2. PROJECT DESCRIPTION

2.1 Project Overview

The Project involves establishment of a new bauxite mine capable of producing up to 50Mdptpa along an incremental expansion pathway. The environmental impacts of the Project have been assessed at several different levels of production along this pathway: a minimum rate of 15Mdptpa, a maximum rate of 50Mdptpa, and a nominal intermediate rate of 30Mdptpa. However, the actual rates and the timing of production increases are subject to market conditions. The initial production capacity is subject to ongoing feasibility studies but is likely to be 22.5Mdptpa.

The initial phase of mining operations involves production to replace depleted East Weipa production as well as developing third party markets. Production capacity would expand to replace Andoom production once those reserves are depleted. Production capacity will thereafter be expanded to 50Mdptpa when market conditions are suitable. The Project has bauxite reserves capable of sustaining a mine life of approximately 40 years, depending on annual production rate.

2.2 Description of the Mine

The term "mining activities" is defined in Section 147 of the EP Act, and this Project will, in summary, involve the following types of mining activities defined in that section:

- prospecting, exploring and mining under the *Mineral Resources Act 1989* (Qld);
- processing those materials;
- a number of activities directly associated with, or facilitating or supporting, the mining and processing activities (see **Section 2.8** for details);
- rehabilitation/remediation; and
- actions taken to prevent environmental harm.

Certain changes may occur in the layout of facilities, associated infrastructure, and the mining areas as the mine develops. Should any such change be likely to lead to a significant increase in environmental harm, an amendment to the environmental authority (mining activities) would be required.

2.3 Exploration Activities

Exploration activities are conducted throughout ML7024 and ML6024 from time to time and involve surveying; prospecting; the establishment of road and/or vessel access; drilling; test pits; use of instruments and equipment for mineral detection; sampling and digging to extract test material; extracting ore samples to determine mineral content; geotechnical investigations, temporary accommodation; drawing of surface water; land clearance; trucking of ore and test samples extracted, and other associated activities under the *Mineral Resources Act 1989, Environmental Protection Act 1994* and *Commonwealth Aluminium Corporation Limited Agreement Act 1957*. The transport corridor within ML 6024 is also required for this purpose, along with associated port and town infrastructure north of the Embley River. The disturbance caused by these activities is rehabilitated in accordance with EM Plan and PoOps commitments.

2.4 Mining Process

Vegetation is cleared by bulldozers following the wet season when the ground is sufficiently moist to allow tree roots to pull clear of the ground rather than breaking. Consideration is given to the selective extraction of structural grade timber in the Project area prior to mining, where practicable and where the timber can be beneficially used. The cleared vegetation will be pushed into windrows and burnt. RTA has previously trialled salvaging some felled trees for replacement in rehabilitated areas for fauna refuge. However, these trials were unsuccessful as wildfires burnt the stockpiled logs. Further trials are planned.

Approximately 600mm of soil is salvaged and returned by scraper or haul truck directly to mined-out areas undergoing rehabilitation, where possible, or stockpiled for later re-spreading. The overburden above the bauxite is then removed by front-end loader and returned to mined-out pits by trucks.

The top of the bauxite strata is generally less than 1m below the natural ground surface. The average ore thickness across the Project area is approximately 3.4m.

A shallow open pit is developed whereby bauxite is mined by front-end loader or excavator. Bauxite is relatively easy to dig and does not require blasting. The ore is loaded into dump trucks and transported via dedicated haul roads to a truck dump station adjacent to the beneficiation plant.

2.5 Rehabilitation

Rehabilitation is undertaken progressively during the life of the mine. Mined areas are likely to be rehabilitated to native woodland. However, the final land use options will be developed and discussed with the Traditional Owners, as required under the WCCCA, and relevant Government stakeholders. The overall objective is to return the land to a post-mining land use that is stable, self-sustaining, requires minimal maintenance, and protects downstream water quality. Details of rehabilitation objectives and strategies are described in **Section 3.5.3**.

2.6 Bauxite Processing

The location of the Boyd and Norman Creek beneficiation plants is shown in **Figures 4** and **5** respectively.

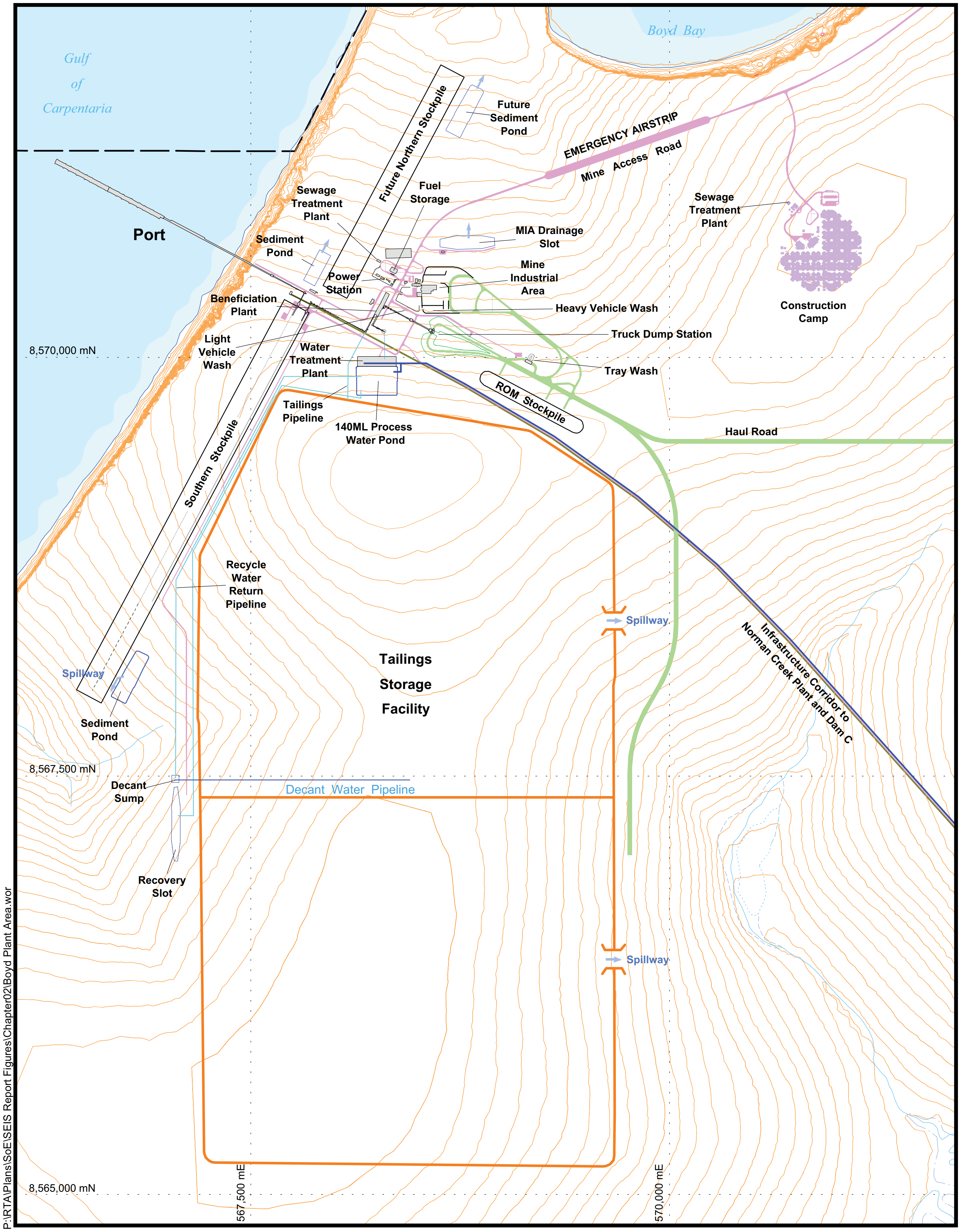
Product grade bauxite is processed by beneficiation, a process where oversized particles are removed by screening and fine particles are removed by washing. No chemicals are used in the beneficiation process. Overall bauxite product recovery from crude ore averages approximately 70%.

The initial Boyd and Norman Creek beneficiation plants are similar “low dispersion energy” plants and each plant uses approximately one tonne of water to produce one tonne of product bauxite. Each plant would be designed so it can be expanded in the future. Some of the crude ore in the Norman Creek mining area has elevated fines content that requires “high dispersion energy” beneficiation. This ore would be processed through a “high dispersion energy” module that would be added to the Norman Creek plant. This module uses approximately 1.9 tonnes of water to produce one tonne of product bauxite.

The beneficiation process generates tailings, which are pumped to TSFs where water is decanted and recycled back to the plant. The process involves:

- crude ore is transported to a truck dump station and dumped into a hopper;
- the ore is sized to <300mm in a primary crusher and then <90mm in a secondary crusher;
- ore is conveyed to the beneficiation plant;
- crushed ore and dispersion water is fed to single-deck scalping screens. Water sprays over the screen decks complete the dispersion of the crude ore. The decks of the scalping screens classify and separate oversize rejects (+25mm) from the crude bauxite feed;
- the oversize rejects are conveyed to a nominal 4000t stockpile adjacent to the plant. A 100,000t stockpile is located between the plant and the TSF. This material is reprocessed in a tertiary crusher and blended with the product stream, used for construction (e.g. roads, TSF walls) or returned to mined-out pits;
- the underflow slurry (–25mm) from each scalping screen flows by gravity onto a dedicated product screen for de-watering of the product (+0.6mm);

The underflow slurry (<0.6mm) from the secondary screen, made up of water, fine bauxite pisolites, sands and clays, is directed to a TSF via the tailings pumping system. Approximately 0.4Mt of tailings is produced for every 1Mdpt of bauxite. The Boyd TSF has a capacity of approximately 216Mt, covers an area up to 1,100ha, and will be about 25m high upon completion. The Norman Creek TSF has a capacity of approximately 234Mt, covers an area of approximately 1,100ha, and will be about 25m high upon completion. The final footprints of the TSFs may be reduced with further design refinement, in which case the heights would increase to a maximum of 30m. Both TSFs would be located within an area of bauxite reserve and economic bauxite reserves would be either pre-mined or used for dam construction;



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Lease boundary

1m contour

South of Embley Project

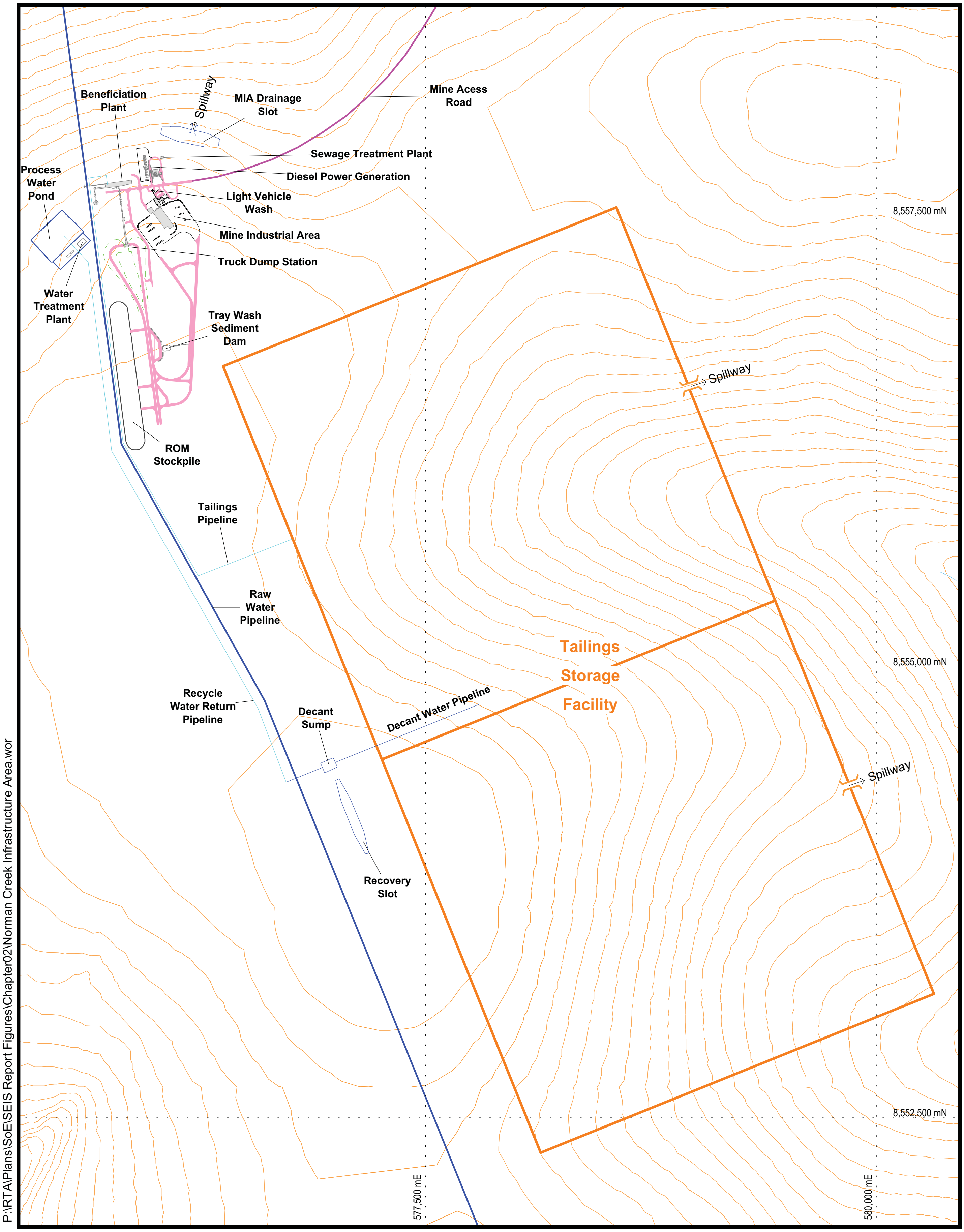
Fig. 4: Boyd Infrastructure Area

N

0 1000m

Datum/Projection: GDA94/MGA Zone 54

Date: 15/12/2011



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South of Embley Project

Fig. 5: Norman Creek Infrastructure Area

N

500 0 500m

Data source: 25403-501-A0-4710-00001.dgn

Datum/Projection: GDA94/MGA Zone 54

Date: 15/12/2011

- the TSFs are divided into cells to facilitate the cycling of tailings perimeter deposition within a cell and between cells, and enhance formation of a broad tailings beach adjacent to the perimeter walls that dries quickly to a consistent density over its full depth;
- the dewatered product bauxite is conveyed to a stacking feed conveyor, which supplies a travelling stacker, which deposits bauxite onto a stockpile pad. A bucket wheel reclaimer withdraws stockpile material and feeds the bauxite onto a reclaim conveyor which, in turn, feeds a load-out conveyor to the wharf; and
- the stockpile area will be expanded in stages as production increases. At a production capacity of 22.5Mdptpa, the stockpile capacity is 850,000 wet product tonnes (wpt) and occupies 21ha. At maximum capacity of 50Mdptpa the stockpile capacity would be 2.85Mwpt and it would occupy 70ha. The stockpile facilities have been designed by RTA so as not to preclude a third party developer from the construction and operation of an additional reclaimer and conveyor. Expansion of the stockpile area could be carried out for a third party, if a suitable commercial agreement is reached with RTA, and port capacity is available as discussed in **Section 2.7**.

2.7 Port Facility and Shipping

RTA proposes to construct and operate a port located between Boyd Point and Pera Head. The port would include an approach jetty, wharf, berths and ship-loader. The berth pockets and departure areas would need to be dredged.

Stage 1 of the wharf includes an approach jetty approximately 638m long and a wharf with two berths (total of 944m). Stage 2 of the wharf would include a further two berths and would be approximately 1,302m in total length. The port is capable of accepting bulk carrier vessels of up to 185,000 deadweight tonnage (dwt) and 18.1m draft. Separate berths are provided for tugs and line boats on the jetty. Tugs and line boats will return to the Lorim Point wharf during inclement weather.

The approach jetty supports the product load-out conveyor and a vehicle access roadway from the Boyd infrastructure area. The wharf supports a rail-mounted travelling ship loader. Some deliveries of fuel would need to occur during construction activities, however, bulk carriers are not refuelled at the SoE port.

Environmental impact assessment was carried out for an initial capital dredge volume of 6.5 million cubic metres for Stage 1 which would provide two berths for vessels up to 185,000dwt and a shipping channel with a depth of 20.2m LAT (lowest astronomical tide) for sailing on all tides (RTA 2011). This was a conservative scenario to ensure that the maximum possible impact of a single capital dredge campaign was assessed. However, further feasibility studies have indicated that RTA is likely to only dredge 2.5 million cubic metres in the initial construction stage, providing 1 berth for a Dedicated Post Panamax Vessel (DPPV) vessel and 1 berth for a 185,000 deadweight tonnage (dwt) vessel and a shipping channel to a depth of 17.3m LAT, providing capacity for the proposed startup capacity of 22.5Mdptpa. Following the initial construction, additional capital dredge campaigns would be undertaken as required up to a total of 6.5 million cubic metres, to increase the capacity of the Port as market conditions allow. Further, an additional maximum 2.4 million cubic metres would need to be dredged as part of the addition of berths 3 and 4 (Stage 2 of the wharf).

Stage 1 of the wharf would be designed and constructed by RTA to permit a future extension to provide additional berths. The proposed port facility would not preclude expansion for a third party, if a suitable commercial agreement were reached between the third party and RTA and subject to the additional capacity not being required by RTA. The EIS has assessed the impact of Stage 1 and 2 of the wharf with a maximum RTA production capacity of 50Mdptpa and the cumulative impact of the operation of the Port up to 63Mdptpa.

The current proposed dredging method incorporates a cutter suction dredger re-depositing material on the sea bottom which is retrieved by a trailing suction hopper dredge (TSHD). The method will be confirmed following engagement of the dredging contractor and included in the final Dredge Management Plan. Dredged spoil would be transported by the TSHD to a new off-shore spoil disposal ground located approximately 17km west of Boyd Point (RTA 2012). The maximum Stage 1 volume of 6.5 million cubic metres would take approximately 300 days to complete (not including shut downs). Should the actual capital dredge volume be less than the maximum proposed, the duration of dredging would decrease in proportion to the reduction in the volume. Annual maintenance dredging of approximately 890,000m^3 (based on a capital dredge volume of 6.5 million cubic metres) is expected to be required to maintain under keel clearance for ships. Dredging would be carried out in accordance with a Dredge Management Plan (RTA 2012).

The port is designed for continuous hours of operation. **Table 2-1** shows the estimated number of shipments from the proposed port. The actual number of vessels will depend on market conditions and actual sales of bauxite.

Table 2-1 Estimated Shipments from Proposed Port

Production Scenario	Mix of Vessels[1] (Ships/Year)	Maximum Number of Vessels[2] (Ships/Year)
22.5Mdptpa	260 Panamax, DPP, Cape size	320 Panamax and DPP
50Mdptpa	540 Panamax, DPP, Cape size	700 Panamax and DPP

Note: All figures approximate.
1. Number of ships will vary depending on market conditions, actual production and size of vessels.
2. Based on Panamax/DPP vessels only.

2.8 Associated Infrastructure

This section describes infrastructure that will be constructed as part of the SoE Project to support the mining, processing and shipping activities.

2.8.1 Transport

During the initial construction period, access to the Project area during the dry season is from the Peninsula Developmental Road (PDR) via the Aurukun Road, Beagle Camp Access Road, Pera Head Access Road and Amban Access Road (the "access roads") that traverse the Aurukun bauxite resource. If there is insufficient time to construct the all-weather mine access road prior to the wet season, temporary seaborne access will be utilised.

Once the ferry terminals and Mine Access Road are constructed, workers will be transported from the Hornibrook ferry terminal (not on ML7024 or ML6024) by high-speed ferry to the Hey River barge/ferry terminal and then by bus to the site at the beginning and end of each roster. The following permanent transport infrastructure is located on the mining lease:

- The Hey River barge/ferry terminal – includes a roll-on roll-off (RORO) barge facility, vehicle parking, covered waiting area and walkway, pontoon and floating ramp for the ferry terminal. Approximately 37,380m^3 of material will be dredged during the initial construction phase and disposed of at the Albatross Bay spoil ground, which is currently used by the Port of Weipa. An area of about 4,400m^2 will be reclaimed and supported by rock revetment and/or sheet piles. A thin band of mangroves will be cleared.
- All weather sealed 38km Mine Access Road from the Hey River barge/ferry terminal to the Boyd infrastructure area (see **Figure 1**) and a 24km spur road from the Mine Access Road to the Norman Creek infrastructure area. Culvert causeways are used for some watercourse crossing points.

Plant, equipment and materials transported by barge from Cairns is offloaded at Humbug Wharf (not on ML7024 on ML6024) and transferred via RORO barge from the Humbug barge terminal to the Hey River barge/ferry terminal. Barges may also deliver to Evans Landing wharf, direct to the Hey River barge/ ferry terminal (depending on the draft of the barge), or direct to the Port or temporary seaborne access (particularly during the construction phase).

2.8.2 Water Supply and Management

The locations of water management infrastructure in the Boyd and Norman Creek infrastructure areas respectively are shown in **Figure 4** and **Figure 5**. A detailed plan of water management in the Boyd infrastructure area is provided in **Figure 6**. Schematic diagrams of the proposed water management systems are shown in **Figure 7** and **Figure 8**.

The Project's principal water requirements are for process water, haul-road watering, vehicle wash-down, dust suppression, and potable supplies. Typically, water would be drawn in order of preference from tailings recycle, recovery slots, and then a combination of surface water dam (Dam C) and artesian bores. After the construction of the Norman Creek plant, some supplementary surface water will be drawn directly from the Ward River to minimise the risk of inadequate supply from Dam C. The overall water balance for the Project is summarised in **Table 2-2**.

Table 2-2 Average Annual Water Balance

Production Scenario	Average Annual Demand (GL)	Average Annual Supply (GL)					
		Recycle from Tailings	Artesian	Dam C	Recovery Slots*	River	Total Supply
22.5Mdptpa	24.8	7.1	4.9 (7.8 peak)	12.0 (Stage 1)	0.8	0	24.8
30Mdptpa	33.0	9.4	6.0 (10.6 peak)	13.8	1.6	2.2	33.1
50Mdptpa	63.7	22.1	11.9 (15 peak)	25.4	1.6	2.5	63.6

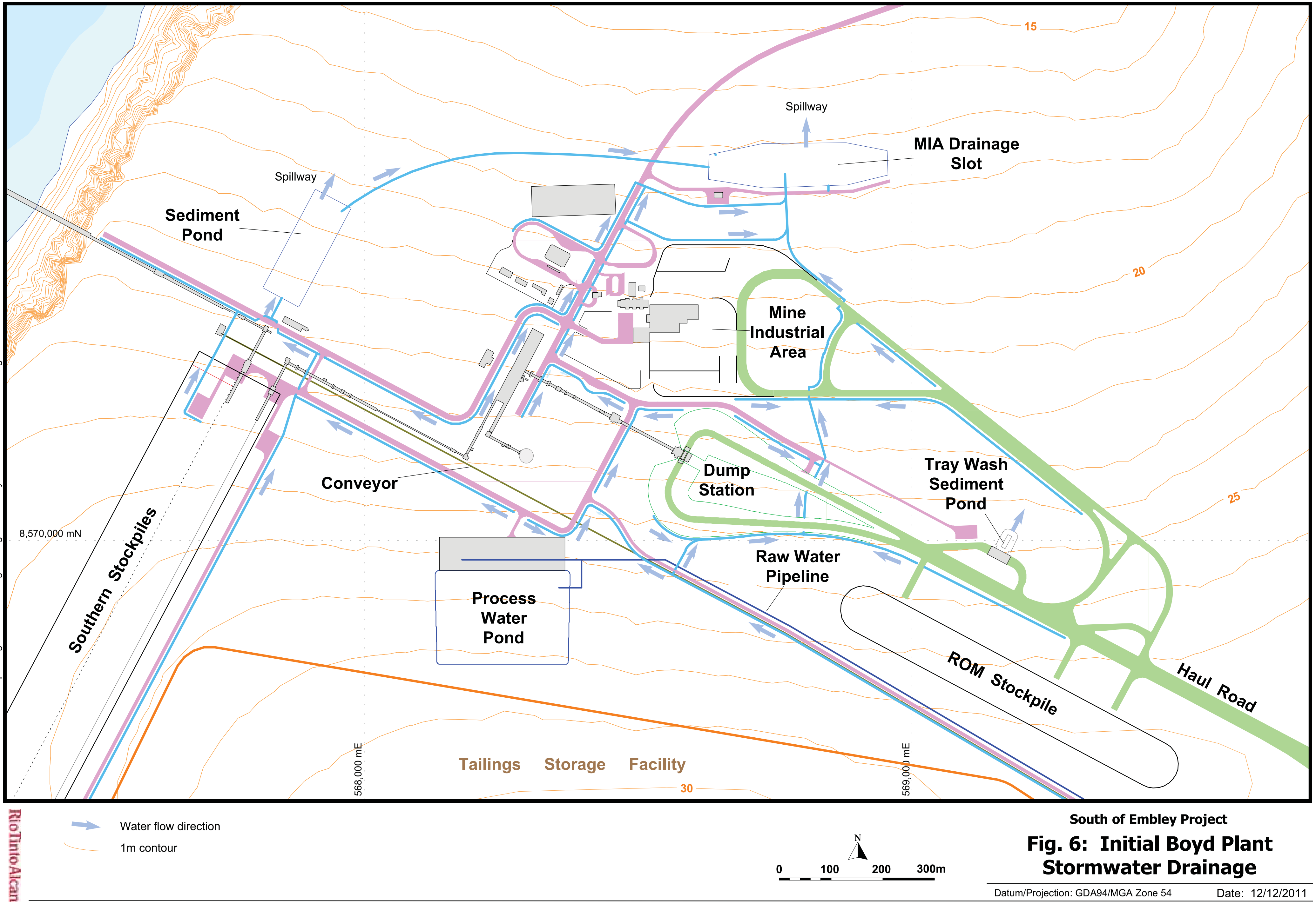
* Trenches dug adjacent to tailings storage facilities to recover water.

A water supply dam (Dam C) is on a freshwater tributary of Norman Creek and has a catchment area of 259km^2. Dam C is a conventional earth-fill dam with a maximum capacity of 29GL, which would be constructed either in two stages or a single stage. If constructed in two stages, the first stage would provide 10.9GL storage capacity and, later, the wall would be raised to provide 29GL storage capacity. The dam would be constructed in a single stage (29GL capacity) should expansion of production be anticipated to occur quickly. This is the subject of ongoing feasibility studies.

Reverse osmosis potable water treatment plants treat raw water from Dam C to a standard that meets the *Australian Drinking Water Guidelines* (NHMRC 2004).

Stormwater runoff generated within active mine areas is mostly captured within the internally draining mine pits. The post-mining landscape effectively provides internally draining sumps that contain stormwater runoff, which then infiltrates through the pit floor and walls. In the event that the post-mining topography is not an internally draining pit, stormwater runoff is directed via a sediment pond. Sediment traps are also included as part of the drainage designs at points where haul roads cross watercourses.

No watercourses are diverted as part of the Project.



South of Embley Project

Fig. 6: Initial Boyd Plant Stormwater Drainage

Datum/Projection: GDA94/MGA Zone 54 Date: 12/12/2011

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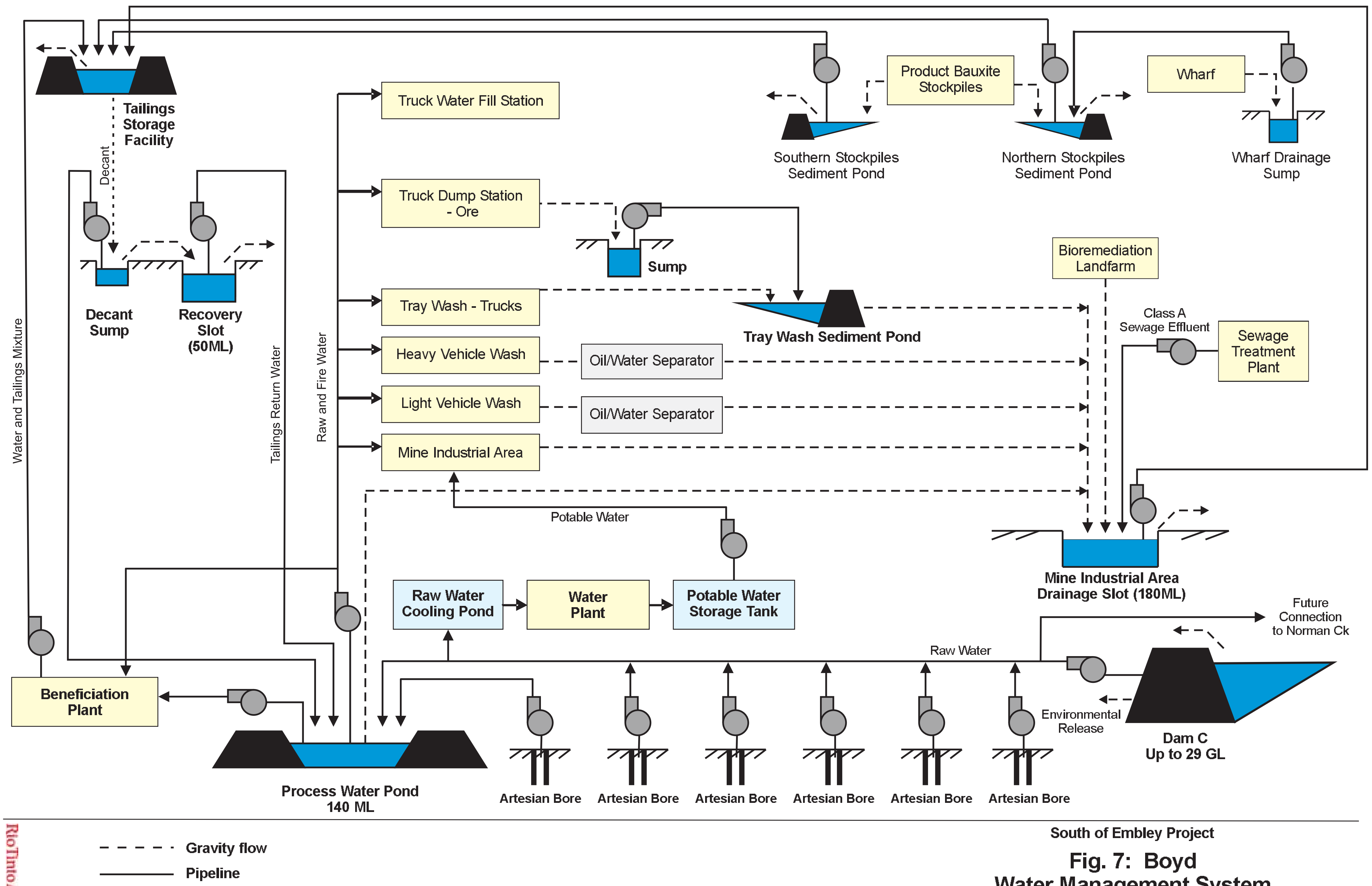

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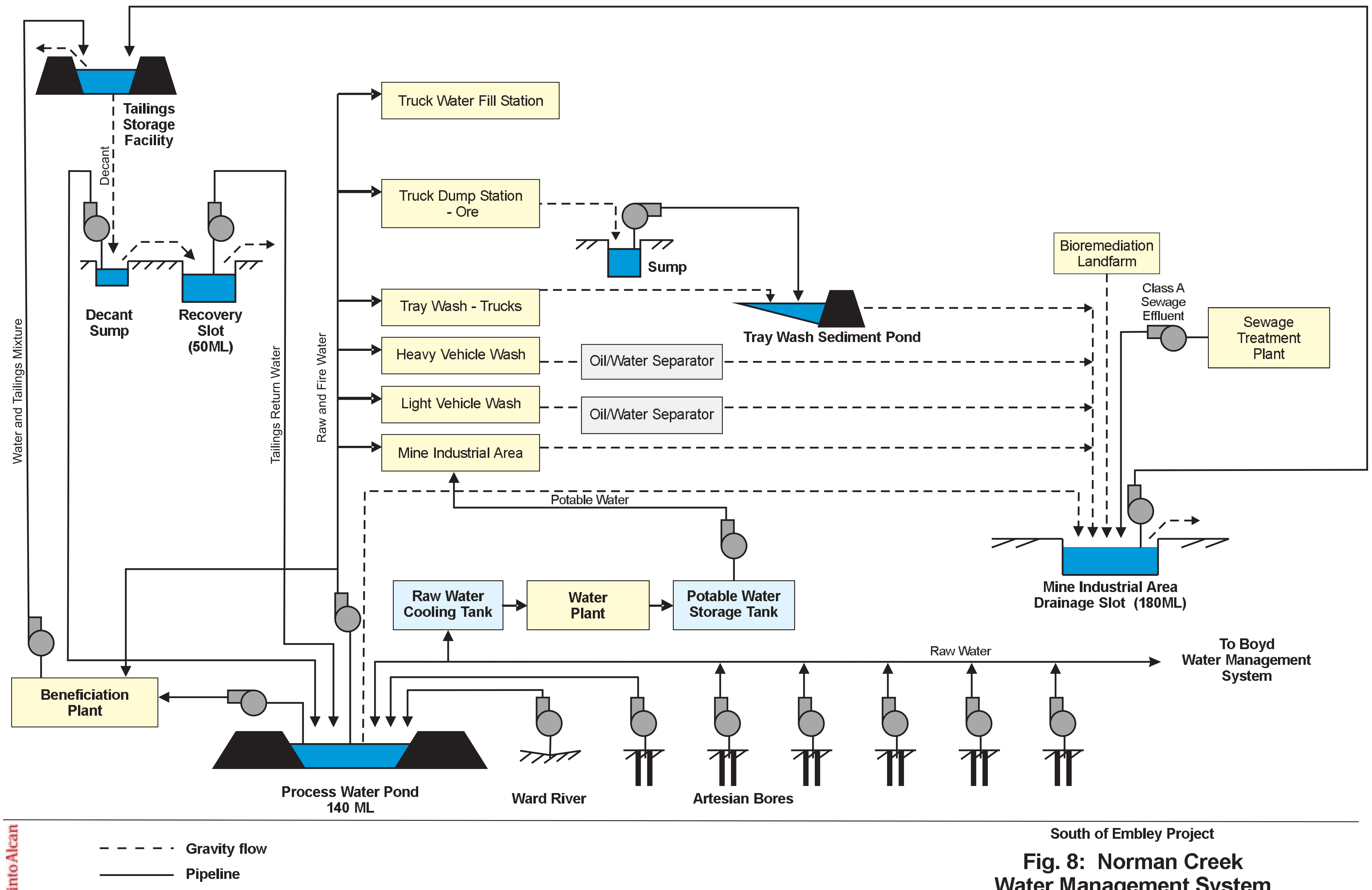
South of Embley Project

Fig. 7: Boyd Water Management System

Date: 13/12/2011



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South of Embley Project

Fig. 8: Norman Creek Water Management System

Date: 15/12/2011

2.8.3 Sewage

During the initial construction phase, prior to a sewage treatment plant (STP) being commissioned, the construction areas will be serviced by portable ablution facilities. Sewage will be stored in holding tanks and regularly transported by a licensed regulated waste transporter back to Weipa for treatment in an existing licensed STP. This method would also be utilised if temporary mobile construction camps were used for the Mine Access Road construction or an accommodation barge was used during dredging of the Port.

The construction camp, and Boyd and Norman Creek infrastructure areas are serviced by separate gravity-fed package STPs. The effluent from the construction camp is treated to Class A standard (as defined in Schedule 3D of the *Public Health Regulation 2005*). During construction treated effluent from the construction camp STP would be recycled for use in irrigation of landscaped areas in the construction camp as well the dust suppression and earthwork compaction during construction in the Boyd infrastructure area, the mine access road, infrastructure corridor, Dam C and the TSFs (refer to **Figure 2** for locations). During operations, treated effluent from the Boyd and Norman Creek STPs would be diluted in the process water ponds and recycled.

2.8.4 Power Generation and Supply

Electricity for the Project is generated by a diesel-fuelled power station located at the Boyd infrastructure area. The power station would be expanded in stages using multiple generating units to meet the following demands:

- 22.5Mdptpa – 20.8MW;
- 30Mdptpa – 37.4MW; and
- 50Mdptpa – 58.2MW.

Transmission lines reticulate power to artesian bores and water-supply pumps. When the Norman Creek infrastructure area is established, power would either be reticulated from the Boyd infrastructure area or the additional power generating capacity would be located at the Norman Creek infrastructure area to reduce transmission line losses and provide higher efficiency.

2.8.5 Mining-Related Activities

The mining-related activities that will be carried out on the mining leases include:

- Access track and road construction;
- Seaborne access;
- Quarrying of rock and gravel;
- Dam construction;
- Clearing of vegetation;
- Controlled burning of timber;
- Topsoil stripping and stockpiling;
- Overburden removal by front-end loader and truck;
- Bauxite mining by front-end loader or excavator, and haulage by truck;
- Rehabilitation;
- Bauxite crushing and sizing;
- Beneficiation plant operation;
- Transport of bauxite by conveyor;
- Stacking and reclaiming product bauxite from a stockpile;
- Dredging of berth pockets and departure areas at port;
- Loading ships and operating a port;
- Dredging at barge/ferry terminal;
- Operation of barge and ferry;
- Transport of personnel, fuel and supplies by road;
- Disposal of bauxite tailings;
- Stockpiling of oversize bauxite;
- Disposal of overburden;
- Operation of diesel-fuelled power stations;
- Water management system operation;
- Borefield operation;
- Haul-road watering;
- Sewage treatment plant operation;
- Operation of potable water treatment plants;
- Operation of temporary construction camp;
- Temporary storage of general and regulated wastes;
- Heavy equipment workshop and service bay;
- Fixed-plant workshop;
- Operation of warehouse;

- Diesel, oil and other hydrocarbon storage;
- Lube-truck operation;
- Chemical storage;
- Heavy equipment and light vehicle refuelling;
- Heavy vehicle and light vehicle wash-down areas;
- Tyre store and change bay;
- Concrete batching;
- Offices and crib room; and
- Emergency service centre.

The Boyd and Norman Creek infrastructure areas are linked by a 15km infrastructure corridor, approximately 64m wide. The corridor provides space for an overland conveyor, access road, transmission line, water supply pipeline, and telecommunications. A second, 16km-long, 50m-wide corridor links the Norman Creek infrastructure area with the pumping station on the Ward River and provides space for an access road, transmission line and water supply pipeline (see **Figure 1**).

Notifiable Activities are activities defined in Schedule 3 of the EP Act. The Notifiable Activities that will occur in the Project area are shown in **Table 2-3**.

Table 2-3 Notifiable Activities

Notifiable Activity	Description	Location
1	Abrasive Blasting	Various locations throughout the mining lease.
7	Chemical Storage (potentially greater than 10t of Dangerous Goods)	Boyd infrastructure area Norman Creek infrastructure area
14	Engine reconditioning works	Boyd infrastructure area Norman Creek infrastructure area
23	Metal coating (spray painting > 5L per week)	Various locations throughout the mining lease.
25	Mineral processing	Boyd beneficiation plant Norman Creek beneficiation plant
29	Petroleum product or oil storage: b)(iii) petroleum products that are combustible liquids in class C1 or C2 in *AS 1940:2004 The storage and handling of flammable and combustible liquids* – more than 25,000L capacity	Boyd infrastructure area Norman Creek infrastructure area
37	Waste storage, treatment or disposal	Temporary storage of regulated waste in mining infrastructure areas and Boyd and Norman Creek infrastructure areas (e.g. batteries, tyres, waste oil).