<sup>3</sup>. This volume has been calculated based upon the nominated extraction limits, proposed depths of extraction and a 1:3 (V:H) batter around the perimeter of the Extraction Area.

### 2.3.3 Off-site Resources

An important component of the Project would be the acceptance of a range of natural materials from off site that could be processed to produce a range of sand-based products.

Based on experience to date, it is expected that approximately 150,000t of VENM/ENM/ASSM/other approved materials could be attracted annually to the Quarry Site for placement on site or processing. The nature of these resources would vary widely and would include both non-acid generating and acid generating fine sands, clay, gravel and rock. Notwithstanding their variability, the Applicant recognises that it is preferable for these materials that might otherwise be treated as waste be effectively “recycled” and used as alternatives to “virgin” or primary natural products, thereby extending the life of the natural resources throughout the region, accepting material that might otherwise be transported to more distant locations, and creating commercial savings and benefits from what could otherwise be treated as waste.

### 2.3.4 Processed Products

The Applicant proposes to produce a range of sand products derived from the sand and soil resources within the Quarry Site and from a variety of imported materials delivered to the Quarry Site. The main products that would be produced include (but would not be limited to):

- fine-grained sand for concrete/asphalt/construction;
- mortar sand/brickies loam; fill sand for bedding pipes etc;
- sand products for use in biofiltration media;
- sand suitable for use in production of glass; and
- soil and topdressing materials.

## 2.4 Site Establishment and Construction Activities

### 2.4.1 Introduction

Site establishment and construction activities would include / have included preparatory works for the sand processing operations and the dredging operations. For the purposes of the *Environmental Assessment*, it has been assumed that these works would occur concurrently.

The site establishment and construction activities would include / have included:

- boundary definition;
- earthworks for the processing area;

- construction of the processing plant and related infrastructure; and
- tree screen planting.

The activities involved in the establishment of the sand extraction operations are discussed in Section 2.5.

## 2.4.2 Boundary Definition

The boundary of each approved Project component would be surveyed to ensure **all** boundaries are clearly marked to ensure all operations occur within the approved boundaries.

## 2.4.3 Earthworks for the Processing Areas

### Soil Removal and Bund Wall Construction

Topsoil would be stripped from the processing areas and pushed up/shaped together with sand excavated from the **Extraction Area or imported materials** to form the perimeter bunds around the processing areas. Topsoil and sand would be used to construct the perimeter bund around the processing area to **~2m above the processing area pad. Excess topsoil would be stockpiled either for sale or use in rehabilitating finalised lake edges / backfilled areas.**

### Sand Filling

The elevation of the processing areas would be raised through the placement of sand **or imported materials**. Raising the height of the processing area would assist to **avoid or** reduce damage to equipment during flood events.

### Internal Road Construction

Internal roads would be formed **as required** with **either on-site or** imported materials to provide an all-weather surface for vehicles.

## 2.4.4 Processing Plant Construction

The construction of **fixed** processing plant **components** would involve limited earthworks, laying of concrete foundations, delivery and placement of transportable office/amenity buildings, construction of workshop, erection of processing equipment and conveyors, electrical installation and erection of signage, etc.

## 2.5 Sand Extraction

### 2.5.1 Extraction Area Design

The **Extraction Area** has been designed to maximise the recovery of the fine-grained sand resource within the context of the environmental and operational constraints.

The Extraction Area covers an area of 43.8ha and extends to a depth of 20m or to the base of the sand resource. Final batters would be formed at 1:3 (V:H) to avoid potential instability on the edge of the extraction pond. Following consultation with Country Energy, a 15m setback would be provided along the western property boundary around the power poles located on the property boundaries in the southwestern section of the Extraction Area. In consultation with Country Energy, the two power poles within the proposed limit of extraction could be removed and the poles on either side raised at the appropriate time in order to maintain the required clearance of the power lines.

## 2.5.2 Extraction Procedures and Methods

The procedures to extract the recoverable sand within the extraction sites would involve the following component activities.

1. Identification of the planned area of sand removal (ensuring the limits remain within the approved extraction boundary).
2. Soil removal and installation of surface water controls (if extending beyond existing perimeter bunding).
3. Extraction of recoverable sand by excavation and/or dredging.

### Identification of the Nominated Sand Removal Area

Each area of extraction would be clearly defined to ensure that extraction is undertaken within the approved extraction boundary. This could be undertaken utilising GPS enabled equipment, slashing of the grass within the active extraction stage, or other markings to guide equipment operators.

### Vegetation Removal

No substantial vegetation beyond exotic grass exists within most of the Extraction Area, however, approximately 25 *Casuarina glauca* trees are present (in 2008) along the alignment of the existing Altona Road. Trees and groundcover would be removed ahead of the planned road removal in that stage.

### Soil Removal and Installation of Surface Water Controls

Following the delineation of the next active extraction stage, topsoil would firstly be stripped to expose sufficient sand to be extracted. The topsoil would be stripped to a depth of approximately 0.3m and used to form bunding up to 1.8m AHD around the perimeter of extraction. Excess topsoil not required for creation of bunds or for rehabilitation would either be used for topsoil on other land owned by the Applicant, incorporated into sand products or sold without processing.

Defined sections of the 1.8m AHD bund (up to 50m wide) would be reduced to a height of 1.3m AHD in order to provide a grassed spillway during flood events. A spillway would be installed within both the eastern and western extent of the bunds surrounding the Extraction Area.

All topsoil bunds would be grassed to stabilise the surface and would form part of the surface water control measures to prevent off-site runoff entering the extraction sites. The bunding would not, however, prevent the Extraction Area from being inundated during a major flood event. In the event of a major flood, the spillways, being at a lower level than the adjacent bunds, would allow the flood waters to drain naturally into and out from the Extraction Area and avoid scouring.

## Extraction of Recoverable Sand

Following the removal of topsoil, the upper 0.5m to 1.0m of loamy sand **may** be extracted using a 30t excavator and/or swamp dozer starting at the point furthest within each stage from the extraction pond and moving back to within approximately 5m of the pond. A thin layer of the loamy sand would be left at the base of the excavation to minimise inflow of water from the water table.

The remaining sand profile would then be extracted using a cutter-suction dredge. The dredge would float on the pond and move backward and forward across the pond extracting from the underwater face of sand. Any parts of the sand resource above the water table (**including any loamy sand not excavated**) would slowly slide into the extraction pond as the dredging operation advances across the pond. The sand/water slurry would be pumped directly from the dredge via a pipeline to the approved fill sites **or to the processing areas**. The **range** of the dredge would be **adjusted as required, typically** once or twice each day, by the use of tie ropes connected to anchors on the banks of the extraction pond.

### 2.5.3 Extraction Rates

The maximum annual extraction rate is 650,000m<sup>3</sup> **which** would comprise sand-based products **transported by road and** intermittent extraction of sand for hydraulic transportation to approved fill sites.

The extraction rate would fluctuate according to the market requirements for the various sand products produced, **whether to supply industry or for filling purposes**, the maximum total extraction **would** not exceed 650,000m<sup>3</sup>.

The volume of sand extracted in any one year for the **Applicant's** filling projects would depend upon several factors including timing for approvals for development of the nominated fill sites.

### 2.5.4 Mobile Equipment

The number of items of mobile equipment would vary depending upon the extent of sand production and the prevailing market requirements. Any decommissioned equipment would be replaced with equipment of similar capacity. **Equipment of smaller capacity and additional equipment may be utilised from time to time to complete specific tasks (e.g. a bobcat to clean around difficult to reach areas of the processing plant).** The mobile equipment proposed for regular use during site establishment and operation **includes the following, not including the equipment used to develop the fill sites.**

- Cutter – Suction Dredge (diesel or electric)
- D6 Swamp Dozer (or equivalent)
- 950 Front-end Loaders (or equivalent)
- 10 000L Fuel tanker
- 30t Excavators
- 15 000L Water truck

- Crane
- Road Trucks
- Off-road Trucks
- Street Sweeper

## 2.6 Processing and Blending Operations

### 2.6.1 Introduction

Sand would need to be processed to produce the sand products meeting specifications required by customers. Washing of the extracted sand is required to remove a range of **material** naturally present within the sand e.g. shell, mud, vegetation etc whilst screening and blending would be undertaken to remove oversize or add particular size fractions. The extent and type of processing would be dependent upon the specifications of the products required.

The **Applicant** also intends to process a range of **imported** materials (VENM/ENM/ASSM) that would otherwise be destined as fill materials. The opportunity exists to either produce blended products with on-site sand resources or specific products reflecting the characteristics of the **imported material**.

Sand extracted for filling purposes on the various fill sites would **not** need to be processed.

### 2.6.2 Processing Area Layout and Design

The main components within the **processing area(s)** comprise the following (**depending on the products being produced at that time**).

- A wash plant.
- Multipurpose plant with **crushing**, screening and blending capabilities.
- A **glass sand processing plant**.
- **Imported material** receipt area(s).
- Access roads.
- Bunded area for storage of treated **ASSM** and loamy sand.
- General storage area, workshop, office and ablutions block, parking areas.
- Perimeter bunding with vegetation screen.

The internal area of the southern processing area would be approximately 3.3ha and the northern processing area would be approximately 2.25ha and be surrounded on the eastern and southern boundaries with a 2m high vegetated perimeter bund.

The outer surface of the perimeter bunds would be established with grass. A vegetation screen would be planted on the outer slopes of the **processing area bunds** to provide enhanced visual screening.

Prior to receipt of ASSM that is intended to be processed (rather than placed within the extraction pond), a runoff sump would be constructed and all runoff from the ASSM receipt and processing area would be directed to the sump. Any overflow from the sump would drain through piping to the extraction pond.

Access to the southern processing area would be provided through an access road within the northwestern part of the processing area to Altona Road. A second access could also be constructed to enhance one-way traffic flows. Access to the northern processing area would be through the northern and/or western section of the processing area onto the internal roads or Altona Road following realignment.

All employee and visitor vehicles would be parked within defined parking areas.

### 2.6.3 Sand Washing Operations

Washing through the wash plant would be the main processing undertaken for the recovered sand to be sold to industry. Raw sand would either be loaded into the wash plant hopper by off-road trucks or pumped directly from the dredge. The wash plant would remove any impurities (e.g. vegetation), fine particles (i.e. silts and clays) and oversize materials, e.g. shells or clay balls. All fines separated during the process would be returned via the tailwater return pipe. The washed sand would be stockpiled using a stacker. The stockpile(s) would have a maximum height of approximately 8m to 10m. From time to time, washed sand would be relocated by a front-end loader and stockpiled within a nearby area.

### 2.6.4 Crushing, Screening, Blending and Processing Other Products

The processing of the loamy sand and other sand products and the recycling of suitable imported materials (VENM/ENM/ASSM) would be undertaken using the multipurpose plant. The multipurpose plant would consist of various module mobile equipment and have the ability to simply screen the loamy sand or screen and blend dredged sand with either loamy sand extracted on site or imported materials. Crushing may also be undertaken of oversize materials such as shells. Additionally, some of the sandier imported materials could be screened and either blended with sands produced on site or sold without further blending.

Any imported materials not suitable for processing and any unsaleable material would be placed in defined backfilled areas around the margins or base of the extraction pond.

A glass sand processing plant may also be installed as an extension to the wet processing plant. The plant would be of a similar nature to the wash plant but provide for an additional level of precision separation (both upper and lower size fraction control) to meet the quality specifications for sand to be used in glass production.

## 2.7 Imported Material Receival, Treatment and Backfilling Operations

### 2.7.1 Introduction

The Applicant proposes to receive a range of imported materials, including VENM/ENM/ASSM at the Quarry Site for processing and/or use as backfill. VENM/ENM, i.e. materials that don't generate acid, would either be used to:

- a) progressively backfill sections of the extraction pond and cap ASSM materials placed within the pond; or
- b) create a final landform suitable for wetlands and surrounding parkland around the extraction pond in accordance with the planned recreational and environmental land uses of the area.

Additionally, ASSM not suitable for processing would either be used to backfill the extraction pond from below approximately -1m AHD (where VENM/ENM is to be placed as a capping material) or be interned beneath the finalised lake sections of the extraction pond. The approved SWMP for the Quarry presents a flow chart for the receipt, treatment and handling of VENM/ENM/ASSM. The following subsection details the management of VENM/ENM/ASSM receival, treatment prior to processing and backfilling sequencing and procedures.

### 2.7.2 Backfilling Sequence and Procedures

VENM/ENM not used in production of saleable products would either be used to backfill the extraction area or deposited along the edges of finalised sections of the extraction pond. The backfilling sequence would be generally reliant upon the stages of completion of the Extraction Area as some areas may become available for backfilling earlier than other stages.

Within the extraction area, the swamp dozer and/or 30t excavator would be used to push/move VENM/ENM/ASSM suitable for creating a slope of 1:10 (V:H) for approximately 10m from the shoreline forming an area suitable for wetland establishment. The dredge may also be utilised to assist with placement of material to finalise the slope. It is expected that backfilled material further than 10m from the edge of the extraction pond would settle underwater at an angle of between approximately 1:3 and 1:6 (V:H) depending on the nature of the VENM/ENM/ASSM. Additional backfilling would also be undertaken to reclaim portions of the shoreline, providing flat areas surrounding the final lake. The length of the shoreline backfilled to create wetlands and reclaim lake edges would be dependent on the volume of suitable material received. In the event that limited volumes of suitable material are received, focus would be placed upon the formation of a consolidated wetland area, preferentially across the southern boundary of the Quarry Site adjacent the Cudgen Plateau.

Separate approval would be sought for any additional filling of land to raise the level of the land above the existing ground level, whether that overlay areas within or beyond the Extraction Area.

## 2.8 Waste Management

### 2.8.1 Introduction

Waste generated by the Project would be either related to extraction and processing operations or involve the production of general wastes. The extraction and processing operations would result in the mobilisation and separation of potentially acid generating pyritic fines and sediments while the extraction of the loamy sand would also expose potentially acid materials. Furthermore, a range of acid producing materials would be received on site (i.e. **ASSM**). A small amount of oversize material may also be produced during the processing operations though it is unlikely to be acid generating.

General wastes associated with equipment maintenance, and operating the office would also be generated.

The following subsections describe the nature of these waste materials and their management.

### 2.8.2 Acid Generating Materials

Acid generating pyritic fines mobilised as a result of extraction would be largely removed from the product sands during the washing process. The process water that passes through the washing plant would remove the bulk of pyritic fines and sediments. During deposition of sand at each fill site, the fines would remain within the tailwater and return to an on-site tailwater pond. In both cases, the process water or pond water would be returned via a tailwater return pipe and, using a snorkel, the fines would be deposited above a section of the extraction pond floor. In the event that a finalised section of the extraction pond is not available, a separate temporary return pond would be created to temporarily store and contain the fines. As the operation proceeds, the fines would be re-pumped directly to a finalised section of the extraction pond.

Additionally, as discussed in Section 2.7.2, **ASSM** materials would also be deposited within the extraction pond. **ASSM** suitable for passing through the dredge would be deposited within the active dredging area in the **Extraction Area** whilst **ASSM** not suitable for any form of processing would be deposited beneath the pond surface of a completed section of the pond. Furthermore, any excess **ASSM** which cannot be processed would also be deposited beneath the pond surface. All fines, sediments and **ASSM** interned beneath the surface of the extraction pond would be covered by a minimum of 2m of water to avoid potential remobilisation through wind or wave action on the dredge pond surface. This depth of water has been demonstrated at Dunmore Sand Quarry (south of Wollongong) to be adequate for the fines not to oxidise and adversely affect the acidity of the pond water.

Regular testing of the water within the extraction ponds would also be undertaken to ensure that the water quality meets relevant guidelines and standards. Water quality monitoring and management are described within the approved **Soil and Water Management Plan for the Project**.

### 2.8.3 Oversize Materials

Small amounts of oversize materials would be **separated** during screening operations (approximately 1% to 5% of screened materials). Oversize is likely to comprise large shell fragments, oversize rock fragments and clay balls **and sticks** dredged from the base of the

**Extraction Area.** Screened oversize **not recovered for crushing and utilisation in products** would be placed **into the Extraction Area** in a similar manner to VENM/ENM. In the event that any oversize is suspected to be potentially acid producing, it would be interned beneath at least 2m of water.

## 2.8.4 General Waste

Routine servicing of earthmoving and dredging equipment would **generally** be undertaken by contractors with mobile equipment. All used oil and grease would be removed from site by the responsible contractor. **If required, any waste oil generated outside of routine servicing would be stored within an appropriately bunded area before being removed from site.**

All paper and general wastes originating from the office, ablutions, **and** amenities together with routine maintenance consumables from the servicing of the processing plants and mobile equipment would be disposed of in appropriate containers placed adjacent to each building. The waste containers would be collected by a licenced waste disposal contractor on an as-needs basis **or taken by the Applicant to a licenced waste facility.** All wastes capable of being recycled would be separately stored and removed.

## 2.9 Hydraulic Transportation to Fill Sites

### 2.9.1 Introduction

An estimated 2,500,000m<sup>3</sup> of sand would be required to raise the level of approximately 125ha of land, **if separately approved,** owned by the **Applicant** and associated companies. The sand **is approved to be** transported from the **Extraction Area** to each fill site by hydraulic means, i.e. pumped as a sand / water slurry through a pipeline. The sand would be separated from the water on the fill site and the water (including the separated fine silt component) pumped back to the fines placement area within the extraction pond.

This section provides an overview of the proposed pipeline corridors, the activities involved in establishing the required pipelines and the operational issues relating to the pumping of the sand slurry from the **Extraction Area** to the boundaries of the eastern and northern fill sites. Details of the activities on each of the fill sites would be the subject of separate development applications for each site. The Project which is the subject of this assessment is confined to delivery of the sand slurry to the boundary of the northern and eastern fill sites and the return of the separated tailwater (and the fine silt component).

### 2.9.2 Pipeline Corridors

The proposed pipeline corridors **will be used to** hydraulically transport or pump the sand slurry to both the northern and eastern fill sites. Beyond the **Quarry Site,** the northern pipeline corridor follows a route identified to have no substantial trees or shrubs that need to be cleared to enable the pipeline to be positioned. For the eastern pipeline corridor, it is intended to locate the pipeline adjacent to the proposed road between Tweed Coast Road and Turnock Street to serve the development of the land east of Tweed Coast Road. Within the **Quarry Site** itself, the internal pipelines would be periodically relocated to accommodate site activities.

Pipelines within the northern pipeline corridor would be buried approximately 1m beneath the ground surface within the road reserve on the western side of Tweed Coast Road **unless prevented by existing infrastructure**. No clearing would be required within the northern pipeline corridor as the pipelines would simply be **placed or** buried within the existing cleared road easement (see Section 2.9.3 for details). Placement of the pipelines within the northern pipeline corridor would involve underbored crossings of up to four driveways and Tweed Coast Road approximately 600m north of the Tweed Coast Road / Crescent Street intersection.

It is noted that, prior to placement of any pipelines external to the **Quarry Site or** on land owned by the **Applicant** and associated companies, Tweed Shire Council would be consulted to ensure that the precise placement of pipelines within the corridors does not adversely affect any existing services or services planned to be installed during the period that the pipelines would be required.

### 2.9.3 Design Features

The hydraulic transportation of the sand slurry **could** involve the following components, **with specific details depending on the size and power of the dredge pump and related factors**.

1. The pumps on the dredge within the extraction pond would provide the energy to extract and pump the sand slurry for up to 500m from the dredge.
2. A 300mm diameter HDPE pipeline for sand slurry delivery and 500mm diameter HDPE pipeline for tailwater return to be supplied in 10m to 12m sections for joining with standard couplings and flanges.
3. A number of 300mm and 500mm diameter steel pipes would be incorporated along the sand slurry delivery and tailwater return pipelines respectively where additional strength is required, e.g. below roads and across drainage lines.
4. An enclosed booster pump **could** be located on the **Applicant's** land **to** the east of the **Quarry Site** to provide the necessary **power** to pump the sand slurry to the fill sites. A further booster pump **might** be located near the boundary of Lots 26C and 26D DP 10715 to provide the energy to pump the sand slurry to the eastern-most sites. The booster pumps would be placed within acoustically treated and enclosed storage units (approximately the size of a small sea container) and would be positioned using a small truck-mounted crane).
5. A series of underbored crossings would be incorporated along the length of the pipelines to be positioned safely beneath roads, driveways, other services and infrastructure.
6. A narrow service road would be constructed adjacent to the pipeline route to enable a 4WD light vehicle to undertake the necessary daily inspections and maintenance where necessary.

The use of a 500mm diameter return pipeline would reduce the friction of the tailwater and hence reduce the horse power required from the tailwater return pump located within the fill site.

## 2.9.4 Pipeline Installation

Installation of pipelines of the nature proposed is a standard practice adopted by numerous companies, construction contractors and local and State Government Agencies. All pipes would be delivered along the respective corridors using a road truck and laid either in a prepared trench or on the cleared ground using a front-end loader. Due to the weight of the steel pipes, no specific anchoring of the pipelines would be required. All driveways and roads which are crossed by the pipelines would be underbored to allow the pipeline to pass underneath without disrupting or damaging the driveway or road surface. Standard procedures for the underboring of public roads and driveways within the road reserve would be adopted and outlined within the application for the Road Construction Permit (see Section 2.2.4).

## 2.9.5 Operations

The operation of the pipelines between the **Extraction Area** and either the processing plant or fill sites would require the adoption of a range of standard operations procedures. **Regular checks of the integrity of the equipment and pipelines would be conducted.**

**Table 2.2** lists each of the fill sites, their fill sand requirements (**if approved for fill**) and the likely duration of the overall campaigns for each site.

**Table 2.1**  
**Fill Sand Requirements and Duration of Pumping of Fill Sites**

Fill Site#	Area (ha)	Approximate Fill Sand Requirement (m <sup>3</sup> )	Duration of Filling Campaign*
1. Part Lot 21 DP 1082482	11.7	230,000	6 months
2. Lots 1 and 2 DP 828298 (filling complete)	10.5	300,000	Completed
3. Part Lot 3 DP 828298	3.2	80,000	2 months
4a. Part Lot 4 DP 727425 and Lot 26C DP 10715	5.8	130,000	3.5 months
4b. Part Lot 26D DP 10715 and Lot 11 DP 871753	9.1	160,000	4 months
5. Lots 11, 12 and 13 DP 871753	4.0	100,000	2.5 months
6. Part Lots 11, 12 13 and 14 DP 871753, Lots 1 to 9 DP 781714	6.5	500,000	13 months
7. Part Lot 10 DP 857710	16.9	350,000	9 months
8. Part Lot 10 DP 857710, Lot 1 DP 10075645, Lot 2 DP 1111554	46.8	650,000	17 months
<b>Total</b>	<b>124.5</b>	<b>2,500,000</b>	<b>5 years 6 months</b>
* Based on an annual pumping rate of 450,000m <sup>3</sup> per year.			

The program for pumping sand to the fill sites would depend upon the **approvals**, timing and conditional requirements for each of the developments at each of the fill sites. It is therefore possible that the pumping operations may be intermittent with a period of no pumping to fill sites.

## 2.10 Road Transportation

### 2.10.1 Introduction

An important component of the Project would be the despatch and distribution by road of the range of products produced within the processing areas and the receipt of **imported materials**. This section reviews the **Quarry Site** entrances, site access roads and the levels of product truck movements and other traffic likely to travel to and from the **Quarry Site**. Further controls relating to road transportation are presented in **the approved Transport Management Plan**.

### 2.10.2 Altona Road Realignment and Crescent Street Intersection

The realignment of Altona Road and northern part of Crescent Street and Altona Road intersection with Tweed Coast Road will be undertaken in accordance with the separate development approval for those activities. When Altona Road is ultimately realigned, it would be linked with the improved intersection providing a curved access road and minimising sterilisation of the sand resource south of the road. **Parts of Altona Road, Crescent Street and Tweed Coast Road** have been widened and upgraded since the original approval.

### 2.10.3 Quarry Site Entrances and Access Roads

Prior to the realignment of Altona Road, the northern processing area and northern portion of the Extraction Area would be accessed via the eastern section of Altona Road utilising the intersection constructed in accordance with Council issued DA 22/0145. An access road would then generally follow the route of the proposed realigned Altona Road to access the northern processing area. The southern processing area would be accessed by the existing access intersection on the western section of Altona Road. An additional access intersection may also be utilised if required to enhance one-way traffic flows.

Following the realignment of Altona Road, the Project would variably involve the use of up to five access points directly off the realigned Altona Road, namely two entrances to the southern processing area, two to the northern processing area and an additional entrance to provide access to the eastern portion of the **Quarry Site**.

Access to each entrance would be provided by a concrete culvert positioned within table drains **where present**. The gate for each entrance would be sign-posted and **the processing area accesses** would be setback approximately 20m from the sealed section of Altona **Road** to enable vehicles to safely park off Altona **Road** whilst the gates are being opened, if necessary.

**The** sight distances and proximity to other intersections **has been assessed** and identified the intersections with **so that the realigned Altona Road** could be safely constructed. All required line markings and signs would be installed in accordance with relevant **current** standards.

## 2.10.4 Transport Routes

Prior to Altona Road relocation and Tweed Coast Road widening and a roundabout at Altona-Tweed Coast Road, all product trucks departing from the processing area would travel eastwards along the eastern section of Altona Road towards Crescent Street and then northwards along Crescent Street towards Tweed Coast Road. The bulk of the trucks would continue to travel northwards towards the Pacific Highway whilst a small proportion would travel southwards to deliver products to local construction projects noting that these trucks would turn left (northwards) and utilise the interchange roundabout to U-turn until a roundabout at Altona-Tweed Coast Road is constructed.

No project-related trucks would travel on Altona Road west of the Quarry Site, south of Altona Road on Crescent Street or on any other local roads except for the purpose of a local delivery.

Transport routes for trucks importing material to the Quarry Site will be via Tweed Coast Road to Altona Road and the Applicant would nominate a preferred route for trucks as part of the preparatory procedures required for the delivery of the imported material.

## 2.10.5 Heavy Vehicle Levels

Prior to the realignment of Altona Road and associated upgrade of its intersection with Tweed Coast Road a maximum of 12 laden truck per hour would occur on the unwidened part of Altona Road (western section). A maximum of an additional 30 laden trucks per hour could occur on the eastern ~150m part of Altona Road which has been widened to two lanes as approved in DA 22/0145. Following realignment of Altona Road (to a two laned road for the length of the Quarry Site), the restriction of the additional 30 laden trucks per hour to the western part of Altona Road would be removed.

These limits apply to both product export and material importation.

## 2.11 Hours of Operation and Project Life

### 2.11.1 Hours of Operation

Table 2.3 records the approved hours of operation for all activities planned for the Quarry Site.

### 2.11.2 Project Life

The Project is currently approved to 2047. The complete extraction of the sand resource within the extraction sites would be dependent on the issuing of the required development consents for development of the fill sites and may extend the operation over a more extended period. Backfilling and rehabilitation of the final sections of the lake would be undertaken progressively, with finalisation of the Project area following the completion of sand extraction depending on quantity of imported fill approved and available.

**Table 2.2**  
**Hours of Operation**

<b>Activity</b>	<b>Monday to Friday</b>	<b>Saturday</b>	<b>Sunday</b>
Site establishment, dry processing, product transport by road, VENM receipts, other quarrying operations not specified in this table.	7.00am to 6.00pm	7.00am to 1.00pm	-
Sand extraction by dredging and pumping to the processing plant, wet processing.	7.00am to 10.00pm	7.00am to 4.00pm	-
Sand extraction by dredging and pumping to fill sites.	7.00am to 6.30pm	7.00am to 1.00pm	-
Operation of dredge to fill pipeline with water or pipeline flushing	6.30am to 7.00pm	6.30am to 1.30pm	-
Maintenance (if inaudible at neighbouring residences)	Any day		

## **2.12 Infrastructure and Services**

### **2.12.1 Buildings**

The **Applicant** proposes to construct / erect a range of buildings on site to assist with site operations, management and security including the following.

- Offices
- Maintenance workshop
- Amenity / ablutions facilities

All of these buildings would be located on a raised area within the processing areas. Separate construction certificate applications would be submitted (**as applicable**) to Tweed Shire Council following the grant of Project Approval.

### **2.12.2 Services**

#### **2.12.2.1 Power**

Power for fixed plant in the southern processing area is supplied by a ground transformer on the western boundary of the southern processing area. Power for the electric dredge and booster pump is provided via power poles installed within the Extraction Area. The location of the power poles will be adjusted as required to suit the progression of extraction.

The power requirements for plant in the northern processing area would be supplied using diesel or diesel generators, however, if feasible, an electrical connection could be utilised.

#### **2.12.2.2 Water**

Potable water will be supplied through a bottled water service. Mains water may also be connected for use in potable water and equipment washdown.

Water required for processing would be drawn from the extraction pond either in the form of a slurry with the sand being dredged or through water **directly** pumped from the extraction pond. The pumping rate for the dredge would **generally** be **up to** approximately 300litres/sec or 17.3ML per day (based upon a maximum 16 hour day).

During processing, **effectively all** process water would be returned to the extraction pond with the process fines **with only small amount** of water incorporated with the various products produced.

**A water balance is included within the Soil and Water Management Plan.**

### **2.12.2.3 Sewage**

The on-site ablutions would be **provided through portable pump out systems.**

### **2.12.2.4 Communications**

**Communications would be provided via the mobile/satellite network and UHF communication channels.**

### **2.12.2.5 Fuel**

It is estimated that **between 50,000L (construction material only utilising electric dredge) and a maximum of 900,000L (including hydraulic transfer of fill material and utilisation of diesel dredge and booster pumps)** of diesel fuel would be required annually to operate all on-site mobile equipment **and** pumping stations. The fuel for the mobile equipment would **either** be stored within a self-bunded mobile fuel tank (capacity 10,000L) **or brought to site via a contracted refuelling service.** **If an on-site mobile fuel tank is utilised,** whilst not in use, the fuel tanker would be parked adjacent the workshop.

### **2.12.2.6 Consumables**

A number of maintenance products, such as air and oil filters, would be stored in the workshop for servicing mobile equipment and plant.

## **2.13 Employment**

Once fully operational, the operation would employ approximately five full time equivalent persons. A range of other contractors would also be engaged from time to time.

Additionally, the Project would provide employment for approximately 14 truck drivers for delivering sand products and **imported material** deliveries.

## 2.14 Safety and Security

The **Applicant** would continue to adopt all the required safety measures for all on-site activities as required by the **Department of Primary Industries and Regional Development** and **SafeWork NSW**.

As discussed in Section 2.4.1, fencing would be maintained around the **Quarry Site boundary**. Signs exhibiting “Warning – Deep Water” or “Do not Swim” would be positioned at appropriate locations **around the extraction lake** and the Site Manager would undertake regular inspections of the boundary fences to ensure they are in good condition.

All entrance gates would also be locked outside the hours when trucks are travelling to and from the processing areas and extraction site.

**If required**, security lighting would be provided around the office and workshop compound but directed downwards and not towards local nearby residences.

## 2.15 Landscaping and Rehabilitation

### 2.15.1 Introduction

The **Applicant** would adopt a progressive approach to site landscaping and rehabilitation to ensure that, wherever possible, disturbed areas are either temporarily or permanently stabilised to limit erosion and adverse visual impacts. The following subsections describe:

- the **Applicant**'s rehabilitation objectives for each phase of rehabilitation including site establishment;
- the rehabilitation procedures to be adopted throughout the life of the Project;
- the components involved in site decommissioning;
- the final landform that would be progressively formed throughout the life of the Project; and
- the planned long term uses of the rehabilitated landform.

An important component of the **Applicant**'s plans for development at Kingscliff, Chinderah and Cudgen is the rehabilitation of the **Quarry Site**, with the progressive backfilling of the northern **portion of the Extraction Area** and selected finalised sections of the southern **portion of the Extraction Area** and introduction of native vegetation to create wetland areas and landscaped parklands. The construction of recreational facilities such as sporting fields, walking and equestrian tracks would occur following completion of sand extraction and filling activities within the respective **part of the Extraction Area and Quarry Site**. **These ultimate land uses may occur concurrently with extraction and processing operations in other parts of the Quarry Site.**

The proposed rehabilitation procedures **were** developed with the assistance of HMC Environmental Consulting (for soil resources), Idyll Spaces (for flora species and community construction) and Kendall and Kendall (for preferred fauna habitats). The **rehabilitation** procedures adopted **are described in the approved Rehabilitation Management Plan for the Project and would be** regularly reviewed throughout the life of the Project and modified if appropriate, to reflect the operational experience gained.

## 2.15.2 Site Establishment and Construction Phase

### 2.15.2.1 Rehabilitation Objectives

The site establishment and construction phase would result in the disturbance of a number of areas on the Quarry Site, some of which would need to be rehabilitated during the phase itself. The objectives relevant to this phase are as follows.

- To stabilise all disturbed areas to limit erosion and dust lift-off.
- To create a visually attractive site.

### 2.15.2.2 Rehabilitation Procedures

The rehabilitation procedures to be adopted would be consistent with best practice in the extractive industry. The procedures are presented for surface water management structures, amenity bunds, and visual screening.

#### Water Management Structures

Bunding used to retain dirty water within, and divert external stormwater away, from operational areas would be stabilised either through placement of stripped grass (which has previously been successfully applied) or vegetated with a pasture seed mix in accordance with the approved Rehabilitation Management Plan.

#### Amenity Bunds

The amenity bund on the southern and eastern sides of the processing areas would be constructed during the construction of the processing area / extension of the processing area. The outer surfaces of the amenity bund would be covered with topsoil, and stabilised with placement of stripped grass or a pasture seed mix in accordance with the approved Rehabilitation Management Plan.

#### Visual Screening

A range of tree and shrub species would also be planted on the outer side of the amenity bunds. Species will be selected in accordance with the approved Rehabilitation Management Plan. A vegetation screen has also previously been established on the eastern boundary of the Quarry Site (adjacent Tweed Coast Road and Crescent Street).

## 2.15.3 Extraction Sites

### 2.15.3.1 Rehabilitation Objectives

The Applicant's rehabilitation objectives for the extraction sites are as follows.

- To provide a low maintenance, geotechnically stable and safe landform that would provide for planned recreational uses including sporting fields if approved.

- To backfill finalised edges of the **extraction** pond and revegetate to provide wetlands, surrounding parklands and facilities that would complement the **Applicant's** broader development plan (see Section 2.15.5).

### 2.15.3.2 Rehabilitation Activities

The northern portion of the Extraction Area will be progressively backfilled and where approved raised to a higher level, and reclaimed sections would be seeded with a suitable pasture mix (if required) in accordance with the approved Rehabilitation Management Plan, essentially recreating the existing landform and use or other approved use. It is noted that consistent with separate approval, the elevation of much of the northern portion of the Extraction Area would be further raised and landscaped to provide for sporting fields and recreational activities.

As described in Section 2.7, some finalised sections of the Extraction Area may incorporate both an extended flat area and an adjoining 10m wide wetland area. Topsoil would be placed along the edges of the pond and, where possible, directly transferred to maintain the soil structure and organic content. The soil surface would be left roughened so as to reduce erosion and promote establishment of vegetation.

The final surface on the pond edges would be revegetated through use of seed and planting of tubestock as required. Species would be selected in accordance with the approved Rehabilitation Management Plan.

An important component of revegetation would be the maintenance program to ensure the soil substrate and range of plants are maintained and any weed infestations are controlled. A vegetation monitoring program would be undertaken to record the progress of revegetation and the establishment success.

In the event of any ongoing erosion problems that cannot be successfully stabilised through the use of vegetation, 'hard' erosion control measures, such as rock armouring, would be investigated and implemented where required.

### Pipeline Corridors

Within the northern pipeline corridor, following installation of the underground pipelines, all soil material would be replaced and, if required, sown with a suitable grass seed mix for stabilisation. Similarly, upon removal of the underground pipelines, the void would be backfilled with the sand previously removed and stockpiled or sand from the Quarry Site and the soil material replaced and a grass seed mix applied, as required. The sections of the pipeline beneath the respective roads would be retained and capped off for the future use by Council, TfNSW or any authority to convey utilities under the road(s) at any future date. As the pipeline within the eastern corridor would be above ground, it is envisaged that, following removal of the pipeline, no specific rehabilitation measures would be required. As outlined within Section 2.9, no trees would be required to be removed for the installation of the pipelines, hence, no trees would need to be planted within the pipeline corridors following the removal of the pipelines.

## 2.15.4 Site Decommissioning and Final Landform

The Applicant intends to remove all buildings and structures off site at the end of the Project life. Any concrete footings would be ripped up and removed.

All unsealed internal roads not required for the subsequent land use(s) would be cross-ripped, topsoiled and seeded. It is envisaged that the site entrances would be retained for the intended recreational uses. Additionally, the amenity bund wall for the southern processing area could be retained and utilised in the final land use. The benefits of retaining the bunding around the Extraction Area will also be reviewed and all or sections of bunding may be retained for long-term maintenance of water quality within the retained pond.

Any areas where there have been fuel spillages etc would be remediated either on site or the affected material removed from site.

The margins of the final lake would contain flat areas of land and a number of shallow wetland areas extending from the shore for a distance of up to 10m. The exact width of the flat area would depend on the availability of imported material throughout the life of the Project. Any areas where backfilling has not occurred around the lake edges would dip into the lake at a slope of 1:3 (V:H). The total depth of the lake would vary depending on the depth of the sand resource and volume of imported materials interned within the pond though the maximum depth would be approximately 20m.

The final landform would be consistent with the intended final uses described in Section 2.15.5.

## 2.15.5 Final Land Uses

The long term land uses on the Quarry Site would be consistent with the overall master development plan for the development of the Applicant's landholdings within Kingscliff, Chinderah and Cudgen. In accordance with the master development plan and dependent on the relevant approvals, the extraction site and processing area at the end of the Project life and beyond could comprise the following.

- Multipurpose sports fields
- Boat house
- Athletics tracks
- Indoor pool
- Recreation pond with parkland, walking tracks and picnic facilities
- Ecotourism
- Equestrian club
- Tennis club
- Bowling club
- Conservation Area

Community and local government support for this range of facilities has been established through various consultation undertaken with Council, surrounding residents, community groups and the wider community (see RWC, 2008). It is noted that the formation of a recreational pond and parkland would be consistent with the proposed final land use for the Hanson Tweed Sand Quarry.