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NORTHEAST BUSINESS PARK

Dredging Site Based Management Plan

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CABOOLTURE RIVER DREDGING

DREDGING SITE BASED MANAGEMENT PLAN

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1. INTRODUCTION

Northeast Business Park Pty Ltd proposes to dredge approximately 6.5km of the existing navigation channel within the lower reaches of the Caboolture River to:

- ensure safe navigable entrance to the river at all tides facilitating marine traffic for the proposed Northeast Business Park marina development, and addressing an existing safety concern whereby the safe passage of larger vessels currently restricted to top of navigation tide are not compromised in adverse weather conditions; and
- increase the outfall of water flows in flood events providing substantial flood mitigation upstream.

The proposed dredging area commences approximately 1km east of the mouth of the river. Spoil from the capital dredging works is proposed to be reused as fill within the NEBP site and will be transferred to the designated placement area via a polyethylene spoil transfer pipeline.

In addition to the dredging of the navigation channel, excavation of the entrance channel to the proposed lock will constitute capital dredging works where excavation takes place below the high water mark.

The proposed NEBP dry-land marina and navigation lock will be excavated as part of the marina basin construction and will be addressed in the Construction Environmental Management Plan (CEMP) (Cardno, 2007). Therefore dredging associated with the installation of the lock infrastructure is not considered in this document.

A siltation model has been constructed by Cardno Lawson and Treloar (CLT) 2007, and this model indicates that the navigational channel will continue to be affected by siltation and will require periodic maintenance dredging. However the section of the river between the navigational channel and the development project area will have minimal changes.

Modelling has identified that siltation will occur within the dredged navigation channel, and approximately 40,000 m^3 of material will be required to be removed on a two to three yearly dredging frequency, particularly between chainages 4000 to 5000 (refer to drawing 7900/33/01-302, Appendix A). Additional dredging will be required on a five year frequency throughout the entire navigational channel to maintain sufficient underkeel clearance (i.e. 3.0m below Lowest Astronomical Tide). The approximate volume of additional dredging is estimated at 220,000 m^3 every 5 years. These estimates are likely to be conservative in the longer term as the dredged navigation channel approaches a dynamic equilibrium with the adjacent banks and flow regimes (CLT 2007).

Dredging spoil from capital works shall be treated in a designated area within the NEBP project area for reuse on site as fill to ensure development areas are protected from flood waters. This location will continue to be utilised for the treatment of maintenance dredge spoil for at least 10 years following the initial capital dredging works. After this time, the land is programmed to be developed and an alternative location will be identified.

This Dredging Site Based Management Plan (Dredging SBMP) outlines the potential impacts of the proposed dredging activity and specifies mechanisms that will be incorporated to ensure environmental impacts associated with the dredging and spoil disposal are minimised as far as practicable. In particular, dredging will be occurring within the Queensland Transport preferred navigational channel located within the Moreton Bay Marine Park and adjacent to Ramsar wetlands.

This Dredging SBMP has been prepared to support an Environmental Impact Statement (EIS) which has been prepared for the proposed NEBP development.

The development description of the activity to which this Dredging SBMP relates, as defined in the *Environmental Protection Regulation 1998*, is provided below.

ERA 19(c) - Dredging material—dredging material from the bed of any waters (other than dredging by a port authority of material for which a royalty or similar charge is not payable) using plant or equipment having a design capacity of more than 100 000 t a year.

This Dredging SBMP has been prepared to support applications for all necessary approvals required as part of the works. These include:

- Resource Entitlement for dredging works located within the QT preferred navigational channel under the *Lands Act 1994*;
- Allocation of Quarry Material for removal of quarry below high water mark associated with dredging works under the C*oastal Protection and Management Act 1995*;
- Permit for dredging works in the Moreton Bay Marine Park under the *Marine Parks Act 2004*;
- Operational Works that is Tidal Works (prescribed tidal works) under the *Integrated Planning Act 1997*; and
- Material Change of Use involving an Environmentally Relevant Activity under the *Integrated Planning Act 1997*.

2. SITE DESCRIPTION

2.1 Queensland Transport Preferred Navigation Channel

Dredging within the Caboolture River shall occur within the defined navigational channel (by Queensland Transport (QT)) as shown on Figure 1. The property description adjacent to the defined dredge area on the left bank is Lot 164 on Plan C311334 and on the right bank Lot 16 on Plan SP158298.

A full set of the engineering drawings showing Queensland Transport's (Maritime Safety Queensland) preferred alignment and cross sections at 100m intervals is attached as Appendix A.

The QT preferred dredging profile as shown on Figure 1 and Appendix A drawings includes a channel width of 50m excavated to a depth of RL -4.25m AHD. This channel depth will provide approximately 3.0m of water at Lowest Astronomical Tide (LAT). The side batters of the channel will be shaped at 1:3 to match existing levels.

The lower reaches (and mouth) of the Caboolture River where capital and maintenance dredging is proposed discharges into the shallow marine waters of Moreton Bay. The river system has seen the development of soil and vegetation types typical of an estuarine ecosystem.

The mouth of the Caboolture River is approximately 7.5km (4.8m in a direct line) from the eastern boundary of the NEBP project area.

2.2 Background to the Queensland Transport Preferred Navigation Channel Alignment

Three (3) alternative alignments for the proposed dredged channel were investigated to determine the optimum location of the proposed channel.

The alignment shown in Appendix B is based on the current location of the navigation markers and results in an inefficient alignment resulting from the sharp changes in direction required to keep within the existing channel markers.

This alignment was modified by Cardno Civil Engineering to smooth out the sharp bends while attempting to keep within the existing channel markers as much as possible. This second alternative is shown in Appendix C.

A meeting was held with the Harbour Master, Captain Richard Johnsson to review the proposed alignment from a navigation safety perspective. This resulted in a further change to the alignment being proposed by the Harbour Master in three (3) locations. The channel was realigned to the Harbour Master's preferred alignment as shown on Figure 1. This alignment will require the repositioning of 29 navigation aids to the new locations as shown on Drawing No. 7900/33/01-302 included in Appendix A.

2.3 Spoil Disposal Area

Dredge spoil shall be disposed of as fill on Lot 24 on Plan SP158289 of the NEBP as shown on Figure 2. This area forms part of Residential Area 2 of the NEBP development. An area approximately 51 ha in size is proposed for the spoil disposal area.

The existing ground level of the proposed spoil disposal area ranges from RL 1.5m AHD to RL 3.5m AHD. The preliminary design levels for Residential Area 2 are estimated to range between RL 3.4 m and RL 6.5 m.

3. CAPITAL DREDGING

This section refers to capital dredging at the Caboolture River mouth.

3.1 Quantity of Material to be Dredged

Capital dredging is proposed over a total length of approximately 6.5km to a design depth of RL of -4.25 m AHD (3.0m below Lowest Astronomical Tide of -1.26m AHD). The capital dredging works are anticipated to generate approximately 545, 300 m^3 of dredge spoil.

Civil resourcing suggests that the proposed capital dredging activity will occur over an approximate 21 months.

3.2 Characteristics of Quarry Material to be Removed

3.2.1 Acid Sulfate Soils

Coffey (2007) has undertaken a borehole investigation within the defined dredge area to determine the dredging properties of soils including acidity and contaminant levels.

Three distinct subsurface soil profiles were identified which were:

- River Mouth Sediments;
- Pre Holocene Sediments; and
- Holocene Estuarine Sediments.

Field screening tests for acid sulfate soils (ASS) identified that none of the material is actual ASS, but that all soil profiles contain Potential Acid Sulfate Soils (PASS) with oxidised pH values of less than 4. Sampling and analysis of sediments were undertaken in accordance with Queensland Acid Sulfate Soil Investigation Team (QASSIT) guidelines.

Quantitative laboratory testing was undertaken on selected samples from all three soil profiles using the Suspension Peroxide Oxidation Combined Acidity and Sulfate method (SPOCAS). Based on laboratory analysis the following assessment conclusions were made.

- No soils within the proposed dredge area are Actual ASS.
- All soils within the proposed dredge area should be considered Potential ASS.
- A high proportion of acid reactive calcium is present in the river mouth and Pre Holocene sediments, which may neutralise some or all total potential acidity generated. However the estuarine sediments show an acid generating capacity greater than the acid neutralising capacity of the soils.

All potential acidity can be managed to avoid environmental harm by the implementation of an appropriate regime of containment, monitoring and treatment. The State Planning Policy 2/02 “Planning and Managing Acid Sulfate Soils” requires that testing, treatment and monitoring regimes are to be set out under an approved Acid Sulfate Soil Management Plan (ASSMP).

3.2.2 Contamination

Sediments were also tested for contamination to determine the potential for toxicity in dredge spoil material which will ultimately be used as fill. The most likely form of contamination of the river sediments was considered to be by heavy metals from existing industry, farming operations or tributyl tin from defouling water craft.

Analysis was undertaken for:

- Heavy metals; and
- Tributyl tin.

No contaminants above the relevant guidelines were recorded.

3.2.3 Sediment Properties

The Coffey (2007) investigation also undertook analysis to determine the characteristics of sediment and to determine the suitability of the material as fill. The assessment concluded that:

- soils can be readily cut and pumped and will settle quickly;
- longer holding periods may be required to reach normally acceptable turbidity levels for soils in the upper reaches of the dredge area; and
- dredge spoil will be generally suitable for use as engineered fill for future building platforms when dried and mixed with sand.

3.3 Methodology for Dredging of Quarry Material and Transfer of Dredge Spoil

Dredge spoil will be dredged by cutter suction dredging equipment. Suction dredges act like underwater vacuum cleaners drawing bed material into the dredge. The cutter head describes arcs in the sediment loosening the material to aid removal. Cutter suction dredgers take the substratum profile down to the required depth at one location before moving onto the next.

Slurry (sediment and water) is drawn up by this method and dredged material is pumped ashore via a pipeline.

Silt curtains will be employed at all times during dredging activities to minimise impacts caused by sedimentation to the marine environment and existing sensitive areas, including the Ramsar wetlands.

The proposed dredging profile includes a channel width of 50m excavated to a depth of RL -4.25 m AHD. This channel depth will provide approximately 3.0 m of water at LAT. The side batters of the channel will be shaped with a batter slope of 1:3 to tie into existing levels.

The depth of excavation required within the proposed 6.5km dredge channel varies to a approximate maximum of 2.8 m.

Dredge spoil is proposed to be piped to the NEBP project area using a polyethylene spoil transfer pipeline for treatment at Residential Area 2 as shown on Figure 2.

The pipeline will extend upriver approximately 500m beyond the upper limit of the dredging and will exit from southern bank of the river at the existing easement for Farry Road.

The pipeline will then be located on land, extending approximately 1.5km along the Farry Road easement to meet the south-eastern corner of the NEBP project area, which is the location of the proposed dredge spoil area (refer to Figure 2).

3.4 Dredge Spoil Disposal

Dredge spoil shall be disposed of as fill within the NEBP development, on Lot 24 on Plan SP158289. The disposal area is approximately 51 ha in size, and is shown on Figure 2. The dredge spoil disposal area forms part of Residential Area 2 of the NEBP development.

The existing ground level of the proposed spoil disposal area ranges from RL 1.5m to RL 3.0m. This is below the Q100 flood level of 3.0m AHD, hence bunding will be constructed to a Q50 flood level to prevent flood waters from entering the proposed treatment area. The preliminary design levels for Residential Area 2 range between RL 3.4m AHD and RL 6.5m AHD, and the area therefore requires approximately 1,237,860 m^3 of fill.

The spoil will consist of a slurry of sediment and water, and will be directed into spoil settlement ponds within the spoil disposal area. It is estimated that this slurry will have a ratio of approximately 1 part sediment to 5 parts water. Following settlement within the spoil settlement ponds, tailwater will be released via a drain or pumps to tailwater treatment ponds.

The sediment component of the spoil will remain in the spoil settlement ponds where it will be allowed to dry.

3.5 Tailwater Treatment System

The proposed tailwater treatment system includes a series of treatment ponds to be formed within Residential Area 2 and will be designed further as part of the operational works approval process.

The tailwater treatment system will enable further settlement of sediment from the tailwaters. The water will be tested and if necessary treated to ensure the required water quality parameters are met, prior to being released from this system to the receiving environment, namely the Caboolture River.

4. MAINTENANCE DREDGING

4.1 Responsibility for Maintenance Dredging

Whilst navigational safety remains the responsibility of Queensland Transport and the Harbour Master, it is anticipated that funding for ongoing maintenance dredging of the navigation channel will be at least partially funded by those generating significant boat traffic on the Caboolture River, including the NEBP.

At this time, it is anticipated that Port Binnli Pty Ltd will be responsible for the overall management and operation of the proposed marina at NEBP. An agreement will therefore be required between Queensland Transport, Port Binnli Pty Ltd and other stakeholders as appropriate to facilitate the timely dredging of the navigational channel.

4.2 Quantity of Dredge Spoil

Dredging modelling of the Caboolture River undertaken by CLT (2007), indicates that siltation of the Caboolture River will continue to occur, with approximately 220,000 m^3 of material over 5 years accumulating within the defined dredge area (this is in addition to the 40,000 m^3 of material required to be dredged two to three yearly between chainages 4000 and 5000) as shown on drawings attached as Appendix A). Periodic maintenance dredging will therefore be required every 2 to 3 years for parts of the navigational channel and entire dredging of the channel 5 yearly.

4.3 Characteristics of Quarry Material

Modelling undertaken for the Siltation Study identified generally, that it is expected that the material deposited within the navigation channel will initially have a relatively high percentage of sand due to the redistribution of material from adjacent banks. However in time the percentage of fine material will increase as the dredged navigation channel approaches a dynamic equilibrium with the adjacent banks and flow regimes. Flooding events are also likely to influence the deposition of fine material within the navigation channel. As such it is difficult to provide a long-term prediction on the quality of material removed from the river during maintenance dredging.

4.4 Methods of Dredging of Quarry Material

Dredging will be undertaken using a small cutter suction dredge. The captured sediment slurry will be pumped to Residential Area 2 for disposal until indicative civil construction and development stages commence in 2017/2018 for Residential Land East.

4.5 Maintenance Dredge Spoil Disposal Area

The identified Dredge Spoil Disposal Area is intended for disposal of capital dredge spoil and at a minimum 2 episodes of maintenance dredging prior to development with residential housing. During this period, an understanding of the quantity and characteristics of dredge material will be gained and this will allow appropriate designation of a longer term maintenance spoil disposal location ensuring effective and low risk treatment and management. This strategy for planning for long term disposal of dredge spoil is consistent with recent government initiatives to investigate alternative long-term spoil disposal options in Southeast Queensland.

5. INFORMATION ADDRESSING KEY COASTAL PLAN POLICIES

The *Southeast Queensland Regional Coastal Management Plan 2006* (RCMP) provides specific regional direction on coastal management outcomes in support of the *State Coastal Management Plan – Queensland's Coastal Policy 2001* (SCMP) that sets out the overall policy for coastal zone management.

The RCMP applies to an area that extends from and includes Maroochy Shire in the north to the Queensland-New South Wales border to the south and to the limit of Queensland waters to the east.

Policies of relevance to this proposal for capital dredging and maintenance dredging are hereafter addressed to support an application for a development approval under the *Integrated Planning Act 1997* for carrying out ERA 19 (dredging). Dredging is proposed in the Caboolture River and within the Moreton Bay Marine Park and Ramsar wetland which have the following values as identified under the *Environmental Protection (Water) Policy 1997* (EPP Water):

- scenic amenity;
- recreational amenity;
- aquatic ecosystems;
- spiritual significance;
- biological diversity and productivity;
- flood and water flow moderation;
- setting for maritime activities; and
- setting for coastal dependent development.

The EPP Water also identifies pressures on these existing values relating to the following existing factors:

- dredging;
- acid sulfate soil disturbance;
- catchment run-off;
- fishing intensity;
- introduced marine species;
- boating;
- recreational/tourism activities;
- water pollution including industrial discharges (STPs);
- land clearing;
- predicted impacts of climate change and seal-level rise; and
- inappropriate structures.

5.1 Dredging - Policy 2.1.8

This policy identifies major coastal management issues associated with dredging in Southeast Queensland, namely the sustainability of at-sea disposal and viability of land-based disposal of dredge material, and provides development guidance for management of dredging.

This application involves dredging approximately 6.5km of the existing defined navigational channel to provide safe passage for boats. The dredge spoil will be transferred to land within the NEBP project area for dewatering and use as fill material for the NEBP development to enable land levels to be constructed to prevent Q100 flood impacts.

The main concern arising from dredging operations within coastal wetlands would be the potential increase in turbidity (poor water quality) of Caboolture River due to disturbance of sediments at the dredge site. A decrease in the depth to which light penetrates (euphotic depth) could potentially impact on floral & faunal communities in the waterways. Management of dredging activities will focus on the control of turbidity and development conditions will reflect appropriate turbidity levels.

Release of tail water from dredge spoil ponds is expected to enhance water quality, due to the current degraded state of the water quality in the Caboolture River. The proposed water quality parameters are of a higher standard than existing water quality. Water quality parameters are consistent with the EPP Water and are identified in element 4 'Water Quality' of this Dredging SBMP. Refer to response to policy 2.4.1 for further details.

Table 1 below has been prepared to demonstrate compliance with this policy.

Table 1 Compliance with Policy 2.1.8 of the RCMP

Requirement	Response
No degradation or alternation of surrounding natural environment.	Due to the nature of the proposed dredge activity and the measures outlined in this Dredging SBMP, the impact of the dredge works will not result in significant degradation or alteration of the surrounding natural environment. The proposed dredging works is not expected to alter the ability of the adjoining land to function as a barrier protecting lands from coastal waters. There will be no dredging taking place on land and dredging will be located entirely within the navigational channel of the Caboolture River. It is anticipated that the characteristics of dredge material will be entirely uncontaminated sand, with fines increasing in numbers further upstream. The settling periods in the lower and upper reaches of the Caboolture River where navigational dredging is occurring are sufficient to prevent long term suspension and therefore degradation of the natural environment, specifically species requiring light penetration.
No impact on groundwater levels, recharge rates or the supply of water to coastal wetlands.	The limited depth of dredging proposed is not expected to result in alteration of groundwater levels, groundwater recharge rates or the supply of water to coastal wetlands.
No impact to coastal habitats.	The biodiversity of coastal wetlands may be impacted on by the increase of total suspended solids (TSS) in the water column reducing light photons to benthic organisms or phytoplankton within the immediate area. However various existing activities within Caboolture River contribute to TSS including altered land uses and poor catchment management resulting in increased rates of erosion and sediment transport. A long term decline in water quality may severely impact on coastal wetlands. Borehole testing has indicated that all soils will

Requirement	Response
	settle rapidly but higher turbidity may persist for soils in the upper reaches of the dredge area. This Dredging SBMP addresses concerns and includes varied implementation strategies to enhance current water quality within Caboolture River including silt curtains and the development of a water quality monitoring program during dredging cycles (using turbidity as the key indicator for reduced water quality and monitoring at a frequency (and type) to provide indications of potential environmental impact and therefore corrective action). In summary the location and existing environmental values of the proposed dredge area the dredge activity is not expected to result in degradation of fisheries habitat or unacceptable disturbance of coastal habitats. No clearing or damage to marine vegetation is proposed as a result of the proposed dredging activity within the defined navigational channel.
Rehandling of dredge material involving the treatment of material such as silts, muds and clays to stabilise contaminants and remove water for eventual placement at land-based sites.	Dredge spoil will be piped to the disposal area with spoil eventually utilised as engineered fill when mixed with sand. A tailwater treatment system has been devised to ensure water released to the receiving environment meets relevant water quality objectives specified in this Dredging SBMP, which are sourced from the EPP Water, Schedule 1.
An effective dredge-material handling facility needs to be close to navigable water, enabling barge and dredge access for transportation of material and pump-out facilities, includes lage-scale land parcels suitable for placement and drying of large volumes of material; and have relatively low conservation, agricultural and community values.	A large scale parcel of land (known as Residential Area 2) has been designated as the dredge spoil disposal area with sufficient capacity for capital dredging spoil and 2 maintenance dredging episodes over 10 years, including a tailwater treatment system. This large scale parcel of land is part of the bulk earthworks model requiring fill to achieve suitable building platforms above the Q100 + 300mm flood level. Spoil will eventually build up in this area providing the adequate ground levels for flood protection. The spoil disposal area has low conservation, agricultural and community values as described in the EIS.
Contaminated dredge spoil can pollute dredge-management placement sites, groundwater and adjacent areas.	The proposed dredge spoil within the defined dredge area has been assessed for toxicant levels. The dredge spoil has no contaminants. As such the toxicity of water runoff is expected to be within water quality guidelines. Material that may be released to receiving waters from dredge spoil disposal areas and tailwater treatment ponds is not foreign to the receiving environment and generally will have minimal impact on coastal wetland functions (compared to other activities such as treatment plans discharging foreign material into the marine

Requirement	Response
	environment).
Dredging activities will avoid adverse impacts on coastal resources in areas of state significance.	With proposed water quality objectives and the monitoring regime as discussed above, adverse impacts are identified early and corrective action proposed in accordance with this Dredge SMBP. It is expected that potential dredging impacts, specifically increased TSS, will be minimal due to the nature of the dredge spoil and the mitigation measures proposed in this Dredging SBMP.
Appropriate handling and treatment procedures for dredge-material in which acid sulfate soils (ASS) are present must be established.	An Acid Sulfate Soil Management Plan (ASSMP) has been prepared to ensure appropriate handling and treatment of dredge material that is found to be potential or actual ASS.

5.2 Future Need for Access - Policy 2.3.1

The objective of this policy is to ensure the provision of public access to and along foreshore and coastal waters.

The proposed dredging relates to an existing navigational channel, and therefore improves access to existing upstream maritime infrastructure, enhancing the public usability of coastal waters. During the time of the dredging, some inconvenience may occur to users of the navigational channel, however, the ultimate result and intent for the dredging is to ensure maintenance of access to the foreshore and public usability of coastal waters within the Caboolture River previously not accessible for boats with a draft of more than 0.8m.

5.3 Coastal Hazards – Policy 2.2.4

Cardno Lawson Treloar (CLT) has undertaken a detailed hydrodynamic and morphological assessment of Caboolture River to assess the morphological changes of the river following capital dredging of the navigation channel.

There is a requirement for ongoing maintenance dredging to maintain an adequate navigational depth of 3.0 m below LAT every two to three years through chainages 4000 to 5000, and every 5 years along the entire length of the QT preferred navigation channel.

Capital dredging of an existing silted estuary has been shown to improve flood mitigation upstream thereby reducing the risk to coastal developers upstream from sea level rise and storm tide inundation, and providing all tide evacuation routes for large and small marine transport in times of coastal hazards.

Moreton Bay is regularly subject to elevated water levels associated with meteorological events, such as cyclones. The difference between the elevated water level and the predicted tide level is referred to as storm surge and when combined with the astronomical tide is referred to as storm tide. The Caboolture River discharges to Moreton Bay approximately 7.5km downstream of the project area and is subject to storm tides.

To date a specific storm tide assessment within Caboolture Shire has not been undertaken. It is understood that Caboolture Shire Council along with other Councils is currently investigating the storm tide threat within Southeast Queensland, and it is anticipated that their investigation will be completed in the latter half of 2008.

In general, the change in bed depth (a maximum of 2.2m) at the estuary (no change to the cross section of the existing navigation channel) through dredging works is not expected to

have a significant adverse effect on storm tide levels upstream at the NEBP project area given the setback of 100m from the development footprint and closed marina system.

5.4 Water Quality Management - Policy 2.4.1

The objective of this policy is to identify and establish environmental values and water quality objectives for coastal waters, manage water quality in coastal waters according to those values and objectives, manage the release of contaminants to coastal waters, and manage changes to runoff quantity and quality from coastal catchments from human use and management practices to meet water quality objectives.

The SCMP and RCMP in terms of development and use of the coastal zone refers to the EPP Water (Schedule 1) where environmental values and water quality objectives have been determined for coastal waters.

Environmental values and water quality objectives have been determined for the Caboolture River published by the EPA in the report, "*Caboolture River Environmental Values and Water Quality Objectives*" dated March 2007. WQOs have been developed in accordance with the Queensland Water Quality Guidelines (QWQG). Development and use of this coastal zone is planned and managed to protect the identified values and achieve water quality objectives.

The QWQG state the environmental values for the Caboolture River as "*the intrusive value of aquatic ecosystems, habitat and wildlife in waterways and riparian areas and their habitat, food and drinking water".*

The WQOs for the Caboolture River are presented in Table 2.

Table 2 Water Quality Objectives to Protect Aquatic Ecosystem Environmental Value

Indicator	Water Quality Indicator			
	Deception Bay	Lower estuary	Mid estuary	Upper estuary
Turbidity	< 6 NTU	< 6 NTU	< 8 NTU	< 25 NTU
Suspended Solids		< 15 mg/L	< 20 mg/L	< 25 mg/L
Chlorophyll a	< 1.6 μg/L	< 2 μg/L	< 4 μg/L	< 8 μg/L
Total Nitrogen	< 200 μg/L	< 200 μg/L	< 300 μg/L	< 450 μg/L
oxidised N	< 2 μg/L	< 3 μg/L	< 10 μg/L	< 15 μg/L
ammonia N	< 5 μg/L	< 8 μg/L	< 10 μg/L	< 30 μg/L
organic N	< 190 μg/L	< 180 μg/L	< 280 μg/L	< 400 μg/L
Total Phosphorous	< 30 μg/L	< 20 μg/L	< 25 μg/L	< 30 μg/L
filterable reactive phosphorus	< 14 μg/L	< 6 μg/L	< 6 μg/L	< 10 μg/L
Dissolved Oxygen (% saturation)	95-105	90-105	85-105	80-105
pH	8.1-8.4	8.0-8.4	7.0-8.4	7.0-8.4
Secchi Depth	> 1.3m	> 1.5m	> 1.0m	> 0.5m

Caboolture River capital and maintenance dredging is proposed for the lower estuary of the Caboolture River where the existing water quality is essentially poor (EHMP, 2007).

The Caboolture River lower and mid estuary is a slightly to moderately disturbed ecosystem defined as:

"Ecosystems in which aquatic biological diversity may have been adversely affected to a relatively small but measurable degree by human activity. The biological communities remain in a healthy condition and ecosystem integrity is largely retained. Typically, marine systems would have largely intact habitats and associated biological communities. Slightly-moderately disturbed systems could have rural systems receiving runoff from land disturbed to varying degrees by grazing or pastoralism, or marine ecosystems lying immediately adjacent to metropolitan areas (AWQG 2000; 3. 1-10)".

The major findings of the 2007 Ecosystem Health and Monitoring Program (EHMP) undertaken by the Healthy Waterways identifies the Caboolture Estuary has in general:

- elevated nutrients and low dissolved oxygen levels in the model and upper reaches;
- lower freshwater inputs resulting in higher salinity levels throughout; and
- intact natural riparian habitat remaining in some of the inter-tidal zone but extensively impacted riparian habitat above the highest tide mark.

Over time ecosystem health monitoring has shown a gradual decline in health over the period of assessment, particularly with regards to water quality. EPA water quality data since 1996 supports this fact. Poor water quality can be attributed to natural and anthropogenic processes.

Natural processes contributing to poor health include impacts associated with flooding, storm surges, nutrients from oceanic upwelling and poor riparian cover and bank stability. Anthropogenic processes contributing to the poor health of Caboolture River includes the alteration of run-off patterns leading to diffuse pollution associated with discharges from agricultural land (for example increased sedimentation in stormwater), residential development (for example unmanaged stormwater runoff) and industry (for example sewage treatment plants).

These findings have been supported by The Ecology Lab Pty Ltd (2007) report for the proposed NEBP development which shows water quality of the Caboolture River is under considerable stress. The water quality parameters measured in the Caboolture River in December 2005 and January 2006 show that the existing water quality is poor in relation to the WQOs stated in Table 2 above. The measured levels of nutrients and suspended sediments were significantly above the WQOs and the levels of dissolved oxygen were significantly below the WQO.

Water quality parameters for Caboolture River navigational dredging set in Element 4 of this Dredging SBMP takes into account existing background factors and WQO's for the Caboolture River in order to maintain an environment to support sensitive species and comply with reasonable release criteria. Water quality criteria at the dredge apparatus are more stringent that those at the proposed release point at the dredge spoil (which is upstream at the mid estuary) given the location of the navigation channel dredging in relation to environmentally sensitive areas. Figure 3 provides an illustration of the QT preferred navigation channel dredging alignment and areas of environmental significance (refer to policy 2.8.1 for further details).

Potential impacts on these values, and techniques proposed for dredging, handling and disposing of dredge spoil to meet the requirements of the defined water quality objectives are outlined in Table 3.

Table 3 Potential Impacts on Environmental Values and Techniques to Meet Water Quality Objectives

Impacts of Dredging	Response
Temporary increase in suspended sediment, causing increasing turbidity and potential release of oxygen-depleting substances. Potential impacts of these effects include: - temporary lack of sunlight, disturbing algal/plant growth; - disturbance to sensitive benthic animals; - nutrient enrichment causing algal blooms; - uptake of contaminants by marine life causing direct toxic effects; and - smothering of benthic animals and plants.	The settling period for silts is 99% after 1 hour therefore it is expected that there will be no difficultly in meeting suspended solids criteria during dredging. All samples required less than 16 hours to attain turbidity measurements of less than 100 NTU and after 24 hours, most (75%) samples had turbidity values less than 20 NTU. Dredging shall be undertaken using cutter suction (300mm) dredging and silt curtains shall be employed to encourage settlement of particles. Dredging will necessarily involve disturbance to benthic fauna within the dredge area. Reporting suggests a diverse assemblage of benthic organisms and fish were identified in the Caboolture River however dredging will not adversely affect populations of existing fauna species provided appropriate management is implemented and habitat is compensated (The Ecology Lab, 2007). No contamination of marine sediments was found that would elevate heavy metals in the water that would result in biological magnification.
Disturbance of bathymetry, tidal currents, or sediment-transport processes may cause alteration of erosion and sedimentation patterns in adjacent areas.	The natural sediment transport patterns have been significantly altered by the construction of the weir 19km upstream from the mouth of the Caboolture River. Although the proposed dredge area may accumulate further sediment, modelling has demonstrated that dredging does not significantly impact on the level of sedimentation in waters and natural processes up the coastline (CLT, 2007). Potential impacts on the stability of beds and banks and on the physical integrity of the land by the dredging operation are expected to be minimal however as the purpose of the works is create an navigation channel accessible to boats with a maximum draft of 3 m, potential impacts from boat wash are likely. With the QT preferred dredge alignment the navigation channel is in some instances less than 10 m from the bank of the Caboolture River. Any adverse impacts including adjacent bank collapse and subsequent sedimentation that could be directly associated with the purpose of the capital works shall be investigated. A preliminary Riverbank Erosion assessment of the Caboolture River has been undertaken to determine the existing bank status with a riverbank erosion monitoring program proposed in order to quantity changes to bank stability (specifically from boat wash) to inform restoration projects (Cardno,

Impacts of Dredging	Response
	2007). The Proponent has committed to financially contribute to Caboolture riverbank restoration having investigated proven management options. Dredging is, in addition to removing deposited sand from drift from coastline beaches, likely to remove the fine sediments generated by land uses within the catchment compared to the coarser sediments that would cycle within less modified estuaries. Removal of fine sediments would not influence the physical integrity of the land including stability of beds and banks of watercourses.
Loss of Water Supply	The Caboolture River is tidal and therefore use as a water supply is limited. The majority of tailwater in dredge slurry will be returned to the Caboolture River system at nominated and controlled release points however some water after treatment will be used for dust suppression and/or construction purposes.
Detrimental impact on Recreational and Visual Amenity	Dredging is expected to have minor impacts on recreational and visual amenity in the short term only. However capital dredging will occur within a defined navigational channel where existing dredging has previously occurred, and is required to maintain an adequate depth for navigational safety.

Potential impacts on marine flora and fauna and proposals for mitigation of siltation, turbidity, and disruption to the aquatic environment by the proposed capital dredging works are detailed in Table 4.

Table 4 Potential Marine Flora/Fauna Impacts and Proposed Mitigation Measures

Potential Impacts	Mitigation measures
Smothering of marine plants from increased turbidity levels caused by dredging activity.	Silt curtains are to be employed during the duration of all dredging activities to minimise increases in turbidity outside the dredge area.
Direct disturbance of marine flora and fauna as a result of the dredging activity.	Dredging will occur within the defined navigational channel that is excluded from being a fish habitat area and therefore a resource. Mitigation to minimise disturbance on marina flora and fauna outside the navigational channel is emphasised in this Dredging SBMP, particularly in regards to water quality.
Decreased dissolved oxygen levels with less light penetration and increase in benthic organism activity.	A water quality monitoring program will be established during dredging works to determine turbidity, TSS and pH with contingency plans prepared. The Caboolture River is currently rated as a poor environment in terms of existing water quality. Beneficial impacts from dredging have been determined and may include: • re-oxygenation of sediments; • creation of construction materials; and • reduce siltation impacts on coastal wetlands and seagrass communities.

Source: DPIF (1998) Fish Habitat Management Operational Policy FHMOP 004.

The quality of the dredge spoil has been assessed in the Sediment Analysis Program undertaken by Coffey Geotechnical and The Ecology Lab, the conclusions of which are detailed in Table 5 following:

Table 5 Quality of Dredge Spoil

Quality Parameters	Level of Parameter
Physical Characteristics	A settlement rate > 99% after 1 hour was found therefore no issues with meeting suspended solids criteria for release waters during dredging are expected. In addition all samples required less than 16 hours to attain turbidity measurements of less than 100 NTU and after 24 hours, most (75%) samples had turbidity values less than 20 NTU. Holding periods in excess of 60 hours may be required to achieve turbidity levels suitable for discharge of return flows back to the river. Dispersion testing by Coffey (2007) indicate quarry material is non-dispersive.
Nutrients	Nutrient levels in sediments were relatively low compared to ANZEC Guidelines with cleaner sediments downstream in the shallow estuary compared to upstream at the NEBP project area. This appears to correspond with the increase in maritime infrastructure with some metals peaking in concentration at Monty's marina.
Acid Sulphate Potential	Zero total actual acidity with 17.5% of sampling identifying total potential acidity. Possibly high neutralising capacity.
Contaminants	No indication of contaminants in dredged material from geotechnical findings. Note: Nickel was moderate in 4 samples.

Dredge spoil will be adequately disposed of on land, and will be managed in accordance with Element 10 of this Dredging SBMP.

This Dredging SBMP includes the treatment and disposal of dredge spoil and therefore addresses policy 2.4.3 waste-disposal facilities of the SCMP and RCMP.

5.5 Groundwater Quality - Policy 2.4.5

The objective of this policy is to maintain groundwater quality and recharge processes. More specifically, activities are not to lower the watertable so as to expose acid sulphate soils or permit ingress of saline water to freshwater aquifers.

As the activity is dredging material submerged in water, no potential impacts are anticipated on groundwater quality or recharge rates.

5.6 Acid Sulfate Soils – Policy 2.4.6

As discussed in section 3.2 the characteristics of the dredge spoil have been examined. Field screen testing identified that all soil profiles are Potential ASS with oxidised pH values below 4. However no total actual acidity was recorded as field pH values were predominantly above 7. Quantitative laboratory testing undertaken on selected samples identified all soils within the proposed dredge area should be considered to be PASS.

All potential acidity can be managed to avoid environmental harm. The SPP 2/02 "Planning and Managing Acid Sulfate Soils" requires that testing, treatment and monitoring regimes are to be set out under an approved ASSMP.

An ASSMP has been prepared and is attached as Appendix R4 of the EIS.

5.7 Areas of State Significance (Scenic Coastal Landscapes) – Policy 2.7.1

No regional direction has been issued under the RCMP for policy 2.7.1. Rather the Southeast Queensland Regional Scenic Amenity Study provides a framework to estimate or rate the most scenic areas in Southeast Queensland. This plan seeks to acknowledge, protect and manage significant scenic amenity areas and features such as coastal waters, wetlands, dunes and foreshores.

One key coastal site identified for its scenic amenity value has been included in the Regional Plan, namely Hays Inlet and Brisbane northern wetlands. This area is located south of the Caboolture River mouth and does not extend to the proposed dredge location. This policy is therefore not considered further in this assessment of policies of the Regional Plan.

5.8 Areas of State Significance (Natural Resources) - Policy 2.8.1

The objective of this policy is to identify areas of state significance (natural resources) as valuable features and includes measures to ensure the maintenance, protection and enhancement of the area's values.

The areas of state significance (natural resources) where they are located on the coast or within the coastal zone and linked to the coast include:

- significant coastal wetlands;
- significant coastal dune systems;
- endangered regional ecosystems; and
- protected areas (State land), land declared critical habitat, and areas of major interest as defined under the *Nature Conservation Act 1992*.

Areas of state significance (natural resources) which have been identified in the site locality are the wetland ecosystems of Moreton Bay and critical habitat of migratory wading shore birds. These wetlands extend into the Caboolture River and therefore have the potential to be affected by dredging activities. Figure 3 illustrates the location of the QT preferred navigational channel in relation to areas of state significance (natural resources) including significant coastal wetlands, significant coastal dunes, and endangered regional ecosystems.

Policy 2.8.1 states that:

> *"Existing urban, maritime and rural land uses within 'areas of state significance (natural resources) will not expand in these areas unless it can be demonstrated that there will be no adverse impacts on coastal resources and their values. If a use or activity that has adverse effects is to occur within 'areas of state significance (natural resources)', it must have a demonstrated net benefit for the state as a whole."*

The Proponent has adopted a 'net benefit' approach as a central tenet of the development philosophy, seeking to achieve important demonstrable net benefits to the community in social, environmental and economic terms, on a sustainable basis.

Dredging of the Caboolture River is required to maintain access to the project area proposed for the NEBP development. The NEBP project area was identified as the best site for a business park and marine precinct development for the following reasons:

Location: The proximity of the site in the Northern corridor to major business centres, infrastructure, the Caboolture River, Deception Bay and Pumicestone passage, which provide the ideal location for the Business Park and marine precinct, presenting the last viable opportunity for a substantial marina between Brisbane and Mooloolaba.

Environmental: The current state of the site as a large heavily altered environment (Former Pine Plantation cut out in 1994) on the fringe of urban development provides the opportunity for development in this strategic location with minimal damage to the existing environment. Opportunity exists for the rehabilitation and preservation of the surrounding environment and eco-systems to improve their ecological value.

Industry demand: A regional and state demand for industry growth that aligns with the project's proposal for a business park and marine precinct with provision for community facilities (e.g. residential, recreational, etc.) that will promote and assist in supporting the economic growth of the region.

In short, the NEBP development presents the opportunity to transform a heavily degraded former pine plantation into an integrated, holistic, landmark development – thereby changing the face and advancing the identity, ecological health and prosperity of the Caboolture region.

The NEBP development is an opportunity to build a mixed-use business park and marina precinct that will create net benefits to the community, environment and economy.

The objectives and outcomes of the NEBP development include:

- strengthening of the regional economy;
- provision for world class marina facility with important marine industry linkages to the regional marine industry;
- effective use of strategically significant property;
- regeneration of degraded pine plantation land;
- improvement to local water quality through environmental management practise;
- management of impacts and safety standards of recreational boating in Moreton Bay and the Pumicestone Passage;
- rehabilitation of ecological corridors on the site;
- provision for high quality urban design standards;
- to provide a regional destination and a 'centre' for Burpengary;
- facilitation of local public transport development; and
- to provide a valuable and unique addition to the economic, social and recreational fabric of the region.

Given that the proposal involves the dredging of the existing Caboolture River navigation channel:

- it is not anticipated that there would be any a significant impacts to the Moreton Bay wetlands and the various wildlife species that it supports;
- management options to regulate boat speed and restore degraded riverbanks have been investigated;

- the Caboolture River is part of the habitat zone of the Moreton Bay Marine Park which has less environmental significance when compared conservation and protection zones; and
- the defined navigational channel existed prior to its inclusion in the Moreton Bay Marine Park and the historical use of this channel has not reduced the environmental values in the order of its exclusion to marine zoning.

Therefore the proposal is not contrary to Policy 2.8.1.

This assessment is based on the premise that the dredging works would be carried out in accordance with the environmental controls specified in the Dredging SBMP and the investigative works proposed as part of the Preliminary Assessment of Riverbank Erosion within the tidal reaches of the Caboolture River.

5.9 Coastal Wetlands - Policy 2.8.2

The objective of this policy is to identify coastal wetlands as valuable features and include measures to ensure the maintenance, protection and enhancement of coastal wetlands and values.

Given that the proposal involves dredging limited to the existing Caboolture River navigation channel and subject to water quality management controls as outlined in element 4 of the Dredging SBMP.

- it is not anticipated that there would be any a significant impacts to the Moreton Bay wetlands and the various wildlife species that it supports; and
- the proposal is not contrary to Policy 2.8.2.

This assessment is based on the premise that the dredging works would be carried out in accordance with the environmental controls specified in Dredging SBMP, specifically element 6 “Flora and Fauna Management”.

5.10 Biodiversity - Policy 2.8.3

The objective of this policy is to safeguard biodiversity on the coast through conserving and appropriately managing the diverse range of habitats including coral reefs, seagrass, soft bottom (benthic) communities, dune systems, salt flats, coastal wetlands and riparian vegetation.

Potential impacts on ecosystems and habitats in a regional and local context for these areas relate principally to temporary increases in turbidity during the conduct dredging works and thereafter from boat strikes from the increase in marine vessels accessing the Caboolture River.

Management and monitoring of dredging activities are proposed to control turbidity and sedimentation, and these controls will prevent adverse impacts on areas of coastal biodiversity significance. Every effort will be made to ensure maintenance dredging shall be undertaken only when required and in periods that will have minimal effect on migratory birds (eg. winter).

Options to minimise the risk from boat strikes on marine fauna are being considered, primarily marking the navigational channel to restrict boats passage along the Caboolture River to this area and controls on speed limit.

At this stage of the investigation of aquatic ecology, there are no constraints that have been identified to the proposed development that could not be mitigated by appropriate construction procedures or by management action.

Given that the proposal involves the dredging of the existing Caboolture River navigation channel:

- it is not anticipated that there would be any a significant biodiversity impacts; and
- the proposal is not contrary to Policy 2.8.3.

This assessment is based on the premise that the dredging works would be carried out in accordance with the environmental controls specified in the Dredging SBMP, sections 11 and 13.

For further details a Cardno (2007) report on Matters of Environmental Significance has been prepared and is attached as Appendix L2 of the EIS.

6. DREDGING IN A FISH HABITAT AREA

Dredging in a Fish Habitat Area (FHA) is regulated by the Department of Primary Industries and Fisheries under Queensland *Fisheries Act 1994* (Fisheries Act) and *Fisheries Regulation 1995* that provides for the "management, use, development and protection of fisheries resources and fish habitats and the management of aquaculture activities, and for related purposes".

Dredging within the Caboolture River in a declared FHA (Deception Bay Fish Habitat Area "A" No. 13) may increase pressures on marine ecosystems resulting in changes in fisheries productivity, particularly loss of fisheries habitat and a reduction in water quality. As such dredging for infrastructure adjacent to the project area requires approval under the Fisheries Act. Support can be expected when:

- the impacts of such works are minimal;
- works are for fisheries purposes or community benefit; and
- appropriate mitigation measures are carried out to counter any approved loss of fisheries habitat.

Approvals for dredging in a FHA covered by policy FHMOP 004 "Dredging, Extraction and Spoil Disposal Areas" are issued under section 51 of the Fisheries Act for works in a declared FHA.

Dredging is proposed entirely within the confines of the navigational channel preferred by the QT. In addition to navigation channel dredging, minor excavation works are proposed adjacent to the development site for construction of a lock.

Charts for the Caboolture River show a defined channel marked with navigation aids, and in accordance with the Fisheries Act, such a defined navigation channel is excluded from the FHA. There is no requirement for an approval for works in a FHA when capital and maintenance is located entirely within the defined dredging channel.

The risks of dredging have been identified and are addressed in this Dredging SBMP. Potential impacts may include turbidity plumes and disturbance of marine benthos. Navigational dredging of tidal reaches also enables increased use of the waterway which may lead lo bank damage due to disturbance from boat wash (Cardno, 2007). Impacts from spoil disposal areas are also considered.

Turbidity plumes and disturbance to marine benthos has been addressed through construction methodology and use of silt curtains and a detailed and focused water quality monitoring program that has corrective actions imbedded in the event of non-compliance with water quality criteria. No constraints concerning aquatic ecology from capital and maintenance dredging has been identified in a report by The Ecology Lab Pty Ltd (2007) commissioned for the NEBP development involving a mixed-use business park and marina.

A preliminary assessment of riverbank erosion in the Caboolture River has been undertaken with a monitoring program proposed to determine potential impacts from dredging works and an increase of marine vessels in a largely undeveloped waterway. Management options, specifically riparian vegetation restoration, have been investigated with a funding program proposed for necessary works to avoid adverse impacts as a result of the proposed NEBP development.

Potential impacts arising from spoil disposal areas will be managed as discussed in section 3 with use of sediment ponds and a tailwater treatment system.

7. DREDGING IN A MARINE PARK

Capital and maintenance dredging will be required (refer to section 4 of this Dredging SBMP) to create and maintain navigational depth for users of the NEPB marina located 7.5 km upstream from the Caboolture River Estuary. The Caboolture River Estuary is zoned as part of the Moreton Bay Marine Park.

Issues regarding dredging in a marine park relate specifically to zones which are highly protected. The objectives of all highly protected zones include:

(a) providing for the protection of the natural integrity and values of areas of the Marine Park; and
(b) subject to the above, providing opportunities for certain activities to be undertaken in relatively undisturbed areas.

Capital and maintenance dredging is required within the QT preferred navigational channel alignment that has been designated as part of the habitat zone of the Moreton Bay Marine Park. The Caboolture River navigational channel existed prior to the commencement of the zoning plans.

The purpose of a habitat zone under section 15 of the *Marine Parks (Moreton Bay) Zoning Plan 1997* is to:

(a) conserve significant habitats within the marine park and the cultural heritage and amenity values of the marine park; and
(b) maintain the productivity and diversity of ecological communities within the marine park; and
(c) provide for reasonable public use and enjoyment of the zone consistent with the conservation of the marine park.

The zoning plan provides that written permission is required for “carrying out works for a purpose consistent with the objective… for that zone”.

Approval to conduct capital and maintenance dredging works within the Marine Park shall be sought as part of the approval process with any conditions proposed included in a revised version of this Dredging SBMP to ensure best practice environmental management and environmental compliance.

8. PREAMBLE TO THE SITE-BASED MANAGEMENT PLAN

8.1 Site-Based Management Plan Structure

This Dredging SBMP includes the following key components:

- **Rationale:** identification of the element to be managed and the environmental impact of activities associated with each element.
- **Objective / Target:** identification of the environmental objectives to be achieved in compliance with applicable legislation.
- **Tasks/Actions:** monitoring and management measures to be implemented in order to achieve the stated objectives and to ensure impact mitigation.
- **Performance Indicators:** measurable indicators and standards set to assess the efficiency of management measures and determine compliance with the SBMP.
- **Monitoring:** monitoring requirements to measure compliance with the performance indicators and frequency of monitoring.
- **Reporting and Review:** the requirements for reporting of monitoring results and review of management measures where required.
- **Corrective Action:** measures to be undertaken should monitoring indicate non-compliance with performance indicators.

8.2 Relevant Legislation

The primary legislation relevant to this SBMP is the *Environmental Protection Act 1994 (EP Act)*. The EP Act protects environmental values through development and implementation of environmental protection policies and regulates environmentally relevant activities prescribed in the *Environmental Protection Regulation 1998.*

The EPP Water ensures protection of environmental values from activities that may result in the release of contaminants to waterways or stormwater drains.

The *Environmental Protection (Air) Policy 1997 (EPP Air)* ensures protection of ambient air quality and specifies indicators and air quality goals for control of the release of airborne contaminants.

The *Environmental Protection (Noise) Policy 1997 (EPP Noise)* specifies an acoustic quality objective for protection of the well-being and amenity of individuals and the community in residential areas. Planning noise levels are also specified for development of beneficial assets.

The *Environmental Protection (Waste Management) Policy 2000 (EPP Waste)* promotes the efficient use of non-renewable resources and the use of waste as a resource. The hierarchy of waste management is outlined and lists waste management practices in the preferred order of adoption.

Compliance with the *Coastal Management and Protection Act 1995* (Coastal Act) is required because the proposed dredging will occur within a coastal management district. The objective of the Coastal Act is to ensure environmentally sustainable development via the provision of protection, conservation, rehabilitation and management of the coast including its resources and biological diversity.

Compliance with the *Fisheries Act 1994* (Fisheries Act) is required because the spoil pipeline will traverse a fish habitat area. The Fisheries Act is an Act for the protection of fisheries resources and fish habitats.

Compliance with the *Marine Parks Act 2004* which provides for marine parks and the conservation of the marine environment amongst other purposes. This Act and regulations enable the declaration of Marine Parks and regulate activities contained within those areas.

Uses in the defined Marine Park are controlled by the *Marine Parks (Moreton Bay) Zoning Plan 1997* which is due to expire on the 1 September 2008. Permits are required for activities such as dredging in the Marine Park. Triggers exist for development within 100m of a Marine Park under the *Integrated Planning Act 1997* and provisions of this Act are administered by the EPA through Queensland Parks and Wildlife.

Compliance with the *Nature Conservation Act 1993* (*NC Act*) and associated *Nature Conservation (Wildlife) Regulation 1994 which* provides a framework for the conservation of nature. One of the primary mechanisms by which this objective is to be achieved is through the declaration and management of protected areas and the protection of native wildlife and its habitat. This legislation specifies management principles and intents for areas and species of conservation significance.

8.3 Terminology

The term **Principal** refers to Northeast Business Park Pty Ltd.

The term **Contractor** refers to any party or company responsible for operation of the dredging apparatus, disposal of dredge spoil and rehabilitation of the spoil disposal area.

The term **Consultant** refers to the civil and/or environmental engineering consultant employed by the Principal.

The term **Works** refers to all matters associated with dredging in defined areas and spoil disposal.

The term **EPA** refers to the Environmental Protection Agency.

The term **QT** refers to the Maritime Safety Division of Queensland Transport.

The term **SBMP** refers to this Dredging Site Based Management Plan.

The term **Council** refers to Caboolture City Council.

The term **Works Site** refers to the dredging apparatus, defined dredge area and the spoil disposal area during the conduct of works.

8.4 Program and Contractual Obligations

The SBMP covers the operation phase of the works. This is defined as the period from the commencement dredging to the substantial completion of the dredging, spoil disposal and rehabilitation of the spoil disposal area. The Principal is generally responsible for ensuring that the provisions of the SBMP are met, with the exception of certain planning or design issues, which are explicitly noted throughout the SBMP as being the responsibility of the Contractor or the Consultant.

The Principal shall ensure that all persons who are to be employed or sub-contracted for the works shall be trained as to their individual responsibilities as set out in this SBMP and as provided by the EP Act, including the following.

General Environmental Duty – whereby a person in the performance of their duties shall not do so in a manner which will cause, or is likely to cause, environmental harm unless the person takes all reasonable and practical measures to prevent or minimise the harm.

Duty to Notify Environmental Harm – whereby if a person in the performance of their duties becomes aware that serious or material environmental harm is caused or threatened, then the person must contact the Contractor whereupon the Contractor must immediately notify the Principal and/or the EPA.

Compliance with the SBMP – whereby a person in the performance of their duties shall do so in a manner that ensures that the provisions of this SBMP are complied with.

8.5 Responsibilities

The Principal is responsible for appointing a suitably qualified Contractor and for ensuring that all requirements of the regulatory authorities are complied with.

The Contractor is responsible for ensuring that the dredge and associated equipment is operated and maintained to achieve compliance with the development approval issued by the regulatory authority. This includes providing training of staff and any contactors in operational responsibilities, monitoring and maintenance procedures, lines of communication and contingency management.

8.6 Non-Compliance and Corrective Action Requirements

The Principal shall assume responsibility for implementation of this SBMP. Where the Principal becomes aware of a site or operational condition that does not comply with stated performance indicator(s) of this SBMP, there is a requirement for corrective action. A Corrective Action Request ("CAR") form is to be completed and authorised where appropriate in general compliance with the example CAR form provided in Appendix D of this Dredging SBMP. The Principal is also required to maintain a register of CARs, which shall demonstrate that appropriate actions have been completed within a suitable timeframe.

Any CAR registered in accordance with this SBMP shall be provided to the Principal, any State or Commonwealth Government Department, any statutory authority or other person, consensually or as lawfully required.

In some instances, further investigation or monitoring may be required to establish whether the Principal has failed to adequately implement the SBMP, or has failed to comply with relevant legislation, guidelines and statutes. In these instances, an independent party such as the Consultant shall carry out the investigation or monitoring. If it is established that the cause for non-compliance with the stated performance indicator(s) has arisen from the Contractor's actions or omissions, then the costs of the monitoring shall be deducted from payments to the Contractor and paid to the Consultant, otherwise the costs of the monitoring shall be obtained from the Principal and paid to the Consultant.

8.7 Monitoring and Review

This Dredging SBMP is a living document. As such, to ensure the environmental management at the site is continually improved, a review of this document by the Principal, in consultation with relevant agencies shall occur:

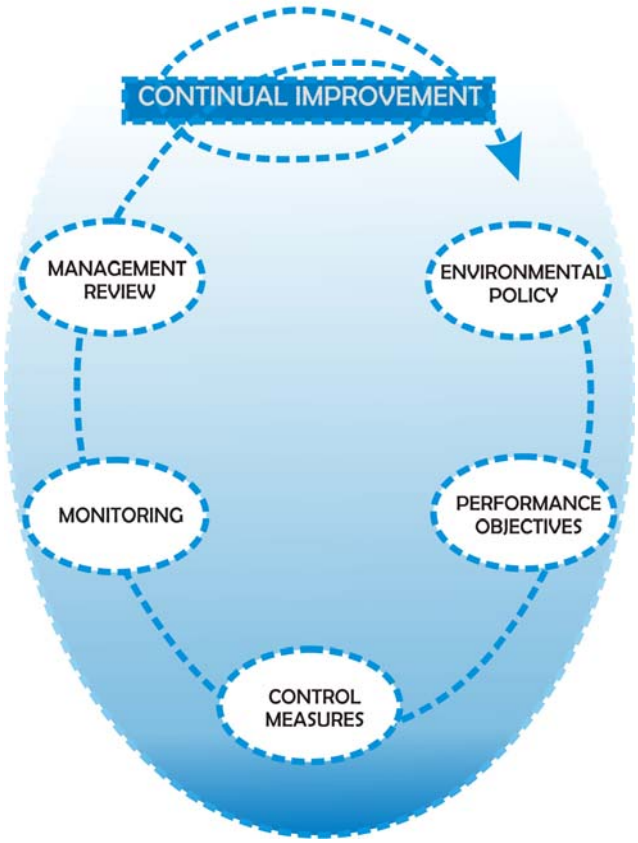
- to incorporate any relevant condition requirements issued subsequent development approval(s);
- following significant environmental incidents;
- at the completion of environmental audits; and
- in the instance whereby the objectives of any element of this Dredging SBMP are not being met.

The suitability, adequacy and effectiveness of this Dredging SBMP shall be reviewed annually following a continual improvement procedure as illustrated below and at the time of Annual Return. The review should consider the following matters.

- Suitability of the objectives.
- The extent to which the objectives have been met.
- Monitoring results.
- Audit findings.
- Technical reviews.
- Changes to organisational structure, plant and equipment, or procedures and practices.

The Dredging SBMP shall not be implemented or amended in a way that contravenes any condition of a relevant approval(s).

The continual improvement of this Dredging SBMP shall be undertaken as illustrated below.



8.8 Environmental Auditing

Environmental Auditing shall be undertaken as part of capital dredging works.

The Proponent shall engage an appropriately qualified Environmental Auditor, independent of contractual arrangements for the design and construction of the project, for the duration of the works.

The Environmental Auditor shall audit the dredging works against the Dredging SBMP and any subsequent revisions three monthly until completion of dredging works and when a significant incident occurs including:

- after a cyclone or when another major storm event (i.e. 1:25 ARI) occurs;
- when an uncontrolled release occurs at the dredge or spoil disposal location (this includes a visible plume within the river that is not fully contained by a silt fence); and
- when direct or indirect impacts from the works have been identified on the nearby Fish Habitat Areas or Marine Park areas (this includes fish kills).

The Environmental Auditor at the completion of the dredging works must finalise audits and prepare a summary of the results.

A copy of each Audit Report shall be provided to the administering authorities within 10 business days of a written request being made.

9. ELEMENT 1: COMMUNITY AWARENESS

RATIONALE

Dredging and spoil disposal activities are likely to have short term impacts on public amenity due to temporary disruption to navigation throughout the Caboolture River Navigational Channel.

OBJECTIVE / TARGET

To ensure relevant stakeholders that may be affected by the works are notified of the nature, duration, and program for the proposed works.

Relevant stakeholders within the project area include the following.

- Local commercial and recreational fishermen.
- Local community.
- Conservation groups.
- Traditional land owner groups.
- Caboolture City Council.
- Regional Harbour Master.
- Environmental Protection Agency incorporating the Queensland Parks and Wildlife Service.
- Department of Primary Industries and Fisheries.
- Department of Natural Resources and Water.
- Department of Environment and Water (commonwealth).

TASKS / ACTIONS

The Principal shall advise stakeholders of the nature of the proposed works and the proposed works program.

The Regional Harbour Master shall be contacted at least two weeks prior to the commencement of dredging operations so that a Notice to Mariners and public notices warning vessel operators of the dredging operations can be promulgated.

The Contractor shall provide a representative point of contact for receiving complaints and points of concern from stakeholders, which shall be clearly identified on signage attached to the dredging apparatus and on the entry to the spoil disposal area.

Contact details shall include a contact telephone number which is to be manned during working hours. A 24 hour emergency contact shall also be provided.

The Contractor shall comply with the elements of this SBMP that relate to the protection of amenity.

PERFORMANCE INDICATORS

Stakeholders are informed of the nature and duration of proposed works if they significantly change from that civil construction program of works provided as part of the EIS.

All complaints are responded to within one working day.

All CARs are closed out within time frames agreed between the Principal and the Contractor.

All CARs raised in response to actual or potential environmental harm are actioned within a maximum of 24 hours.

RECORD KEEPING

The Contractor shall maintain a record of all complaints received in relation to dredging and spoil disposal activities including complainant details, nature of complaint and corrective actions undertaken.

The Contractor shall make all records available for inspection by relevant authorities on request.

REPORTING AND REVIEW

The Contractor shall report to the Principal upon the requirement to complete a CAR and the actions taken in respect of the CAR.

All CARs shall be included in the CAR Register to be kept under the provisions of this SBMP.

CORRECTIVE ACTION

Where complaints are received from affected community members, corrective actions should be undertaken to resolve the issue. Refer to the element to which the complaint relates.

The Contractor shall implement the corrective action as required within the agreed time frame noted on the CAR.

10. ELEMENT 2: AIR QUALITY

RATIONALE

The Works will involve the use of powered mechanical equipment for wet dredging and the movement of spoil to the disposal area to achieve the required landform for the related development. The bulk handling of earth material has the potential to create air impurity emissions by release of dust as suspended then deposited particulate matter however this is unlikely considering ratio of sediment to water.

Air emissions associated with constructing spoil disposal ponds and tailwater ponds may cause a dust impact at nearby residences therefore requiring dust controls.

OBJECTIVE / TARGET

To comply with the *EP Act*, the subordinate *EPP Air*, Council By-Laws and health and safety requirements and to ensure acceptable amenity for the development.

To minimise the emission of air impurities associated with dredging.

To comply with the stated performance indicators for air impurity levels in the locality of the transport route for dredge spoil.

TASKS / ACTIONS

When constructing the spoil disposal area and treatment ponds via bulk handling of dry material for depth and bunding, dust shall be suppressed using a water truck with recycled water or collected stormwater on site.

Dust deposition at nearby residences shall be monitored in a dust monitoring program using fallout sampling methodology in the event of a validated complaint.

All vehicles and equipment shall be operated and maintained in accordance with the manufacturer's specifications.

Water within tailwater treatment ponds shall be mixed occasionally to prevent stagnation and algal blooms causing an odour nuisance if releases are periodic and subject to a specific water height.

PERFORMANCE INDICATORS

No complaint relating to excessive emission of air impurities from the dredging and spoil disposal area from any person.

Dust and particulate matter shall not exceed the following levels when measured at any nuisance sensitive or commercial place:

a) Dust deposition of 120 milligrams per square metre per day, when monitored in accordance with Australian Standard AS 3580.10.1 of 2003 (or more recent editions); OR
b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM10) suspended in the atmosphere of 150 micrograms per cubic metre over a 24 hour averaging time, at a nuisance sensitive or commercial place downwind of the site, when monitored in accordance with:

- Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or
- any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority.

MONITORING

A visual inspection of all mechanical equipment shall be undertaken prior to use on a daily basis.

When requested by the administering authority, dust and particulate monitoring shall be undertaken to investigate any complaint of environmental nuisance caused by dust and/or particulate matter from dredging spoil management, and the results notified within 14 days to the administering authority following completion of monitoring. Monitoring shall be carried out at a place(s) relevant to the potentially affected dust sensitive place and at upwind control sites and must include:

a) for a complaint alleging dust nuisance, dust deposition; and

b) for a complaint alleging adverse health effects caused by dust, the concentration per cubic metre of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM10) suspended in the atmosphere over a 24hr averaging time.

If through the CAR process it is determined that on the balance of probabilities the Contractor's actions have brought about a complaint then dust deposition or suspended particulate monitoring shall be undertaken in response to complaints received as directed by regulatory authorities.

RECORD KEEPING

The Contractor shall maintain a record of all complaints received in relation to air quality including complainant details, nature of complaint and corrective actions undertaken.

The Contractor shall maintain a record of any monitoring results undertaken including details of corrective actions and/or repairs undertaken.

The Contractor shall provide a copy of monitoring results to the administering authority within 14 days of receiving monitoring results when dust monitoring is a result of a complaint and request by that administering authority.

The Contractor shall make all records available for inspection by relevant authorities on request.

REPORTING AND REVIEW

The Contractor shall report to the Principal upon the requirement to complete a CAR and the actions taken in respect of the CAR.

CORRECTIVE ACTION

Should a complaint relating to excessive emission of air impurities from dredging and/or spoil disposal be received, the following corrective actions are to be implemented.

- Response to complainant outlining procedure for corrective action.
- Identification of the source(s) of the excessive emission of air impurities.
- Implementation of appropriate mitigation measures as determined by the Principal and Consultant in consultation with the Contractor.
- Relevant validation monitoring of air impurity concentrations at nominated locations.
- Notification of complainant that complaint has been closed out, with details of corrective actions undertaken.

The Contractor shall implement the corrective action(s) as required within the agreed time frame noted on the CAR.

11. ELEMENT 3: NOISE

RATIONALE

Mechanical equipment including the cutter suction dredge shall be used for dredging works, construction of the dredge spoil transfer pipeline and preparation of the spoil disposal area. Appropriate management measures are required to ensure that noise produced during the works do not result in disturbance at noise sensitive places or damage to nearby structures.

OBJECTIVE / TARGET

To control noise generated by dredging activities and to minimise the impact of noise to ensure acceptable levels of amenity for the closest sensitive receptors and to prevent damage to nearby structures as a result of ground vibration.

To comply with the EP Act, the EP Regulation, Council By-Laws and recognised noise criteria as contained in Australian Standard (AS) 2436 *Guide to Noise Control on Construction, Maintenance and Demolition Sites*.

TASKS / ACTIONS

Dredging works shall be managed to control noise. Specific control measures may include, but not be limited to the following.

- All noise generating mobile and stationary plant and equipment, and processes shall be controlled to minimise noise emission in accordance with AS 2436: *Guide to Noise Control on Construction, Maintenance and Demolition Sites* or most recent equivalent.
- All powered mechanical equipment fitted with effective exhaust mufflers.
- Working hours at the works site limited to specific days and working hours appropriate to the zone of the area.
- Fixed noise sources screened or enclosed where practicable.

PERFORMANCE INDICATORS

Noise must not cause an environmental nuisance at any nuisance sensitive place or commercial place.

The works shall be carried out by such practicable means necessary to prevent the emission of noise that constitutes *"unreasonable"* or *"intrusive"* noise as defined by the EPP Noise.

MONITORING

If it is determined that on the balance of probabilities the Contractor's actions have brought about a complaint of excessive noise then noise monitoring shall be undertaken in response to complaints received as directed by regulatory authorities.

Noise monitoring shall be undertaken to investigate any complaint of noise nuisance, and the results notified within 14 days to the administering authority. Monitoring shall include:

- LA 10, adj, 15 mins
- LA 1, adj, 15 mins
- LA 90, adj, 15 mins
- the level and frequency of occurrence of impulsive or tonal noise;
- atmospheric conditions including wind speed and direction;
- effects due to extraneous factors such as traffic noise; and
- location, date and time of recording.

The method of measurement and reporting of noise levels must comply with the latest edition of the Environmental Protection Agency's Noise Measurement Manual.

RECORD KEEPING

The Contractor shall maintain a record of all complaints received in relation to noise emissions including complainant details, nature of complaint and corrective actions undertaken.

The Contractor shall maintain a record of any monitoring results undertaken including details of corrective actions and/or repairs undertaken.

The Contractor shall make all records available for inspection by relevant authorities on request.

REPORTING AND REVIEW

The Contractor shall report to the Principal upon the requirement to complete a CAR and the actions taken in respect of the CAR.

CORRECTIVE ACTION

Should a complaint relating to excessive emission of noise from the works site be received, the following corrective actions are to be implemented.

- Response to complainant outlining procedure for corrective action.
- Identification of the source(s) of the excessive emission of noise.
- Implementation of appropriate mitigation measures as determined by the Principal and Consultant in consultation with the Contractor.
- Relevant validation monitoring of noise levels as a result of the works at nominated locations.
- Notification of complainant that complaint has been closed out, with details of corrective actions undertaken.
- The Contractor shall implement the corrective action(s) as required within the agreed time frame noted on the CAR.

12. ELEMENT 4: WATER QUALITY

RATIONALE

Dredging within the navigation channel will involve excavation of sediment which has the potential to increase suspended sediment and turbidity levels in and around the dredge areas. Dredging activities are to be conducted in an appropriate manner in order to minimise and prevent adverse impacts on the current quality of the local aquatic environment.

Tailwater from treatment ponds has the potential to release sediment to the receiving environment if settlement time is insufficient and heavy metals mobilised by any acidity. Water quality of tailwaters if released to the receiving environment must comply with relevant water quality objectives.

OBJECTIVE / TARGET

To ensure no degradation of the local aquatic environment.

TASKS / ACTIONS

Dredging works must be managed by the use of silt curtains and other appropriate mitigation devices to ensure minimal release of sediment to the local aquatic environment.

Maintenance and operation of all dredging equipment shall occur according to manufacturer's specifications to ensure no uncontrolled discharge of dredge spoil to the surrounding water environment and accidental release of contaminants.

Impose a limit on the rate of the dredge pump to ensure that discharge is not excessive into the spoil pond which could increase the water velocity and in turn increase the amount of suspended solids released at controlled sampling point(s).

Release points from the tailwater treatment systems must be established and affixed with sediment control devices (refer to Element 10 of this Dredging SBMP).

Prominent markers identifying the positioning of the spoil disposal transfer pipeline shall be displayed to prevent accidental damage to the pipeline.

PERFORMANCE INDICATORS

The dredging works shall ensure that surrounding waters comply with the quality characteristics in Table 6[1] below for the duration of the dredging works at the locations and frequency presented in Table 7.

Contaminants other than settled/treated stormwater runoff waters must not be released from the site to surface waters or the bed or banks of surface waters.

Silt curtains shall be used at all times during dredging.

[1] The limits proposed for discharge from the tailwater treatment system were considered in accordance with the Environmental Values and Water Quality Objectives for Waters of the Caboolture River Catchment (EPA 2007) for middle estuary waters as defined in Plan WQ1422, the nature of the material and existing water quality environment of the Caboolture River.

Table 6 Water Quality Criteria

Parameter	Acceptable Criteria
At Dredge	
Turbidity	Less than 10% above background
pH	8.0 – 8.4
At Spoil Disposal Area (at NEBP project area)	
pH	7.0 – 8.4
Suspended solids	50 mg/L
Dissolved Oxygen	80 – 105% saturation
Total Nitrogen	Less than 300 µg/L
Total Phosphorus	Less than 25 µg/L

MONITORING

Water quality monitoring shall be undertaken in accordance with the schedule provided in Table 7.

Table 7 Water Quality Monitoring Program Frequency

Location	Frequency	Type	Parameter
Background			
Mid-water column between 500 and 100 metres up current of the dredge apparatus and Release point for Spoil Disposal Area	Daily on an outgoing tide	Field sampling	pH Turbidity Dissolved Oxygen
Mid-water column between 50 and 100 metres up current of the Release point for Spoil Disposal Area	Weekly on an outgoing tide	Laboratory analysis	Suspended Solids
At Dredge			
50 m distance from the boundary of the silt curtain at mid water column	Daily on an outgoing tide	Field sampling	pH Turbidity Dissolved Oxygen
At Spoil Disposal Area (at NEBP project area)			
At release point	Daily when a release occurs	Field sampling	pH Dissolved Oxygen
At release point	Weekly when a release occurs	Laboratory analysis	Suspended Solids

Water quality monitoring in the event of a visible sediment plume beyond the silt curtain shall be undertaken in accordance with Table 8.

Table 8 Water Quality Monitoring in the Event of a Sediment Plume

Location	Parameter	Limit	Frequency
Mid-water column between 50 and 100 metres up current of the dredge apparatus (background)	Turbidity (Laboratory Analysis)	No Limit	Daily on an outgoing tide when a Sediment Plume is visible.
At a location representative of the Sediment Plume at mid-water column	Turbidity (Laboratory Analysis)	Less than 10% TSS (mg/L) above background	Daily on an outgoing tide when a Sediment Plume is visible.

Monitoring shall be undertaken and records kept of contaminant releases to waters from the discharge location for the quality characteristics and not less frequently than specified in Table 7 for general operations and Table 8 in the event of a visible sediment plume. All determinations of the quality of contaminants released must be:

a) made in accordance with methods prescribed in the latest edition of the Environment Protection Agency Water Quality Sampling Manual; and

b) carried out on samples that are representative.

Water quality monitoring shall be undertaken until completion of dredging works.

RECORD KEEPING

The Contractor shall keep record of all water quality monitoring results and report recommendations for inspection by relevant authorities on request.

The Contractor shall maintain a record of any monitoring results undertaken including details of corrective actions and/or repairs undertaken.

Monthly reports shall be prepared by the Contractor and submitted to the Principal on the monitoring undertaken during works, including all corrective action taken to achieve environmental performance requirements.

REPORTING AND REVIEW

In the event of a contradiction between management requirements stated by this Dredging SBMP and any management requirements of relevant Approvals, the requirements of the Approvals shall prevail and this Dredging SBMP shall be updated.

Results of monitoring shall be forwarded periodically to a suitably qualified environmental consultant to assess water quality.

The Contractor shall report to the Principal upon the requirement to complete a CAR and the actions taken in respect of the CAR.

CORRECTIVE ACTION

Should there be non-compliance with the stated performance indicators the following corrective actions are to be implemented.

- Cease Works.
- Contactor to investigate the cause of the non-compliance seeking expert advice from the Environmental Auditor when required. Environmental Auditor to undertaken an investigation in accordance with section 8.8 of this Dredging SBMP.
- Implementation of appropriate mitigation measures as determined by the Principal and Consultant in consultation with the Contractor and Auditor.
- Relevant validation monitoring to confirm that the nominated corrective actions have been effective.

The Contractor shall implement the corrective action(s) as required within the agreed time frame noted on the CAR.

13. ELEMENT 5: ACID SULFATE SOIL MANAGEMENT

RATIONALE

All dredge spoil has been identified as Potential Acid Sulfate Soil (PASS). In this respect efforts are required to avoid and / or minimise as much as reasonably practicable the detrimental impact on surrounding water quality (groundwater and receiving surface waters) through the effective identification, treatment and management of acid sulfate soils on the works site.

OBJECTIVE / TARGET

To comply with the Acid Sulfate Soil Management Plan (ASSMP) section 9 for dredge spoil disposal appended to the NEBP EIS.

TASKS / ACTIONS

The Contractor shall ensure that works addresses all tasks relating to the management of Acid Sulfate Soils as listed in the conditions of the approval and in the relevant section of the ASSMP.

The Contractor shall ensure that the dredge depth does not exceed RL -4.25 m.

MONITORING

The Contractor shall ensure that all monitoring requirements relating to ASS as detailed in the ASSMP are complied with.

RECORD KEEPING

The Contractor is required under the ASSMP and Element 4 of this Dredging SBMP to keep record of monitoring results and actions taken in non-compliance.

The Contractor shall maintain a record of:

- lime delivery dockets;
- how and where neutralising agent was used on site; and
- soil and water monitoring results.

Lime delivery records shall be checked against amounts of lime used.

PERFORMANCE INDICATORS

Water Quality criteria specified in Element 4 is achieved during dredging of potentially acidic soils and release of tailwaters to the receiving environment.

REPORTING AND REVIEW

As per Element 4 “Water Quality”.

CORRECTIVE ACTION

Should there be non-compliance with the stated performance indicators the following corrective actions are to be implemented.

- Identification of the cause of the non-compliance by the Contractor;
- Implementation of appropriate mitigation measures as determined by the Principal and Consultant in consultation with the Contractor; and

- Relevant validation monitoring to confirm that the nominated corrective actions have been effective.

The Contractor shall implement the corrective action(s) as required within the agreed time frame noted on the CAR.

14. ELEMENT 6: MARINE FLORA AND FAUNA MANAGEMENT

RATIONALE

Dredging works have the potential to have localised impacts upon marine flora and fauna communities. Further, secondary impacts from the dredging works are possible, including flora smothering due to increased suspended sediment leading to fauna habitat alterations and changes in species composition and or abundance. Dredging works will be managed so as to prevent and/or minimise any impacts to local marine flora and fauna.

OBJECTIVE / TARGET

To ensure the prevention and minimisation of impacts to marine flora and fauna species within and around dredge areas.

To ensure compliance with all the requirements of the Marine Parks Permit and the DPI&F.

TASKS / ACTIONS

The Contractor shall comply with the DPI&F Code for Self-Assessable Development MP02 – *Maintenance works on existing lawful structures (other than powerlines and on farm drains) in a declared fish habitat area or involving the removal, destruction or damage of marine plants* when dredging.

The Contractor shall provide training and education of all staff and sub-contractors to inform of the ecological values of the works site.

The Contractor shall only undertake dredging in specified areas and according to previously approved works methodologies.

In order to deter turtle interaction with the dredge apparatus, the Contractor shall ensure that tickler chains are installed and functional at all times.

The Contractor shall schedule all maintenance dredging works to occur the winter season (June – August) for shorebird management.

MONITORING

The Contractor shall inspect all flora and fauna protection equipment on a daily basis to ensure it is operational, and undertake any maintenance or repairs where necessary.

The dredged areas shall be inspected during dredging works at regular intervals to determine compliance with performance criteria.

RECORD KEEPING

The Contractor is required under this element to record all death of marine flora and fauna during dredging works and investigate adverse impacts.

PERFORMANCE INDICATORS

Works are undertaken within specified areas and according to previously approved methodologies.

No fatalities or injury to marine turtles and mammals as a result of the works.

Staff and sub-contractors are trained and educated about the ecological values of the works site.

REPORTING AND REVIEW

The Contractor shall report to the Principal upon the requirement to complete a CAR and the actions taken in respect of the CAR.

CORRECTIVE ACTION

Should there be non-compliance with the stated performance indicator the following corrective actions are to be implemented.

- Identification of the cause of the non-compliance.
- Implementation of appropriate mitigation measures as determined by the Principal and Consultant in consultation with the Contractor.
- Relevant validation monitoring to confirm that the nominated corrective actions have been effective.

The Contractor shall implement the corrective action(s) as required within the agreed time frame noted on the CAR.

15. ELEMENT 7: CULTURAL HERITAGE MANAGEMENT

RATIONALE

Although there is no Aboriginal Cultural Heritage recorded on the Queensland Department of Natural Resources and Water Cultural Heritage Database and Register for the dredge area, it is probable that the absence of recorded Aboriginal Cultural Heritage places reflects a lack of previous cultural heritage surveys of the area. As a precaution, the activities will be managed in such a way that disturbance is prevented or kept to a minimum as per the engineered drawings submitted for approval. Subsequent sites of cultural heritage significance will be managed in line with duty of care guidelines established by the *Aboriginal Cultural Heritage Act 2003*.

OBJECTIVE / TARGET

No destruction or damage of significant archaeological sites, or objects of cultural value to occur at any time during the works.

To carry out appropriate tasks and actions throughout the duration of the works which comply with the stated objectives.

TASKS / ACTIONS

The Contractor shall provide training and education of all staff and sub-contractors to ensure they are aware of potential items of archaeological, historic site or Aboriginal Cultural Heritage Significance.

In the event of an archaeological, historic, or Aboriginal Cultural Heritage site being discovered, all works shall cease in the vicinity of the find and the area shall be fenced to restrict access until appropriate measures are taken, under the direction of the Department of Natural Resources and Mines (Cultural Heritage Co-ordination Unit), to deal with the find.

The following protocol shall be strictly followed for reporting a find of cultural heritage significance.

- The Contractor shall arrange an inspection of the material *in situ* by a suitably qualified archaeologist and shall notify the Principal, Department of Natural Resources and Water (DNRW) and Queensland Police (if required).
- If the find is of human bones, the Principal shall notify the Queensland Police and the Cultural Heritage Coordination Unit of the DNRW.
- Ensure all bones remain in-situ until identified. Ensure works do not recommence until notification has been given by the Police or DNRW that suitable arrangements have been made for removal.
- If the find is of archaeological material, works may recommence 100m from the find. The archaeological Consultant shall record the location and nature of the find of all archaeological material.
- The archaeologist will notify the Project Manager when works can recommence in the area of the find.
- Determine corrective action for removal or on-site management of archaeological material within the legal requirements of the *Aboriginal Cultural Heritage Act 2003* and in consultation with the DNRW Cultural Heritage Coordination Unit.

PERFORMANCE INDICATORS

No destruction or damage of significant archaeological sites, or objects of cultural value, are to occur during works.

REPORTING AND REVIEW

In the event of an archaeological or historic site, item or place being discovered, the find shall be immediately reported to the Principal and DNRW Cultural Heritage Co-ordination Unit.

The Contractor shall report to the Principal upon the requirement to complete a CAR and the actions taken in respect of the CAR.

CORRECTIVE ACTION

Corrective action will be determined within the legal requirements of the *Aboriginal Cultural Heritage Act 2003* and in consultation with the DNRW Cultural Heritage Co-ordination Unit and relevant local traditional owner parties.

Should there be non-compliance with the stated performance indicator the following corrective actions are to be implemented.

- Identification of the cause of the non-compliance.
- Implementation of appropriate mitigation measures as determined by the Principal and Consultant in consultation with the Contractor.
- Relevant validation monitoring to confirm that the nominated corrective actions have been effective.

The Contractor shall implement the corrective action(s) as required within the agreed time frame noted on the CAR.

16. ELEMENT 8: DANGEROUS AND HAZARDOUS MATERIALS

RATIONALE

The Works will involve the use of dangerous or hazardous materials such as fuel for powering dredging apparatus. The works site for dredging is required to be managed to prevent impacts on human health and the receiving environment as a result of accidental release or spillage of dangerous or hazardous materials associated with the works.

OBJECTIVE / TARGET

To comply with the *EP Act* and Australian Standard 1940-2004 *The Storage and Handling of Flammable and Combustible Liquids* (AS 1940).

To effectively manage the safe storage, handling and disposal of dangerous or hazardous materials within the works site.

TASKS / ACTIONS

Site Induction training shall include instructions to staff on correct procedures for storage and handling of dangerous and hazardous substances.

Dangerous or hazardous substances shall be stored in an adequately bunded containment area[2]. Incompatible substances shall be stored in separate containment areas.

Material Safety Data Sheets (MSDS) shall be displayed with each dangerous or hazardous substance stored within the containment area.

A register shall be maintained of all dangerous or hazardous substances stored within the works site and all associated MSDS.

Bunding shall be designed to ensure the containment of spillages in accordance with the nature of stored materials and in accordance with the MSDS and manufacturers' instructions.

Containment areas shall be designed to prevent entry of stormwater and rainfall.

All maintenance and cleaning of plant and equipment shall be undertaken within designated containment areas.

All refuelling of the barge shall be undertaken off site at a gazetted area (existing approved refuelling dock).

Excess (waste) fuel and oil shall be stored in appropriate containers within a designated containment area for collection by a licensed waste disposal contractor and disposal at an approved waste facility.

Disposal of waste hazardous materials shall be undertaken by a licensed contractor approved by the EPA.

The Contingency Plan in the event of a spill (refer to Element 12) shall be followed.

Spill kits and booms shall be maintained on the dredge for clean up of chemical or fuel spills.

Emergency procedures concerned with spillage events and containment measures shall be addressed in site induction proceedings and displayed in a prominent position on the dredge apparatus and within the spoil disposal area.

PERFORMANCE INDICATORS

No adverse human health or environmental impacts associated with hazardous materials is experienced on the works site at any time.

[2] Any flammable or combustible liquids as defined by AS 1940 involved with the works are to be stored and handled in accordance therewith.

No spill or handling incidents that may potentially cause impact to humans or environmental degradation.

All CARs are to be actioned closed out within time frames agreed between the Principal and the Contractor.

All CARs raised in response to actual or imminent potential environmental harm to be actioned within a maximum of 24 hours.

MONITORING

Weekly monitoring shall include inspection of the dredge and containment areas to ensure that spillage or seepage of fuel or oil has not occurred and the integrity of the containment area is not compromised.

RECORD KEEPING

The Contractor shall maintain a record of any accidental release or spillage of hazardous materials including details of corrective actions undertaken.

The Contractor shall make all records available for inspection by relevant authorities on request.

REPORTING AND REVIEW

Environmental incidents shall be reported immediately to the Principal.

The Principal shall notify the EPA immediately in the event of accidental release of hazardous materials from the site.

Records of disposal and clean up measures shall be maintained with site records.

CORRECTIVE ACTION

Should there be non-compliance with the stated performance indicators the following corrective actions are to be implemented.

- Environmental Audit investigating the cause of the non-compliance.
- Implementation of appropriate mitigation measures as determined by the Principal and Consultant in consultation with the Contractor.
- Relevant validation monitoring to confirm that the nominated corrective actions have been effective.
- Records kept of non conformance by way of the system defects.

The Contractor shall implement the corrective action(s) as required within the agreed time frame noted on the CAR.

17. ELEMENT 9: WASTE MANAGEMENT

RATIONALE

Waste management at the works site is to focus on appropriate methods to avoid, reuse, recycle and dispose of waste materials generated as a result of the works.

OBJECTIVE / TARGET

To ensure that all materials used to conduct the works do not cause unlawful environmental harm.

To ensure no waste material is released from the works site in an uncontrolled manner.

The Contractor has due regard for the waste management hierarchy detailed in the *Environmental Protection (Waste Management) Policy 2000*. The waste management hierarchy lists the types of waste management practices in preferred order of adoption, as detailed below.

1. Waste avoidance
2. Waste re-use
3. Waste recycling
4. Energy recovery from waste
5. Waste disposal

TASKS / ACTIONS

Dredging Contractors shall maintain a regular waste removal schedule and document all waste disposal activities. These activities shall be listed on a Waste Register Form.

The Contractor shall provide appropriate methods for the collection and lawful disposal of any wastes produced at the works site. Instructions to site workers for the handling, storage, and disposal of each type of waste shall be provided by the Contractor in both the site preparation and dredging phase.

Where possible dredged material shall be re-used for on-site engineered fill or in erosion protection/nourishment.

Waste shall be collected by a licensed waste disposal contractor for disposal.

Provide appropriately designed and located litter bins that will prevent access to birds or other animals or otherwise allow wind to dislodge litter.

Prevent boat maintenance in waterways that may cause the release of waste to water through displaying the nil release policy on the barge or another prominent position.

PERFORMANCE INDICATORS

No waste of any type is released from the dredging site in an uncontrolled manner.

Evidence of waste spillage or dispersal shall indicate non-compliance with the objectives and the tasks/actions outlined in this Dredging SBMP.

MONITORING

The waste collection site shall be inspected weekly by the Contractor during dredging works and by the Contractor during operation to determine the need for additional collection services.

Visual inspections of all waste holding and collection areas shall be undertaken by the Contractor on a daily basis during works and by the Contractor on a weekly basis during operation.

RECORD KEEPING

The Contractor shall maintain a record of all complaints received in relation to waste including complainant details, nature of complaint and corrective actions undertaken.

Records of all waste management actions shall be maintained including details of regulated waste tracking, removal by contractors, quantity and proposed final destination of waste.

The Contractor shall make all records available for inspection by relevant authorities on request.

REPORTING AND REVIEW

The Contractor shall report to the Principal upon the requirement to complete a CAR and the actions taken in respect of the CAR.

CORRECTIVE ACTION

Should there be non-compliance with the stated performance indicators the following corrective actions are to be implemented.

- Identification of the cause of the non-compliance;
- Implementation of appropriate mitigation measures as determined by the Principal and Consultant in consultation with the Contractor; and
- Relevant validation monitoring to confirm that the nominated corrective actions have been effective.

The Contractor shall implement the corrective action(s) as required within the agreed time frame noted on the CAR.

18. ELEMENT 10: DREDGE SPOIL MANAGEMENT

RATIONALE

A management procedure is required to ensure that dredged material is not released into the receiving environment. Spoil disposal should not cause significant degradation to the treatment area and its neighbouring environment.

It is the Principal's responsibility to ensure that dredging works are conducted in compliance with this Dredging SBMP.

OBJECTIVE / TARGET

To prevent the release of water from treatment ponds not in compliance with water quality objectives specified in Element 4 of this Dredging SBMP.

TASKS / ACTIONS

The Contractor shall ensure that the construction of all bunding and sediment control structures at spoil disposal areas is complete prior to commencement of dredging activities.

Spoil disposal area bunding and tailwater treatment ponds shall be suitably designed for a storm return period of 1:50 years.

Erosion and sedimentation control measures shall be implemented by the Contractor in accordance with the requirements of the Soil Erosion and Sediment Control Guidelines, Institute of Engineers Australia including:

- sediment fences;
- stormwater diversion drains or channels to direct uncontaminated upslope runoff around the works areas that shall be terminated at silt traps and may require erosion control measures depending on the flow velocity;
- topsoil removed for pond construction shall be stockpiled at heights of no more than 1.5 m and located within designated storage areas; and
- sediment and erosion controls shall only be removed at the completion of achieving the desirable land levels.

The Contractor shall ensure that the quality of treated waters discharged from the tailwater treatment system achieves the criteria stated in Element 4 of this Dredging SBMP.

The Contractor shall ensure that environmental management associated with the spoil disposal area complies with the Operational Works approval issued for alteration of land form on that property.

PERFORMANCE INDICATORS

Compliance with all elements of this Dredging SBMP.

All CARs are to be actioned within time frames agreed between the Principal and the Contractor.

All CARs raised in response to actual or potential environmental harm to be actioned within a maximum of 24 hours.

REPORTING AND REVIEW

In the event of a contradiction between management requirements stated by this Dredging SBMP and any management requirements of relevant Approvals, the requirements of the Approvals shall prevail and this Dredging SBMP shall be updated in accordance with section 8.7.

Reporting to the Principal upon requirement to complete a CAR and the actions taken in respect of the CAR.

Failures in erosion and sediment control devices shall be immediately reported to the Contractor so that procedures may be revised where necessary.

CORRECTIVE ACTION

Non-conformance with this Dredging SBMP shall be documented and a CAR issued. All CARs shall be included in the CAR Register to be kept under the provisions of this SBMP.

The Contractor shall implement the corrective action as required within the agreed time frame noted on the CAR.

19. ELEMENT 11: NAVIGATIONAL SAFETY

RATIONALE

Navigational safety whilst dredging must be considered in the presence of other vessels using the Caboolture River.

OBJECTIVE / TARGET

To ensure compliance with the *Transport Operations (Maritime Safety) Act 1994*, the *Transport Operations (Marine Pollution) Act 1995* and subordinate regulations to these Acts.

TASKS / ACTIONS

The Contractor shall ensure that all dredge equipment, including for example barges, anchor buoys and floats are clearly marked to be visible during the hours of daylight and night identified with omni-directional yellow flashing lights.

The Contractor shall ensure that a clear navigation channel is maintained at all times during the dredging operation.

The Contractor shall provide temporary navigation markers to guide vessels around the work area to provide safe navigation.

Any other navigational requirements of the Regional Harbour Master must be implemented.

PERFORMANCE INDICATORS

Compliance with Harbour Master Concurrence and Advice Requirements.

REPORTING AND REVIEW

Reporting to the Principal upon requirement to complete a CAR and the actions taken in respect of the CAR.

CORRECTIVE ACTION

Non-conformance with Harbour Master Requirements shall be documented and a CAR issued. All CARs shall be included in the CAR Register to be kept under the provisions of this SBMP.

The Contractor shall implement the corrective action (in consultation with the Regional Harbour Master as required) within the agreed time frame noted on the CAR.

20. ELEMENT 12: CONTINGENCY PLAN

RATIONALE

Dredging works and the dredge spoil disposal shall be managed to avoid detrimental impact on the receiving environment as a result of emergency events including accidental release, prolonged rainfall and unforseen circumstances.

OBJECTIVE / TARGET

To comply with the *EP Act* in effectively managing emergency events at the sites.

To avoid detrimental impact on the receiving environment external to the works site as a result of unplanned or emergency events associated with the works.

TASKS / ACTIONS

Accidental Release of Material

In the event that accidental release of material occurs at the dredging site during the works, the following actions shall be implemented.

1. The Contractor shall take appropriate steps to contain the released material.
2. The Contractor shall make an initial assessment of the severity of the accidental release and the nature of the material.
3. The Contractor shall notify the EPA, MSQ (if spill in the marine environment) the Principal and the Consultant of any accidental release of material.
4. The Contractor shall take steps in consultation with the EPA to treat, remove or otherwise manage the released material.
5. The Contractor, EPA, Principal and Consultant shall make an assessment of the area to confirm the success of the remediation works and whether additional works are required.
6. Following completion of remedial actions the Contractor shall provide an incident report or CAR to the Principal detailing the nature of the incident and the corrective actions implemented.
7. The Proponent shall organise for an Environmental Audit in accordance with section 8.8 of this Dredging SBMP to assess the work procedures or cause of the failure and implement any changes deemed to be appropriate to prevent reoccurrence of a similar incident in the future

Heavy or Prolonged Rainfall

Spoil disposal area bunding and tailwater treatment ponds are expected to be suitably designed for a storm return period of 1: 50 years. In the event that heavy or prolonged rainfall occurs beyond this event magnitude at the site during the works, the following actions shall be implemented.

1. The Contractor shall make an initial assessment of the possible impacts of the rain based on weather forecasts and current site conditions.
2. If the assessment concludes that the rainfall event will result in an increased risk of stormwater contamination, then the Contractor shall cease works at the site.
3. The Contractor shall take actions to ensure that erosion and sediment control measures in place over the site are performing as well as possible. Actions shall also be taken to ensure that all materials being stored at the site including fuels and lime are secure and there is no risk of accidental release or stormwater contamination from such materials.

4. If required, the Contractor shall make necessary repairs, alterations or additions to the erosion and sediment control devices.
5. The Contractor shall only recommence at the site after the site has been assessed by an Environmental Auditor and it has been determined that the risk of erosion and sedimentation has returned to normal, and all erosion and sediment control measures have been checked and repaired/replaced as required.

Dredging Works Are Halted Due to Unforseen Circumstances

In the event that the dredging works are halted due to unforseen circumstances, to ensure that safety is a priority the Contractor shall ensure that all navigational aids are intact and operational.

Prior to vacating the works site, the Contractor shall ensure that all equipment is removed from site.

PERFORMANCE INDICATORS

No adverse environmental impacts associated with unplanned or emergency events of any type to be experienced on the works site at any time during the works.

All CARs are to be actioned closed out within time frames agreed between the Principal and the Contractor.

All CARs raised in response to actual or imminent potential environmental harm to be actioned within a maximum of 24 hours.

REPORTING AND REVIEW

The Contractor shall develop and maintain a dedicated Emergency/Incidents Register to record emergency events and file a copy of CARs for scrutiny by interested parties on the actions taken and outcomes in this Register.

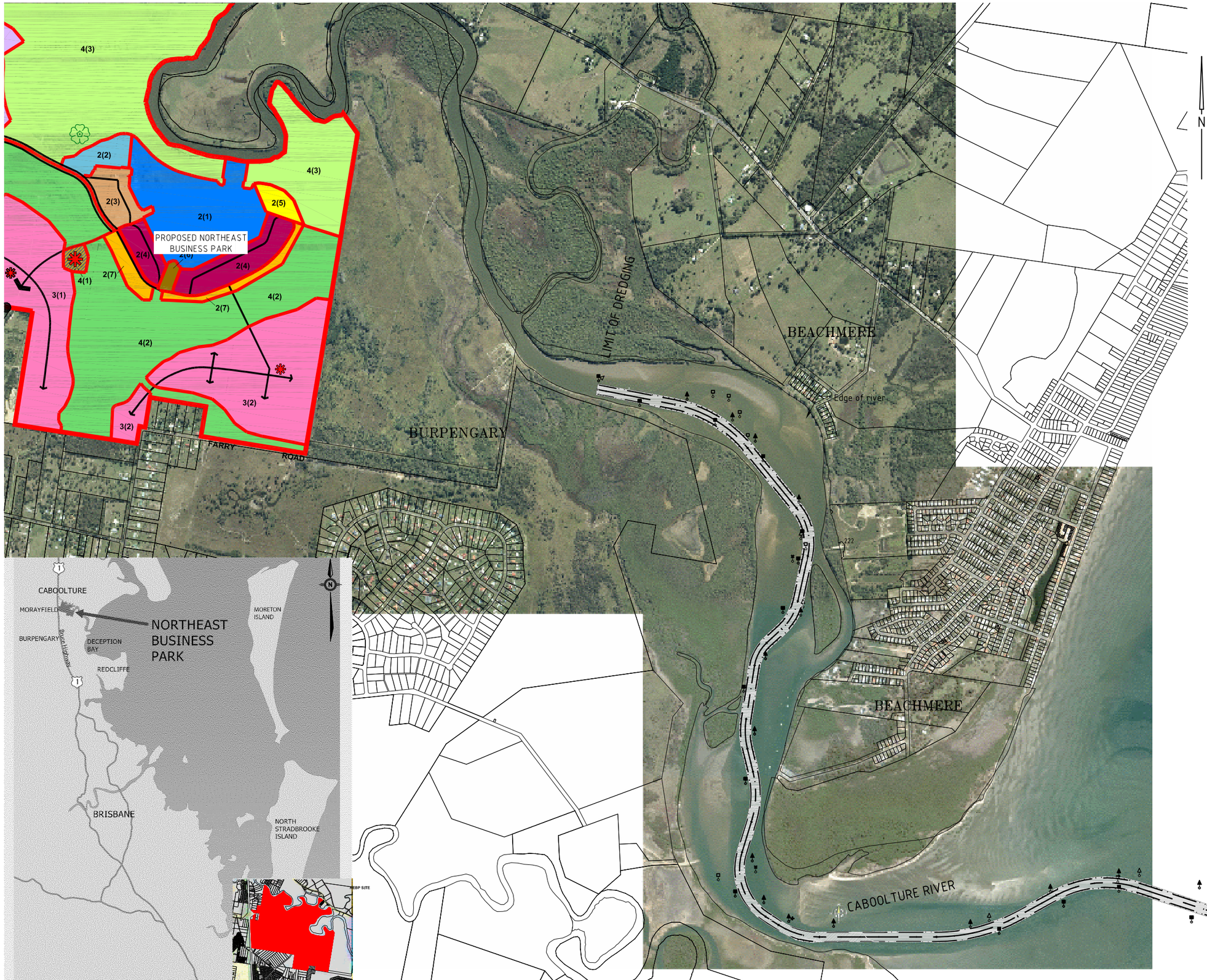
CORRECTIVE ACTION

Should there be non-compliance with the stated performance indicator the following corrective actions are to be implemented.

- Identification of the cause of the non-compliance;
- Implementation of appropriate mitigation measures as determined by the Principal and Consultant in consultation with the Contractor; and
- Relevant validation monitoring to confirm that the nominated corrective actions have been effective.

The Contractor shall implement the corrective action(s) as required within the agreed time frame noted on the CAR.

FIGURES



NAVIGATION AID LOCATIONS SPECIFIED BY THE HARBOUR MASTER

PROPOSED NAVIGATION AIDS - GDA94 MGA Zone 56

No.	NAV AID	EASTING	NORTHING
1.	STBD BCN	505818.000	6996864.000
2.	PORT BCN	505776.000	6996683.000
3.	STBD BCN	505391.000	6996926.000
4.	PORT BCN	505391.000	6996845.000
5.	STBD BCN	505028.000	6996844.000
6.	PORT BCN	505098.000	6996766.000
7.	STBD BCN	504604.000	6996657.000
8.	PORT BCN	504756.000	6996622.000
9.	STBD BCN	503879.000	6996660.000
10.	PORT BCN	503357.000	6996820.000
11.	STBD BCN	503641.000	6996686.000
12.	PORT BCN	503412.000	6997417.000
13.	STBD BCN	503509.000	6996785.000
14.	PORT BCN	503402.000	6997905.000
15.	STBD BCN	503448.000	6997007.000
16.	PORT BCN	503610.000	6998323.000
17.	STBD BCN	503460.000	6997679.000
18.	PORT BCN	503691.000	6998585.000
19.	STBD BCN	503518.000	6998078.000
20.	PORT BCN	503713.000	6998729.000
21.	STBD BCN	503705.000	6998309.000
22.	PORT BCN	503505.000	6999127.000
23.	STBD BCN	503695.000	6998908.000
24.	PORT BCN	503251.000	6999319.000
25.	STBD BCN	503464.000	6999231.000
26.	PORT BCN	502851.000	6999420.000
27.	STBD BCN	503343.000	6999343.000
28.	STBD BCN	503102.000	6999453.000
29.	PORT BCN	502633.000	6999551.000

LEGEND

Proposed and Existing Green Navigation Beacon

Proposed and Existing Red Navigation Beacon

Existing Yellow Navigation Beacon

NOTE:

- Total dredging cut quantity is 545,300m³
- Total dredging area is 356,553m²
- Minimum depth of dredging is 0.000m
- Maximum depth of dredging is 3.210m

100 0 100 200 300 400 500m
SCALE BEFORE REDUCTION 1:10000

DATE PLOTTED: 19 November 2007 - 8:28am

Rv.	DATE	REVISIONS	REC.	APPR.

A1 DATUM: A.H.D.

CAD FILE: I:\7800-40\ACAD\DMP\Figure 1 QT Preferred navigational channel alignment for dredging.dwg
XREF's: X-A1-BO-SHT FINAL; X-Base-Design 3; Caboolture_mga94; X-A1-BO-SHT FINAL

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NORTHEAST BUSINESS PARK

Queensland Transport Preferred Navigational Channel for Dredging Works

DATE: 14-11-2007 Rv.

Figure 1

NAVIGATION AID LOCATIONS SPECIFIED BY THE HARBOUR MASTER

PROPOSED NAVIGATION AIDS - GDA94 MGA Zone 56

No.	NAV AID	EASTING	NORTHING
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LEGEND

Proposed and Existing Green Navigation Beacon

Proposed and Existing Red Navigation Beacon

Existing Yellow Navigation Beacon

NOTE:

- Total dredging cut quantity is 545,300m³
- Total dredging area is 356,553m²
- Minimum depth of dredging is 0.000m
- Maximum depth of dredging is 3.210m

PROPOSED NORTHEAST BUSINESS PARK

RESIDENTIAL AREA 1

RESIDENTIAL AREA 2

BEACHMERE

BURPENGARY

CABOOLTURE

BRUCE HIGHWAY

BUCKLEY ROAD

BACK CREEK ROAD

FERRY ROAD

Soil Disposal Transfer Pipe

Dredge Spoil Disposal and Treatment Area

LIMIT OF DREDGING

Edge of river

CABOOLTURE RIVER

N

CABOOLTURE

MORAYFIELD

BURPENGARY

DECEPTION BAY

REDCLIFFE

NORTHEAST BUSINESS PARK

MORETON ISLAND

BRISBANE

NORTH STRADBROKE ISLAND

130 0 130 260 390 520 650

SCALE 1:13000

DATE PLOTTED: 19 November, 2007 - 8:45am

Rv.	DATE	REVISIONS	REC.	APPR.

A1 DATUM: A.H.D.

CAD FILE: I:\7800-40\ACAD\DMP\Figure 4 Soil Disposal Location.dwg
XREF's: X-A1-BO-SHT FINAL; X-Base-Design 3, Caboolture_mga94; X-A1-BO-SHT FINAL

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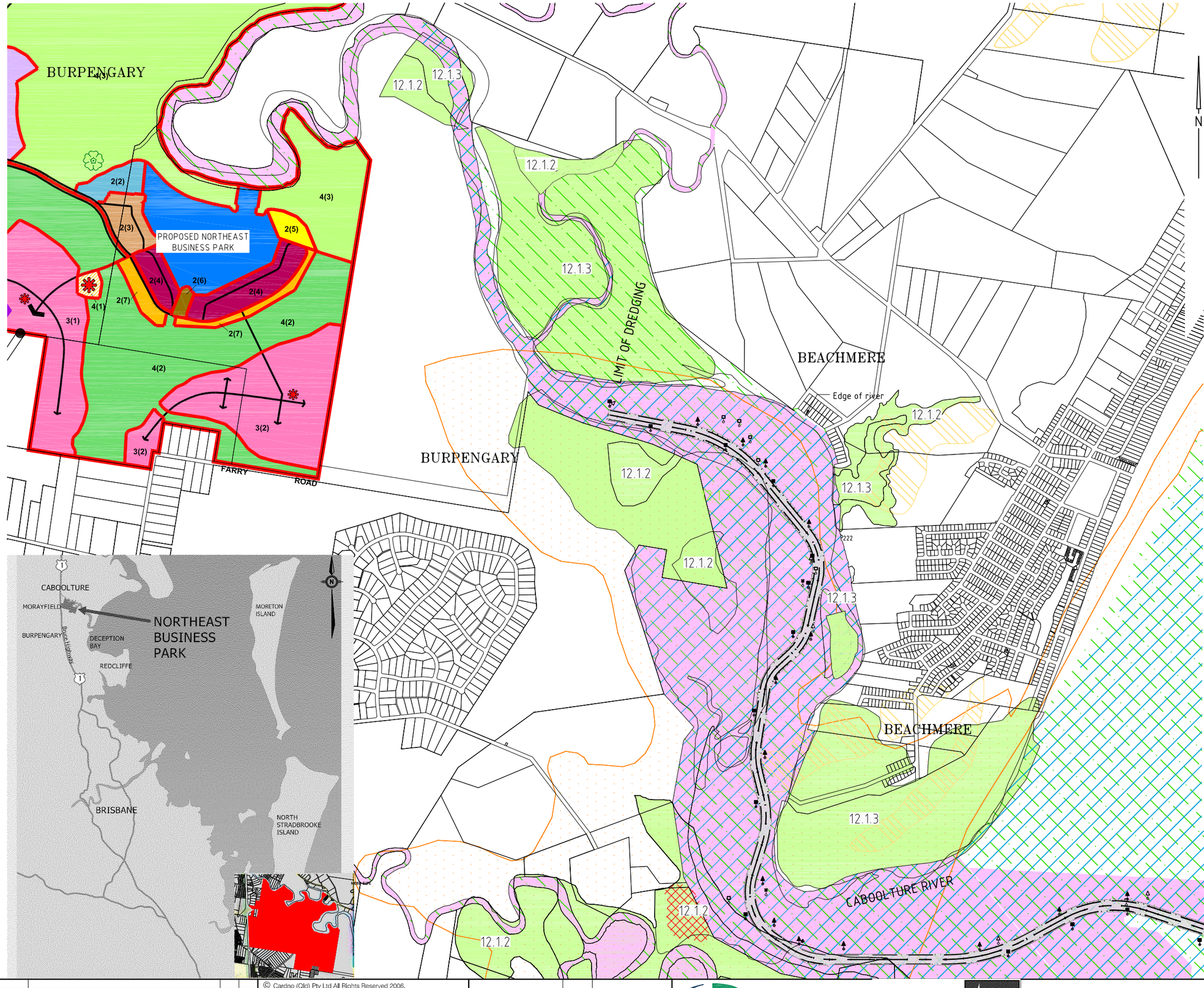
NORTHEAST BUSINESS PARK

Soil Disposal Location

DATE: 14-11-2007

Figure 2

Rv.



NAVIGATION AID LOCATIONS SPECIFIED BY THE HARBOUR MASTER

PROPOSED NAVIGATION AIDS - GDA94 MGA Zone 56

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29.	PORT BCN	502633.000	6999551.000

LEGEND

- Proposed and Existing Green Navigation Beacon
- Proposed and Existing Red Navigation Beacon
- Existing Yellow Navigation Beacon
- Site Boundary
- Cadastral Boundaries
- Deception Bay Fish Habitat Area 'A'
- Moreton Bay Marine Park - Habitat Protection Area
- Moreton Bay RAMSAR Wetland
- South East Queensland Wader Bird Sites
- Critical High Tide Roosts
- Significant Coastal Dunes
- 2003 Remnant not of Concern Regional Ecosystem

NOTE:

- Total dredging cut quantity is 545,300m³
- Total dredging area is 356,553m²
- Minimum depth of dredging is 0.000m
- Maximum depth of dredging is 3.210m

100 0 100 200 300 400 500m
SCALE BEFORE REDUCTION 1:10000

DATE PLOTTED: 19 November, 2007 - 8:29am

Rv.	DATE	REVISIONS	REC.	APPR.

A1 DATUM: A.H.D.

CAD FILE: I:\7800-40\ACAD\DMP\Figure 3 QT Preferred navigational channel alignment for dredging and area of conservation significance.dwg
XREFs: X-A1-BO-SHT FINAL; X-Base-Design 3; Caboolture_mga94; X-A1-BO-SHT FINAL

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NORTHEAST BUSINESS PARK

Queensland Transport Preferred Navigational Channel for Dredging Works & Area of Conservation Significance

DATE: 15-11-2007 Rv.

Figure 3

APPENDIX A

Engineered Drawings – QT Preferred Alignment

7900/33/01-300 *Northeast Business Park Caboolture River Dredging – Maritime Safety Queensland Preferred Alignment*

7900/33/01-301 *Locality Plan, Notes and Schedule of Drawings*

7900/33/01-302 *Caboolture River Dredging Layout Plan*

7900/33/01-303 *Caboolture River Dredging Centre Line Set Out*

7900/33/01-304 *Caboolture River Dredging Layout Plan – CH 0.000 – CH 800.00 Sheet 1 of 10*

7900/33/01-305 *Caboolture River Dredging Layout Plan – CH 800.000 – CH 1600.00 Sheet 2 of 10*

7900/33/01-306 *Caboolture River Dredging Layout Plan – CH 1600.000 – CH 2300.00 Sheet 3 of 10*

7900/33/01-307 *Caboolture River Dredging Layout Plan – CH 2300.000 – CH 3100.00 Sheet 4 of 10*

7900/33/01-308 *Caboolture River Dredging Layout Plan – CH 3100.000 – CH 3600.00 Sheet 5 of 10*

7900/33/01-309 *Caboolture River Dredging Layout Plan – CH 3600.000 – CH 4100.00 Sheet 6 of 10*

7900/33/01-310 *Caboolture River Dredging Layout Plan – CH 4100.000 – CH 4700.00 Sheet 7 of 10*

7900/33/01-311 *Caboolture River Dredging Layout Plan – CH 4700.000 – CH 52000.00 Sheet 8 of 10*

7900/33/01-312 *Caboolture River Dredging Layout Plan – CH 5200.000 – CH 5700.00 Sheet 9 of 10*

7900/33/01-313 *Caboolture River Dredging Layout Plan – CH 5700.000 – CH 6348.983 Sheet 10 of 10*

7900/33/01-314 *Caboolture River Dredging Cross Sections – CH 0.000 – CH 1700.00 Sheet 1 of 4*

7900/33/01-315 *Caboolture River Dredging Cross Sections – CH 1800.000 – CH 3500.00 Sheet 2 of 4*

7900/33/01-316 *Caboolture River Dredging Cross Sections – CH 3600.000 – CH 5100.00 Sheet 3 of 4*

7900/33/01-317 *Caboolture River Dredging Cross Sections – CH 5200.000 – CH 6348.983 Sheet 4 of 4*

Cardno
Shaping the Future

NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERRED ALIGNMENT

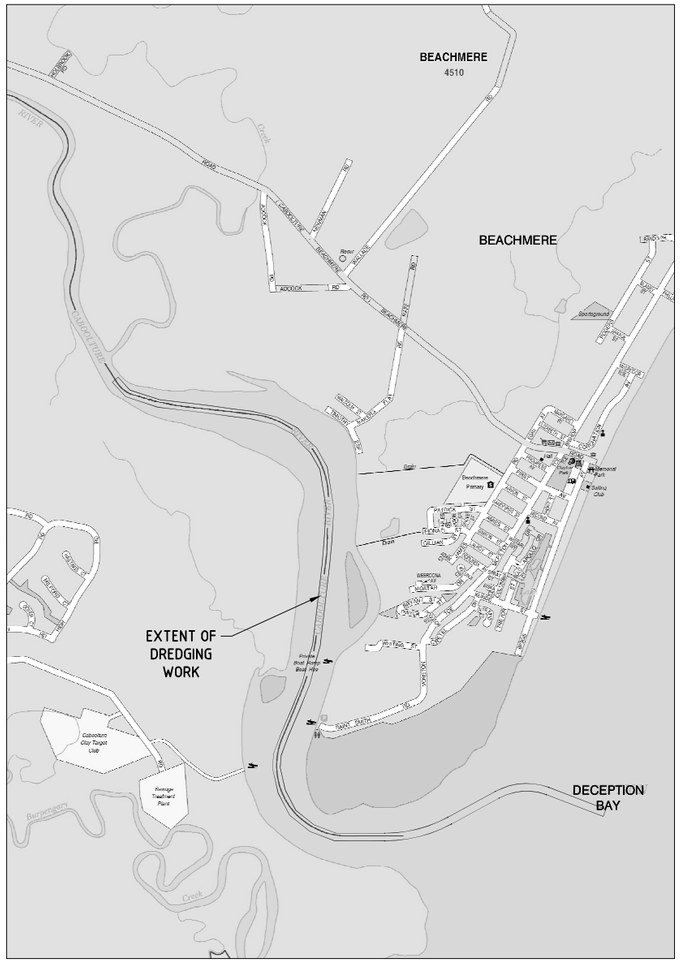
SITE PLAN
1:20000

Cardno (Qld) Pty Ltd
ABN 57 051 074 992

Level 1, 5 Gardner Close, Milton QLD 4064
PO Box 388, Toowong QLD 4066 Australia

Telephone: 07 3369 9822
Facsimile: 07 3369 9722

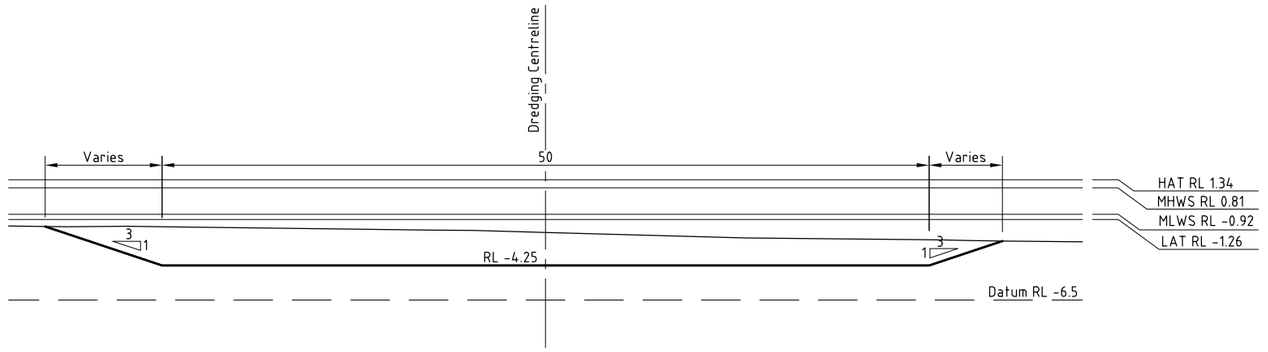
Dwg No.: 7900/33/01-300 Date: 19-10-2007 Rev.:



LOCALITY PLAN
NTS

SCHEDULE OF DRAWINGS

DRAWING No.	DESCRIPTION
7900/33/01-300	Cover Sheet
CABOOLTURE RIVER DREDGING	
7900/33/01-301	Locality Plan, Notes and Schedule of Drawings
7900/33/01-302	Layout Plan
7900/33/01-303	Centre Line Set Out
7900/33/01-304	Layout Plan - Sheet 1 of 10 - Chainage 0.000 - 800.000
7900/33/01-305	Layout Plan - Sheet 2 of 10 - Chainage 800.000 - 1600.000
7900/33/01-306	Layout Plan - Sheet 3 of 10 - Chainage 1600.000 - 2300.000
7900/33/01-307	Layout Plan - Sheet 4 of 10 - Chainage 2300.000 - 3100.000
7900/33/01-308	Layout Plan - Sheet 5 of 10 - Chainage 3100.000 - 3600.000
7900/33/01-309	Layout Plan - Sheet 6 of 10 - Chainage 3600.000 - 4100.000
7900/33/01-310	Layout Plan - Sheet 7 of 10 - Chainage 4100.000 - 4700.000
7900/33/01-311	Layout Plan - Sheet 8 of 10 - Chainage 4700.000 - 5200.000
7900/33/01-312	Layout Plan - Sheet 9 of 10 - Chainage 5200.000 - 5700.000
7900/33/01-313	Layout Plan - Sheet 10 of 10 - Chainage 5700.000 - 6348.983
7900/33/01-314	Cross Sections - Sheet 1 of 4 - Chainage 0.000 - 1700.000
7900/33/01-315	Cross Sections - Sheet 2 of 4 - Chainage 1800.000 - 3500.000
7900/33/01-316	Cross Sections - Sheet 3 of 4 - Chainage 3600.000 - 5100.000
7900/33/01-317	Cross Sections - Sheet 4 of 4 - Chainage 5200.000 - 6348.983



TYPICAL DREDGING SECTION
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1:200
SCALE BEFORE REDUCTION

DATE PLOTTED: 22 October, 2007 - 7:47am

PRELIMINARY
Date 22 October, 2007

Rv.	DATE	REVISIONS	REC.	APPR.

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN.
APPROVED: PROJ. DIR.

A1 DATUM: A.H.D.

CAD FILE: L:\7900-33\SUB 01\Acad\79003301-301.dwg
XREF's: X-A1-B0-SHT FINAL

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NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK
CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
LOCALITY PLAN, NOTES AND SCHEDULE OF DRAWINGS

DATE: 19-10-2007
DRAWING No:
7900/33/01-301

Rv.

BURPENGARY

PROPOSED NORTHEAST
BUSINESS PARK

BURPENGARY

LIMIT OF DREDGING

BEACHMERE

Edge of river

222

BEACHMERE

CABOOLTURE RIVER

LIMIT OF DREDGING

N

NAVIGATION AID LOCATIONS
SPECIFIED BY THE HARBOUR MASTER

PROPOSED NAVIGATION AIDS - GDA94 MGA Zone 56

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29.	PORT BCN	502633.000	6999551.000

LEGEND

Proposed and Existing Green Navigation Beacon

Proposed and Existing Red Navigation Beacon

Existing Yellow Navigation Beacon

NOTE:

Total dredging cut quantity is 545304.925m³

LAYOUT PLAN
Scale 1:10000

100 0 100 200 300 400 500m
SCALE BEFORE REDUCTION 1:10000

DATE PLOTTED: 22 October, 2007 - 7:47am

PRELIMINARY
Date 22 October, 2007

Rv.	DATE	REVISIONS	REC.	APPR.

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN.
APPROVED: PROJ. DIR.

A1 DATUM: A.H.D.

CAD FILE: L:\7900-33\SUB 01\Acad\79003301-302.dwg
XREFs: X-A1-BO-SHT FINAL, X-Base-Design 3, Caboolture_mga94

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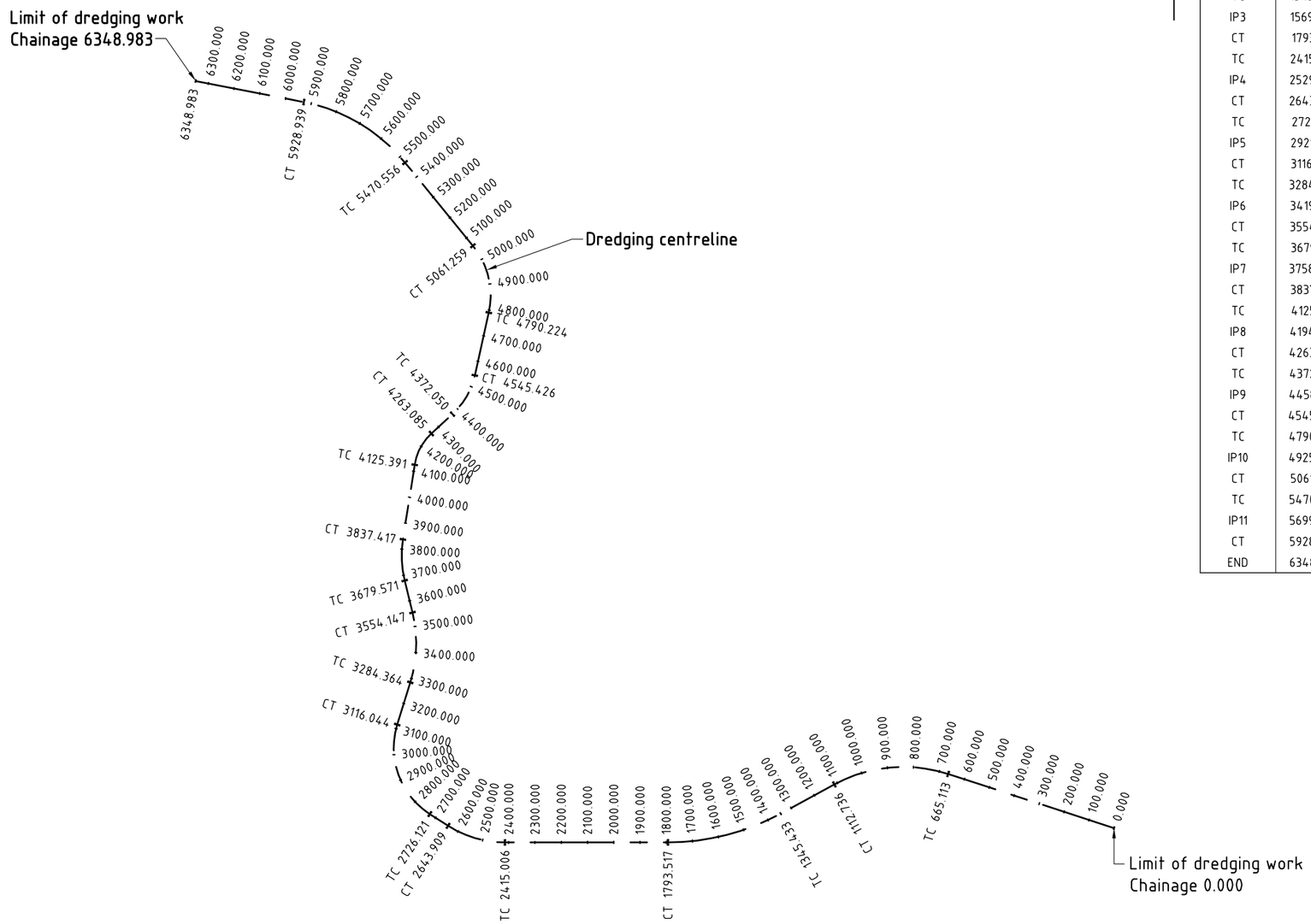
NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
LAYOUT PLAN

DATE: 19-10-2007 Rv.
DRAWING No:
7900/33/01-302



HORIZONTAL CENTRELINE CONTROL DETAILS

Pt	Chainage	Easting	Northing	Bearing	Rad/Spiral	A.Length	D.Angle
IP1	0.000	506125.109	6996658.439				
TC	665.113	505492.803	6996864.751	288°04'15"			
IP2	888.924	505267.453	6996938.280		550.000	-447.623	46°37'51"
CT	1112.736	505059.255	6996824.955	241°26'24"			
TC	1345.433	504854.873	6996713.708	241°26'24"			
IP3	1569.475	504653.925	6996604.330		-900.000	448.083	28°31'33"
CT	1793.517	504425.138	6996604.193	269°57'57"			
TC	2415.006	503803.648	6996603.824	269°57'57"			
IP4	2529.458	503685.968	6996603.754		-400.000	228.903	32°47'16"
CT	2643.909	503586.998	6996667.422	302°45'14"			
TC	2726.121	503517.858	6996711.901	302°45'14"			
IP5	2921.082	503326.108	6996835.257		-300.000	389.923	74°28'12"
CT	3116.044	503393.620	6997053.033	17°13'25"			
TC	3284.364	503443.460	6997213.805	17°13'25"			
IP6	3419.255	503484.400	6997345.867		500.000	-269.783	30°54'53"
CT	3554.147	503451.675	6997480.200	346°18'32"			
TC	3679.571	503421.988	6997602.061	346°18'32"			
IP7	3758.494	503403.062	6997679.752		-400.000	157.846	22°36'35"
CT	3837.417	503415.459	6997758.749	8°55'07"			
TC	4125.391	503460.104	6998043.240	8°55'07"			
IP8	4194.238	503471.198	6998113.933		-205.000	137.695	38°29'04"
CT	4263.085	503523.874	6998162.367	47°24'11"			
TC	4372.050	503604.087	6998236.118	47°24'11"			
IP9	4458.738	503669.945	6998296.670		285.000	-173.376	34°51'19"
CT	4545.426	503689.381	6998383.998	12°32'53"			
TC	4790.224	503742.565	6998622.949	12°32'53"			
IP10	4925.742	503774.188	6998765.027		300.000	-271.034	51°45'50"
CT	5061.259	503682.162	6998877.799	320°47'03"			
TC	5470.556	503423.386	6999194.910	320°47'03"			
IP11	5699.748	503272.362	6999379.980		660.000	-458.383	39°47'35"
CT	5928.939	503037.872	6999425.523	280°59'28"			
END	6348.983	502625.533	6999505.607				

100 0 100 200 300 400 500m
SCALE BEFORE REDUCTION 1:10000

DATE PLOTTED: 22 October, 2007 - 7:41am

PRELIMINARY
Date 22 October, 2007

Rv.	DATE	REVISIONS	REC.	APPR.

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN.
APPROVED: PROJ. DIR.

A1 DATUM: A.H.D.

CAD FILE: L:\7900-33\SUB 01\Acad\79003301-303.dwg
XREF's: X-A1-BO-SHT FINAL

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P.O. Box 388, Toowong 4066.
Email: cardno@cardno.com.au
Web: www.cardno.com.au
ACN: 051 074 992

NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
CENTRE LINE SETOUT

DATE: 19-10-2007
DRAWING No:
7900/33/01-303
Rv.

LAYOUT PLAN
Scale 1:1000

10 0 10 20 30 40 50m
SCALE BEFORE REDUCTION 1:1000

DATE PLOTTED: 22 October, 2007 - 7:41am

Rv.	DATE	REVISIONS	REC.	APPR.

PRELIMINARY
Date..... 22 October, 2007

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN.
APPROVED: PROJ. DIR.

A1 DATUM: A.H.D.

CAD FILE: L:\7900-33\SUB 01\Acad\79003301-304.dwg
XREF's: X-Base, EXISTING UNCLIPPED CONTOURS, X-A1-BO-SHT FINAL, Caboolture_mga56

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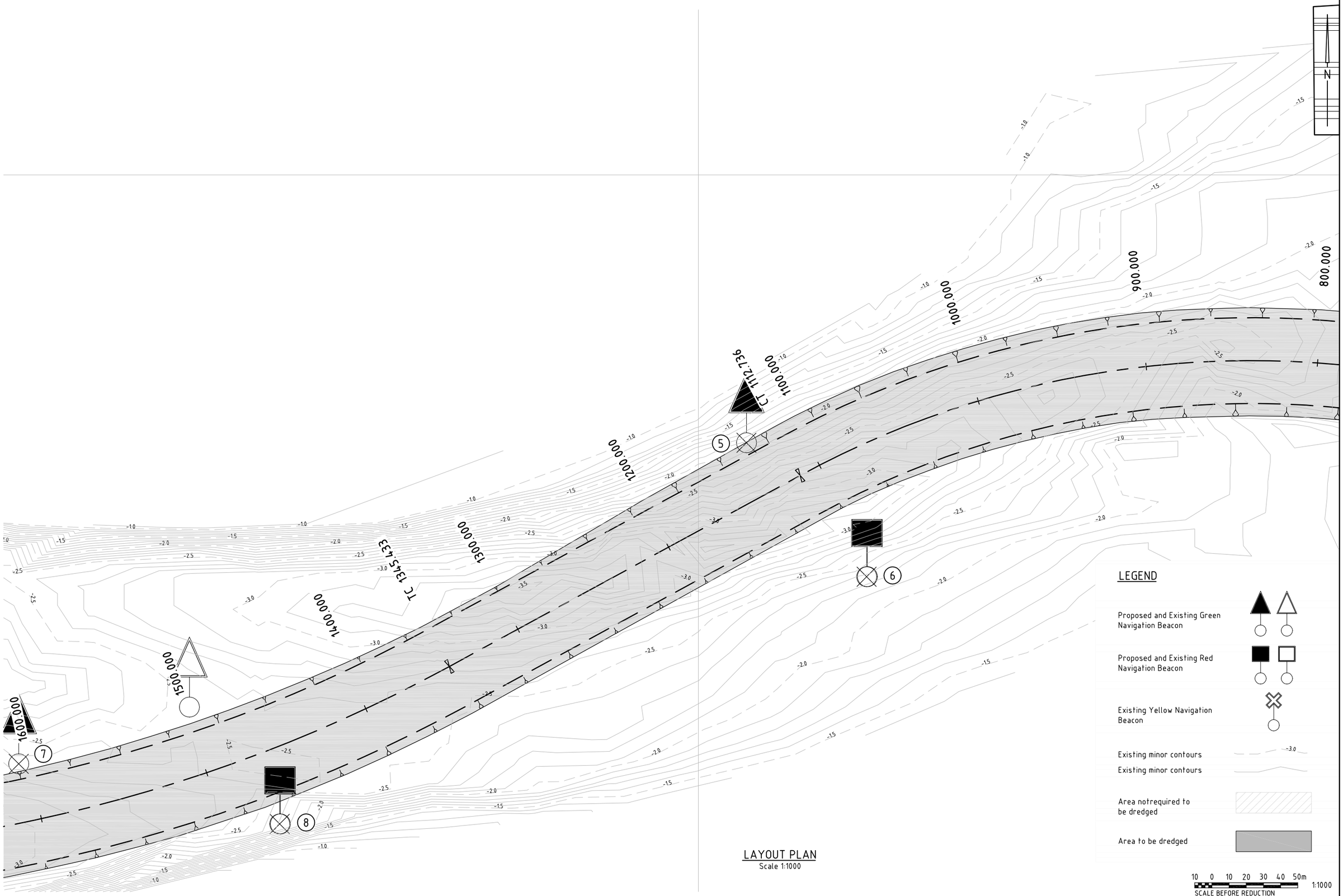
NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
LAYOUT PLAN - CH 0.000 - CH 800.000
SHEET 1 OF 10

DATE: 19-10-2007 Rv.
DRAWING No:
7900/33/01-304



LEGEND

- Proposed and Existing Green Navigation Beacon
- Proposed and Existing Red Navigation Beacon
- Existing Yellow Navigation Beacon
- Existing minor contours -3.0
- Existing minor contours
- Area notrequired to be dredged
- Area to be dredged

LAYOUT PLAN

Scale 1:1000

10 0 10 20 30 40 50m
SCALE BEFORE REDUCTION 1:1000

DATE PLOTTED: 22 October, 2007 - 7:41am

PRELIMINARY
Date 22 October, 2007

Rv.	DATE	REVISIONS	REC.	APPR.

DESIGNED:		A1	DATUM: A.H.D.
DRAWN:			
CHECKED:			
RECOMMENDED: PROJ. MAN.		APPROVED: PROJ. DIR.	

CAD FILE: L:\7900-33\SUB 01\Acad\79003301-305.dwg
XREFs: X-Base, EXISTING UNCLIPPED CONTOURS, X-A1-BO-SHT FINAL, Caboolture_mga94

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NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
LAYOUT PLAN - CH 800.000 - CH 1600.000
SHEET 2 OF 10

DATE: 19-10-2007 Rv.
DRAWING No:
7900/33/01-305

LEGEND

N

- Proposed and Existing Green Navigation Beacon
- Proposed and Existing Red Navigation Beacon
- Existing Yellow Navigation Beacon
- Existing minor contours
- Existing minor contours
- Area notrequired to be dredged
- Area to be dredged

2300.000
2200.000
2100.000
2000.000
1900.000
1800.000
CT 1793.517
1700.000
1600.000
7

LAYOUT PLAN
Scale 1:1000

10 0 10 20 30 40 50m
SCALE BEFORE REDUCTION 1:1000

DATE PLOTTED: 22 October, 2007 - 7:43am

PRELIMINARY
Date 22 October, 2007

Rv.	DATE	REVISIONS	REC.	APPR.

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN.

A1 DATUM: A.H.D.

APPROVED: PROJ. DIR.

CAD FILE: L:\7900-33\SUB 01\Acad\79003301-306.dwg
XREFs: X-Base, EXISTING UNCLIPPED CONTOURS, X-A1-BO-SHT FINAL, Caboolture mga56

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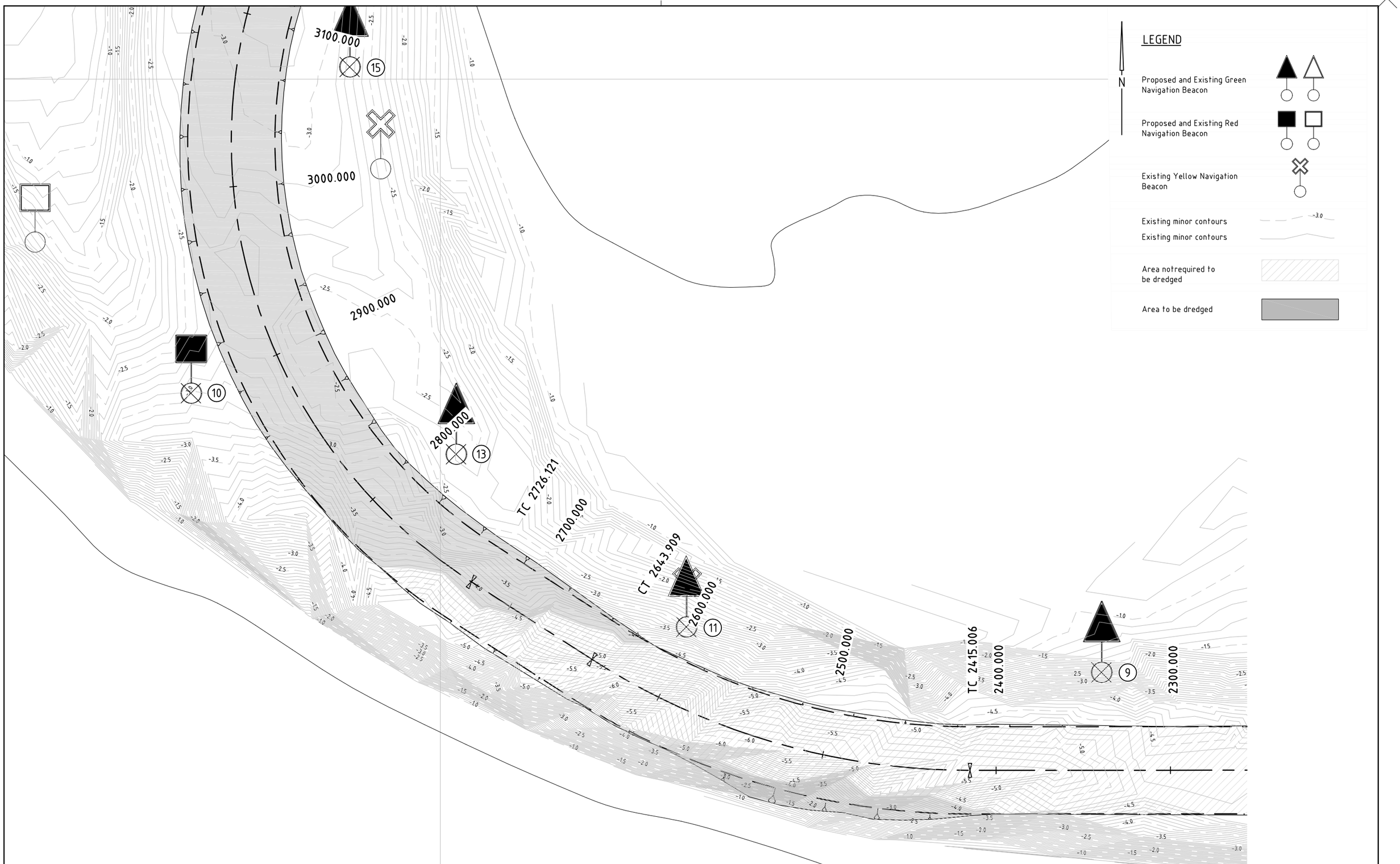
NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
LAYOUT PLAN - CH 1600.000 - CH 2300.000
SHEET 3 OF 10

DATE: 19-10-2007 Rv.
DRAWING No:
7900/33/01-306



LAYOUT PLAN
Scale 1:1000

10 0 10 20 30 40 50m
SCALE BEFORE REDUCTION 1:1000

DATE PLOTTED: 22 October, 2007 - 7:42am

Rv.	DATE	REVISIONS	REC.	APPR.

PRELIMINARY
Date 22 October, 2007

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN.
A1 DATUM: A.H.D.
APPROVED: PROJ. DIR.

CAD FILE: L:\7900-33\SUB 01\Acad\7900330l-307.dwg
XREFs: X-Base, EXISTING UNCLIPPED CONTOURS, X-A1-BO-SHT FINAL, Caboolture mga56

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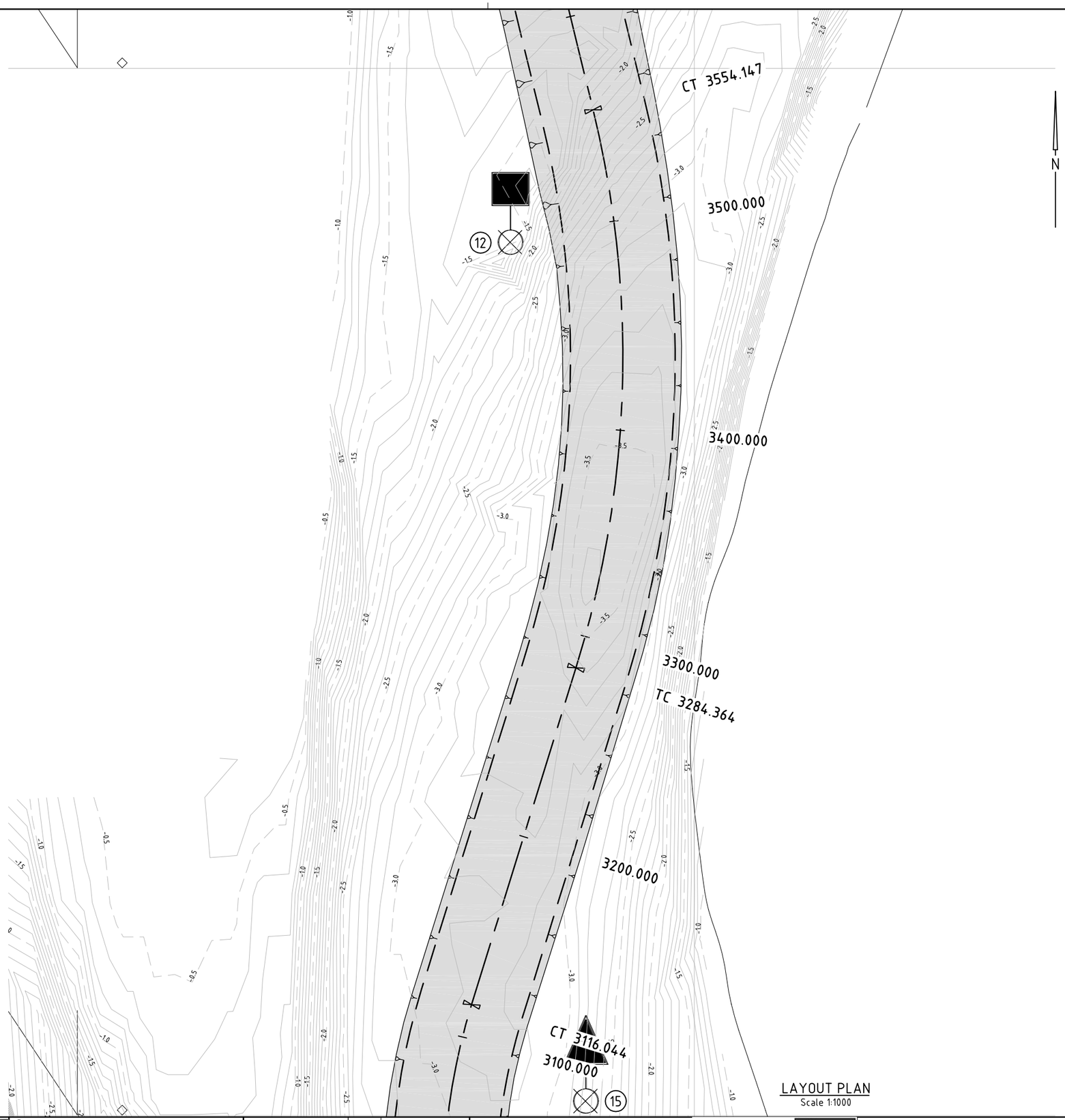
Web: www.cardno.com.au
ACN: 051 074 992

NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
LAYOUT PLAN - CH2300.000 - CH3100.000
SHEET 4 OF 10

DATE: 19-10-2007 Rv.
DRAWING No:
7900/33/01-307



LAYOUT PLAN
Scale 1:1000

10 0 10 20 30 40 50m
SCALE BEFORE REDUCTION 1:1000

DATE PLOTTED: 22 October, 2007 - 7:42am

Rv.	DATE	REVISIONS	REC.	APPR.

PRELIMINARY
Date..... 22 October, 2007

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN.

A1 DATUM: A.H.D.

APPROVED: PROJ. DIR.

CAD FILE: L:\7900-33\SUB 01\Acad\79003301-308.dwg
XREFs: X-Base, EXISTING UNCLIPPED CONTOURS, X-A1-BO-SHT FINAL, Caboolture_mga56

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NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
LAYOUT PLAN - CH 3100.000 - CH 3554.147
SHEET 5 OF 10

DATE: 19-10-2007 Rv.
DRAWING No:
7900/33/01-308

4100.000

4000.000

3900.000

CT 3837.417

3800.000

3700.000

TC 3679.571

3600.000

CT 3554.147

14

17

N

LEGEND

Proposed and Existing Green Navigation Beacon

Proposed and Existing Red Navigation Beacon

Existing Yellow Navigation Beacon

Existing minor contours -3.0

Existing minor contours

Area notrequired to be dredged

Area to be dredged

LAYOUT PLAN

Scale 1:1000

10 0 10 20 30 40 50m

SCALE BEFORE REDUCTION 1:1000

DATE PLOTTED: 22 October, 2007 - 7:42am

PRELIMINARY

Date 22 October, 2007

Rv.	DATE	REVISIONS	REC.	APPR.

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN.

A1 DATUM: A.H.D.

APPROVED: PROJ. DIR.

CAD FILE: L:\7900-33\SUB 01\Acad\7900330I-309.dwg
XREFs: X-A1-BO-SHT FINAL; X-Base; EXISTING UNCLIPPED CONTOURS; Caboolture mga56

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NORTHEAST BUSINESS PARK

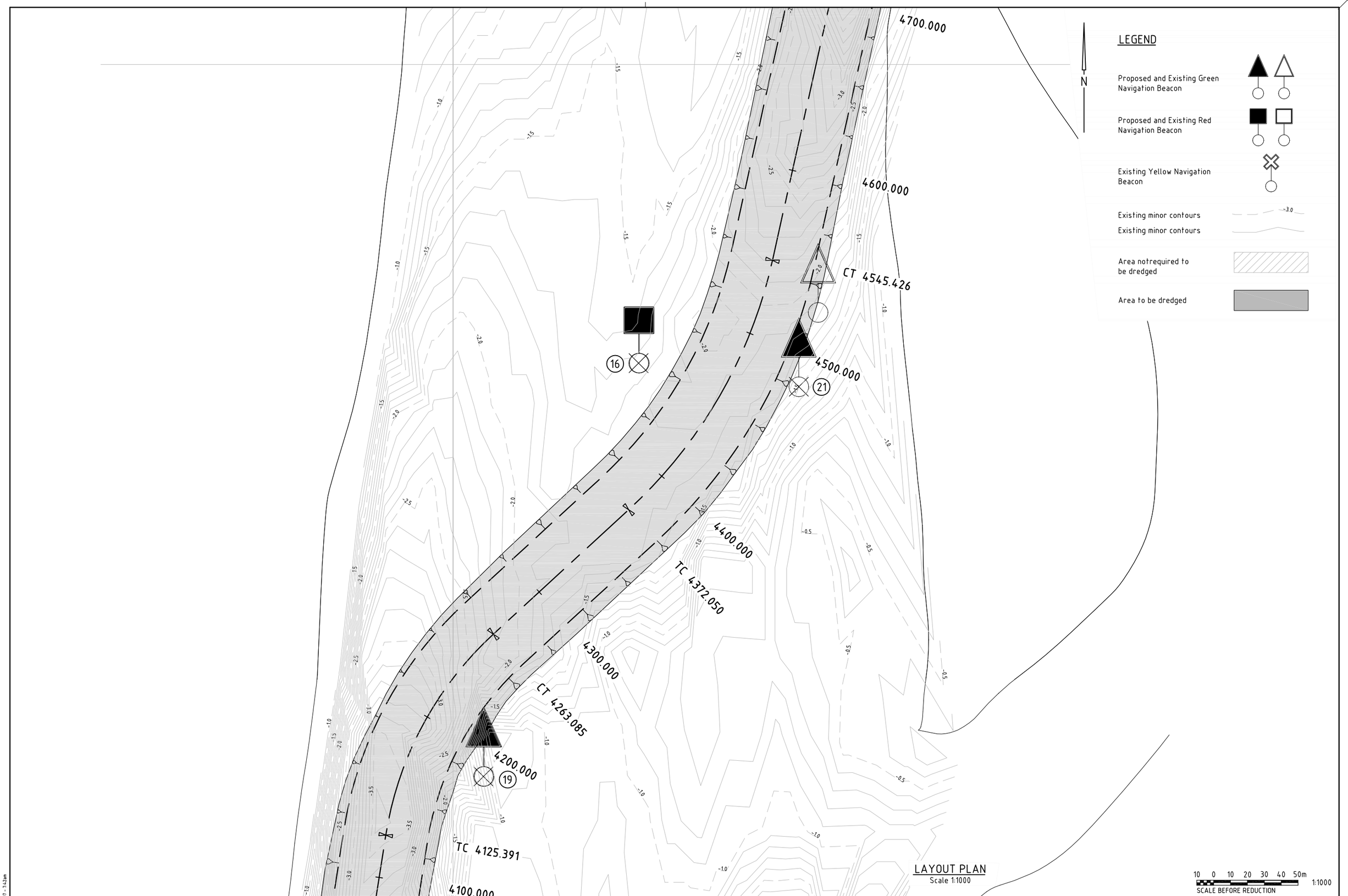
NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
LAYOUT PLAN - CH 3554.147 - CH 4100.000
SHEET 6 OF 10

DATE: 19-10-2007 Rv.

DRAWING No:

7900/33/01-309



LAYOUT PLAN
Scale 1:1000

10 0 10 20 30 40 50m
SCALE BEFORE REDUCTION 1:1000

DATE PLOTTED: 22 October, 2007 - 7:42am

PRELIMINARY
Date..... 22 October, 2007

Rv.	DATE	REVISIONS	REC.	APPR.

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN.
APPROVED: PROJ. DIR.

A1 DATUM: A.H.D.

CAD FILE: L:\7900-33\SUB 01\Acad\79003301-310.dwg
XREF's: X-A1-BO-SHT.FINAL, X-Base, EXISTING UNCLIPPED CONTOURS, Caboolture_mga56

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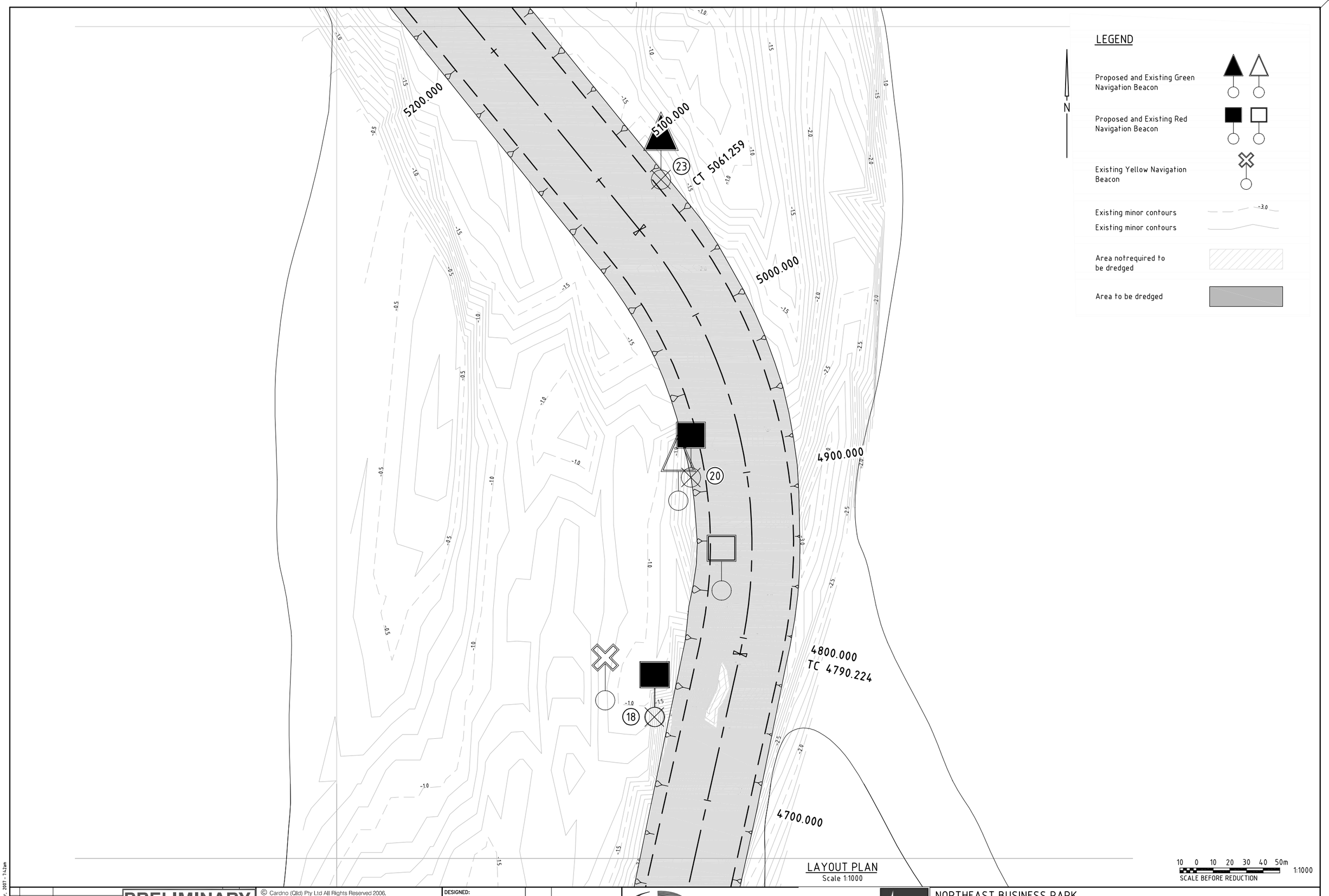
NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
LAYOUT PLAN - CH4100.000 - CH 4700.000
SHEET 7 OF 10

DATE: 19-10-2007 Rv.
DRAWING No:
7900/33/01-310



LEGEND

- Proposed and Existing Green Navigation Beacon
- Proposed and Existing Red Navigation Beacon
- Existing Yellow Navigation Beacon
- Existing minor contours
- Existing minor contours
- Area notrequired to be dredged
- Area to be dredged

LAYOUT PLAN
Scale 1:1000

10 0 10 20 30 40 50m
SCALE BEFORE REDUCTION 1:1000

PRELIMINARY
Date..... 22 October, 2007

Rv.	DATE	REVISIONS	REC.	APPR.

DESIGNED:	A1	DATUM: A.H.D.	
DRAWN:			
CHECKED:			
RECOMMENDED: PROJ. MAN.		APPROVED: PROJ. DIR.	

CAD FILE: L:\7900-33\SUB 01\Acad\79003301-311.dwg
XREF's: X-A1-BO-SHT FINAL, EXISTING UNCLIPPED CONTOURS, X-Base, Caboolture mga94

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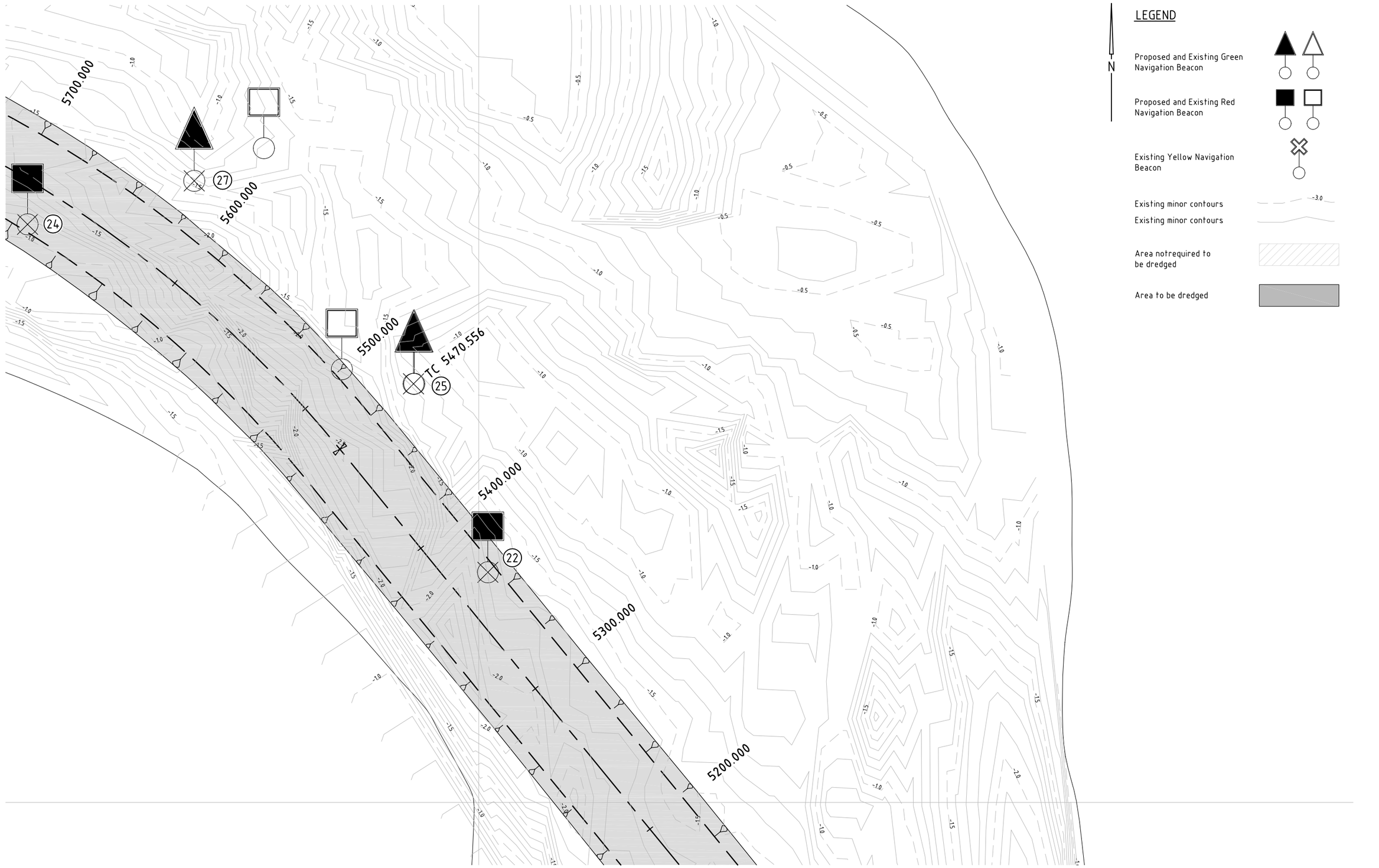
NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
LAYOUT PLAN - CH 4700.000 - CH 5200.000
SHEET 8 OF 10

DATE: 19-10-2007 Rv.
DRAWING No:
7900/33/01-311

DATE PLOTTED: 22 October, 2007 - 7:42am



LEGEND

- Proposed and Existing Green Navigation Beacon
- Proposed and Existing Red Navigation Beacon
- Existing Yellow Navigation Beacon
- Existing minor contours
- Existing minor contours
- Area notrequired to be dredged
- Area to be dredged

LAYOUT PLAN

Scale 1:1000

10 0 10 20 30 40 50m

SCALE BEFORE REDUCTION 1:1000

DATE PLOTTED: 22 October, 2007 - 7:42am

PRELIMINARY

Date..... 22 October, 2007

Rv.	DATE	REVISIONS	REC.	APPR.

DESIGNED:		A1	DATUM: A.H.D.
DRAWN:			
CHECKED:			
RECOMMENDED: PROJ. MAN.		APPROVED: PROJ. DIR.	

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XREF's: X-Base; EXISTING UNCLIPPED CONTOURS; X-A1-BO-SHT FINAL; Caboolture_mga94

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NORTHEAST BUSINESS PARK

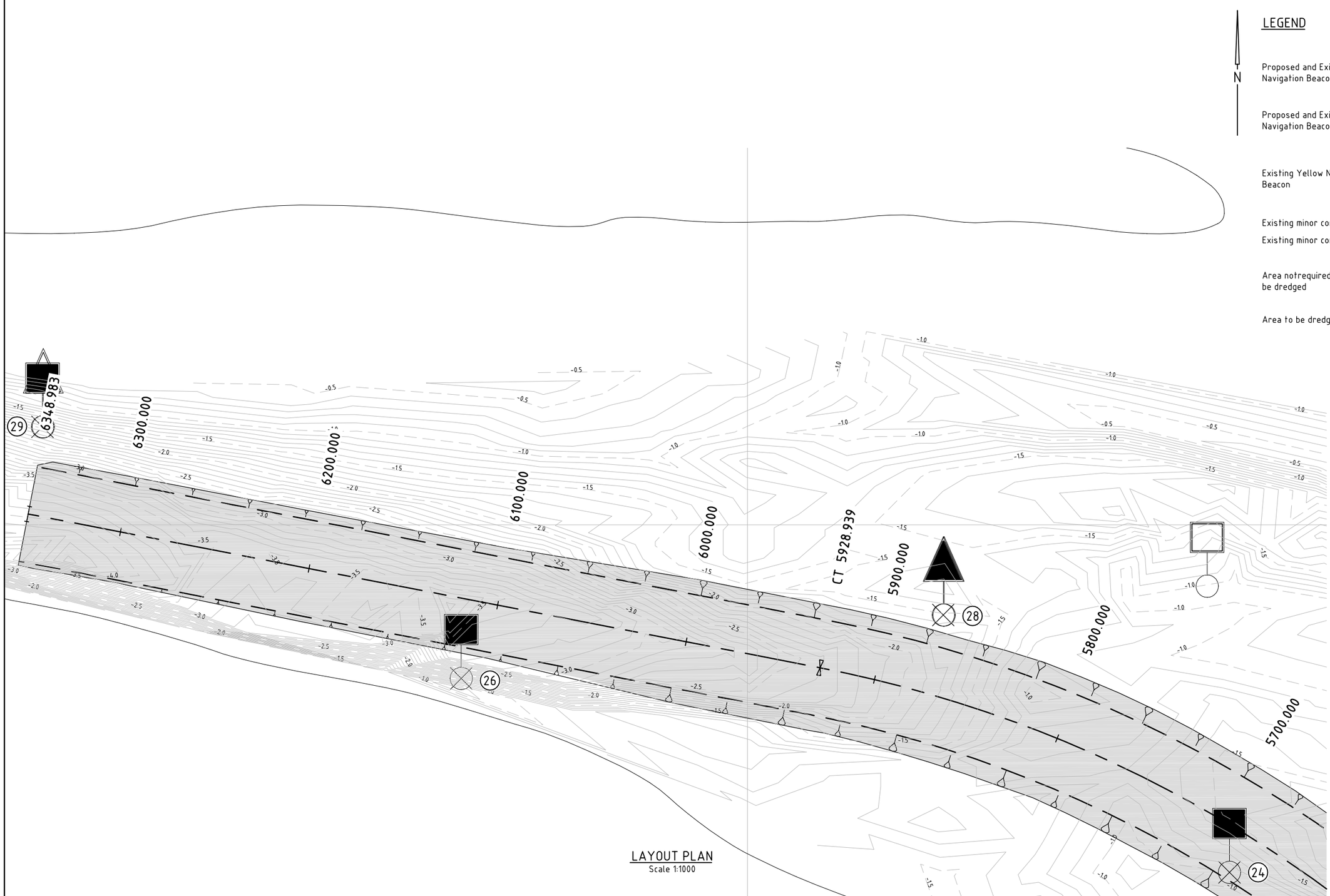
NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
LAYOUT PLAN - CH 5200.000 - CH 5700.000
SHEET 9 OF 10

DATE: 19-10-2007 Rv.

DRAWING No:

7900/33/01-312



LAYOUT PLAN
Scale 1:1000

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SCALE BEFORE REDUCTION 1:1000

DATE PLOTTED: 22 October, 2007 - 7:42am

PRELIMINARY
Date 22 October, 2007

Rv.	DATE	REVISIONS	REC.	APPR.

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN.
APPROVED: PROJ. DIR.

A1 DATUM: A.H.D.

CAD FILE: L:\7900-33\SUB 01\Acad\79003301-313.dwg
XREF's: X-Base; EXISTING UNCLIPPED CONTOURS; X-A1-BO-SHT FINAL; Caboolture mga94

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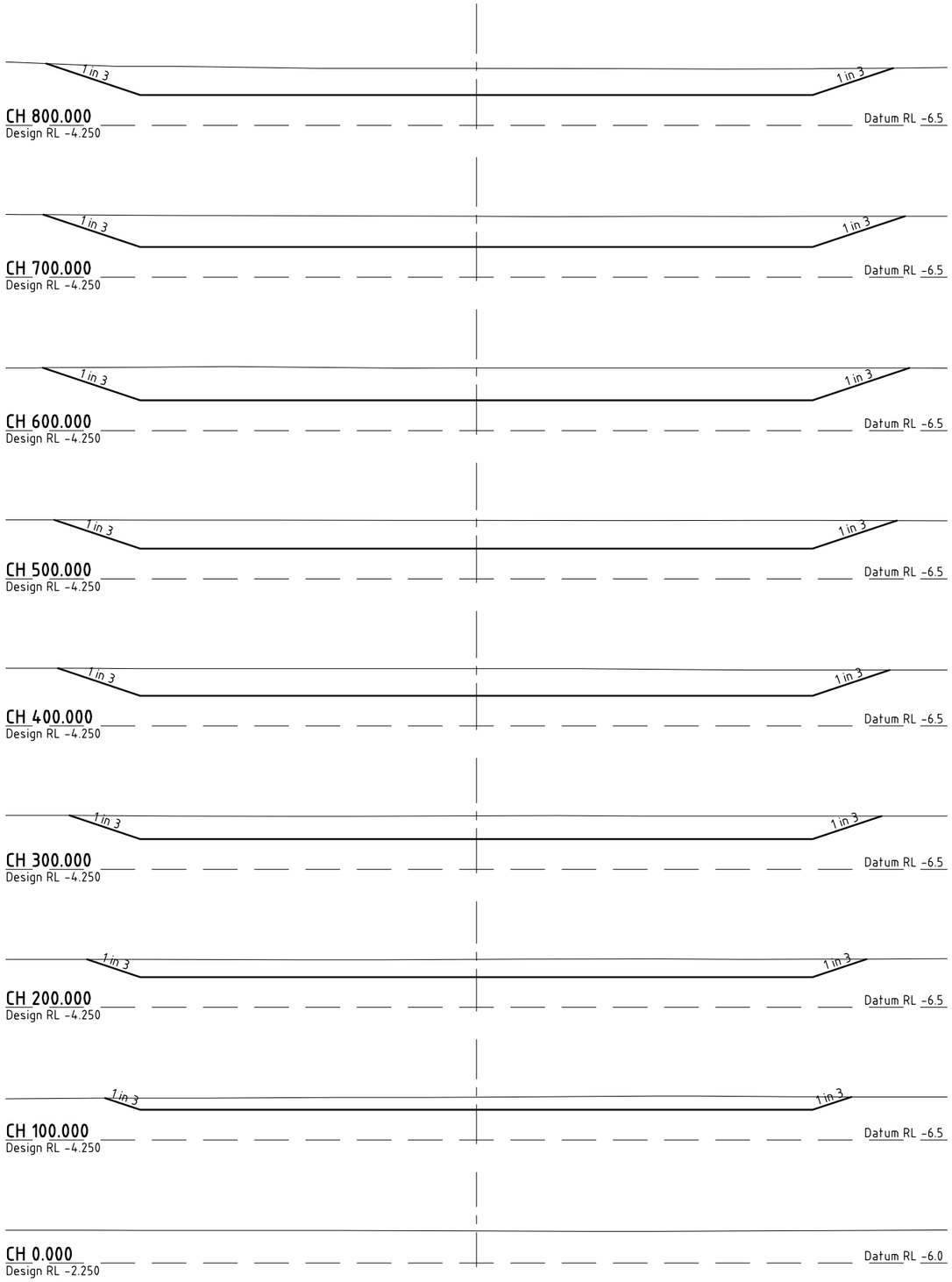
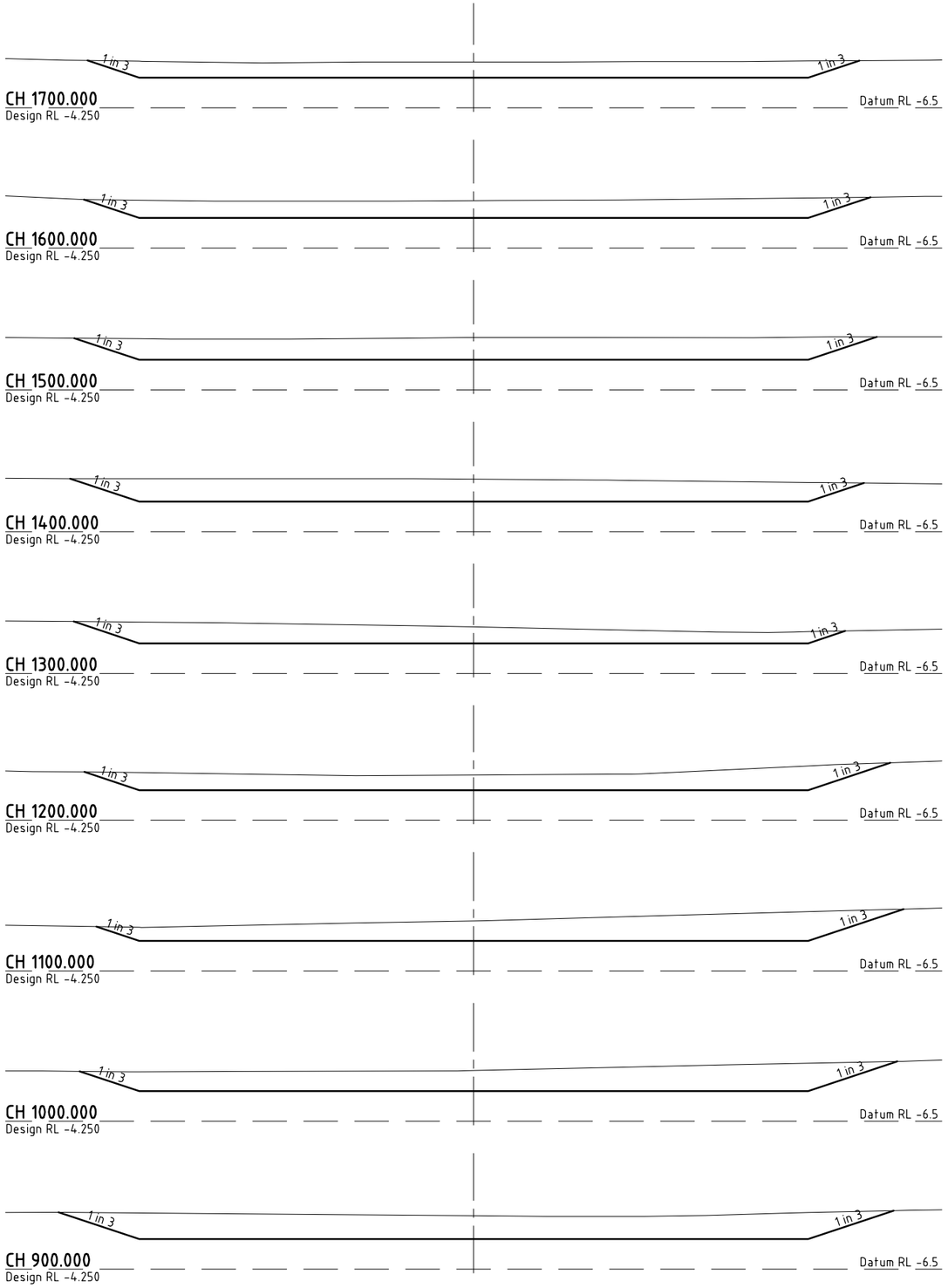
NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
LAYOUT PLAN - CH 5700.000 - CH 6348.983
SHEET 10 OF 10

DATE: 19-10-2007 Rv.
DRAWING No:
7900/33/01-313





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SCALE BEFORE REDUCTION 1:200

DATE PLOTTED: 22 October, 2007 - 1:42am

Rv.	DATE	REVISIONS	REC.	APPR.

PRELIMINARY
Date..... 22 October, 2007

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN.
APPROVED: PROJ. DIR.

A1 DATUM: A.H.D.

CAD FILE: L:\7900-33\SUB 01\Acad\79003301-314.dwg
XREFs: X-A1-B0-SHT FINAL

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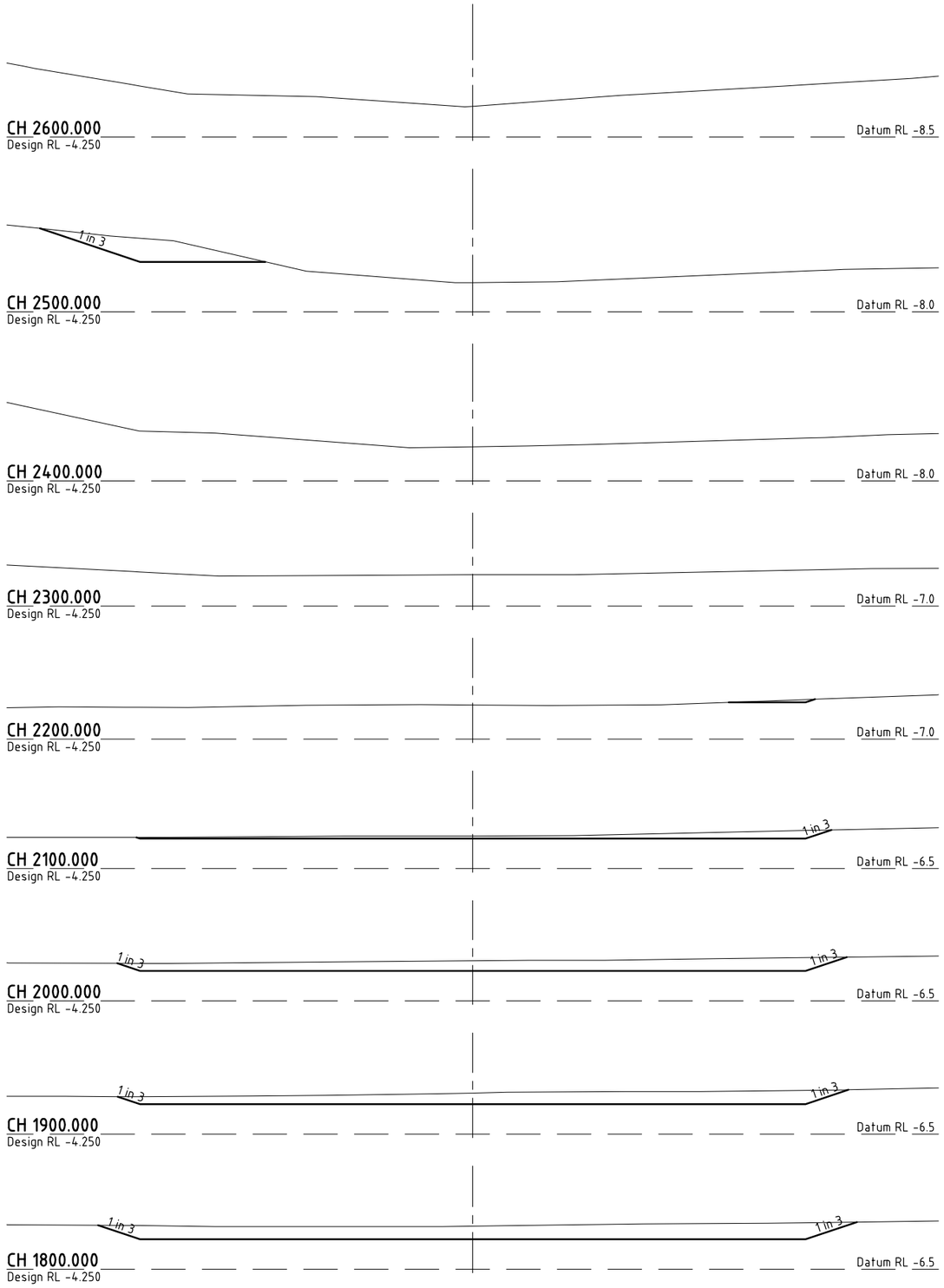
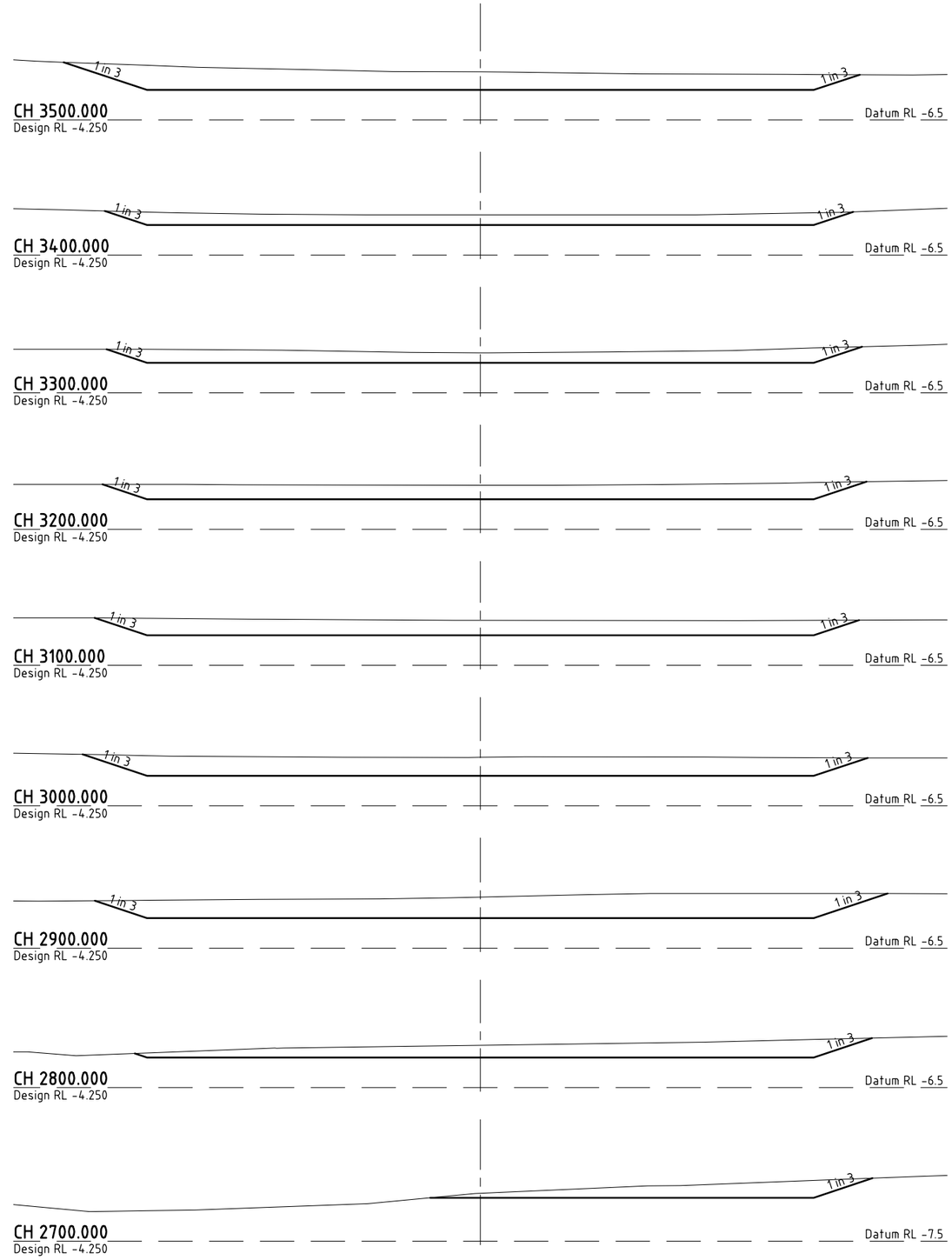
NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
CROSS SECTIONS - CH 0.000 - CH 1700.000
SHEET 1 OF 4

DATE: 19-10-2007
DRAWING No: 7900/33/01-314
Rv.





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DATE PLOTTED: 22 October, 2007 - 7:42am

PRELIMINARY
Date 22 October, 2007

Rv.	DATE	REVISIONS	REC.	APPR.

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN.
APPROVED: PROJ. DIR.

A1 DATUM: A.H.D.

CAD FILE: L:\7900-33\SUB 01\Acad\79003301-315.dwg
XREF's: X-A1-BO-SHT FINAL

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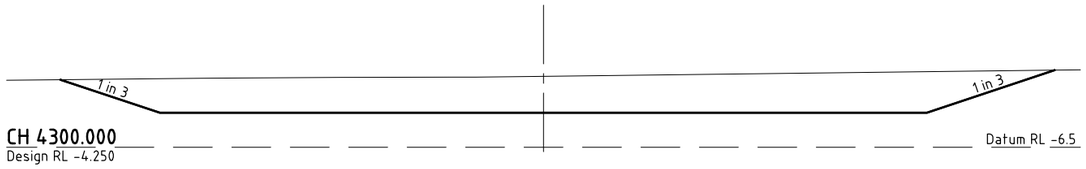
NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
CROSS SECTIONS - CH 1800.000 - CH 3500.000
SHEET 2 OF 4

DATE: 19-10-2007
DRAWING No:
7900/33/01-315
Rv



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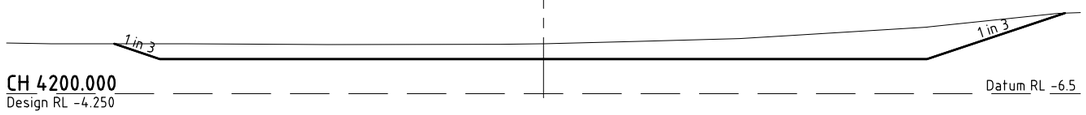

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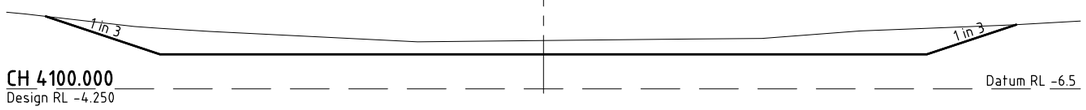

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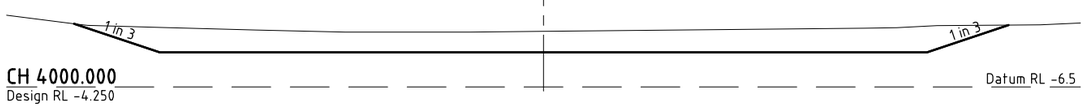

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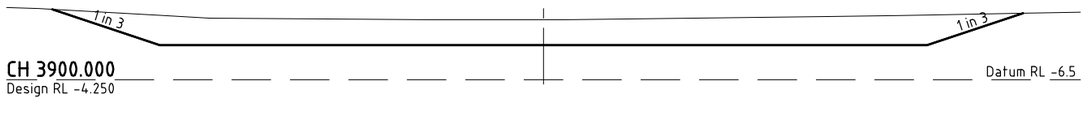

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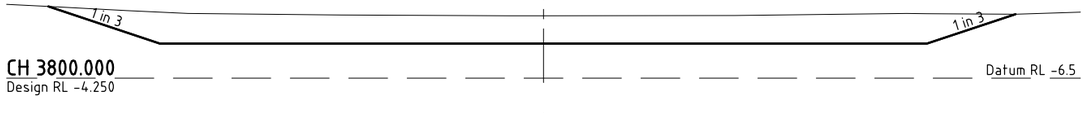

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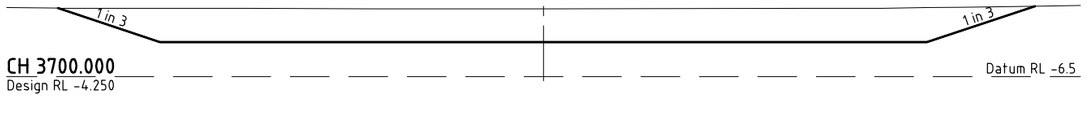

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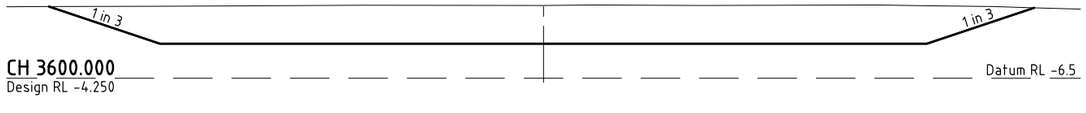

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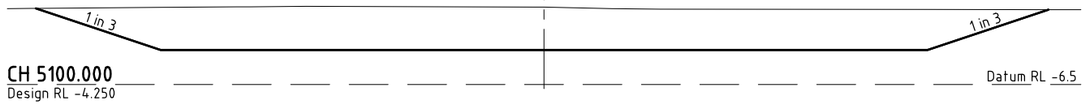

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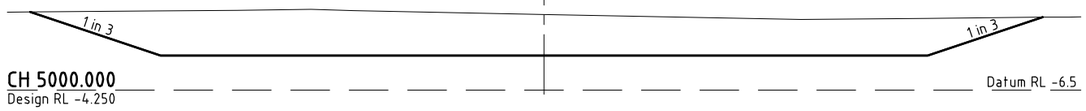

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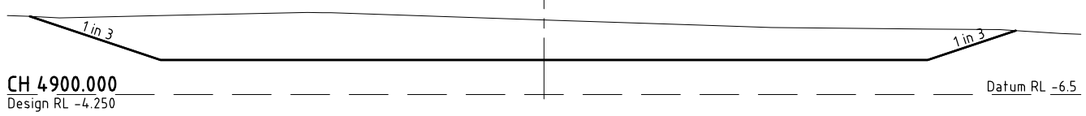

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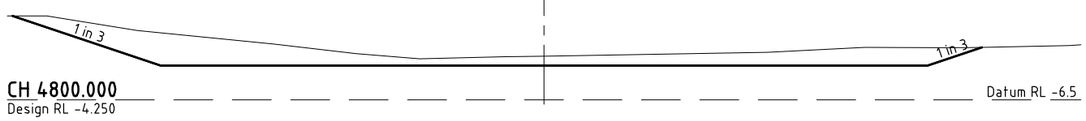

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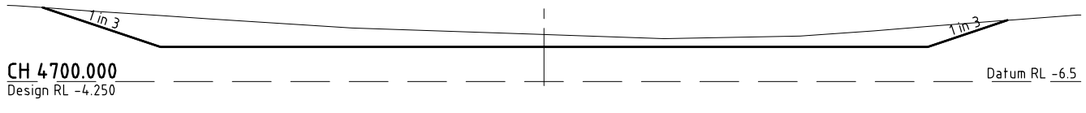

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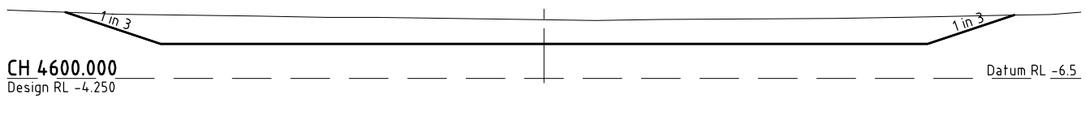

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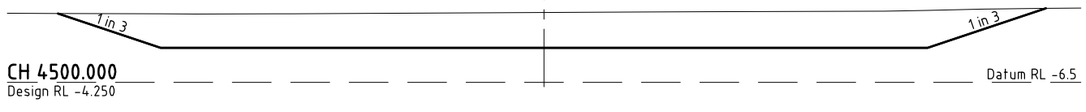

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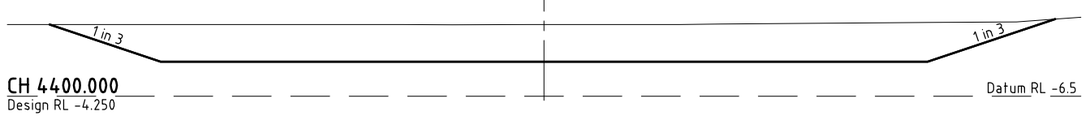

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Design RL -4.250 Datum RL -6.5

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SCALE BEFORE REDUCTION 1:200

DATE PLOTTED: 22 October, 2007 - 1:42am

Rv.	DATE	REVISIONS	REC.	APPR.

PRELIMINARY
Date..... 22 October, 2007

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN.
A1 DATUM: A.H.D.
APPROVED: PROJ. DIR.
CAD FILE: L:\7900-33\SUB 01\Acad\79003301-316.dwg
XREFs: X-A1-BO-SHT FINAL

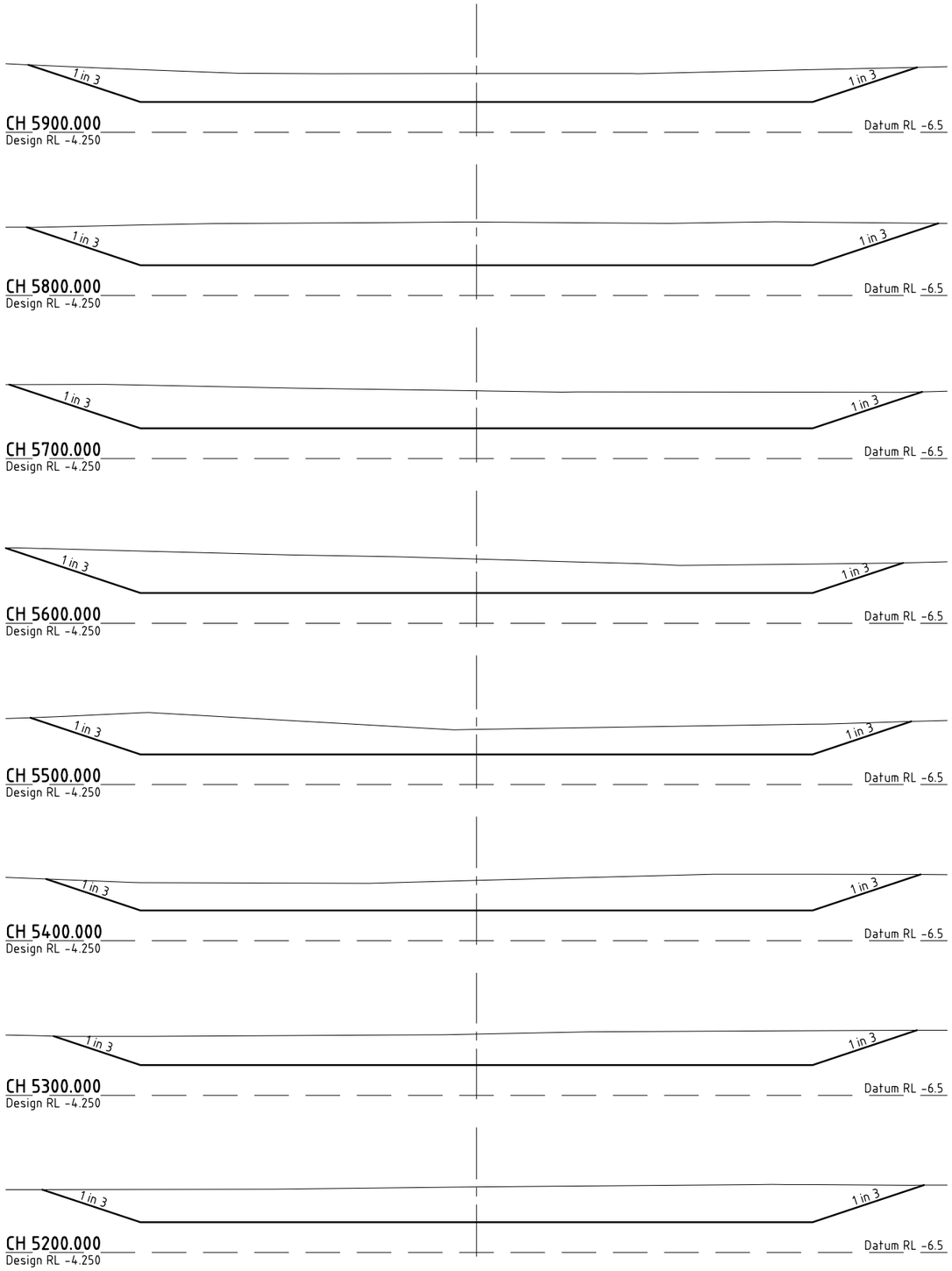
Cardno
Cardno (Qld) Pty Ltd ACN: 051 074 992
Level 1, 5 Gardner Close, Milton 4064
P.O. Box 388, Toowong 4066.
Email: cardno@cardno.com.au
Web: www.cardno.com.au

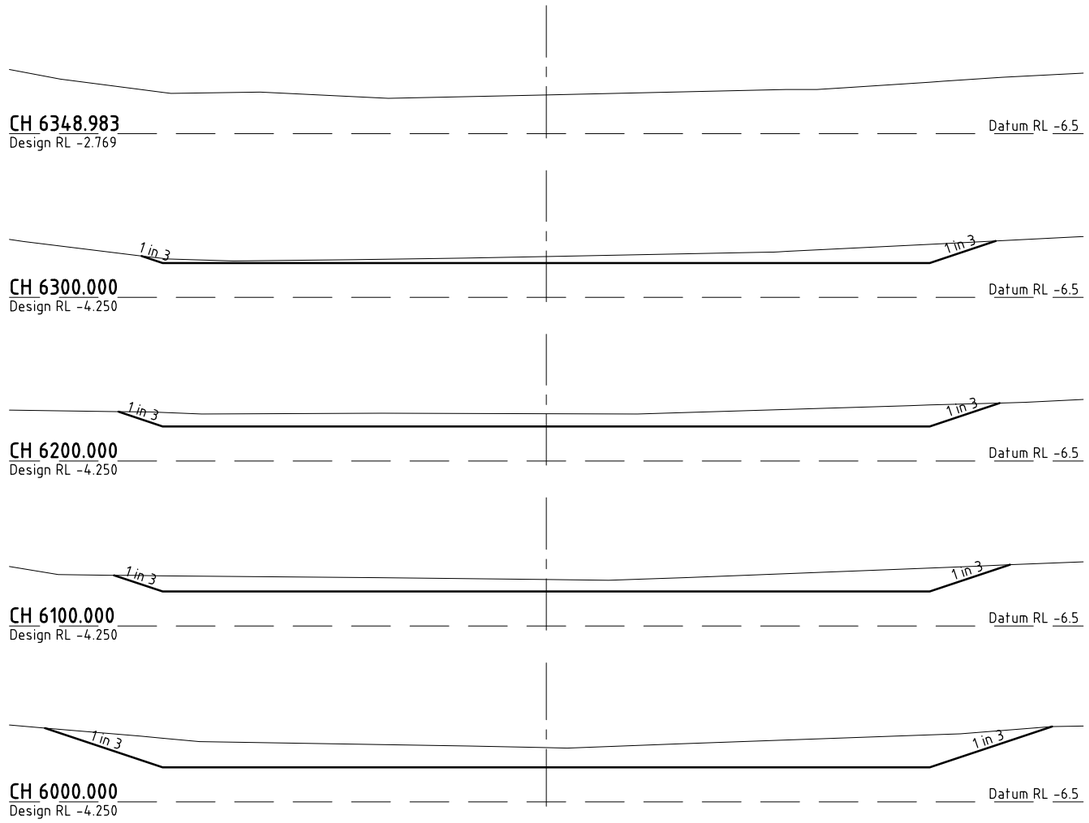
NORTHEAST BUSINESS PARK

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
CROSS SECTIONS - CH 3600.000 - CH 5100.000
SHEET 3 OF 4

DATE: 19-10-2007 Rv.
DRAWING No:
7900/33/01-316





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SCALE BEFORE REDUCTION 1:200

DATE PLOTTED: 22 October, 2007 - 7:42am

PRELIMINARY
Date 22 October, 2007

Rv.	DATE	REVISIONS	REC.	APPR.

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN.
APPROVED: PROJ. DIR.

A1 DATUM: A.H.D.

CAD FILE: L:\7900-33\SUB 01\Acad\79003301-317.dwg
XREF's: X-A1-B0-SHT FINAL

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NORTHEAST BUSINESS PARK

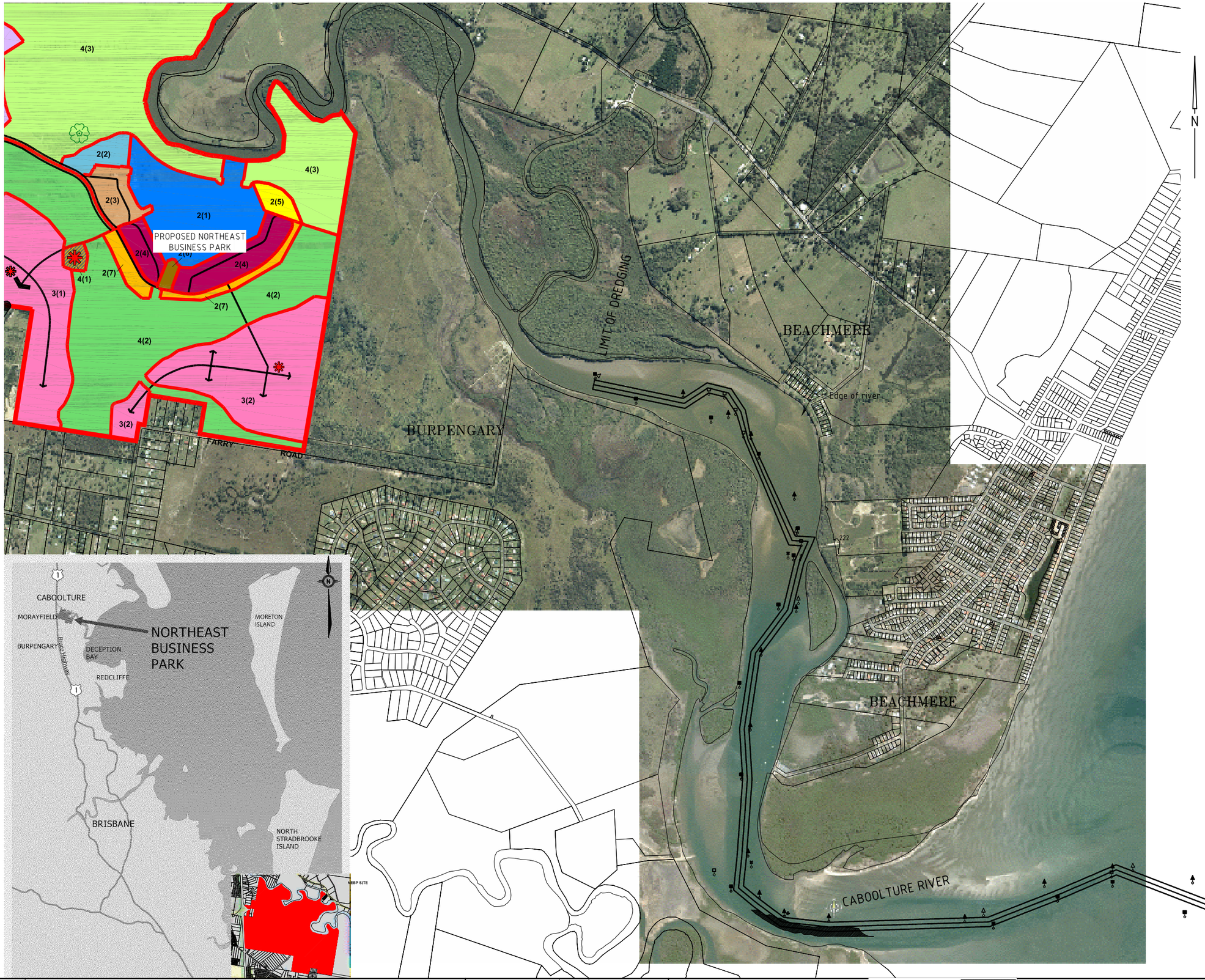
NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
MARITIME SAFETY QUEENSLAND PREFERED ALIGNMENT
CROSS SECTIONS - CH 5200.000 - CH 6348.983
SHEET 4 OF 4

DATE: 19-10-2007 Rv.
DRAWING No:
7900/33/01-317

APPENDIX B

Engineered Drawing – Current QT Navigation Channel



LEGEND

- Proposed and Existing Green Navigation Beacon
- Proposed and Existing Red Navigation Beacon
- Existing Yellow Navigation Beacon

100 0 100 200 300 400 500m
SCALE BEFORE REDUCTION 1:10000

DATE PLOTTED: 19 November, 2007 - 8:26am

Rv.	DATE	REVISIONS	REC.	APPR.

A1 DATUM: A.H.D.

CAD FILE: I:\7800-40\ACAD\DMP\Appendix B - Current QT navigational channel alignment.dwg
XREF's: X-Base-Design 3, Caboolture_mga94, X-Base-Design 3_v2, X-A1-B0-SHT FINAL

Cardno (Qld) Pty Ltd
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NORTHEAST BUSINESS PARK

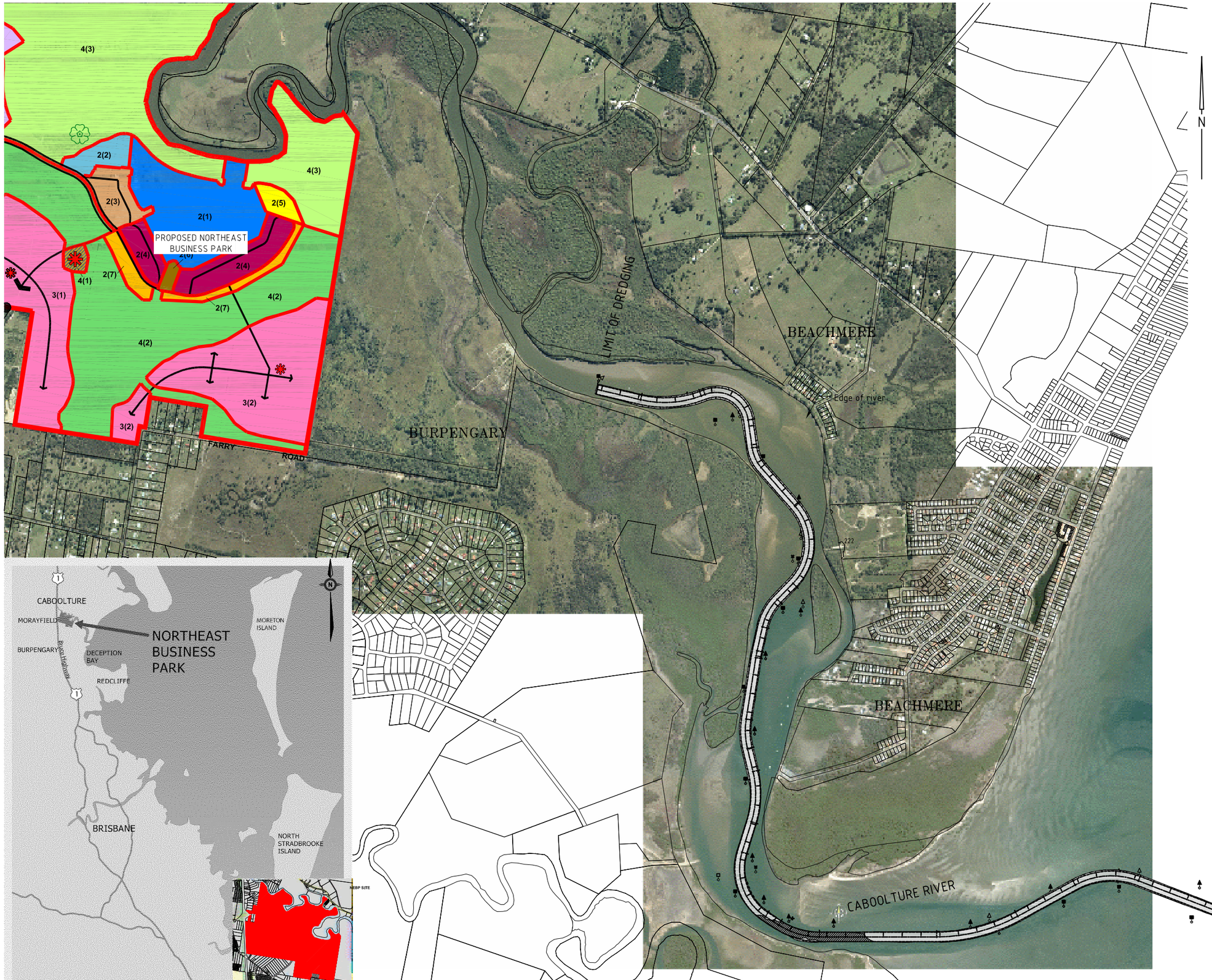
Queensland Transport Historical Navigational Channel Alignment

DATE: 14-11-2007 Rv.

Appendix B

APPENDIX C

Engineered Drawing – Cardno Preferred Alignment



LEGEND

- Proposed and Existing Green Navigation Beacon
- Proposed and Existing Red Navigation Beacon
- Existing Yellow Navigation Beacon

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SCALE BEFORE REDUCTION 1:10000

DATE PLOTTED: 19 November, 2007 - 8:27am

Rv.	DATE	REVISIONS	REC.	APPR.

A1 DATUM: A.H.D.

CAD FILE: I:\7800-40\ACAD\DMP\Appendix Ca - Cardno preferred nagivational alignment.dwg
XREF's: X-Base-Design 3, X-A1-BO-SHT FINAL_v2

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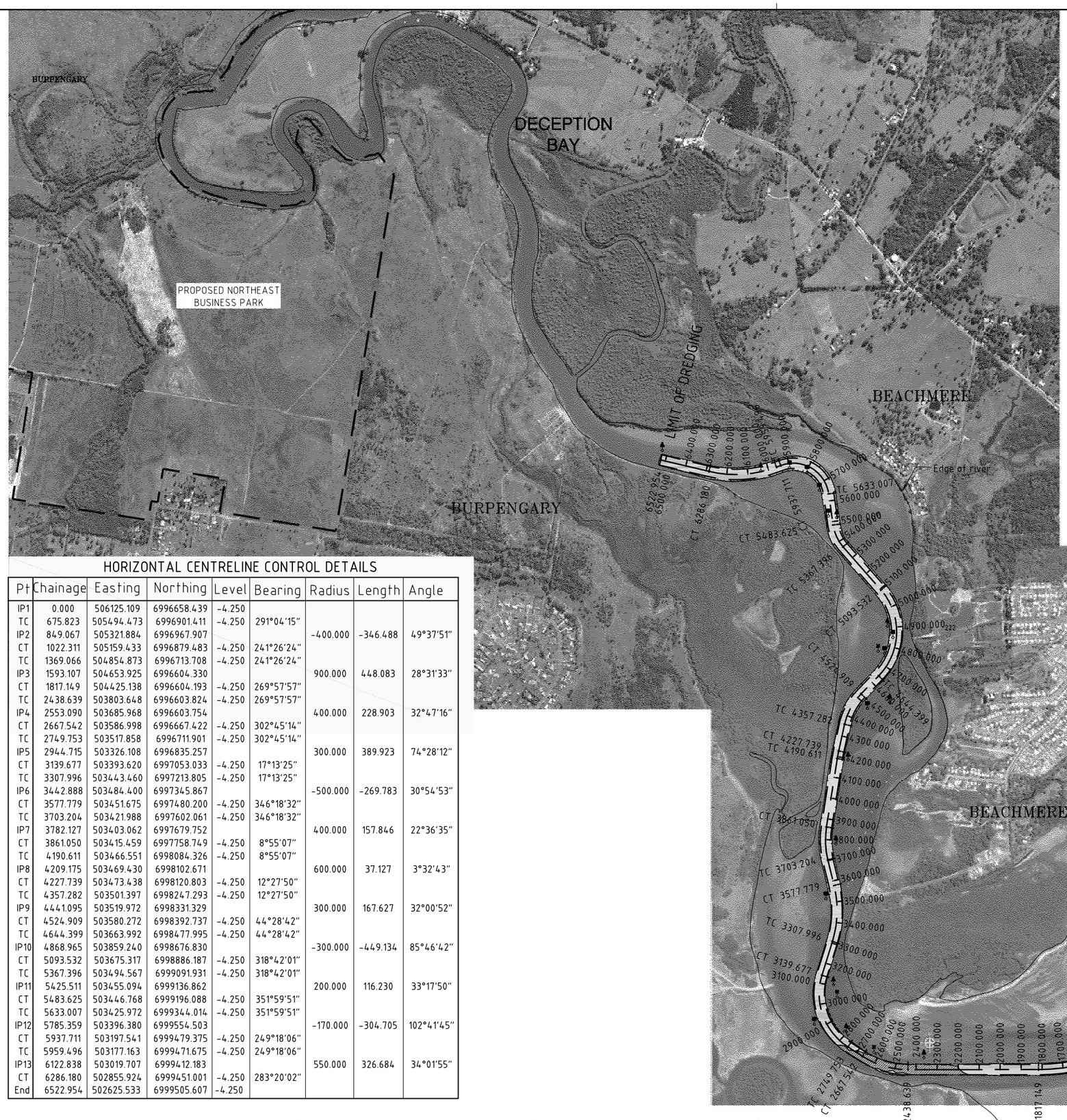
NORTHEAST BUSINESS PARK

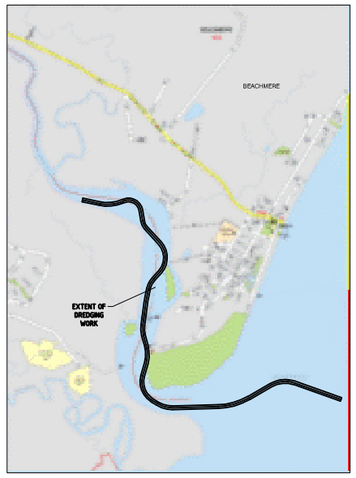
Cardno Preferred Navigational Channel Alignment

DATE:

Rv.

Appendix Ca





N

NAVIGATION AIDS-GDA94 MGA Zone 56		
NAV AID	EASTING	NORTHING
SPECIAL BCN	506473	6996538
STBD BCN	505818	6996864
PORT BCN	505776	6996683
STBD BCN	505499	6996929
PORT BCN	505385	6996895
STBD BCN	504703	6996690
PORT BCN	505098	6996766
STBD BCN	503879	6996660
PORT BCN	504756	6996622
SPECIAL BCN	503641	6996686
PORT BCN	503357	6996820
STBD BCN	503509	6996785
PORT BCN	503412	6997417
STBD BCN	503448	6997007
PORT BCN	503610	6998323
STBD BCN	503460	6997679
PORT BCN	503691	6998585
STBD BCN	503518	6998078
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PORT BCN	503424	6999239
STBD BCN	503705	6998715
PORT BCN	503381	6999361
STBD BCN	503464	6999231
PORT BCN	503323	6999447
STBD BCN	503102	6999453
PORT BCN	503239	6999468
STBD BCN	502633	6999551
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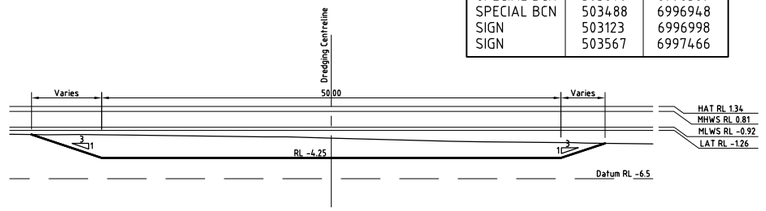
SIGN	503123	6996998
SIGN	503567	6997466



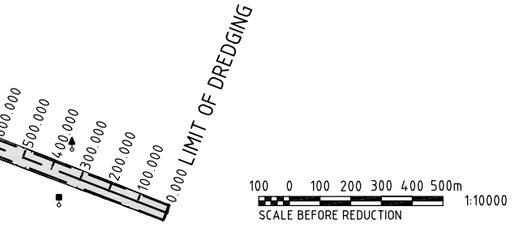
TYPICAL DREDGING SECTION
CH 0.000 – CH 6522.954
Scale1:400

HORIZONTAL CENTRELINE CONTROL DETAILS

Pt	Chainage	Easting	Northing	Level	Bearing	Radius	Length	Angle
IP1	0.000	506125.109	6996658.439	-4.250				
TC	675.823	505494.473	6996901.411	-4.250	291°04'15"			
IP2	849.067	505321.884	6996967.907			-400.000	-346.488	49°37'51"
CT	1022.311	505159.433	6996879.483	-4.250	241°26'24"			
TC	1369.066	504854.873	6996713.708	-4.250	241°26'24"			
IP3	1593.107	504653.925	6996604.330			900.000	448.083	28°31'33"
CT	1817.149	504425.138	6996604.193	-4.250	269°57'57"			
TC	2438.639	503803.648	6996603.824	-4.250	269°57'57"			
IP4	2553.090	503685.968	6996603.754			400.000	228.903	32°47'16"
CT	2667.542	503586.998	6996667.422	-4.250	302°45'14"			
TC	2749.753	503517.858	6996711.901	-4.250	302°45'14"			
IP5	2944.715	503326.108	6996835.257			300.000	389.923	74°28'12"
CT	3139.677	503393.620	6997053.033	-4.250	17°13'25"			
TC	3307.996	503443.460	6997213.805	-4.250	17°13'25"			
IP6	3442.888	503484.400	6997345.867			-500.000	-269.783	30°54'53"
CT	3577.779	503451.675	6997480.200	-4.250	346°18'32"			
TC	3703.204	503421.988	6997602.061	-4.250	346°18'32"			
IP7	3782.127	503403.062	6997679.752			400.000	157.846	22°36'35"
CT	3861.050	503415.459	6997758.749	-4.250	8°55'07"			
TC	4190.611	503466.551	6998084.326	-4.250	8°55'07"			
IP8	4209.175	503469.430	6998102.671			600.000	37.127	3°32'43"
CT	4227.739	503473.438	6998120.803	-4.250	12°27'50"			
TC	4357.282	503501.397	6998247.293	-4.250	12°27'50"			
IP9	4441.095	503519.972	6998331.329			300.000	167.627	32°00'52"
CT	4524.909	503580.272	6998392.737	-4.250	44°28'42"			
TC	4644.399	503663.992	6998477.995	-4.250	44°28'42"			
IP10	4868.965	503859.240	6998676.830			-300.000	-449.134	85°46'42"
CT	5093.532	503675.317	6998886.187	-4.250	318°42'01"			
TC	5367.396	503494.567	6999091.931	-4.250	318°42'01"			
IP11	5425.511	503455.094	6999136.862			200.000	116.230	33°17'50"
CT	5483.625	503446.768	6999196.088	-4.250	351°59'51"			
TC	5633.007	503425.972	6999344.014	-4.250	351°59'51"			
IP12	5785.359	503396.380	6999554.503			-170.000	-304.705	102°41'45"
CT	5937.711	503197.541	6999479.375	-4.250	249°18'06"			
TC	5959.496	503177.163	6999471.675	-4.250	249°18'06"			
IP13	6122.838	503019.707	6999412.183			550.000	326.684	34°01'55"
CT	6286.180	502855.924	6999451.001	-4.250	283°20'02"			
End	6522.954	502625.533	6999505.607	-4.250				

SCHEDULE OF DRAWINGS

DRAWING No.	DESCRIPTION
7900/33/01-100	Cover Sheet
CABOOLTURE RIVER DREDGING	
7900/33/01-101	Locality Plan, Notes and Schedule of Drawings
7900/33/01-102	Layout Plan
7900/33/01-103	Centre Line Set Out
7900/33/01-104	Layout Plan - Sheet 1 of 10 - Chainage 0.000 - 800.000
7900/33/01-105	Layout Plan - Sheet 2 of 10 - Chainage 800.000 - 1600.000
7900/33/01-106	Layout Plan - Sheet 3 of 10 - Chainage 1600.000 - 2300.000
7900/33/01-107	Layout Plan - Sheet 4 of 10 - Chainage 2300.000 - 3100.000
7900/33/01-108	Layout Plan - Sheet 5 of 10 - Chainage 3100.000 - 3600.000
7900/33/01-109	Layout Plan - Sheet 6 of 10 - Chainage 3600.000 - 4100.000
7900/33/01-110	Layout Plan - Sheet 7 of 10 - Chainage 4100.000 - 4700.000
7900/33/01-111	Layout Plan - Sheet 8 of 10 - Chainage 4700.000 - 5200.000
7900/33/01-112	Layout Plan - Sheet 9 of 10 - Chainage 5200.000 - 5700.000
7900/33/01-113	Layout Plan - Sheet 10 of 10 - Chainage 5700.000 - 6522.954
7900/33/01-114	Cross Sections - Sheet 1 of 4 - Chainage 0.000 - 1900.000
7900/33/01-115	Cross Sections - Sheet 2 of 4 - Chainage 2000.000 - 3900.000
7900/33/01-116	Cross Sections - Sheet 3 of 4 - Chainage 4000.000 - 5700.000
7900/33/01-117	Cross Sections - Sheet 4 of 4 - Chainage 5800.000 - 6522.954
7900/33/01-120	Alternative Layout Plan - Existing Navigation Channel



DATE PLOTTED: 19 November, 2007 - 8:28am

Rv.	DATE	REVISIONS	REC.	APPR.

DESIGNED:	V.Kasiano
DRAWN:	V.Kasiano
CHECKED:	J.Nickerson
RECOMMENDED: PROJ. MAN.	G.McIlwain
APPROVED: PROJ. DIR.	G.McIlwain

A1 DATUM: A.H.D.

CAD FILE: I:\7800-40\ACAD\DMP\Appendix Cb.dwg
XREF's: X-A1-B0-SHT A, X-Base

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Sydney	(02) 9496 7700	(02) 9499 3902
Gold Coast	(07) 5539 9333	(07) 5538 4647
Sunshine Coast	(07) 5443 2555	(07) 5443 5642
Townsville	(07) 4772 1166	(07) 4721 2508
Hervey Bay	(07) 4124 5455	(07) 4124 5155
Central Coast	(02) 4323 2558	(02) 4324 3251
Melbourne	(03) 9818 7755	(03) 9818 7033
Rockhampton	(07) 4924 7500	(07) 4926 4375
Toowoomba	(07) 4637 8122	(07) 4637 8155

NORTHEAST BUSINESS PARK

CABOOLTURE RIVER DREDGING
DREDGING WORKS
LAYOUT PLAN

DATE: 09-02-2007 Rv.
DRAWING No:
Appendix Cb

APPENDIX D

Corrective Action Request Form

CORRECTIVE ACTION REQUEST

Report No: _____

Date: _____

DETAILS OF NON-CONFORMANCE: Inspected by:
DETAILS OF PROPOSED ACTION Passed to Principal (as applicable):y/n Date: Reply required by:
CONSULTANT/ AUDITOR/PRINCIPAL ADVICE (as required): Date action required by (if applicable): Signed (by Principal or Principal's representative): Date:
AUTHORITY TO PROCEED Sign: Date:
ACTION CARRIED OUT Sign: Date:
ELEMENT RE-INSPECTED BY Sign: Date:
COPY ISSUED TO PRINCIPAL Date: Sign: