

Brightwater Lake Management Plan

2021 – 2031

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1 Introduction

This Lake Management Plan has been prepared by Sunshine Coast Council to promote effective long-term management of the Brightwater Lake system. It is a 10 year plan that supersedes the original Lake Management Plan developed by Cardno in 2015.

1.1 Purpose

The purpose of the Lake Management Plan is to:

- outline the rights and responsibilities of the lake owners, residents and users;
- develop an appropriate inspection and maintenance schedule to meet objectives and performance standards;
- provide guidelines and management actions for ensuring compliance with secondary contact water quality guidelines;
- provide guidelines for acceptable use of the lake such as sport and recreation; and
- define permitted uses subject to approval such as commercial operations and private structures.

1.2 Objectives

The objectives of the Lake Management Plan are specified in Table 1 below.

Table 1: Management plan objectives

Objective	Performance standard	Refer
Public use complies with guidelines outlined in this management plan	<ul style="list-style-type: none"> Public, residents and sporting bodies are informed of acceptable uses, their rights and responsibilities 	Section 5
Water quality is maintained to a standard suitable for secondary contact recreation use ¹	<ul style="list-style-type: none"> Compliance with water quality guidelines Effective operation and maintenance of salinity exchange system, weir and stormwater infrastructure Growth of undesirable organisms is absent or regulated 	Section 6
Amenity and visual quality of the lake is of an acceptable standard	<ul style="list-style-type: none"> The lake is free of litter and debris and/or removed in a timely manner Growth of undesirable organisms is absent or regulated Structures are designed and located suitably 	Section 6 and 8
Lake assets are maintained in a structurally sound and safe condition	<ul style="list-style-type: none"> Routine inspections and maintenance are undertaken in accordance with relevant schedules Funding adequate to maintain assets 	Section 8
The lake facilitates effective drainage of stormwater run-off	<ul style="list-style-type: none"> Compliance with relevant design criteria Maintain lake to acceptable tolerances from design profile Effective operation and maintenance of weirs, revetment walls and stormwater pipes 	Section 8.2

¹ Secondary contact recreation is any activity where only the limbs are regularly wet, and swallowing water is unusual. Examples of secondary contact recreation are boating, fishing, rowing, kayaking, dragon boating, wading etc.

2 Background

2.1 Site overview

Brightwater Lake is an artificial tidally restricted lake with a surface area of 12.28ha and a volume of approximately 460,000m³. Construction of the lake commenced in 2010 in accordance with the relevant planning approvals granted by the Department of Natural Resources and Water, Department of Environment and Science and Sunshine Coast Council. The development contributes 37% of the total 606.4ha lake catchment area, with the surrounding area including a mixture of residential, agricultural, recreational and undeveloped land uses.

The lake is defined as the area contained within the concrete revetment walls, as depicted in Figure 1 below. The nominal water level of RL 0.8 AHD is controlled by the outlet weir which is located at the eastern boundary, allowing overflow to the Mooloolah River. The lake was designed to be maintained in a brackish/semi saline condition by a salinity pumping system that draws saline water from Hideaway Canal and into the lake.

Stormwater drainage enters the lake from the adjoining land development through controlled outlet structures and pipes into the lake.

Viewing areas for the public are available at specific locations around the perimeter of the lake and public access is available at designated places via parkland adjacent to the lake.

Use of the lake system for recreational purposes is an added benefit and subject to guidelines outlined in this management plan. No navigable access to tidal waters is available.




Figure 1: Locality plan

2.2 Assets

The assets included in this management plan are specified in Table 2 below. Only assets managed and maintained by council are included.

Table 2: Lake assets

Assets	Description	Quantity
Weir	<p>The outlet weir between the lake and the Mooloolah River controls the lake standing water at RL 0.80mAHD. High tides above this will occasionally overtop the weir.</p> <p>The weir is a vertical blade concrete structure, with rock scour protected on the upstream and downstream sides of the weir. A rock lined channel links the weir to the river.</p> <p>Refer Appendix A for weir design drawings.</p> 	1

Salinity exchange system

The salinity exchange system is automated and pumps saline water from Hideaway Canal into the lake to provide sufficient flows and mixing to turn over the total lake water volume approximately every 28 days. The system consists of an inlet structure with pipework suspended underneath a jetty structure and an outlet headwall. An underground pump station houses the duty pump for the system. The entire system is located within a liner park between the Hideaway Canal and the lake.



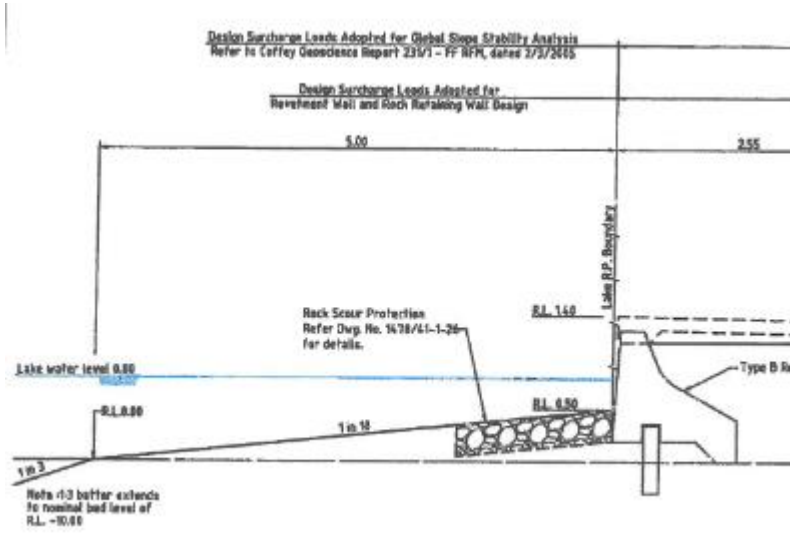
An overview plan of the salinity exchange system is shown in Appendix B.


Inlet structure:




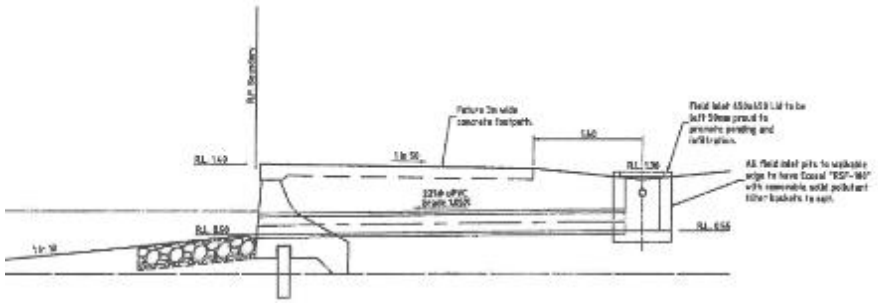
Underground pump station location:





Assets	Description	Quantity
<p>Revetment walls</p>	<p>Lake edge abutting public land only - required to maintain the stability of the lake edge, whilst contributing to the aesthetics and usefulness of the lake.</p> <p>The top of the revetment wall is approximately RL 0.8m AHD.</p> 	<p>Approx. 2850 m</p>
<p>Rock scour</p>	<p>Rock scour provides protection to revetment walls and associated land assets. Rock scour protection exists on both the upstream and downstream sides of the weir.</p>  	<p>Approx. 2900 m</p>

Assets	Description	Quantity
Viewing platforms	<p data-bbox="371 215 1275 275">Platforms built partially over or adjacent to the water to facilitate lake viewing and enjoyment.</p> 	4

Assets	Description	Quantity
Pathways	<p data-bbox="371 215 1251 248">Pathways to facilitate access and connectivity for amenity and enjoyment.</p> 	Approx. 2700 m
Stormwater drainage	<p data-bbox="371 1341 1238 1375">Stormwater pipes draining directly into the lake. All are fitted with a GPT.</p> 	13

Assets	Description	Quantity
<p>Waterway access</p>	<p>Infrastructure facilitating access from public land to the water, e.g. stairs and ramps. There is 1 access ramp and various launching platforms.</p> 	<p>1 ramp and 6 stair entries</p>
<p>Gross pollutant trap (GPT)</p>	<p>Gross pollutant traps (GPT's) are provided at most outlets from stormwater drainage systems to the lake. The GPT's provide primary treatment to all road runoff and secondary treatment to surface runoff.</p> 	<p>13</p>

Assets	Description	Quantity
Signs	<p>Public signage associated with lake use and safety.</p>  	7

3 Land tenure and statutory requirements

3.1 History

The Brightwater Master Planned Community went through an extensive planning assessment process, with the Material Change of Use approval (MCU00/0022) being issued on 15 March 2004. The Voluntary Infrastructure Agreement was signed off on 19 November 2003 and the Reconfiguration of Lot Approval and subsequent Negotiated Decision Notice (REC09/0065) was finalised on 10 November 2009. The Negotiated Decision Notice for the Operational Works Approval (OPW08/0351) for the construction of the lake was issued on 5 November 2009.

The Voluntary Infrastructure Agreement (VIA), dated 19 November 2003 and subsequent Deed of Variation dated 13 November 2009, between the former Maroochy Shire Council and Lensworth Buddina Pty Ltd, defines the water quality and monitoring parameters for the lake, the specific requirements for acceptance of the works on and off maintenance and the management requirements in relation to the construction performance bond and sinking fund.

Consistent with best environmental practice, in 2008 Stockland Buddina engaged Cardno Pty Ltd to prepare a Lake Management Plan to control use, maintenance and water quality of the lake, completing the plan in 2015.

In accordance with the above approvals and agreements, construction of the lake and surrounding development commenced from 2010 by Stockland Buddina Pty Ltd.

Zoned as Open Space with LotPlan 9025SP245187. Ownership of the lake, assets and all adjoining public land were transferred from Stockland Buddina Pty Ltd to Sunshine Coast Council in late 2021.

3.2 Lake ownership details

Name: Sunshine Coast Regional Council

3.3 Lake owner's responsibilities

As owner, council is responsible for ensuring that the lake system and its infrastructure:

- is maintained to a safe and reasonable standard to the best of council's ability;
- provides adequate amenity for residents and general public; and
- facilitates effective drainage of stormwater run-off.

Facilitating water-based recreational use is not a responsibility of council, however guidelines are provided in this plan to allow for this additional community benefit of the lake (refer section 5).

All land abutting the lake is public land in the form of parkland, pathways and road reserve, therefore Council is responsible for the maintenance of all revetment wall structures.

3.4 Legislation

The Lake Management Plan complies with the following statutory legislation and its associated regulations and policies:

- *Local Government Act 2009*
 - Sunshine Coast Council Local Laws
- *Coastal Protection and Management Act 1995*
- *Planning Act 2016*
- *Environmental Protection Act 1994*
- *Waste Reduction and Recycling Act 2011*
- *Fisheries Act 1994*
- *Nature Conservation Act 1992*
- *Transport Operations (Marine Safety) Act 1994*
- *Transport Operations (Marine Pollution) Act 1995*
- *Aboriginal Cultural Heritage Act 2003*
- *Biosecurity Act 2014*
- *Animal Management (Cats and Dogs) Act 2008*

4 Lake purpose and function

4.1 Intent for use

The primary purpose of the lake is to provide amenity and visual quality for the surrounding Brightwater residential development. Additional benefits include water-based recreation and a range of passive recreation opportunities associated with an extensive park and pathways network.

The design intent also considered that the lake facilitate effective drainage of stormwater from the upstream catchment and urban run-off.

The cadastral boundary of the Brightwater Lake is configured so that all revetment walls are located within adjoining lots. These adjoining lots are park and road reserve and as such are not part of the lake proper.

The lake has been designed to achieve a brackish/semi-saline state via pumping from Hideaway Canal to assist in maintaining water quality.

All land abutting the lake is public land in the form of parkland, pathways or road reserve. All normal activities that are allowed in parks and on roads are allowed on the land fronting the lake, except where restricted elsewhere in this management plan.

The lake is intended to be used by the community in a responsible way for their recreational enjoyment, with minimal adverse impact upon the amenity of those dwellings in proximity to the lake. Contact with the water is proposed as secondary contact only (e.g. kayaks, canoes and stand-up paddle board). Fishing is also allowed within the lake, except as precluded in section 5.3.

The land abutting the lake has been generally developed for urban purposes and access to the lake for the public is available at specific locations around its perimeter as public road reserve or parkland. There are facilities (stairs and one ramp) for launching non-motor powered watercraft, however there is no navigable connection to tidal waters.

5 Lake use

Permitted and prohibited uses are detailed in the following section and must be adhered to at all times.

5.1 Permitted uses

Lake use is open to the general public and 'sports/recreational-based' user groups providing the use is a 'permitted use' as described below.

Council, as the owner, may from time to time utilise the lake and/or surrounding open space for public events (e.g., markets and public displays).

With the exception of maintenance/enforcement/safety/disaster response purposes, motor-powered craft are not permitted in the lake.

The following uses and/or actions are permitted in or on the lake without any further approval/s from council:

- human powered craft (e.g., canoe, kayak, rowing, dragon boat and stand-up paddle board (SUP));
- Small wind powered sail craft (excluding kite surfing);
- Model boat/yacht;
- recreational fishing, except as precluded in section 5.3;
- approved event-related temporary floating structures (i.e., pontoon);
- approved maintenance, safety, disaster response and enforcement craft (4 knot speed limit);
- approved construction craft (e.g. barges, dredges and support craft);
- use of lake water for fire control purposes (e.g. helicopter fire services); and
- any other activity prescribed by council from time to time.

Please note:

All lake users are encouraged to exercise a personal duty of care when accessing the lake system and/or participating in water-based recreation. Recreating in constructed tidal lakes has inherent risks, including but not limited to potentially hazardous marine creatures such as sharks and stingers.

The water quality in the lake is maintained to a secondary contact standard. At times post major rainfall events the water quality within the lake may be diminished below secondary contact standards (refer section 6 for an overview of council's water quality management of the lake).

Due to the above reasons, direct exposure through swimming is not advised.

5.2 Permitted uses subject to approval

5.2.1 Events, recreational clubs and commercial operations

Council may agree to allow certain low-use/low-impact events, group/club recreational activities and commercial operations to occur on the lake that do not negatively impact on surrounding residents and the overall amenity. The activity must be a permitted use as specified in section 5.1, including (but not limited to) non-motor powered water taxi, vessel hire and other water-based activities/events e.g. SUP lessons, dragon boat user groups, model boats etc. For such operations to be considered for approval, council requires a written submission detailing the type of activity and any potential impact the activity will have on surrounding residents, other users of the lake, water quality, council-owned assets and overall amenity.

Refer to council's [Community Land and Complementary Commercial Activity Policy](#) for more information.

5.3 Prohibited uses and practices

The following uses or actions are prohibited in the lake:

- events/recreational clubs/commercial operations (SCC approved permits excepted, refer section 5.2.1);
- construction of ramps/pontoons/decks/jetties (SCC owned structures excepted);
- temporary moorings (SCC approved event/recreational club/commercial permits excepted, refer section 5.2.1);
- diving or jumping off any structure over or in the lake;
- fishing from bridges and weirs;
- motor powered craft (with the exception of approved maintenance/enforcement/safety/disaster response craft);
- living on watercraft whether temporarily, intermittently or permanently;
- the storage, maintenance, construction, reconstruction, refitting or undertaking of structural repairs on or to watercraft;
- unmarked fishing equipment (e.g., crab pots)
- releasing, dumping or depositing of any wastes (including garden wastes), contaminants or other pollutants into the lake, adjoining waterways or in a place (e.g., road-side gutter or stormwater drain) where it could reasonably be expected to enter, blow or wash into the lake or adjoining waterways; and
- accessing the lake via revetment walls; and
- any other activity prescribed by council from time to time.

5.4 Temporary restricted use

Council reserves the right to restrict lake use for a specific purpose at any time, if such action is required to either protect public health and safety or prevent pollution of the lake.

5.5 Abutting public land

Abutting public land is under the control of council. All normal activities that are permitted in parks and on roads are permitted on abutting public land fronting the lake except as may be restricted elsewhere in this Lake Management Plan, or by approved signs erected on such land.

5.6 Future development

No further development within the Lake or on adjacent public land is intended by council, unless determined necessary to support the primary purpose and function of the lake.

6 Water quality management

The lake system is best described as a lower catchment flow through system, i.e., an artificial waterway which acts as an estuary in some part, where the flow through rate is determined by catchment inflows, a weir and salinity exchange system.

Influences on water quality in the lake system are therefore principally impacted by:

- sufficient salinity exchange;
- the quality of water being pumped from Hideaway Canal;
- up-stream catchment practices;
- surrounding urban runoff (e.g. hydrocarbons, particulates, pesticides and herbicides); and
- colonisation by organisms. Certain species may proliferate at times of elevated nutrient levels and cause other environment and human health risks (e.g. algal blooms)

Table 3 provides a framework to effectively manage these influences to ensure acceptable water quality is maintained.

Table 3: Water quality management overview

Objective	Water quality is maintained to a standard suitable for secondary contact recreation
Performance standards	<ul style="list-style-type: none"> • Water quality is maintained in accordance with scheduled water quality objectives for secondary contact recreation in the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 and Guidelines for Managing Risks in Recreational Water (NHMRC 2008) • Reactive water quality sampling is in accordance with the methods prescribed in the Queensland Monitoring and Sampling Manual (2018) • Growth of undesirable organisms is absent or regulated
Management controls	<ol style="list-style-type: none"> 1. Maintain impervious and/or vegetated overland flow paths in accordance with routine inspection and maintenance schedules 2. Maintain stormwater drainage systems and GPTs in accordance with routine inspection and maintenance schedules 3. Maintain weir and salinity exchange system in accordance with routine inspection and maintenance schedules 4. Educate residents and public to reduce pollutant run-off and/or input (e.g. signage, residents' handbook and website) 5. Live water quality testing undertaken at 3 locations via remote sensors (physical and chemical analysis to inform effective pump operation)
Corrective action	<ul style="list-style-type: none"> • Respond to issues negatively affecting water quality in a timely manner • Erection of temporary signage if determined necessary • If the relevant water quality guidelines are exceeded, or a trend of declining water quality develops over an extended period, it will be considered to indicate the need for re-assessment of the appropriateness and effectiveness of existing water quality management controls • Adjust pumping operation in accordance with water quality parameters recorded via remote sensors
Monitoring	<ul style="list-style-type: none"> • Visual monitoring to be undertaken concurrent with routine inspections and/or maintenance schedules • Live water quality testing records • Water quality sampling to be undertaken on a reactive basis if requested and determined necessary

	<ul style="list-style-type: none"> • Maintain customer service request records and incident/non-compliance register
Reporting	The results of monitoring will be made available to the public at council's discretion and by request only
Responsibility	SCC

7 Incident, non-compliance and complaint management

Table 4: Incident, non-compliance and complaint management overview

Objective	To ensure prompt and efficient response to pollution, incidents, complaints and non-compliance
Performance standards	<ul style="list-style-type: none"> • Prompt removal of pollution spillages from waterways with minimum risk to the public and the environment • All incidents, complaints and non-compliance are dealt with promptly and efficiently, in accordance with council's Compliance and Enforcement Policy 2018 (or referred to the relevant agency if not already outlined in the policy) • Appropriate investigations are undertaken to determine the source of pollution and the cause of environmental incidents (e.g. oil spills, fish kills and algal blooms)
Management controls	<ol style="list-style-type: none"> 1. Adherence to asset management plans 2. Asset inspections and routine maintenance schedules met 3. Adherence to water quality management procedures (refer section 6) 4. Sufficient signage to communicate safety matters and prohibitions outlined in this management plan (refer section 5.3)
Corrective action	<ul style="list-style-type: none"> • Pollution spill, fish kill or other environmental incident - report to the Department of Environment and Science to ensure that appropriate investigations and testing are undertaken • Address and/or rectify incident, complaint and/or non-compliance • Review customer service requests and incident/non-compliance register and implement improvement to processes and/or signage where deemed necessary
Monitoring	<ul style="list-style-type: none"> • Follow up monitoring to be undertaken in the event of an environmental incident • Maintain customer service request records and incident/non-compliance register
Reporting	Complete the appropriate incident report/debrief when required or requested
Responsibility	SCC

8 Maintenance

8.1 General

Maintenance of the lake and its assets are the responsibility of council and includes routine, planned and reactive maintenance work activities.

Maintenance work is managed through an asset management system and includes activities such as inspection, assessing condition, prioritising, scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance.

Routine maintenance is performed on a regular cycle to upkeep visual amenity and/or replacement of components/sub-components of assets. This work generally falls below the capital threshold. Planned maintenance comprises larger scale repair work (below the capital threshold) or asset renewal (capital work). Reactive maintenance is unplanned repair work carried out in response to service requests and management/supervisory directions.

Types of maintenance may include:

- on-going maintenance of the outlet weir;
- on-going maintenance of the salinity exchange system, including pumps, pipes, intake jetty, outlet structure etc.;
- removal of siltation from bed and banks of the lake, as required, to ensure that it does not become a constraint on the function of the lake;
- removal of debris, litter and undesirable organisms/weeds from the lake and public foreshore areas;
- maintaining revetment walls and rock scour; and
- maintaining stormwater infrastructure.

Refer Table 5 which outlines the entire maintenance framework and regimes.

8.2 Maintenance Management

The following section provides an overview of the maintenance framework for lake features and public assets to meet specific management plan objectives outlined in Table 1.

Table 5: Maintenance framework overview

Feature / asset	Performance standard	Performance indicator	Comments / considerations	Inspection frequency	Routine maintenance frequency	Responsibility
Waterway feature						
Litter, debris etc.	Waterways are free of litter and debris that are impacting on amenity, health and/or safety	a) Inspection and maintenance schedules met b) Reactive works undertaken in a timely manner c) No complaints	<ul style="list-style-type: none"> Officers undertaking litter removal should ensure that appropriate precautions are taken against hazardous objects such as discarded hypodermic syringes Collected litter should be recorded in AMDI database and disposed of at council's refuse tip A public education programme should be considered by council if litter is a persistent problem If fishing equipment (e.g., crab pot or fish trap) is found either unmarked and/or in state of disrepair to a point of it being non-functional then it shall be removed as marine litter (report to DAFF for their agency to remove) 	Monthly	Monthly	SCC Waterways team Engagement with Response Services where required for litter investigation
Undesirable organisms/ weeds	Growth of undesirable organisms is absent or regulated	a) Inspection schedule met b) Reactive works undertaken in a timely manner c) No complaints	<ul style="list-style-type: none"> Any vegetation or plant material, living or dead, located below the level of the highest astronomical tide (Approximately RL 1.05m AHD) is classified as "marine vegetation" under the Fisheries Act. Refer to relevant fisheries accepted development requirements before undertaking any works involving marine vegetation Although herbicides are a possible means of weed control, only herbicides registered for use in aquatic environments should be used All removed vegetation should be disposed of at council's refuse tip In the event of algal blooms, refer to Queensland Harmful Algal Bloom Response Plan 2014. Appropriate laboratory testing should be undertaken to determine the species present and likely cause of the outbreak. If testing indicates the presence of toxic species, specialist advice should be sought regarding any necessary health precautions. 	6 monthly	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Lakes and Wetlands team
Lake profile	Lake is maintained to acceptable tolerances from design profile	a) Survey completed as scheduled b) Maintenance is undertaken in a timely manner before degradation of waterway profile affects the stability of revetment walls or water quality c) No complaints	<ul style="list-style-type: none"> Appropriate geotechnical and chemical testing should be undertaken of material proposed to be dredged or excavated in maintenance operations Approvals to undertake dredging, or other excavation, within a waterway are required under the Planning Act 2016, Coastal Protection and Management Act 1995 (Tidal Works) and the Environmental Protection Act 1994 (ERA 16) (dependant on volume of material to be managed) 	10 yearly	No routine maintenance performed. Any required works are determined based on visual observation and 10 yearly lake survey	SCC Coast & Canals team
Infrastructure						
Weir	The system is operating as designed and providing effective drainage of stormwater run-off	a) Structure is not impeded by marine growth or sedimentation b) Inspection and maintenance schedules met c) Reactive works undertaken in a timely manner d) No complaints	Refer Appendix A for weir design.	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team Contractor
Salinity exchange system	The system is operating as designed and	a) Water is turned over every 28 days	Underwater inspections of the structures are likely to be required, approximately every 12 months. This applies particularly to the inlet structure.	Monthly and annually	Monthly and annually	SCC Coast & Canals team

Feature / asset	Performance standard	Performance indicator	Comments / considerations	Inspection frequency	Routine maintenance frequency	Responsibility
	providing sufficient saline water inflow	<ul style="list-style-type: none"> b) Inlet and outlet structures are not impeded by marine growth or sedimentation c) Inspection and maintenance schedules met d) Reactive works undertaken in a timely manner e) No complaints 	<p>A qualified submarine drone operator or commercial diver should be employed for this work and the required safety measures implemented.</p> <p>Refer Appendix B for infrastructure design drawings.</p>			
Revetment walls	Revetments are maintained in a suitable condition to provide satisfactory protection to adjacent land and assets	<ul style="list-style-type: none"> a) Structure maintained to design b) Inspection schedules met c) Reactive works undertaken in a timely manner d) No complaints 	<p>The stability of revetment walls and other concrete structures is heavily reliant on the condition of the associated scour (see scour maintenance below).</p> <p>Refer Appendix C for revetment wall design typical section.</p>	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Scour	Scour are maintained in a suitable condition to provide satisfactory protection to revetment walls	<ul style="list-style-type: none"> a) Structure maintained to design b) Inspection schedules met c) Reactive works undertaken in a timely manner d) No complaints 	<p>The stability of revetment walls and other concrete structures can be rapidly compromised due to the loss of foundation support if the associated scour are not well maintained</p>	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Stormwater outlets	Provides effective drainage of stormwater run-off	<ul style="list-style-type: none"> a) Structure maintained to design standards b) Inspection and maintenance schedules met c) Reactive works undertaken in a timely manner d) No complaints 	<p>Piping failures, resulting in loss of support behind and beneath stormwater drainage outlet structures can result in rapid deterioration of these structures. This damage can quickly spread to adjacent revetment walls. It is important, for the longevity of these structures, to ensure that piping problems are promptly addressed</p>	Annually	Annually	SCC Stormwater Services team
GPT's	Provides an effective pollutant trap to minimise litter, debris and sediment from entering the lake system	<ul style="list-style-type: none"> a) Structure maintained to design b) Inspection and maintenance schedules met c) Reactive works undertaken in a timely manner d) No complaints e) Minimal litter, debris and sediment entering the lake directly from stormwater outlets 	Refer to manufacturer for design standard details	Monthly	Annually	SCC Stormwater Services team
Viewing platform	Accessible and safe, providing additional enjoyment of the lake amenity	<ul style="list-style-type: none"> a) Structure maintained to design b) Open for use 90% of the time c) Inspection schedule met d) Reactive works undertaken in a timely manner e) No complaints 		6 monthly	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Transport Infrastructure team
Waterway accesses	Accessible, user-friendly and safe, providing additional access and enjoyment of the lake	<ul style="list-style-type: none"> a) Structure maintained to design b) Open for use 90% of the time c) Clear of marine fouling and debris 		Annually	No routine maintenance. Any required works are determined based on	SCC Coast & Canals team

Feature / asset	Performance standard	Performance indicator	Comments / considerations	Inspection frequency	Routine maintenance frequency	Responsibility
		<ul style="list-style-type: none"> d) Inspection schedule met e) Reactive works undertaken in a timely manner f) No complaints 			inspection condition assessment	
Pathways	Accessible and safe, providing additional access and enjoyment around the lake	<ul style="list-style-type: none"> a) Structure maintained to design b) Inspection schedule met c) Reactive works undertaken in a timely manner d) No complaints 		Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Transport Infrastructure team
Signs	Signs are reader-friendly, clearly visible, safe, and do not impact on the visual qualities of the lake	<ul style="list-style-type: none"> a) Structure maintained to design b) Inspection schedule met c) Reactive works undertaken in a timely manner d) Public are compliant with signs relating to local law regulations e) No complaints 	If non-compliance and/or complaints register indicate a growing trend of users whom are not complying with regulations, assess suitability of all forms of public education, including signage. Implement any improvements where determined necessary (see more section 7)	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team

8.3 Standards and specifications

Maintenance work is carried out in accordance with the following standards and specifications:

1. Building Code of Australia
 - a) BCA Vol 2 Part 3.1.2.0 – Drainage (AS 3500.3.2)
 - b) BCA Vol 2 Part 3.1.2.2 (d) – Excavation and Piling near Sewers and Drains
 - c) BCA Vol 2 Part 3.1.1 – Earthworks
2. Australian Standards
 - a) AS 1141: Methods for sampling and testing aggregates
 - b) AS 1428: Design for Access and Mobility
 - c) AS 1604: Treatment of piles
 - d) AS 1664.1: Aluminium Structures Code
 - e) AS 1665: Welding
 - f) AS 1170.1 and 1170.2: Loading Codes
 - g) AS 1650 Galvanising
 - h) AS 1720: Timber Structures Code
 - i) AS 2159: Piling Code
 - j) AS 2239: Galvanic (Sacrificial) Anodes for Cathodic protection
 - k) AS 2312 Two Pack Epoxy Paints
 - l) AS 2832.3 Guide to the Cathodic protection of metals-fixed immersed structures.
 - m) AS 3500: Part 3.2, Stormwater Drainage – Acceptable Solutions
 - n) AS 3600: Concrete Structures Code
 - o) AS 3700: Masonry Structures Code
 - p) AS 3706: Geotextiles Methods of test
 - q) AS/NZ 3004: Marinas and Recreational Boats
 - r) ANZECC: Guidelines for fresh and Marine Water Quality
 - s) AS 3962: Guidelines for Design of Marinas Code
 - t) AS 4110: Steel Structures Code
 - u) AS 4133: Methods of testing rocks for engineering purposes
 - v) AS 4997: Guidelines for the design of maritime structures
3. SEQ Restoration Framework, Guideline & Manual
4. Healthy Waterways – Water sensitive Urban Design – Technical Design Guidelines for SEQ
5. Healthy Waterways – Water by Design Construction and Establishment Guidelines
6. Any other relevant regulations, policies, codes and/or guidelines that fall under the Acts listed in section 3.4

9 Contacts

Entity	Contact details	Enquiry type
Sunshine Coast Council - Customer Service	(07) 5475 7272 1300 007 272	All
Maritime Safety Queensland	(07) 5373 2310 A/H (07) 3305 1700	Marine safety and marine pollution, including oil spills
Sunshine Coast District Water Police	(07) 5457 6711 A/H 0438 200 705	Search and rescue, on-water criminal matters and marine safety complaints
Queensland Boating and Fisheries Patrol	(07) 5444 4599 (Mooloolaba)	Marine safety and fisheries complaints
Department of Environment & Science	1300 130 372	Involving pollution, environmental harm, fish kills and marine strandings
Department of Agriculture and Fisheries	(07) 3404 6999	Involving marine plants
RSPCA QLD	1300 ANIMAL (1300 264 625)	Involving injured wildlife. Will likely be attended by Queensland Parks and Wildlife Service (QPWS)

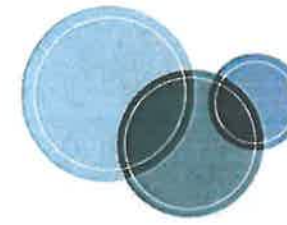
10 Review

This document may be reviewed and updated as determined necessary by council in response to new information, challenges in implementation or changing external factors such as technology, land use, the environment, legislation and community values.

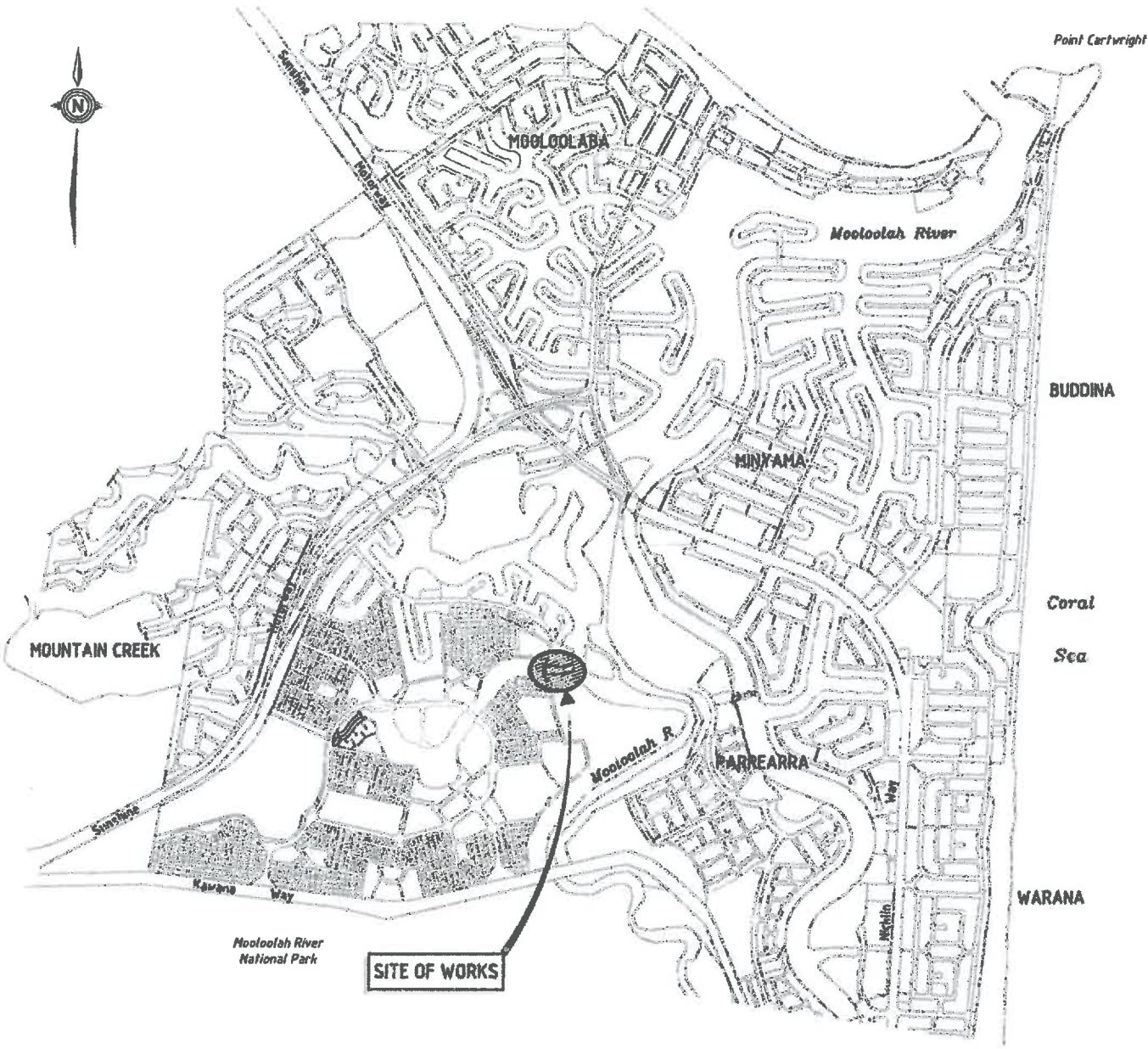
Appendix A: Weir design drawings

WORKS AS CONSTRUCTED

This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
 Signature *[Signature]* Date of Completion: 28 May 2015
 For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
 Shaun Pilcher RPEQ 14593
 In making this certificate we have relied upon information provided by others.
 NOTE: Design drawings produced by Cardno
 Amendments shown made by Calibre Consulting
 Survey Model by RPS



brightwater



LOCALITY PLAN

OUTLET WEIR

SCHEDULE OF DRAWINGS

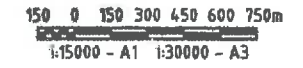
DRAWING No	DESCRIPTION
147841-03-01	LOCALITY PLAN AND DRAWING SCHEDULE
147841-03-02	SITE PLAN AND SETOUT DETAILS
147841-03-03	LONGITUDINAL SECTION
147841-03-04	CROSS SECTIONS
147841-03-05	VEHICLE ACCESS SRV - AS 2890 - TURNING PATH
147841-03-06	PLAN AND SECTION
147841-03-07	STRUCTURAL NOTES AND TYPICAL SECTION
147841-03-08	ROCK SCOUR PROTECTION DETAILS
147841-03-09	REINFORCED CONCRETE RETAINING WALL ELEVATIONS
147841-03-10	RETAINING WALL TYPICAL SECTIONS AND JOINT DETAILS
147841-03-11	RETAINING WALL REINFORCEMENT DETAILS
147841-03-12	SHEET PILE CUT-OFF WALLS
147841-03-13	BASE LAYOUT PLAN
147841-03-14	BASE REINFORCEMENT LAYOUT PLAN
147841-03-15	WEIR REINFORCEMENT DETAILS
147841-03-16	BRIDGE LAYOUT AND REINFORCEMENT PLAN
147841-03-17	BULKHEAD DETAILS - DELETED
147841-03-18	BULKHEAD STORAGE PIT DETAILS - DELETED
147841-03-19	FENCE DETAILS

EXISTING SERVICES NOTE:

- Services shown on these plans are only those evident at the time of survey, from As Constructed survey and from 'Dial Before You Dig' searches. There may be more services not shown on these drawings.
- It is the responsibility of the Contractor to contact the relevant service utility providers to confirm the location of all existing services prior to commencement of works.
- Any damage to services shall be repaired by the Contractor or the relevant authority at the Contractor's expense.

COORDINATE DATUM NOTE:
 THIS PROJECT HAS BEEN DESIGNED ON AN ARBITRARY COORDINATE BASE SUPPLIED BY CONICS (Sunshine Coast) Pty Ltd. THE SCALE FACTOR USED IS ONE(1).

LEVEL SOURCE : PSM 101235, R.L.29.938



DATE PLOTTED: 14 May 2011 09:11:20

REV.	DATE	REVISIONS	REC.	APPR.
F	26/05/2011	Bulkheads & stairs removed		
D	15/06/2008	Logs updated, drawing 18 and services notes added	R.J.W.	P.M.
C	12/02/2008	General amendments due to new concept review	P.H.	G.G.T.
B	30/03/2007	Schedule amended	P.H.	G.G.T.
A	04/01/2006	Weir modified	P.H.	G.G.T.

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 DRAWN: *G.G.*
 CHECKED: *P.M.*
 RECOMMENDED: PROJ. MAN. *P. McKay*
 APPROVED: PROJ. DIR. *G.G. Tamblyn* BPEQ 1223
 CAD FILE: W1041-03-01.dwg
 XREF:

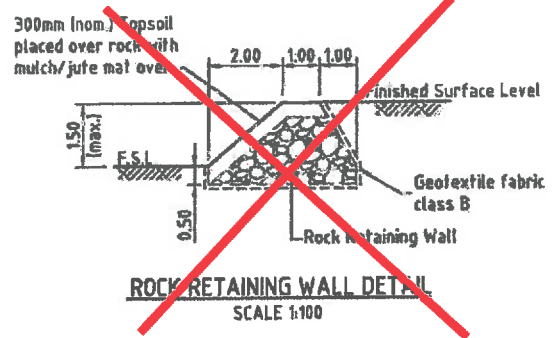
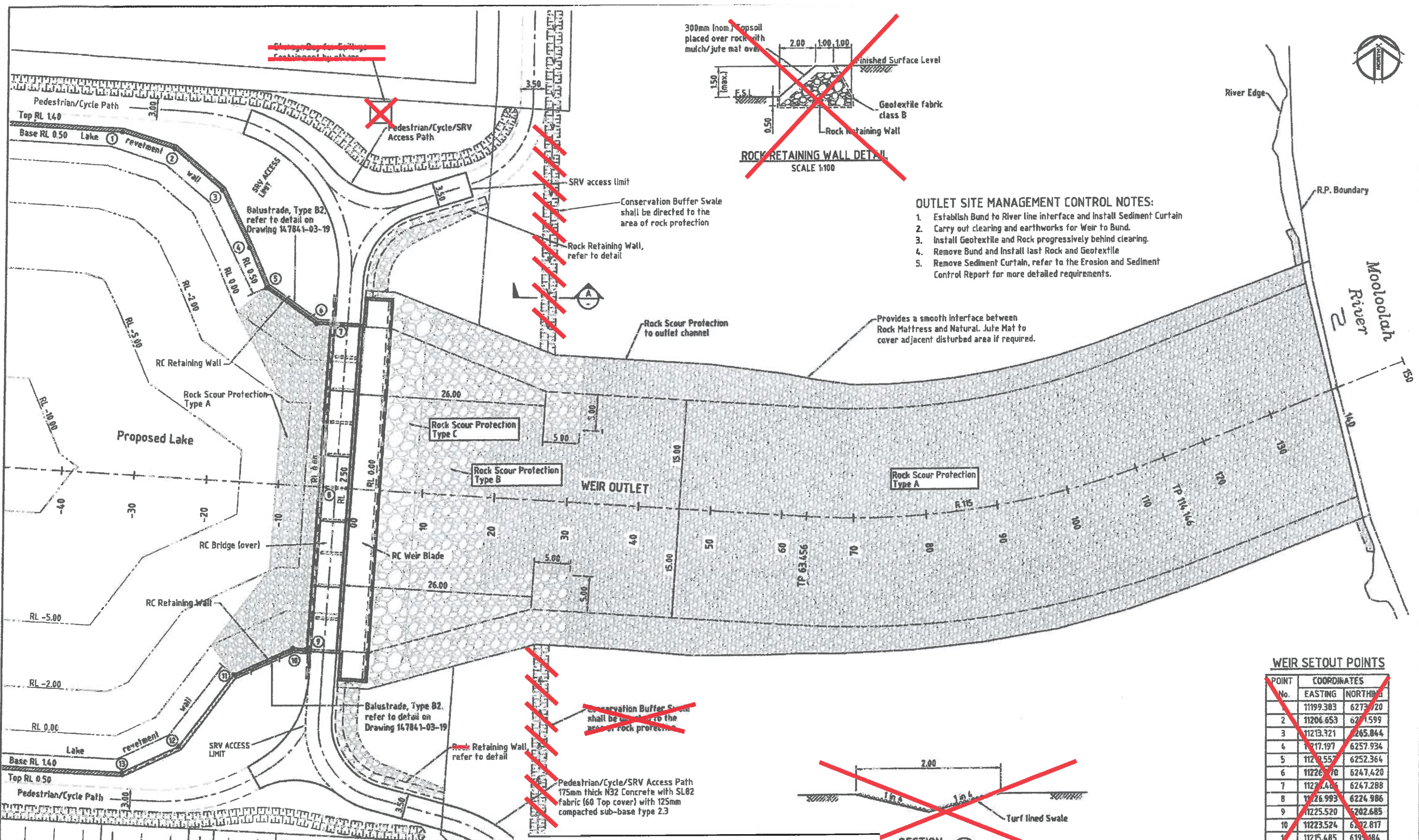
Cardno
 Cardno (Old) Pty Ltd
 ABN 57 00 1 074 992
 SUNSHINE COAST OFFICE: Level 1 @ Maud Street Maroochydore, Qld 4556
 Email: info@cardno.com.au Ph: (07) 5443 2535 Fax: (07) 5443 2862

STOCKLAND BUDDINA PTY LTD
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 Sunshine Coast
 Brisbane
 Sydney
 Gold Coast
 Townsville
 Harvey Bay
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 Rockhampton
 Darling Downs
 Darwin

TELEPHONE:
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 (07) 4924 7500
 (07) 4637 9122
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 (07) 4721 7020
 (07) 4124 5150
 (07) 4003 2092
 (07) 4920 4370
 (07) 4637 9150
 (08) 8041 1700

DATE: 30/08/2005	Rev.
DRAWING No:	
147841-03-01	F



- OUTLET SITE MANAGEMENT CONTROL NOTES:**
1. Establish Bund to River line interface and install Sediment Curtain
 2. Carry out clearing and earthworks for Weir to Bund.
 3. Install Geotextile and Rock progressively behind clearing.
 4. Remove Bund and Install last Rock and Geotextile
 5. Remove Sediment Curtain, refer to the Erosion and Sediment Control Report for more detailed requirements.

WEIR SETOUT POINTS

POINT No.	EASTING	NORTHING
1	11199.303	6273.720
2	11206.653	6215.599
3	11213.321	6265.844
4	11217.197	6257.934
5	11219.557	6252.364
6	11226.70	6247.420
7	11227.46	6247.288
8	11226.993	6224.986
9	11225.520	6202.685
10	11223.524	6172.617
11	11215.485	6195.184
12	11207.913	6189.3
13	11200.161	6185.778

WORKS AS CONSTRUCTED
 This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
 Signature: *[Signature]* Date of Completion: 28 May 2015
 For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
 Shaun Pilcher RPEQ 14593
 In making this certificate we have relied upon information provided by others.
 NOTE: Design drawings produced by Cardno
 Amendments shown made by Calibre Consulting
 Survey Model by RPS

NO.	DATE	REVISIONS	REC.	APPR.
1	09/06/2011	Location of Storage Bay added.	P.H.	P.H.
2	16/02/2012	Amended revetment wall setout	P.H.	P.H.
3	13/07/2012	Rock Retaining Wall detail amended	P.H.	P.H.
4	04/09/2012	SRV pathway parallel spur added.	P.H.	P.H.
5	19/06/2013	Balustrade revised	C.K.	P.H.
6	04/03/2013	RFI RESPONSE	C.K.	P.H.
7	15/08/2013	Section A added, wall detail amended	N.M.	P.H.
8	26/03/2014	100mm nominal thick bench added to rock retaining wall detail.	P.H.	G.G.T.
9	13/02/2014	General amendments due to user concept review.	P.H.	G.G.T.
10	30/03/2017	Pathway relocated, blade walls added	P.H.	G.G.T.
11	04/01/2016	weir modified	P.H.	G.G.T.

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DESIGNED: *[Signature]*
 DRAWING: *[Signature]*
 CHECKED: *[Signature]*
 RECOMMENDED: PROJ. MAN.
 APPROVED: PROJ. MGR.
 G.G. Tamblyn

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 1281 87 091 014 892
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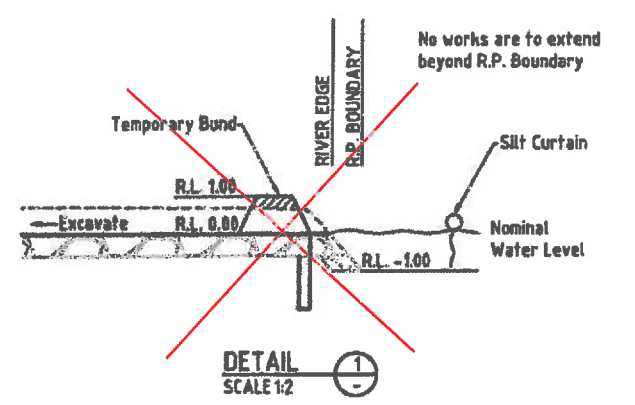
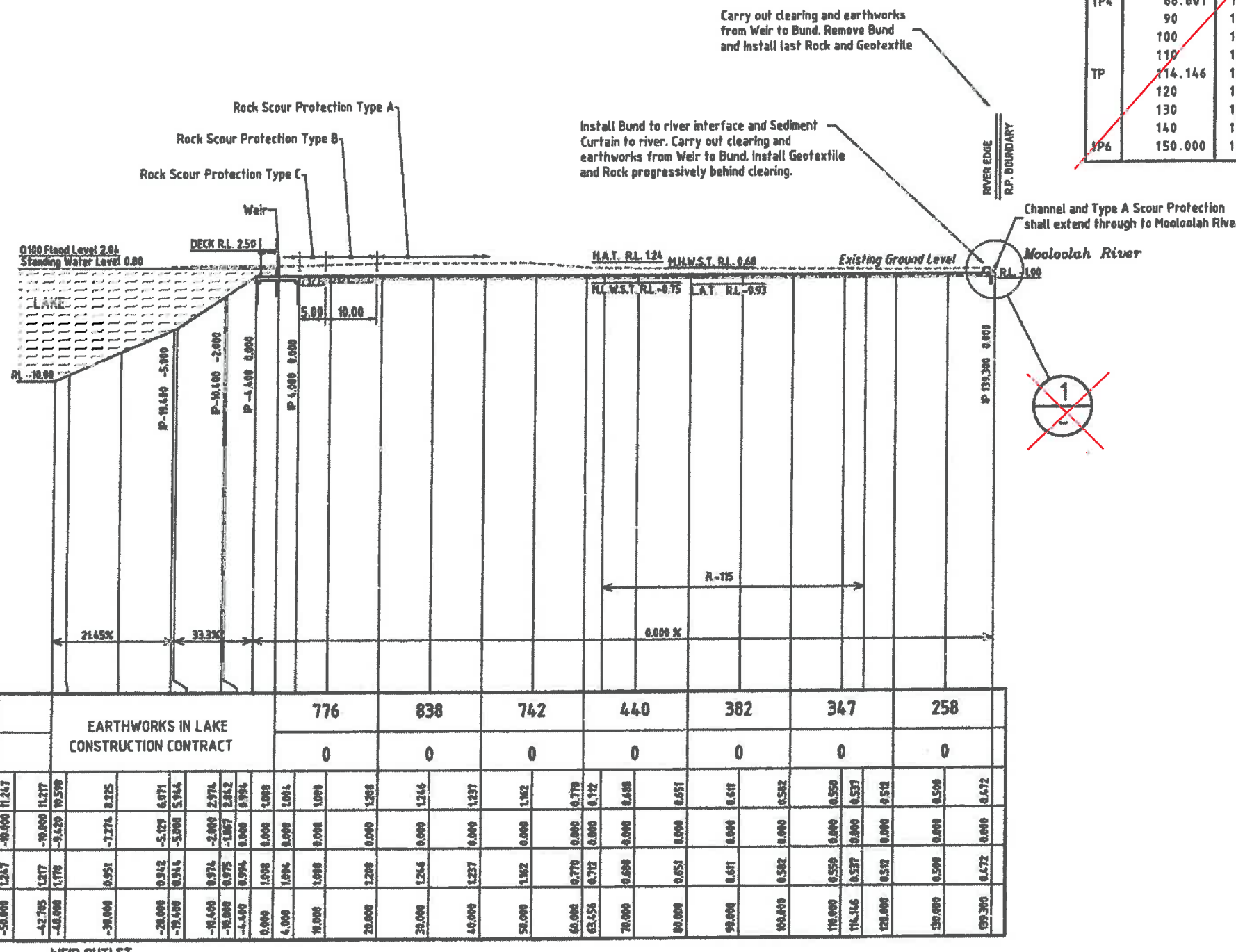
STOCKLAND BUDDINA PTY LTD
 BUNDILLA DEVELOPMENT
 OUTLET WEIR
 SITE PLAN AND SETOUT DETAILS

DATE: 30/08/2006
 Drawing No: 147841-03-02
 K

WEIR OUTLET - CONTROL LINE DETAILS

PT	CHAINAGE	EASTING	NORTHING	BEARING	RAB/SPIRAL	TANGENT	DEF ANGLE	ARC LEN
IP1	-50.000	11181.492	6227.992	93d46'44"				
	-40	11191.470	6227.333	93d46'44"				
	-30	11201.448	6226.674	93d46'44"				
	-20	11211.427	6226.015	93d46'44"				
	-10	11221.405	6225.355	93d46'44"				
IP2	0.000	11231.383	6224.696	93d46'44"	115.000	25.763	25d15'18"	50.690
	10	11241.361	6224.037	93d46'44"				
	20	11251.340	6223.378	93d46'44"				
	30	11261.318	6222.719	93d46'44"				
	40	11271.296	6222.060	93d46'44"				
	50	11281.274	6221.401	93d46'44"				
TP	63.456	11294.701	6220.514	93d46'44"				
	70	11301.240	6220.269	90d31'06"				
	80	11311.231	6220.613	85d32'10"				
IP4	88.801	11320.408	6218.814	80d33'14"				
	90	11321.154	6221.023	80d33'14"				
	100	11330.935	6223.891	75d34'18"				
	110	11340.499	6226.801	70d35'22"				
TP	114.146	11344.383	6228.248	68d31'26"			0d00'00"	
	120	11349.831	6230.392	68d31'26"				
	130	11359.137	6234.053	68d31'26"				
	140	11368.442	6237.714	68d31'26"				
IP6	150.000	11377.748	6241.375	68d31'26"				

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 Shaun Pilcher RPEQ 14593
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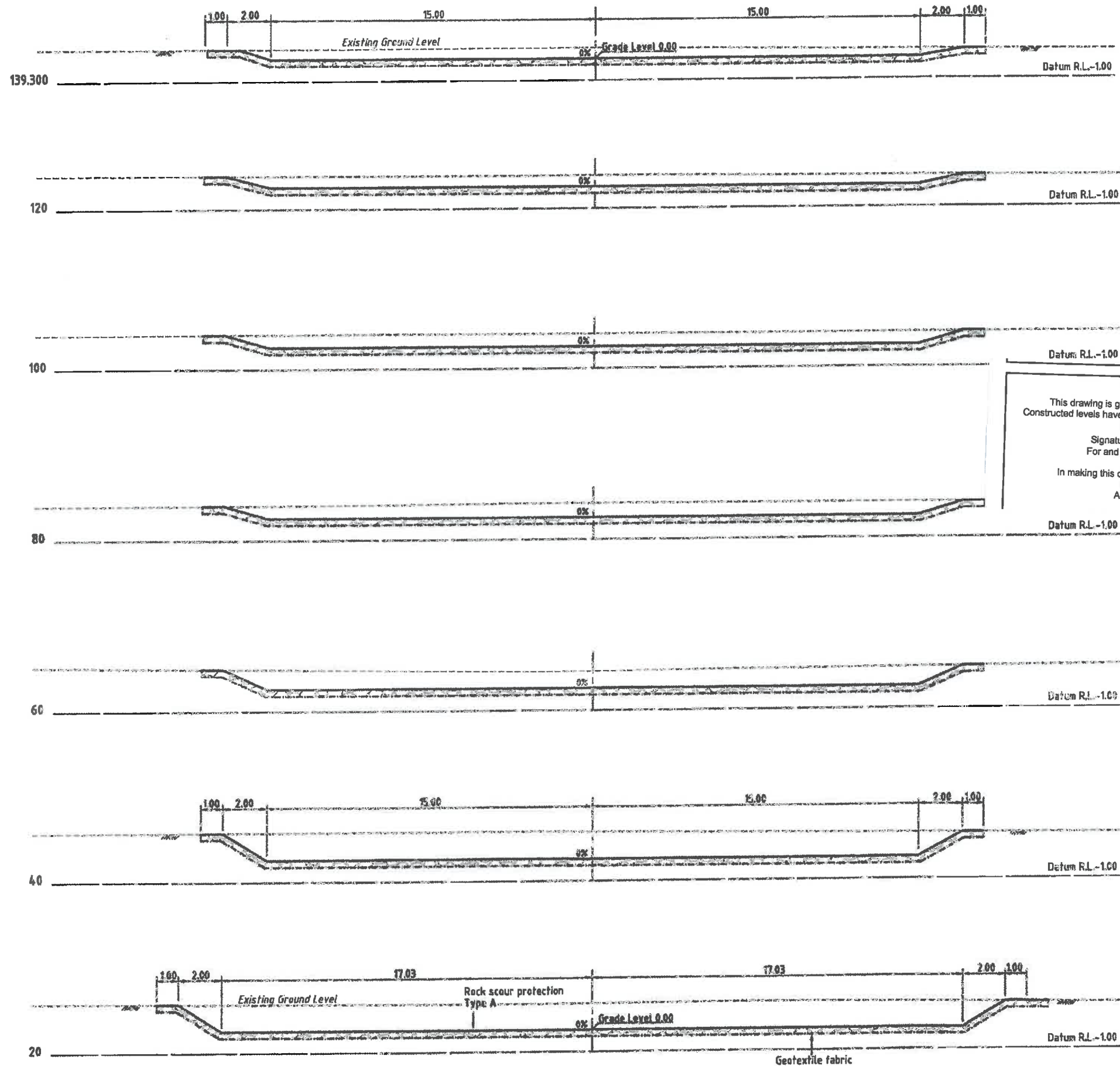


VOLUMES	CUT	FILL	EARTHWORKS IN LAKE CONSTRUCTION CONTRACT																										
			776	838	742	440	382	347	258																				
			0	0	0	0	0	0	0	0																			
DEPTH OF CUT/FILL			11.267	11.217	10.589	8.225	6.871	5.944	2.974	2.162	0.956	0.089	0.094	0.098	1.208	1.246	1.237	1.562	0.779	0.712	0.688	0.651	0.611	0.582	0.559	0.537	0.512	0.500	0.472
GRADE LEVELS			-10.000	-9.420	-8.589	-7.274	-5.127	-3.000	-2.000	-1.867	-0.900	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SURFACE LEVELS			1.267	1.217	1.178	0.951	0.942	0.946	0.974	0.975	0.996	1.000	1.006	1.000	1.000	1.208	1.246	1.237	1.562	0.779	0.712	0.688	0.651	0.611	0.582	0.559	0.537	0.512	0.500
CHAINAGE			-50.000	-42.765	-40.000	-30.000	-20.000	-19.100	-10.000	-9.000	-8.000	4.000	10.000	20.000	30.000	40.000	50.000	60.000	65.658	70.000	80.000	90.000	100.000	110.000	114.146	120.000	130.000	140.000	150.000

LONGITUDINAL SECTION

HOR. 5 0 5 10 15 20 25m 1:500-A1 1:1000-A3
 VERT. 2.5 0 2.5 5.0 7.5 10 12.5m 1:250-A1 1:500-A3

<p>19/10/2005 Bund note on longitudinal amended</p> <p>05/03/2009 RFI Response</p> <p>15/08/2008 Section amended</p> <p>27/03/2008 Weir outlet longitudinal section amended</p> <p>13/03/2008 General amendments due to weir concept review</p> <p>30/03/2007 Pathways relocated, blade walls added</p> <p>04/03/2006 Weir modified</p>	<p>Cardno (Qld) Pty Ltd All Rights Reserved 2008</p> <p>Copyright in this plan and every part thereof belongs to Cardno (Qld) Pty Ltd and may not be used, copied, reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written permission of Cardno (Qld) Pty Ltd.</p> <p>This document is prepared by Cardno (Qld) Pty Ltd for the benefit of the client. The client is responsible for the accuracy of the information provided. Cardno (Qld) Pty Ltd does not accept any liability for any loss or damage arising from the use of this document, whether or not such loss or damage is foreseeable, and whether or not the loss or damage is caused in whole or in part by the negligence of Cardno (Qld) Pty Ltd.</p>	<p>DESIGNED: <i>A.H.</i></p> <p>DRAWN: <i>P.G.</i></p> <p>CHECKED: <i>P.H./P.M.</i></p> <p>RECOMMENDED: PROJ. MAN. <i>P. McKay</i></p> <p>APPROVED: PROJ. DIR. <i>G.G. Tamblin</i></p> <p>CAD FILE: WTM1-03-03.dwg</p>	<p>A1 DATUM: A.H.D.</p> <p>Cardno</p> <p>Cardno (Qld) Pty Ltd ABN 57 081 034 000</p> <p>BUNBURY COAST OFFICE: Level 1, 5 Maud Street, Manlyhead, Qld 4806</p>	<p>OFFICE: <i>[Address]</i></p> <p>TELEPHONE: (07) 5443 5206</p> <p>FAX: (07) 5443 0647</p> <p>BRISBANE: (07) 2966 5629</p> <p>GLASSBORO: (07) 3315 9722</p> <p>GLADSTONE: (07) 4610 2527</p> <p>ROCKHAMPTON: (07) 8639 9200</p> <p>TOWNSVILLE: (07) 4772 1100</p> <p>WAGGA WAGGA: (07) 4124 2423</p> <p>WARRACKLEE: (07) 4013 2814</p> <p>WINDSOR: (07) 4924 7620</p> <p>WYNDHAM: (07) 4821 0122</p>	<p>STOCKLAND BUDDINA PTY LTD</p> <p>BUNDILLA DEVELOPMENT OUTLET WEIR</p> <p>LONGITUDINAL SECTION</p> <p>DATE: 30/08/2005</p> <p>DRAWING No: 147841-03-03</p>
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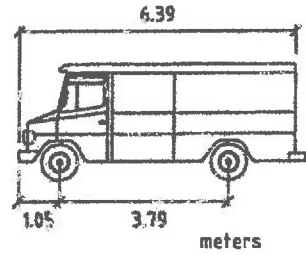


WORKS AS CONSTRUCTED
 This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
 Signature *[Signature]* Date of Completion: 28 May 2015
 For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
 Shaun Pilcher RPEQ 14593
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**WEIR OUTLET
 CROSS SECTIONS**
 SCALE 1:100



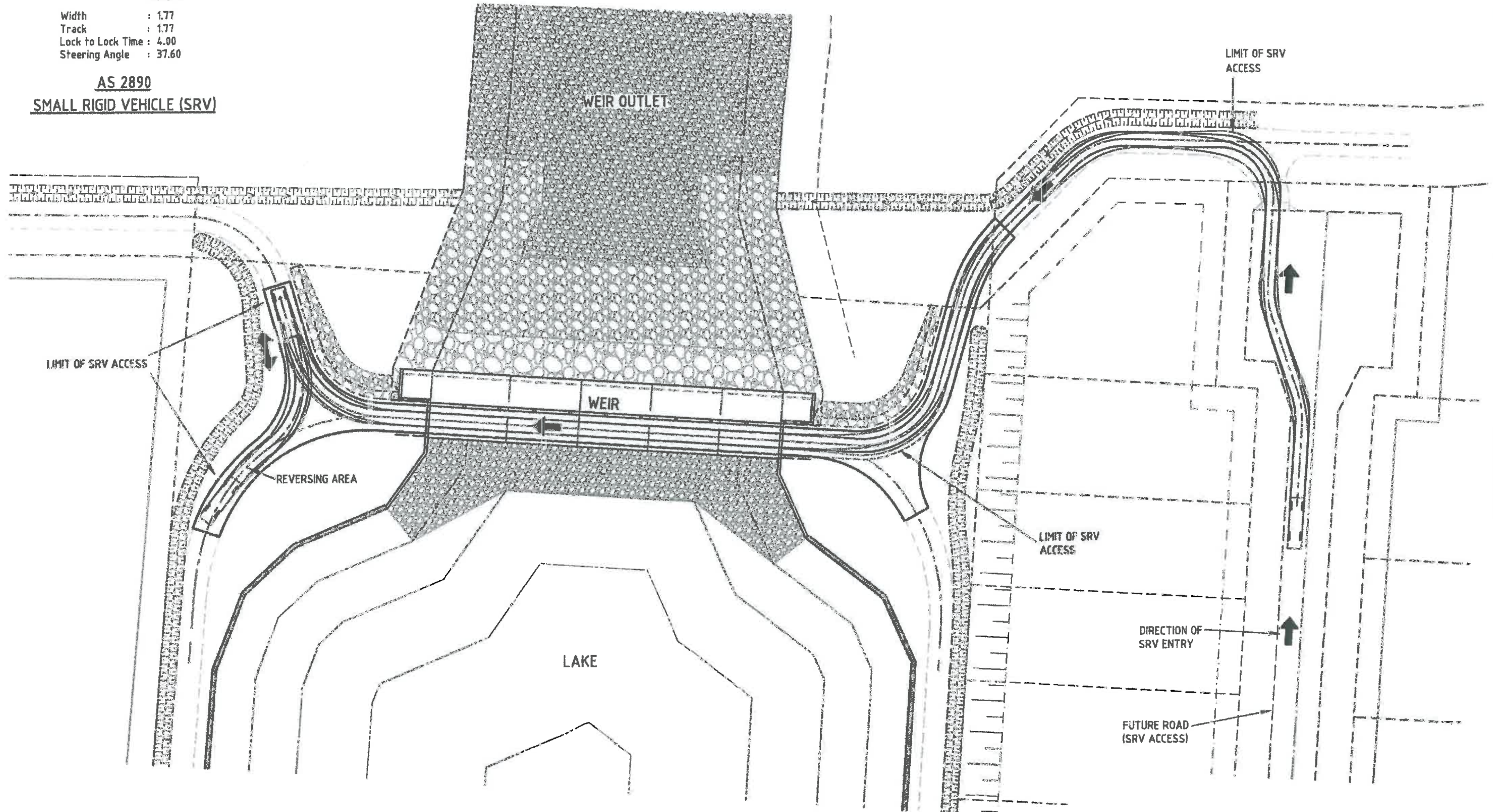
DATE PLOTTED: 28 May 2015 10:58:11 AM 15/08/2008 Title amended, RPS added 13/02/2008 General amendments due to early concept review		DESIGNED: A. M. DRAWN: S. B. CHECKED: A. M. / S. B. RECOMMENDED PROJ. MAN: P. McKay CAD FILE: 147841-03-04.dwg	A1 DATUM: A.H.D. Cardno (Qld) Pty Ltd Level 10, 100 Creek Street, Mackay, QLD 4740 Email: info@cardno.com.au Ph: 082 4042900 Fax: 082 4447800	QUANTITY LIST: Earthwork (Excavation) 100.00 Earthwork (Fill) 100.00 Rock Scour Protection 100.00 Geotextile Fabric 100.00 Reinforcement 100.00 Formwork 100.00 Scaffolding 100.00 Other 100.00	STOCKLAND BUDDINA PTY LTD BUNDILLA DEVELOPMENT OUTLET WEIR CROSS SECTIONS	DATE: 30/06/2008 DRAWING No: 147841-03-04 Rev: B
		APPROVED PROJ. DIR: G. G. Tamblin RPEQ 1323	REVISIONS: 1. General amendments due to early concept review 2. Title amended, RPS added	50% Copyright © 2008 Cardno (Qld) Pty Ltd All Rights Reserved 2008 This drawing is the property of Cardno (Qld) Pty Ltd. It is to be used only for the project and site for which it was prepared. It is not to be used for any other project or site without the written consent of Cardno (Qld) Pty Ltd.		



Width : 1.77
 Track : 1.77
 Lock to Lock Time : 4.00
 Steering Angle : 37.60

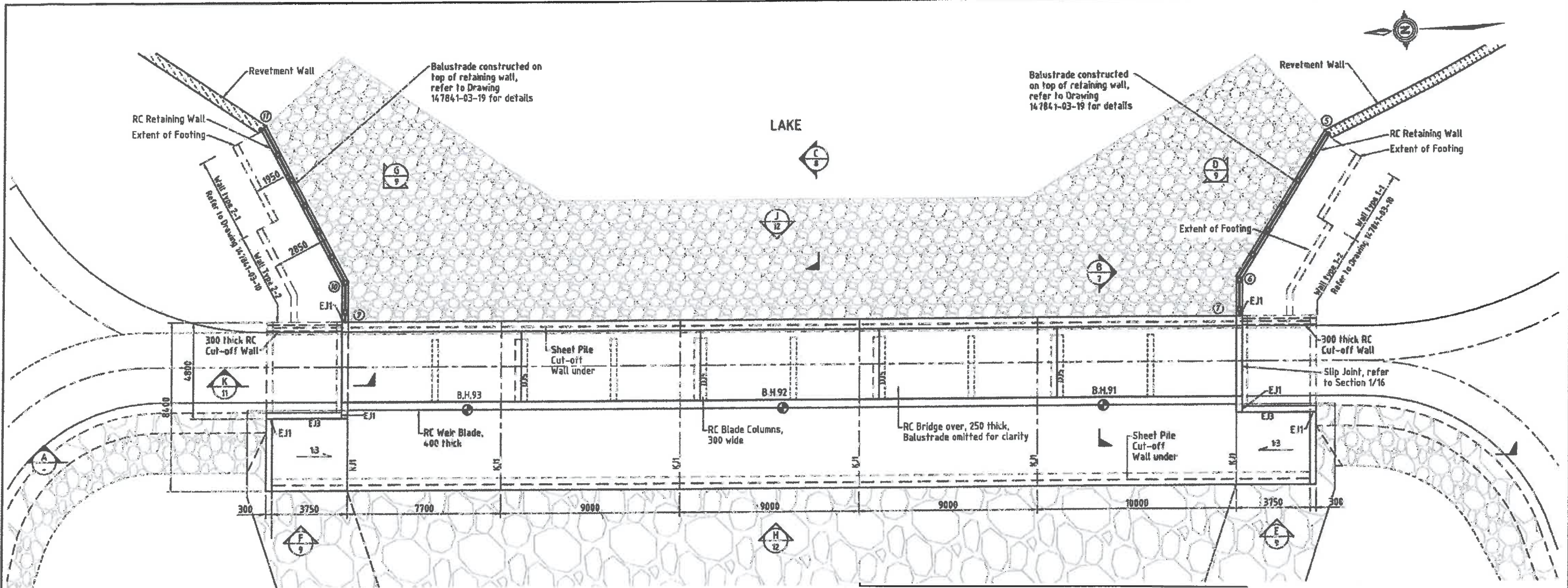
**AS 2890
 SMALL RIGID VEHICLE (SRV)**

WORKS AS CONSTRUCTED
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 Signature: *[Signature]* Date of Completion: 28 May 2015
 For and on behalf of **CALIBRE CONSULTING (QLD) PTY LTD**
 Shaun Pflcher RPEQ 14593
 In making this certificate we have relied upon information provided by others.
 NOTE: Design drawings produced by Cardno
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 Survey Model by RPS



ALLY 12/11/15 10:58 AM 1:250 - A1 1:500 - A3

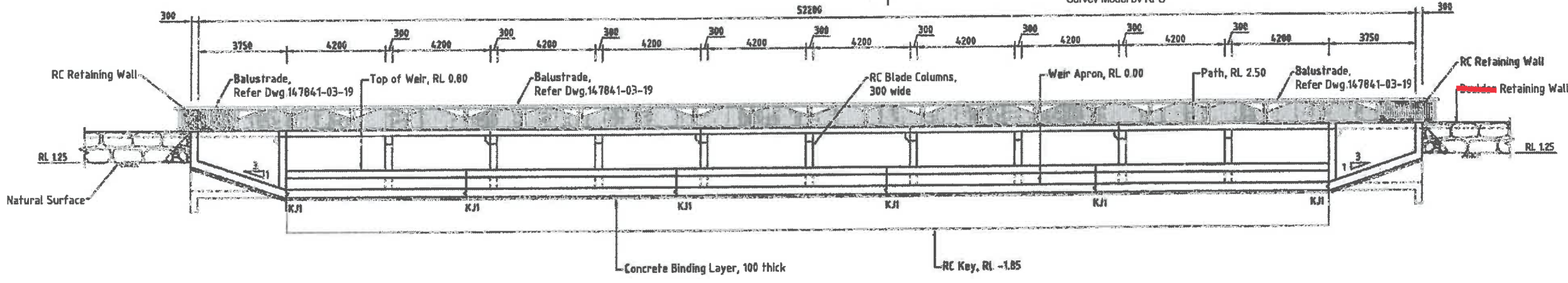
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PLAN
SCALE 1:100

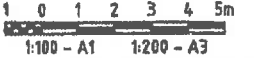
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 Survey Model by RPS

For Balustrade details refer to Landscape Architects drawings. Details shall be approved by Cardno Structural Engineer prior to fabrication.

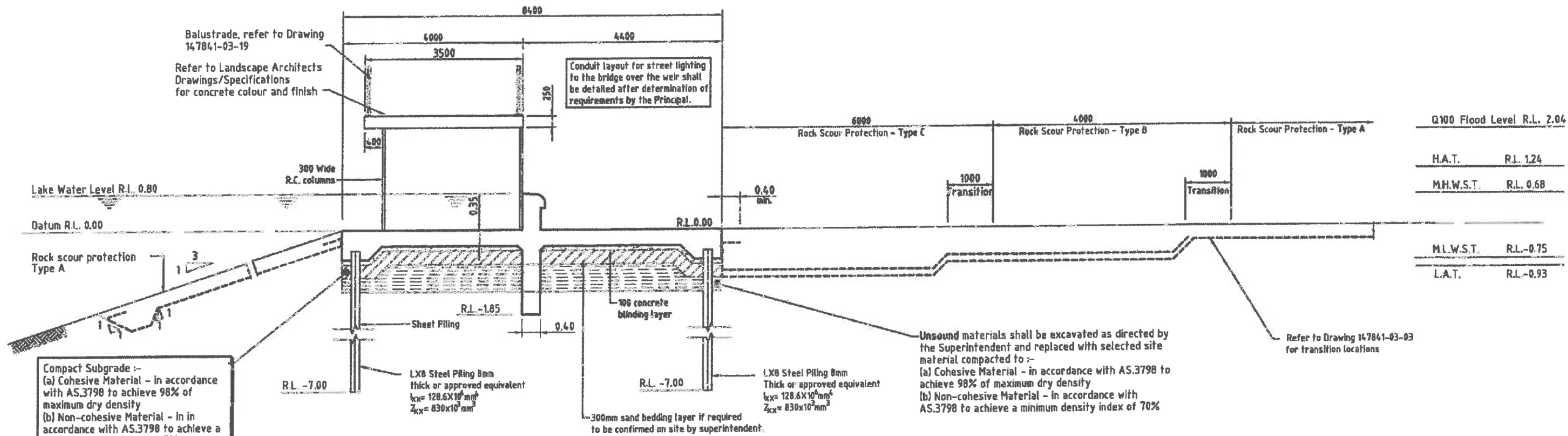


SECTION A - SHEET PILE CUT-OFF WALL OMITTED FOR CLARITY
SCALE 1:100

NOTE
Refer to Drawing 147841-03-02 for weir setout coordinates.



26/05/2011 Bulkheads & slot removed 19/05/2009 Balustrade removed 15/08/2009 Balustrade added 13/02/2009 General amendments due to weir concept review 10/02/2009 Blade columns added 04/01/2006 Weir modified	DESIGNED: R.R. DRAWN: R.R. CHECKED: P.M./A.R. RECOMMENDED: P.M./M.M. P. McKay APPROVED: PROJ. DIR. G.G. Tamblyn RPEQ 3720	A1 DATUM: A.H.D. Cardno Cardno (Qld) Pty Ltd Level 1, 8 Mead Street Merseyville QLD 4815 (08) 9448 8888 Fax: (08) 9448 8888	OFFICE: Brisbane Brisbane Sydney Gold Coast Townsville Hervey Bay Cairns Rockhampton Darling Downs Darwin	TELEPHONE: (07) 5443 5750 (07) 5443 5750 (02) 9414 6116 (07) 5520 5233 (07) 472 1181 (07) 4104 5485 (07) 4223 3875 (07) 4024 3100 (07) 4007 8122 (07) 4001 3615	FAX: (07) 5443 6542 (07) 5443 6542 (07) 9416 0200 (07) 4212 4247 (07) 4721 2908 (07) 4124 6115 (07) 4023 3861 (07) 4028 0187 (07) 4037 4186 (08) 6941 1795	STOCKLAND BUDDINA PTY LTD BUNDILLA DEVELOPMENT OUTLET WEIR PLAN AND SECTION	DATE: 30/08/2005 DRAWING No: 147841-03-06 F
---	--	---	---	---	--	---	---



Compact Subgrade :-
 (a) Cohesive Material - in accordance with AS.3798 to achieve 98% of maximum dry density
 (b) Non-cohesive Material - in accordance with AS.3798 to achieve a minimum density index of 70%
 Minimum allowable bearing capacity of subgrade shall be 100 kPa and shall be confirmed by Geotechnical Engineer prior to placement of blinding layer.

Unsound materials shall be excavated as directed by the Superintendent and replaced with selected site material compacted to :-
 (a) Cohesive Material - in accordance with AS.3798 to achieve 98% of maximum dry density
 (b) Non-cohesive Material - in accordance with AS.3798 to achieve a minimum density index of 70%

SECTION B
 SCALE 1:50

WORKS AS CONSTRUCTED
 This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
 Signature: [Signature] Date of Completion: 28 May 2015
 For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
 Shaun Pilcher RPEQ 14593
 In making this certificate we have relied upon information provided by others.
 NOTE: Design drawings produced by Cardno
 Amendments shown made by Calibre Consulting
 Survey Model by RPS

GENERAL

- G1. These drawings are to be read in conjunction with the specifications. Any discrepancy or omission shall be immediately referred to the Superintendent for resolution.
- G2. All dimensions to be checked by the Contractor before fabrication and construction. DIMENSIONS SHALL NOT BE SCALED.
- G3. All dimensions are in millimetres and reduced levels in metres unless stated otherwise.
- G4. Workmanship and materials shall comply with the Building Code of Australia, and the appropriate S.A.A. Standards, or to such statutory requirements as are deemed to apply to the works.
- G5. The structure has been designed to resist the following loads -
 a. Structure Dead Load
 b. Imposed Dead Load
 c. Live Load

ELEMENT	LOAD	LOAD
Retaining Wall	5.0kPa	5.0kPa
Retaining Wall	5.0kPa	5.0kPa
Weir and Bridge	5.0kPa + 31kN Point Load	

- G6. During construction the structure shall be maintained in a stable condition and no part shall be overstressed.
- G7. No penetrations, chases or temporary fixtures are permitted without prior approval of the Superintendent.
- G8. All props and formwork for beams and slabs shall be removed before construction of any permanent loading on the slab.
- G9. Building material or other temporary loading shall not be placed on suspended floors without the prior approval of the Superintendent.

FOUNDATIONS

- F1. The foundations have been designed for the following maximum allowable bearing capacities

ELEMENT	PRESSURE (kPa)
Footings	100
- F2. Foundations shall be inspected by the Superintendent before placing footings. Footings shall be poured as soon as possible after approval of the foundation and shall be maintained free from water and loose material. Foundations which are allowed to soften or are exposed to excessive water shall be over excavated and backfilled with blinding concrete to the design founding level.
- F3. The site shall be stripped of all topsoil and organic material.
- F4. Sand bedding, (if used) shall be a clean well graded sand, spread in an uniform layer and well compacted.

CONCRETE

- C1. Concrete shall comply with the requirements of AS3600. Concrete grade refers to the minimum 28 day compressive strength F_c in MPa and the prefix N or S refers to Normal Class or Special Class concrete as specified.
- | ELEMENT | GRADE(MPa) | MIN. COVER (mm) | MAX. AGGREGATE SIZE (mm) |
|-----------------|------------|-----------------|--------------------------|
| Retaining Walls | S50 | 70 | 20 |
| Revetment Walls | S40 | N/A | 20 |
| Weir and Bridge | S50 | 70 | 20 |
- S40 Concrete shall have minimum 470kg cement per cubic metre with maximum water cement ratio of 0.45 suitable for durability exposure classification C or N50.
 S50 Concrete shall have minimum 550kg cement per cubic metre with maximum water cement ratio of 0.40.

GRADE	MIN. CEMENT CONTENT (kg/m ³)	MAX. W/C RATIO	MAX. AGGREGATE SIZE (mm)
S50	550	0.40	20

- C2. Concrete sizes do not include applied finishes.
- C3. No construction joints, other than those shown on the drawings, shall be used without the approval of the Superintendent.
- C4. The following finishes shall be provided to concrete surfaces

ELEMENT	FINISH
Retaining walls	Class 2
Revetment walls	Class 2
Weir and Bridge	Class 2

Where not specified, formed finishes shall be Class 3 to AS3610 and unformed surfaces shall be a steel trowel finish, with Weir base slab to have broom finish.
 Exposed edges shall be chamfered 20mm.
 Concrete shall not be placed until reinforcement, formwork etc. are inspected and approved by the Superintendent.
 Concrete shall be mechanically vibrated to give maximum compaction without segregation.
 Concrete elements shall be cured by methods appropriate to their final application.
- C6. Exposed edges shall be chamfered 20mm.
- C7. Concrete shall not be placed until reinforcement, formwork etc. are inspected and approved by the Superintendent.
- C8. Concrete shall be mechanically vibrated to give maximum compaction without segregation.
- C9. Concrete elements shall be cured by methods appropriate to their final application.

REINFORCEMENT

- R1. Reinforcing bars and mesh shall comply with AS4671.
- R2. Reinforcement Symbols
 N - Hot Rolled Grade 500N Deformed Bar
 R - Structural Grade Round Bar
 RL, SL, L, - Welded Wire Mesh
 W - Steel Wire
- R3. Bars shall be bent in accordance with AS3600.
- R4. Reinforcement is shown diagrammatically and is not necessarily shown in true projection.
- R5. Splices in reinforcement are to be made only in the positions shown on the drawings or as otherwise approved by the Superintendent.
- R6. Welding of reinforcement is not permitted without the approval of the Superintendent.
- R7. Reinforcement is to be supported in its correct position within the tolerances of AS3600 by approved bar chairs, spacers or support bars.
- R8. Minimum lap lengths for Grade 500N bars unless shown otherwise shall be
 N12 - 300 N16 - 400 N20 - 500 N24 - 700 N28 - 900 N32 - 1100 N36 - 1400
 Top bars in slabs and beams greater than 300 thick to have laps increased by 25%
 Provide 500 x 500 L' bars to all corners (2-N12 top & bottom to footings UNO)

STEELWORK CORROSION PROTECTION - AS/NZS 2312/ENB6

- P1. All corners and exposed edges shall be rounded to a radius of 2mm.
- P2. Remove all traces of oil, salts and acids with solvent or alkaline degreaser (AS 1627 1)
- P3. Abrasive blast clean to Class 2 1/2
- P4. Paint coating specification.

COAT	TYPE	PRN	DFT
1st	Zinc Rich Primer	C02	75
2nd	Epoxy MID	C13	125
3rd	Epoxy MID	C13	125
			Total 375 um



REV.	DATE	REVISIONS	REC.	APPR.
1	24/05/2015	Balustrade slot removed	[Signature]	[Signature]
2	16/03/2009	Balustrade note revised	EK	PH
3	16/03/2009	Cement notes added	EK	PH
4	15/06/2008	Top cap and balustrades amended	KJW	PH
5	02/05/2008	Section B amended, rock scour protection transitions amended	PM	EGT
6	21/03/2008	Section B amended	PM	EGT
7	13/02/2008	General amendments due to water concept review	PM	EGT
8	30/03/2007	Decisions added	PM	EGT
9	30/03/2007	Blade columns added	PM	EGT
10	06/01/2006	Weir modified	PM	EGT

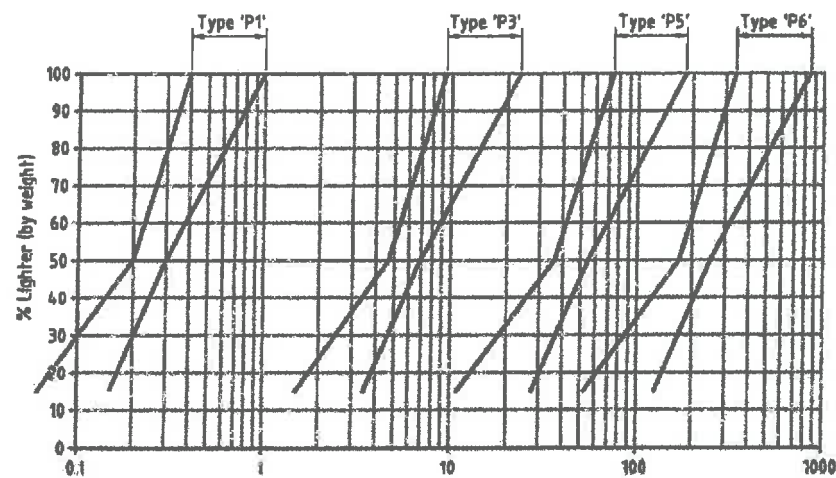
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DESIGNED: RR
 DRAWN: RR
 CHECKED: P.M.A.H.
 RECOMMENDED: PROJ. MAN. P. McKay
 APPROVED: PROJ. DIR. G.G. Tamblyn
 DATUM: A.H.D.
 TAG FILE: 147841-03-07.dwg

Cardno
 Cardno (Qld) Pty Ltd
 Level 1, 9 Maud Street Maroochydore, Qld 4750
 Brisbane Coast Office: Level 1, 9 Maud Street Maroochydore, Qld 4750
 Email: sec@cardno.com.au Ph: 07 5445 2866 Fax: 07 5442 8062

STOCKLAND BUDDINA PTY LTD
 BUNDILLA DEVELOPMENT
 OUTLET WEIR
 STRUCTURAL NOTES AND TYPICAL SECTION

DATE: 30/08/2005
 DRAWING No: 147841-03-07
 Rev: K



ROCK GRADING GRAPH

ROCK GRADING TABLE :

PARAMETER	RANGE	ROCK TYPE			
		P1 (Nom. 50)	P3 (Nom. 150)	P5 (Nom. 300)	P6 (Nom. 500)
W ₁₅	min.	0.06	1.50	11	53
	max.	0.15	3.50	28	128
W ₅₀	min.	0.20	4.70	37	170
	max.	0.30	7.00	56	255
W ₁₀₀	min.	0.40	9.40	75	340
	max.	1.00	24.00	187	850

All gradings given in dry mass (kg.)

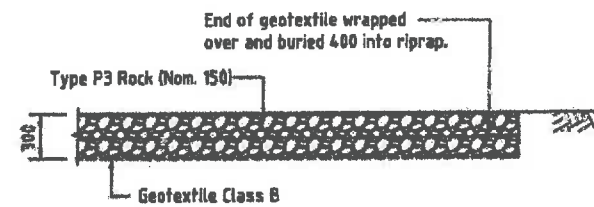
GEOTEXTILE SPECIFICATION TABLE :

Property	Test	Geotextile Class	
		B	C
Minimum grab tensile strength (N)	AS2001.2.3	1000	1800
Minimum G Rating	Austrroads	2500	4200
Minimum trapezoidal tear strength (N)	AS3706.3	400	600
Maximum pore size (EOS μm)	AS3706.7	200	200
Minimum permativity (s ⁻¹)	AS3706.9	0.5	0.5

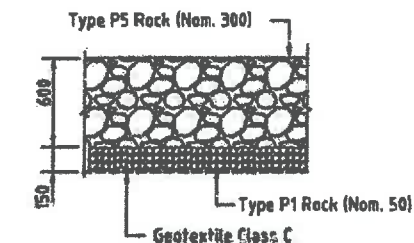
Refer Note No.8

NOTES:

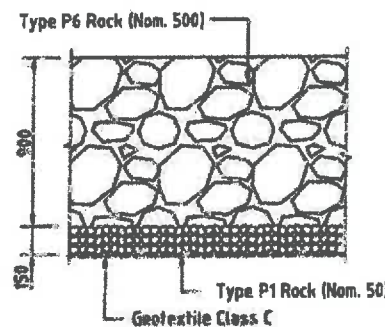
1. A representative sample of rock shall be obtained from the quarry in accordance with AS1141.3.
2. The dry density of the rock shall not be less than 2500 kg/cu.m in accordance with AS4133.2.1.2.
3. The ratio of maximum to minimum dimensions of any rock shall not exceed three.
4. The Los Angeles value of the rock shall not exceed 20 in accordance with AS1141.2.3.
5. The maximum permissible loss for each fraction shall be 12% in accordance with AS1141.2.4.
6. Geotextile fabric shall be lapped 0.50m minimum and shall be keyed at the edges to the satisfaction of the Superintendent.
7. Rock of larger size may be substituted if approved by the Superintendent. If larger rock is used, specified layer thicknesses must be increased whilst maintaining nominated finished levels and profiles.
8. Geotextiles shall be non-woven, needle punched fabrics consisting of polyester or polypropylene polymers.
9. Geotextiles and rock sample should be approved by the engineer before installation.



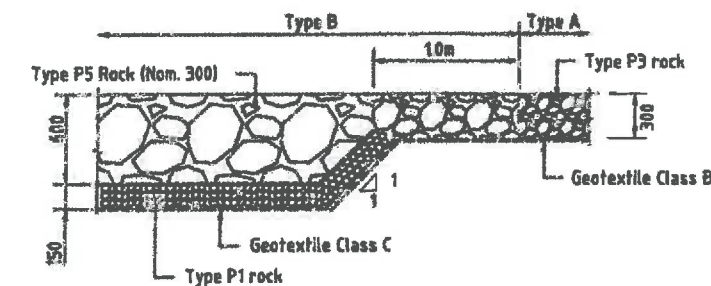
TYPE A



TYPE B



TYPE C



ROCK SCOUR PROTECTION TRANSITION

WORKS AS CONSTRUCTED

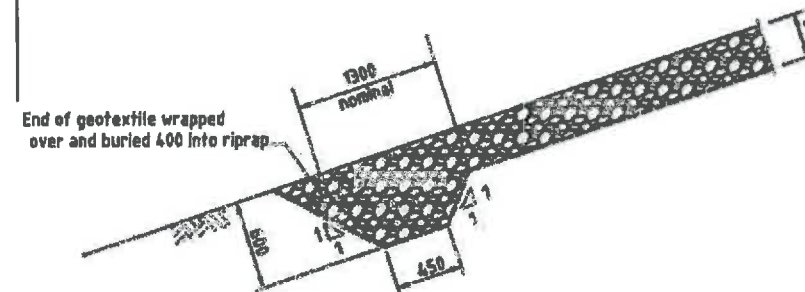
This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY

Signature: [Signature] Date of Completion: 28 May 2015

For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
Shaun Pilcher RPEQ 14593

In making this certificate we have relied upon information provided by others.

NOTE: Design drawings produced by Cardno
Amendments shown made by Calibre Consulting
Survey Model by RPS



SECTION C
1:50

ROCK SCOUR PROTECTION TYPE SECTIONS

SCALE 1:50

500 0 500 1000 1500 2000 2500mm
1:50 - A1 1:100 - A3

PROJECT NO: 147841-03-08

DESIGNED: JFC	DRAWN: JFC	CHECKED: JFC	RECOMMENDED: P.M. G.S.T.	APPROVED: P.M. G.S.T.
DATE: 12/01/2015	DATE: 12/01/2015	DATE: 12/01/2015	DATE: 12/01/2015	DATE: 12/01/2015

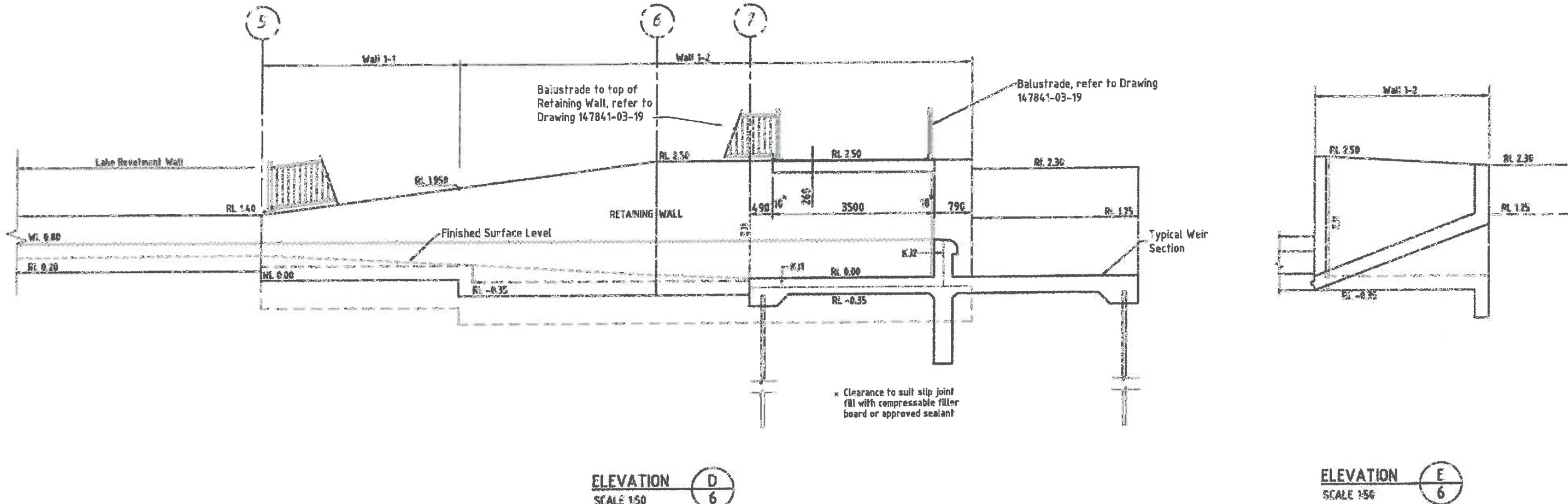
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DESIGNED: JFC
DRAWN: JFC
CHECKED: JFC
RECOMMENDED: P.M. G.S.T.
APPROVED: P.M. G.S.T.

Cardno
Cardno (Qld) Pty Ltd
ABN 12 151 024 560
20/20/2015
147841-03-08
1:50 - A1

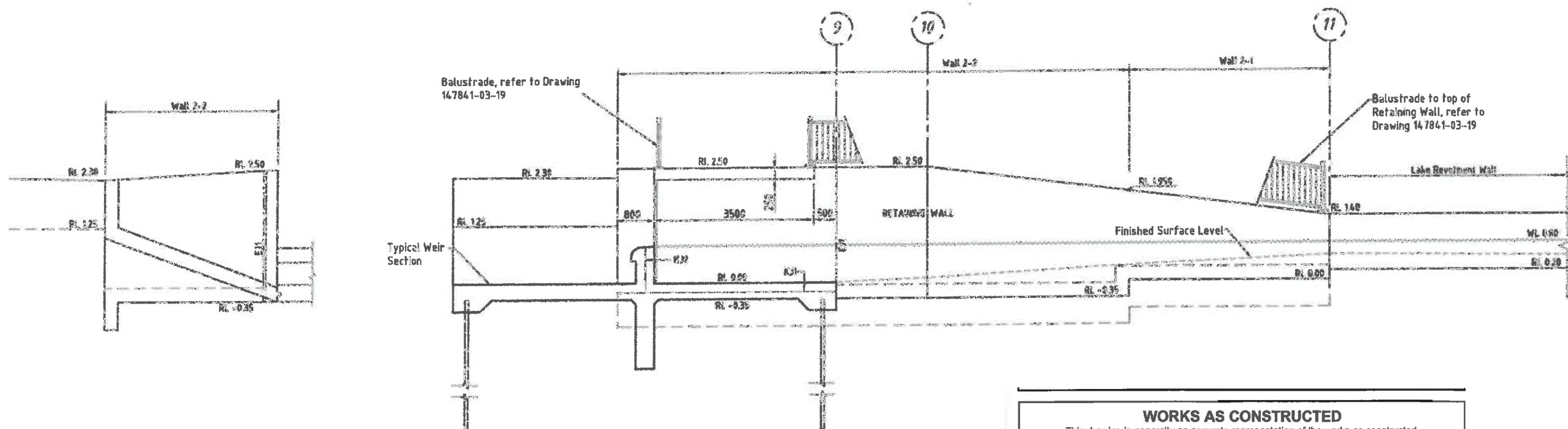
STOCKLAND BUDDINA PTY LTD
BUNDILLA DEVELOPMENT
OUTLET WEIR
ROCK SCOUR PROTECTION DETAILS

DATE: 30/01/2015
DRAWING NO: 147841-03-08
REV: E



ELEVATION D
SCALE 1:50

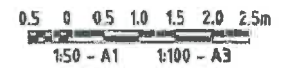
ELEVATION E
SCALE 1:50



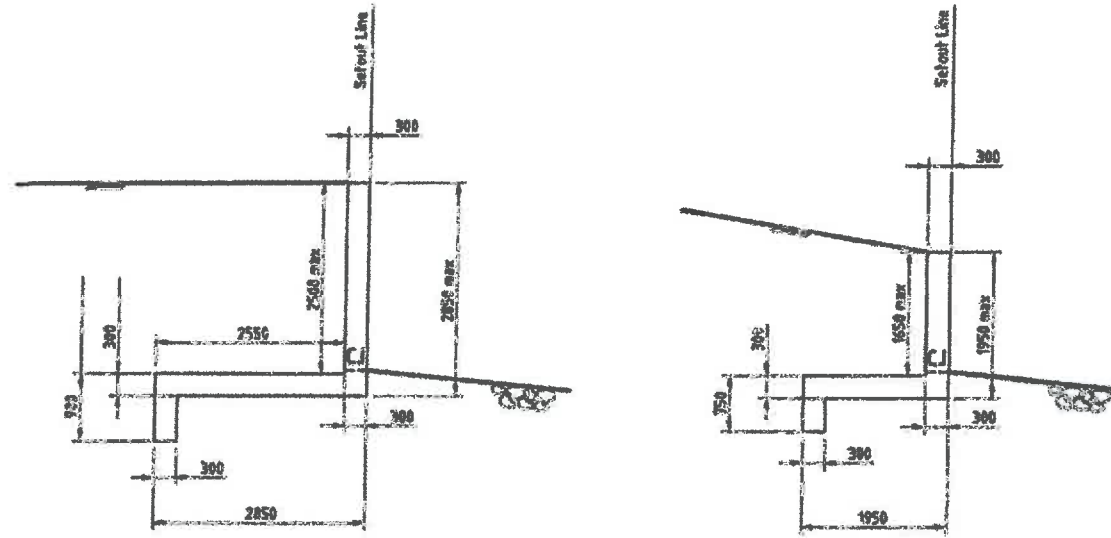
ELEVATION F
SCALE 1:50

ELEVATION G
SCALE 1:50

WORKS AS CONSTRUCTED
 This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
 Signature: *[Signature]* Date of Completion: 28 May 2015
 For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
 Shaun Pilcher RPEQ 14593
 In making this certificate we have relied upon information provided by others.
 NOTE: Design drawings produced by Cardno
 Amendments shown made by Calibre Consulting
 Survey Model by RPS



1. 14/03/2011 Initial design 2. 19/06/2011 Revisions 3. 15/08/2011 Final design 4. 15/02/2015 General amendments for NCC Code of Practice 5. 20/05/2015 Final design 6. 15/05/2015 Final design		REVISIONS DATE REC APPR	DESIGNER: P.P. DRAWN: P.S. CHECKED: P.S./P.P. RECOMMENDED: PROJ. MGR. P. McKay APPROVED: PROJ. DIR. G.G. Tamblyn DATE: 14/03/2011	A1 DATUM: A.H.D.	Cardno (Qld) Pty Ltd Level 1, 8 Wood Street, Brisbane, QLD 4000 Ph: 61 7 325 1000 Fax: 61 7 325 1001	SUPPLIER: BUNILLA DEVELOPMENT CONTRACT NO: 147841-03-09 DATE: 30/08/2015	STOCKLAND BUDDINA PTY LTD BUNILLA DEVELOPMENT OUTLET WEIR REINFORCED CONCRETE RETAINING WALL ELEVATIONS	DATE: 30/08/2015 DRAWING No: 147841-03-09 SHEET: F
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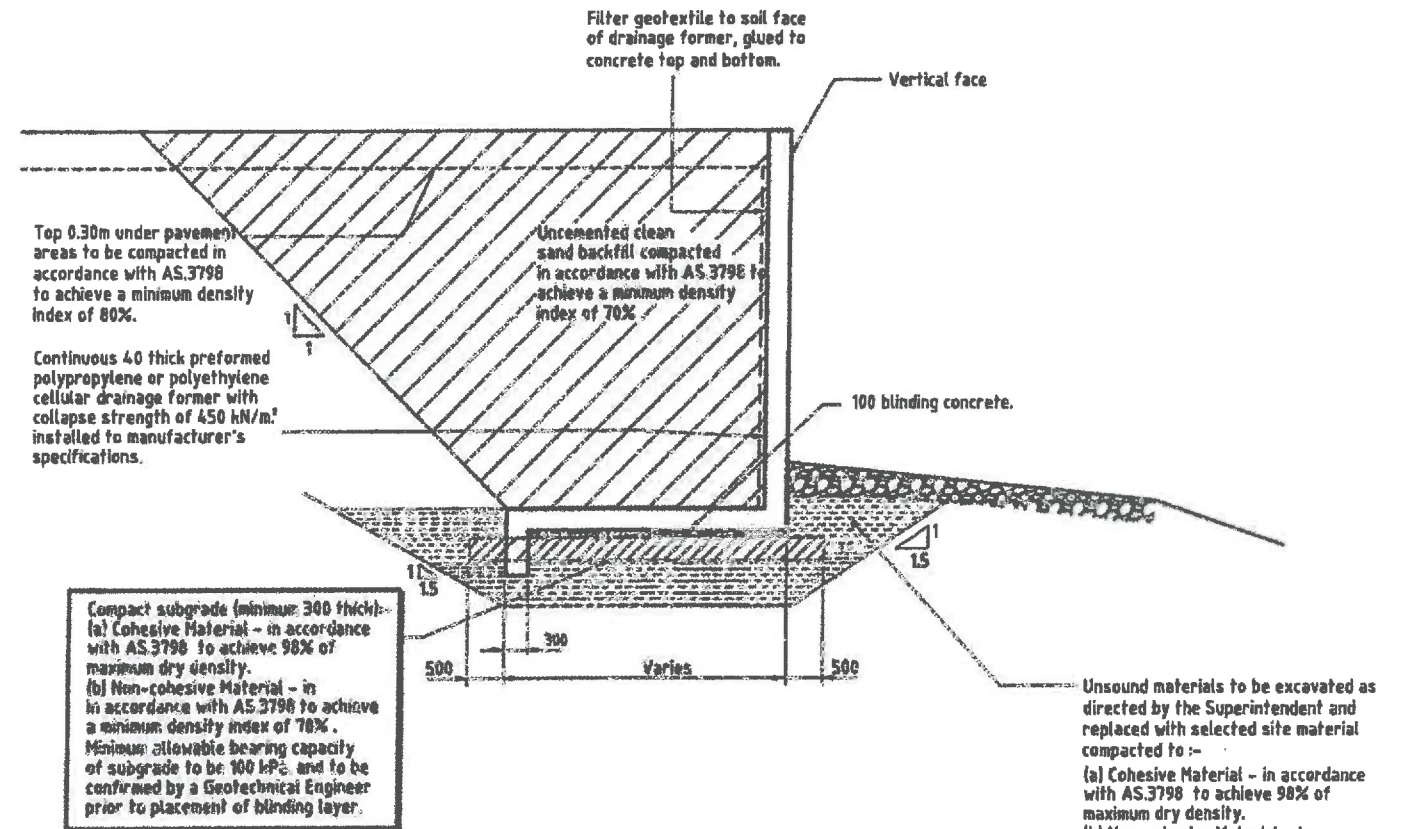


WALL 1-2 AND 2-2

WALL 1-1 AND 2-1

TYPICAL SECTIONS

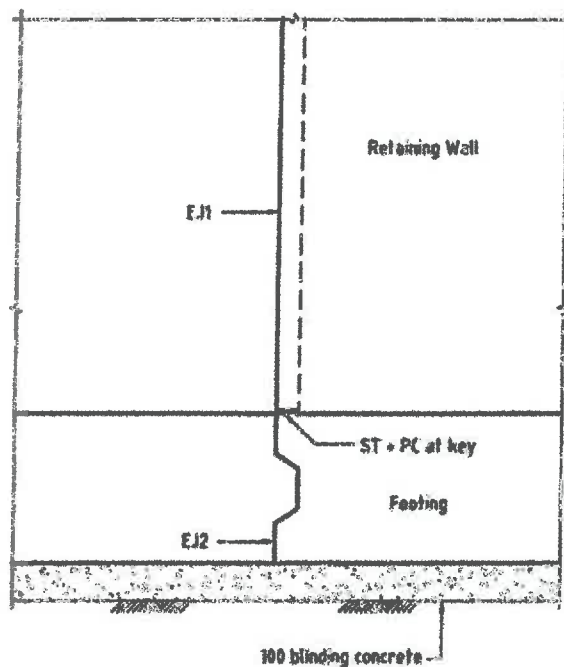
SCALE 1:50



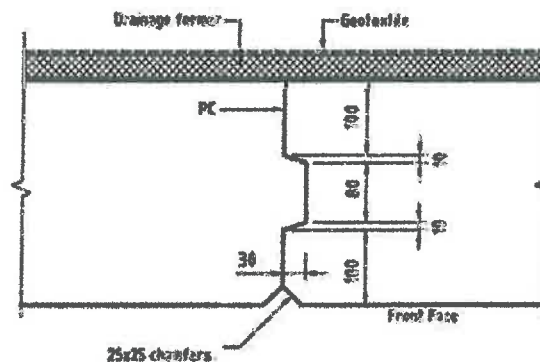
RETAINING WALLS BACKFILL AND COMPACTION REQUIREMENTS
SCALE 1:50

Compact subgrade (minimum 300 thick):
(a) Cohesive Material - in accordance with AS 3798 to achieve 98% of maximum dry density.
(b) Non-cohesive Material - in accordance with AS 3798 to achieve a minimum density index of 78%.
Minimum allowable bearing capacity of subgrade to be 100 kPa, and to be confirmed by a Geotechnical Engineer prior to placement of blinding layer.

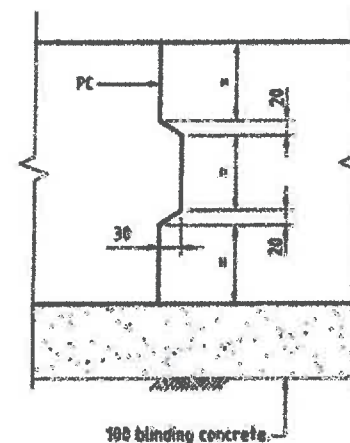
Unsound materials to be excavated as directed by the Superintendent and replaced with selected site material compacted to:-
(a) Cohesive Material - in accordance with AS 3798 to achieve 98% of maximum dry density.
(b) Non-cohesive Material - in accordance with AS 3798 to achieve a minimum density index of 70%.



TYPICAL EXPANSION JOINT ELEVATION
SCALE 1:20



EXPANSION JOINT - EJ1 (Walls only)
SCALE 1:5



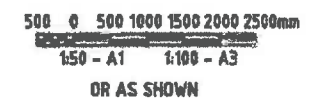
EXPANSION JOINT - EJ2 (Footings only)
SCALE 1:10

NOTE:
Expansion joint EJ1 to align with expansion joint EJ2.

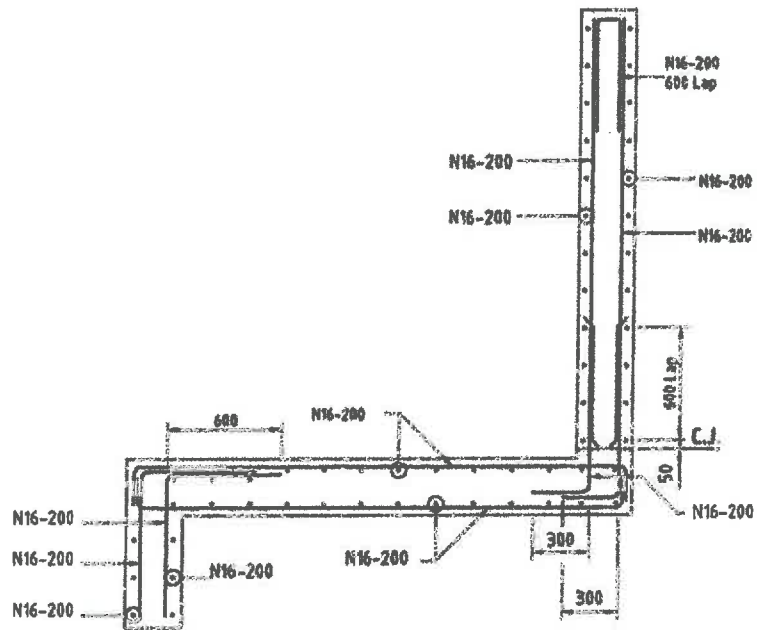
WORKS AS CONSTRUCTED
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Signature: [Signature] Date of Completion: 28 May 2015
For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
Shaun Pilcher RPEQ 14593
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Amendments shown made by Calibre Consulting
Survey Model by RPS

LEGEND:

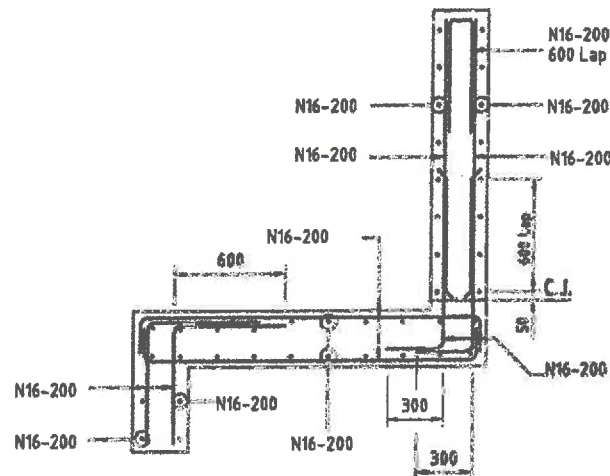
- ST Steel Trowel Finish to surface
- PC 2 Coats Water Based Paint before pouring second concrete (Note: no paint near any joint sealant)
- Geotextile Class B (Refer to Drawing 147841-03-08 for specifications)



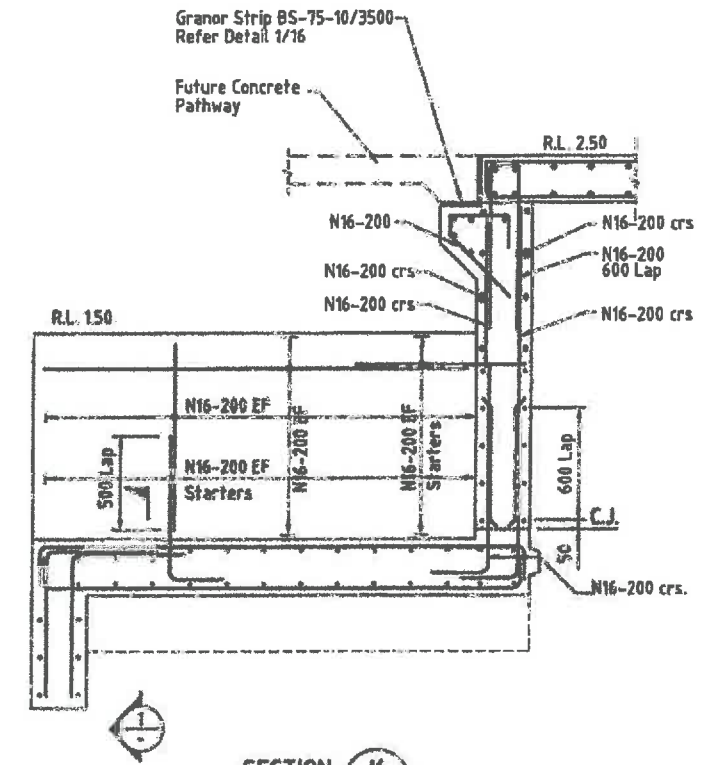
<p>DATE: 05/07/2005 11:00:00 AM B. 21/10/2009 Blinding layer depth amended A. 15/08/2008 Blinding name amended, RPEQ added</p>	<p>Cardno (Old) Pty Ltd All Rights Reserved 2005 Copyright and/or other intellectual property rights in this drawing are the property of Cardno (Old) Pty Ltd and may not be used, copied, modified, reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of Cardno (Old) Pty Ltd.</p>	<p>DESIGNED: P.R. DRAWN: P.R. CHECKED: P.N./P.R. RECOMMENDED: PROJ. MAN. P. McKay LAB FILE: 147841-03-04/05</p>	<p>A1 DATUM: A.H.D. APPROVED: PROJ. ENR. G.G. Tamblyn</p>	<p>Cardno Cardno (Old) Pty Ltd 4/111 15th St Brisbane QLD 4000 PH: 07 3250 3000 FAX: 07 3250 3001 WWW: www.cardno.com.au</p>	<p>STOCKLAND BUDDINA PTY LTD BUNDILLA DEVELOPMENT OUTLET WEIR RETAINING WALL TYPICAL SECTIONS AND JOINT DETAILS</p>	<p>DRAWING No: 30/08/2005 147841-03-10</p>	<p>Rev: B</p>
		<p>DATE: 05/07/2005 11:00:00 AM</p>				<p>147841-03-10</p>	



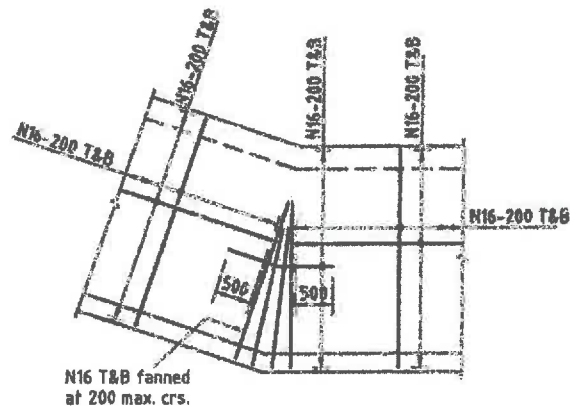
WALL 1-2 AND 2-2
SCALE 1:20



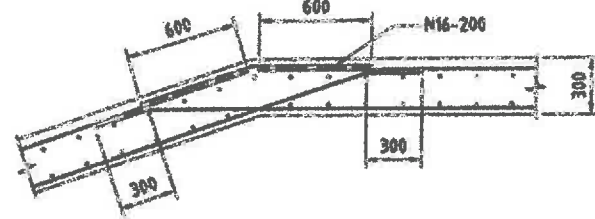
WALL 1-1 AND 2-1
SCALE 1:20



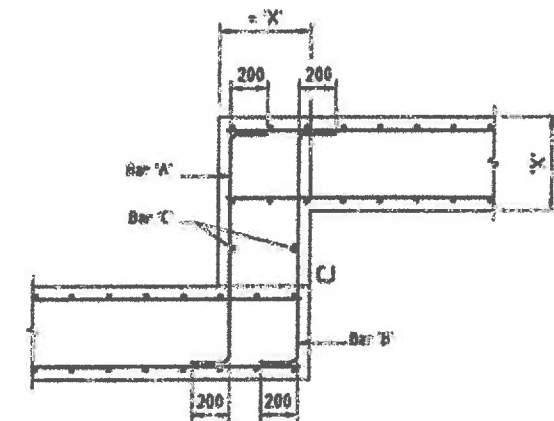
SECTION K 6
SCALE 1:20



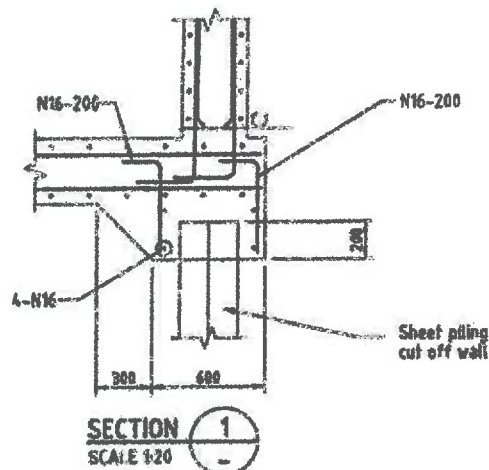
TYPICAL FOOTING TRUNCATION DETAIL
1:100
Wall and key reinforcement omitted for clarity



WALL CORNER DETAIL



FOOTING STEP DETAIL
NOT TO SCALE



SECTION 1
SCALE 1:20

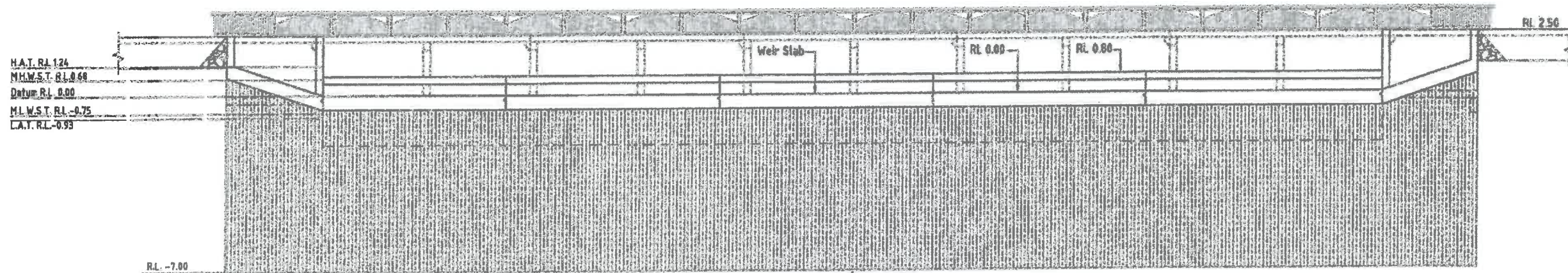
STEP IN FOOTING AT JUNCTION OF WALLS	BARS 'A'	BARS 'B'	BARS 'C'
W1-1, W1-2	N16-200	N16-200	N16-200
W2-1, W2-2	N16-200	N16-200	N16-200

0.2 0 0.2 0.4 0.6 0.8 1.0m
1:20 - A1 1:40 - A3
OR AS SHOWN

WORKS AS CONSTRUCTED
This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
Signature: *[Signature]* Date of Completion: 28 May 2015
For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
Shaun Pilcher RPEQ 14593
In making this certificate we have relied upon information provided by others.
NOTE: Design drawings produced by Cardno
Amendments shown made by Calibre Consulting
Survey Model by RPS

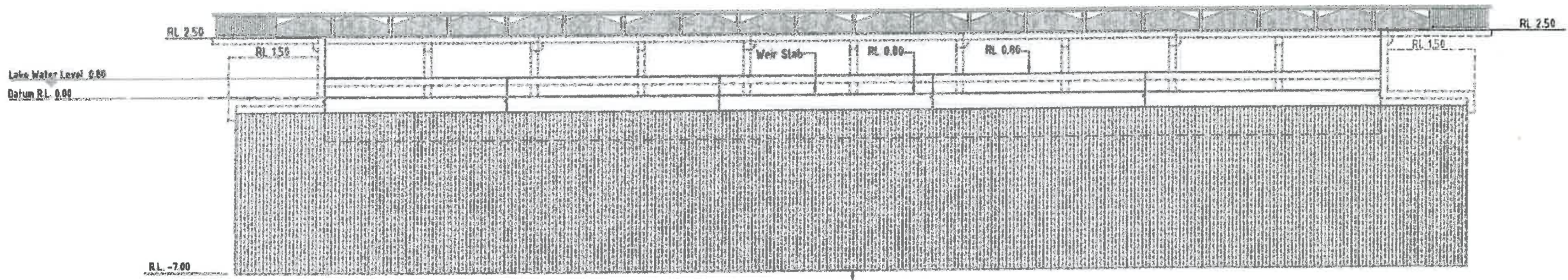
DATE PLOTTED: 14 August 2006 10:48:13 AM

<p>Cardno (Qld) Pty Ltd All Rights Reserved 2006</p> <p>DESIGNED: <i>[Signature]</i> DRAWN: <i>[Signature]</i> CHECKED: <i>[Signature]</i></p> <p>RECOMMENDED: PROJ. MAN. <i>P. McKay</i> APPROVED: PROJ. DIR. <i>G. G. Tamblin</i></p> <p>Cardno (Qld) Pty Ltd Level 1, 150/151 South Brisbane Road, Brisbane QLD 4000 Ph: 07 54422000 Fax: 07 54422001</p>	<p>Cardno</p> <p>Cardno (Qld) Pty Ltd Level 1, 150/151 South Brisbane Road, Brisbane QLD 4000 Ph: 07 54422000 Fax: 07 54422001</p>	<p>STOCKLAND BUDDINA PTY LTD</p> <p>BUNDILLA DEVELOPMENT OUTLET WEIR</p> <p>RETAINING WALL REINFORCEMENT DETAILS</p>	<p>DATE: 30/08/2005</p> <p>DRAWING No: 147841-03-11</p> <p>Rev: C</p>
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LX8 Steel Piling 8mm
 thick or approved equivalent
 $I_{xx} = 128.6 \times 10^6 \text{ mm}^4$
 $Z_{xx} = 830 \times 10^3 \text{ mm}^3$

ELEVATION **H**
 SCALE 1:100



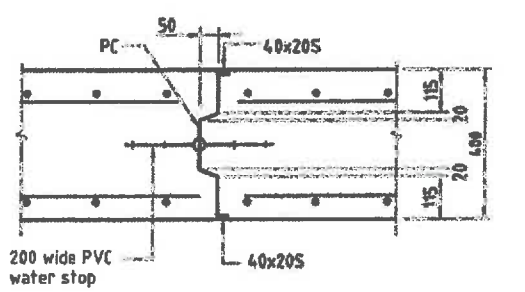
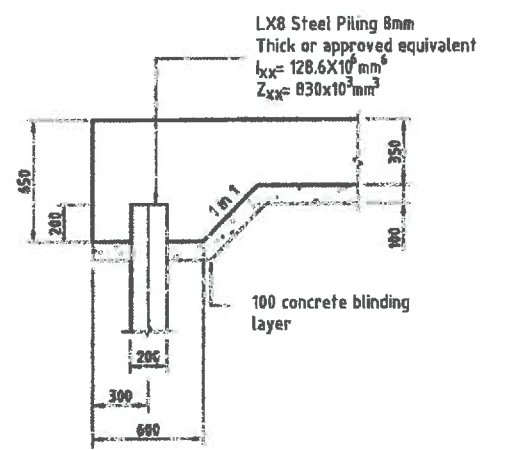
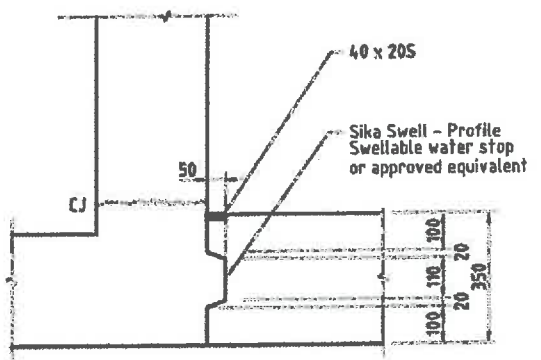
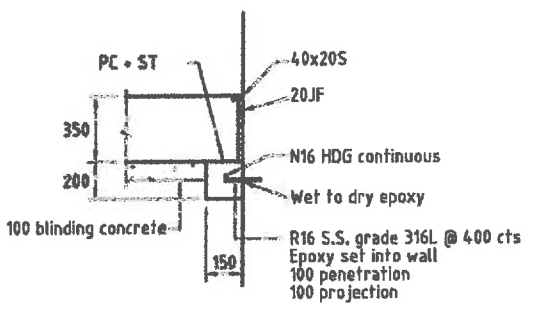
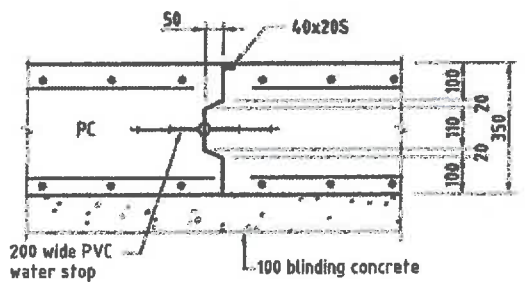
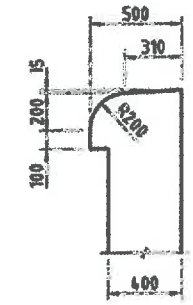
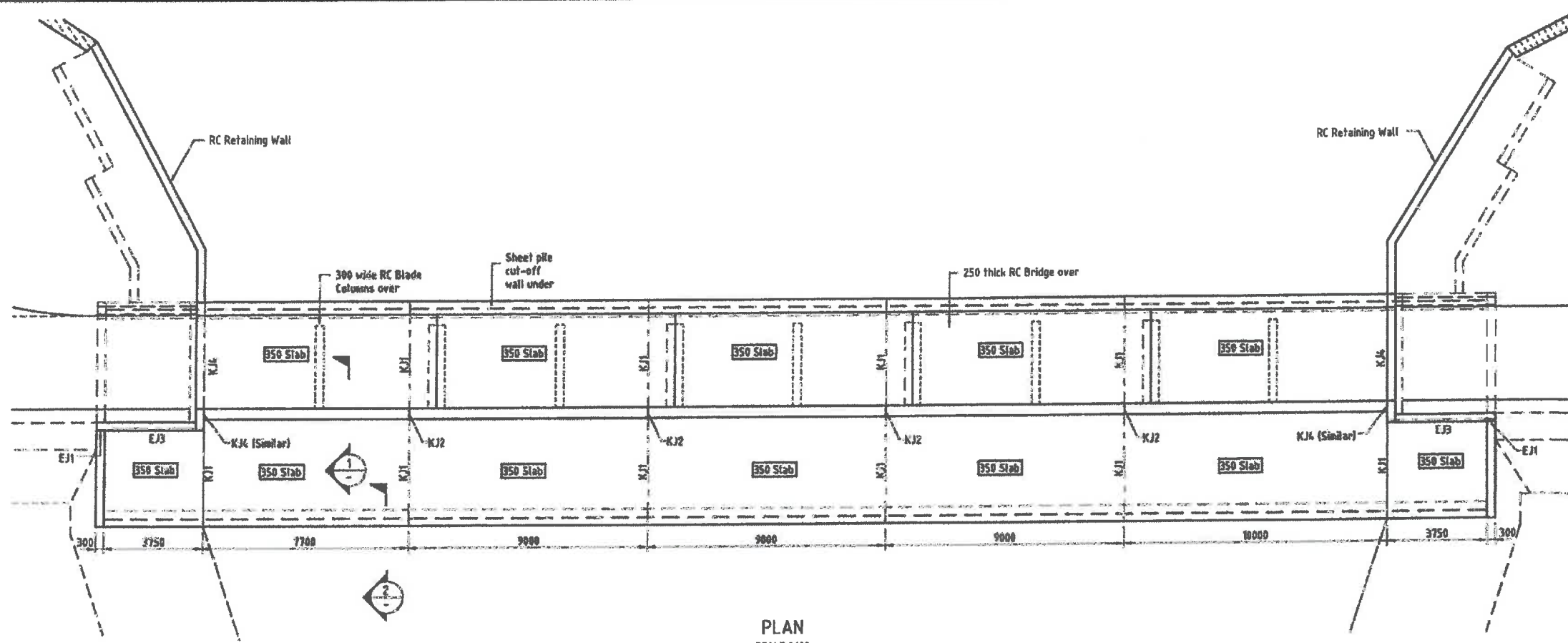
LX8 Steel Piling 8mm
 thick or approved equivalent
 $I_{xx} = 128.6 \times 10^6 \text{ mm}^4$
 $Z_{xx} = 830 \times 10^3 \text{ mm}^3$

ELEVATION **J**
 SCALE 1:100

WORKS AS CONSTRUCTED
 This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
 Signature: *[Signature]* Date of Completion: 28 May 2015
 For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
 Shaun Pilcher RPEQ 14593
 In making this certificate we have relied upon information provided by others.
 NOTE: Design drawings produced by Cardno
 Amendments shown made by Calibre Consulting
 Survey Model by RPS

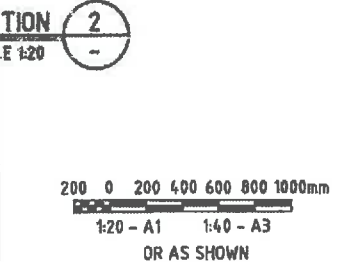
1 0 1 2 3 4 5m
 1:100 - A1 1:200 - A3

DESIGNED: R.P. DRAWN: R.P. CHECKED: P.M. APPROVED: P.M. P.M. 16/5/15 P.M. 16/5/15 DN 16/5/15	A1 DATUM: A.H.D. Cardno Cardno (Cth) Pty Ltd 1/111 St George Street Brisbane QLD 4000 Australia Tel: +61 7 3250 1000 Fax: +61 7 3250 1001 Email: info@cardno.com.au	STOCKLAND BUDDINA PTY LTD BUNDILLA DEVELOPMENT OUTLET WEIR SHEET 5 OF 6 OFF WALLS	DATE: 28/05/2015 DRAWING No: 147841-03-12 D
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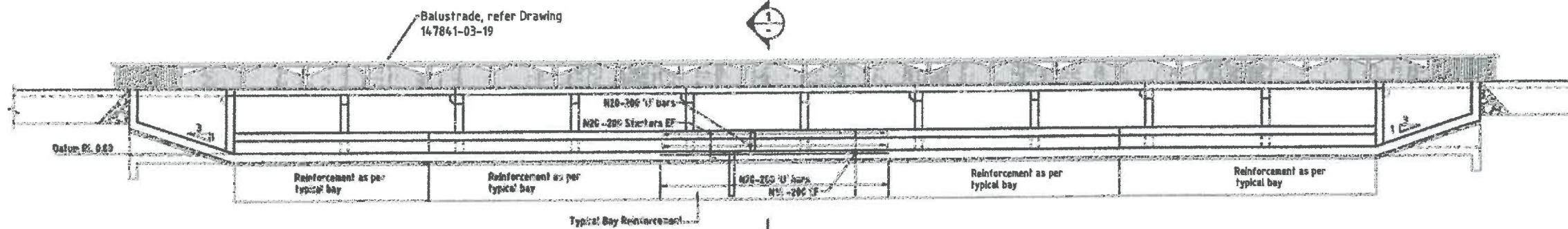


- LEGEND:**
- ST Steel Trowelled Surface
 - PC 2 Coats Water Base Paint before pouring second concrete (Note: no paint near any placement of joint sealant.)
 - 20JF 10 Joint Filler (fixed to one face with 30 long copper nails at 200 centres)
 - 40x205 Sealant 40wide x 20 deep with bond breaker backing strip.

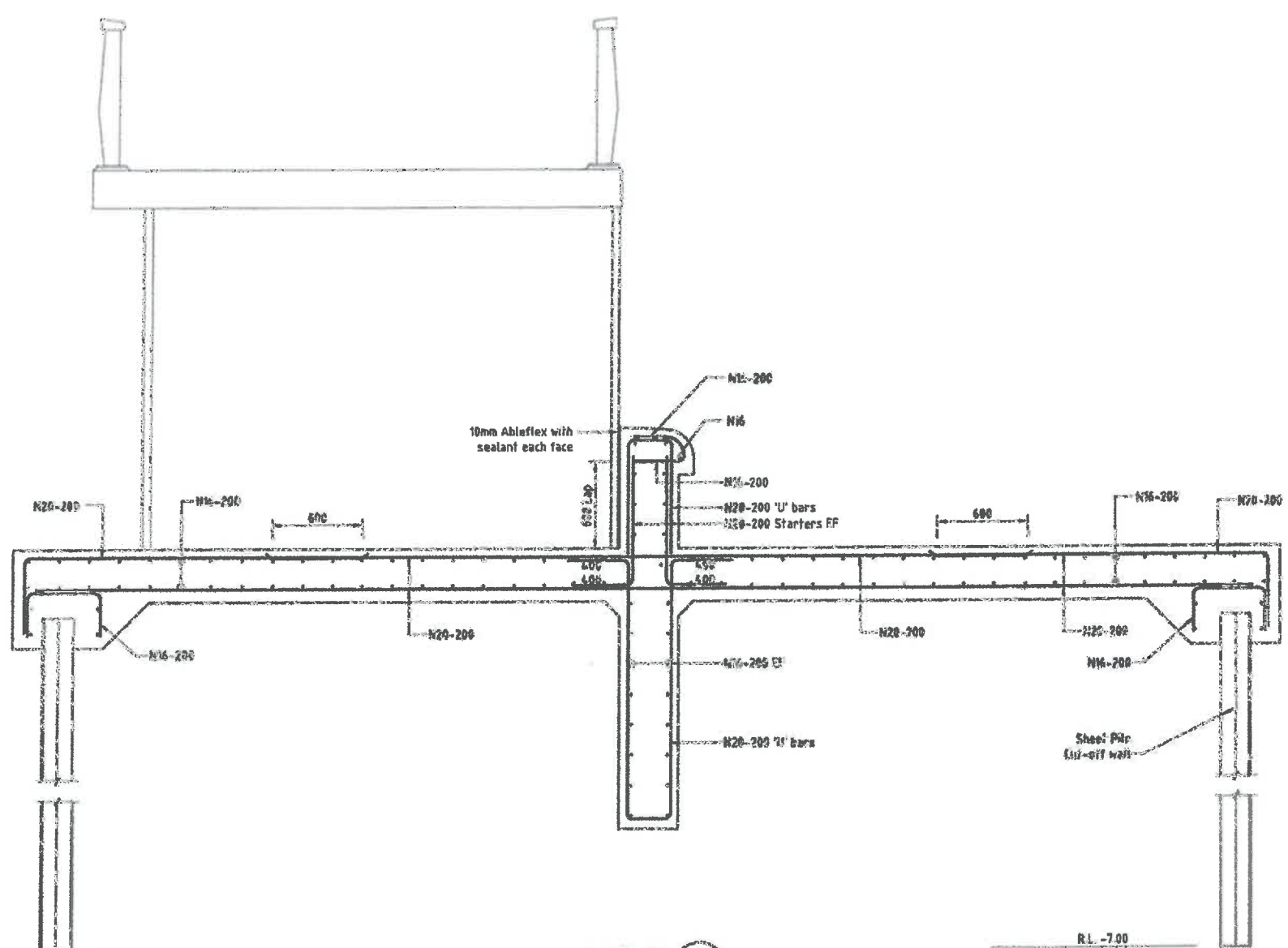
WORKS AS CONSTRUCTED
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 Signature: *[Signature]* Date of Completion: 28 May 2015
 For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
 Shaun Pilcher RPEQ 14593
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 Amendments shown made by Calibre Consulting
 Survey Model by RPS



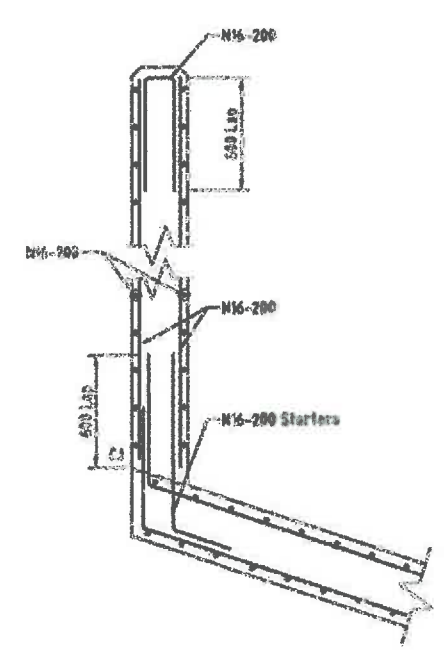
DATE PLOTTED: 30 June 2011 10:44 AM F 76/05/2011 Bulkhead slot removed E 21/10/2009 Blinding layer amended D 15/08/2008 RPEQ added C 13/02/2008 General amendments due to weir concept review B 30/03/2007 Blade column added A 04/01/2006 Weir modified Rev. DATE REVISIONS REC. APPROV.		© Cardno (Qld) Pty Ltd All Rights Reserved 2006 Design of the works and any part of the following drawings is the property of Cardno (Qld) Pty Ltd and shall not be used, copied, reprinted, stored or reproduced in whole or in any manner without the prior written consent of Cardno (Qld) Pty Ltd. This consent shall not be given to any person other than by agreement with Cardno (Qld) Pty Ltd. This document is prepared by Cardno (Qld) Pty Ltd for the benefit of the client. It is not to be used for any other purpose without the prior written consent of Cardno (Qld) Pty Ltd.		DESIGNED: R.R. DRAWN: R.R. CHECKED: P.M./A.R. RECOMMENDED: PROJ. MAN. P. McKay APPROVED: PROJ. DIR. G.G. Tamblin LAD FILE: 147841-03-13 Rev 1 08/11/10-01-02		A1 DATUM: A.H.D. Cardno (Qld) Pty Ltd ABN 97 081 054 962 BUNBERRIGEE OFFICE: Level 1, 2 Mead Street Merimbeth, Qld 4568 Email: info@cardno.com.au Ph: (07) 8465 2050 Fax: (07) 8418 8042		OFFICES: Brisbane Coast Brisbane Sydney Gold Coast Townsville Hervey Bay Cairns Rockhampton Darling Downs Darwin TELEPHONE: (07) 5448 2330 (07) 5500 8079 (02) 9416 0524 (07) 5530 6333 (07) 4772 1160 (07) 4124 8466 (07) 4033 2985 (07) 4024 7620 (07) 4037 8102 (08) 8001 3613 FAX: (07) 8449 8642 (07) 5508 9752 (02) 9418 9559 (07) 5538 4847 (07) 4721 2520 (07) 4124 9105 (07) 4033 3092 (07) 4026 4372 (07) 4037 8105 (08) 8041 1700		STOCKLAND BUDDINA PTY LTD BUNDILLA DEVELOPMENT OUTLET WEIR BASE LAYOUT PLAN DATE: 30/06/2005 DRAWING No: 147841-03-13 Rev: F	
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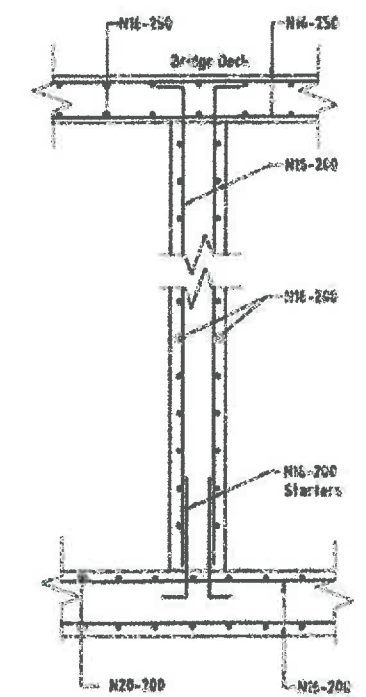
WEIR WALL REINFORCEMENT ELEVATION
SCALE 1:100



SECTION 1
SCALE 1:20
14



SECTION 2
SCALE 1:20
14

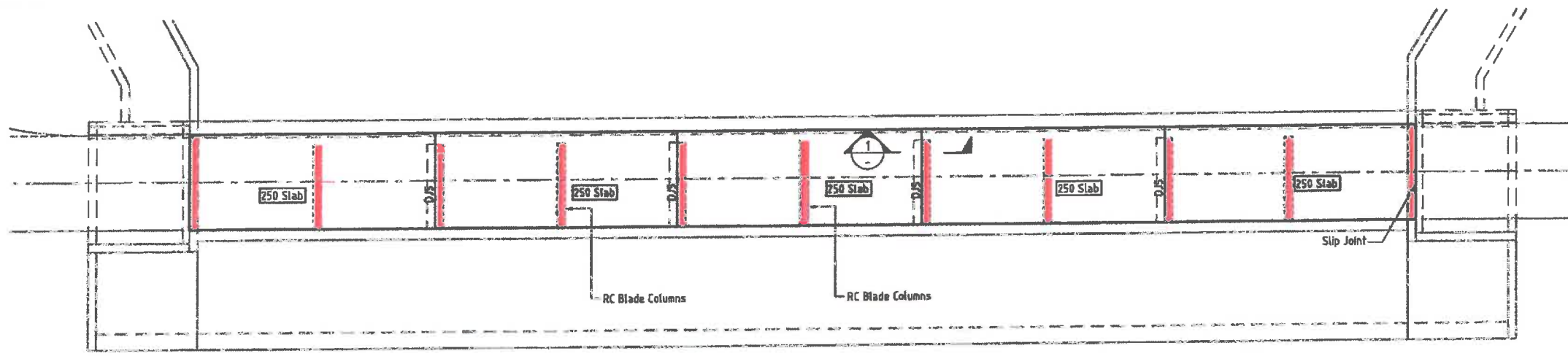


SECTION 3
SCALE 1:20
14

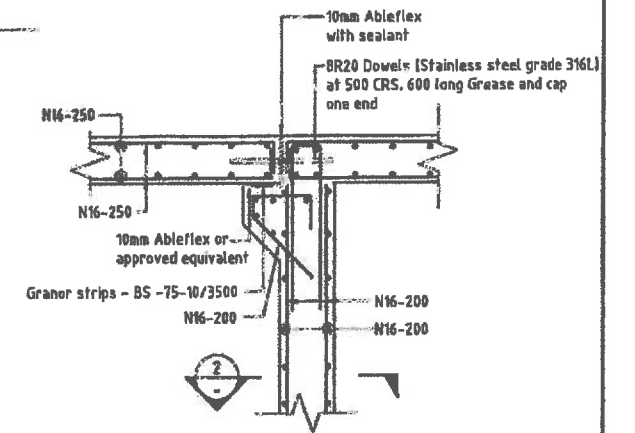
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OR AS SHOWN

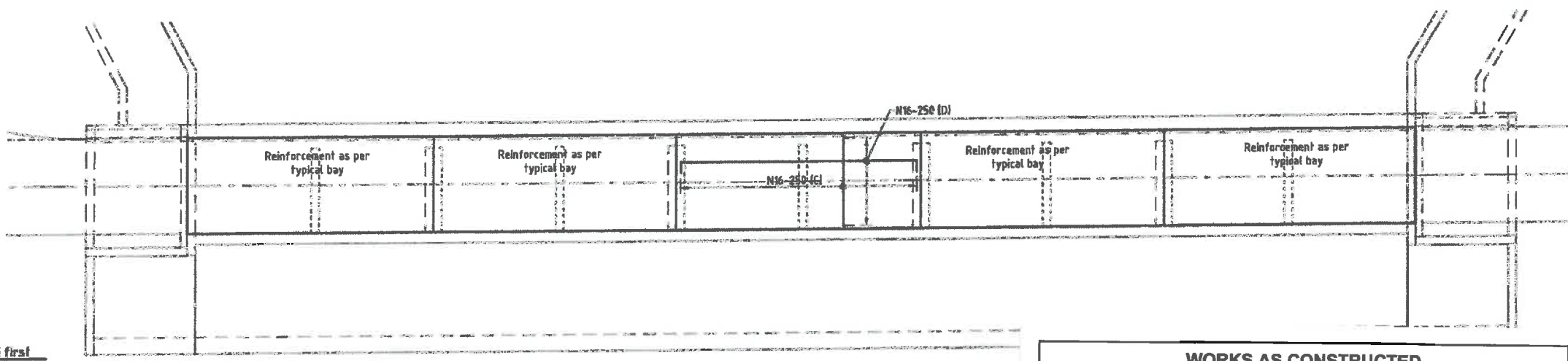
Cardno (Qld) Pty Ltd All Rights Reserved 2008 This drawing is the property of Cardno (Qld) Pty Ltd and is not to be used for any other purpose without the written consent of Cardno (Qld) Pty Ltd.		DESIGNED: <i>[Signature]</i> DRAWN: <i>[Signature]</i> CHECKED: <i>[Signature]</i> RECOMMENDED: <i>[Signature]</i> CAD FILE: 147841-03-15.dwg 2015-05-28 10:11:11	A1 DATUM: A.H.D. APPROVED: PROJ. DIR. <i>G.G. Tamblin</i>	Cardno (Qld) Pty Ltd Level 5, 90 Wood Street, Mackay QLD 4740 Email: info@cardno.com.au Ph: 08 4641 1111 Fax: 08 4641 1111	STOCKLAND BUDDINA PTY LTD BUNDILLA DEVELOPMENT OUTLET WEIR WEIR REINFORCEMENT DETAILS	DATE: 30/08/2008 DRAWING No: 147841-03-15 Rv: F
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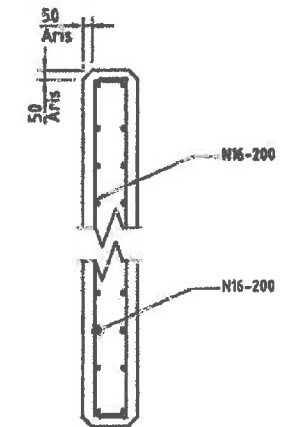
BRIDGE LAYOUT PLAN
SCALE 1:100



SECTION 1
SCALE 1:20



BOTTOM REINFORCEMENT PLAN
SCALE 1:100

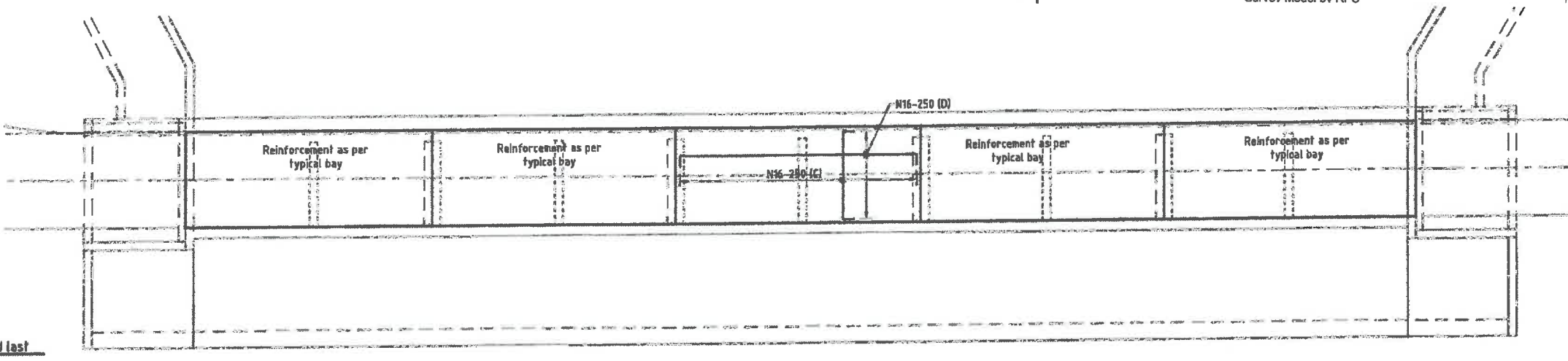


SECTION 2
SCALE 1:20

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For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
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BAR LAYING SEQUENCE
BOTTOM REINFORCEMENT

(B) bars laid second
(A) bars laid first



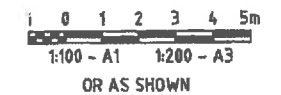
TOP REINFORCEMENT PLAN
SCALE 1:100

BAR LAYING SEQUENCE
TOP REINFORCEMENT

(C) bars laid third
(D) bars laid last

NOTES:

- Concrete grades to bridge shall be not less than :-
Grade S50
- Required cover to reinforcing steel shall be not less than :-
(a) faces of vertical walls and other surfaces exposed to tidal or splash action - 65mm.
(b) sides and upper surface of base slab - 65mm.
(c) underside of base slab - 65mm.
(d) elsewhere - 65mm.



DATE PLOTTED: 10 June, 2011 - 9:02am

Rev.	DATE	REVISIONS	REC.	APPR.
G	26/05/2011	Bidhead etc: repairs		
C	15/08/2008	BSIG added	HJM	PH
B	15/02/2008	General amendments due to wear concept review	PH	GGT
A	16/03/2007	Drawing re-issued for re-issue	PH	GGT

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DESIGNED: RR
DRAWN: RR
CHECKED: P.M./R.R.
RECOMMENDED: PROJ. MAN. P. McKay
APPROVED: PROJ. DIR. G.G. Tamblyn
CAD FILE: 147841-03-16.dwg
DATE: 15/05/11 11:01 AM

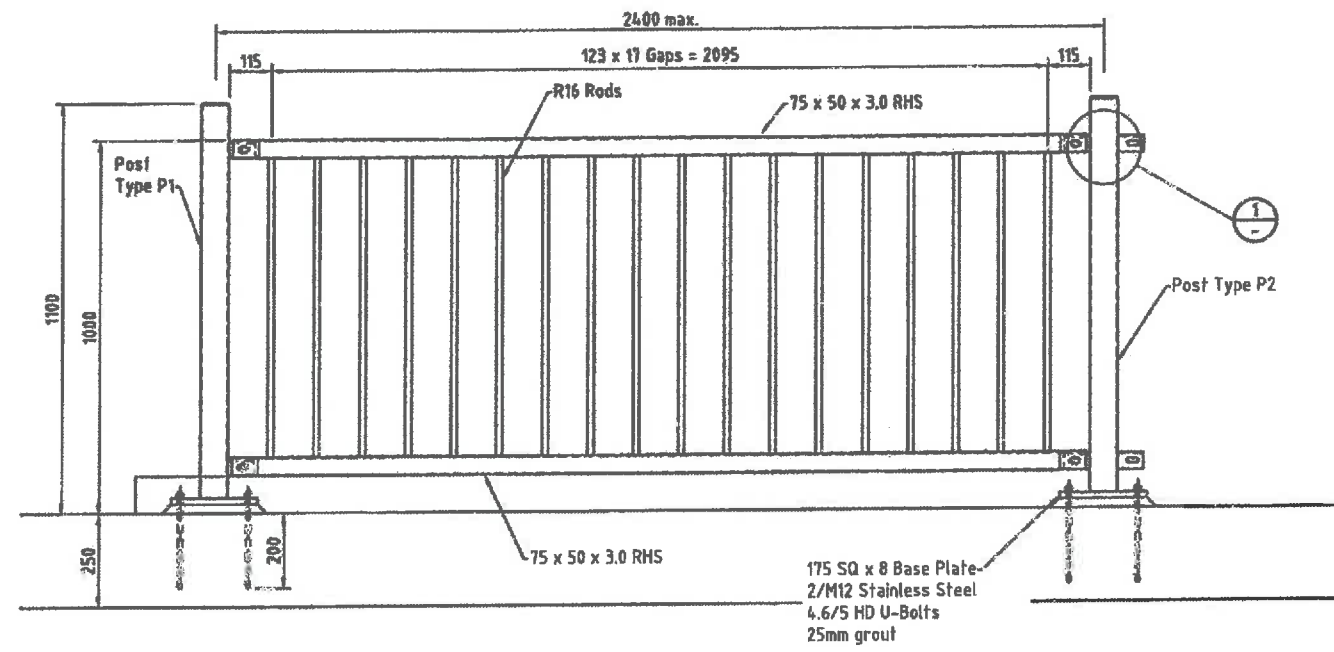
Cardno
Cardno (Qld) Pty Ltd
ABN 57 051 074 922
BUNSHIRE COAST OFFICE: Level 1, 8 Mount Street, Mackay, Queensland 4240
Email: mack@cardno.com.au Ph: (07) 9443 3388 Fax: (07) 9443 3942

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Bendara
Eydney
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Rockhampton: (07) 4084 7500
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Darwin: (08) 8201 3613

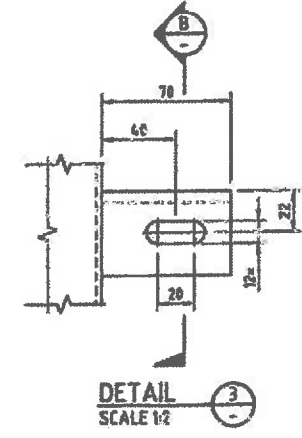
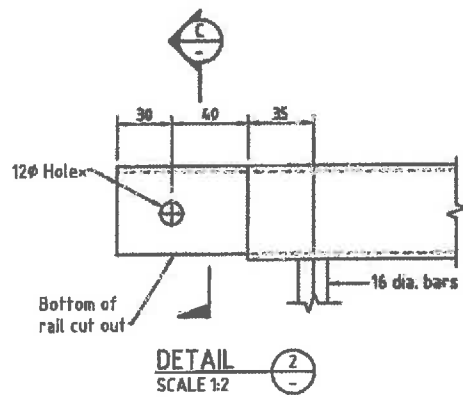
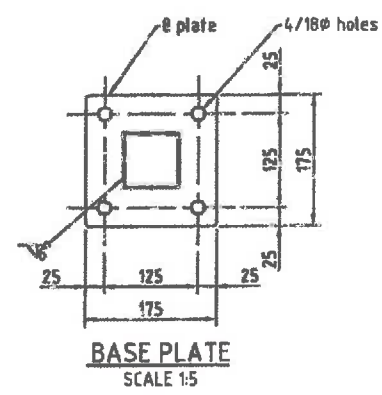
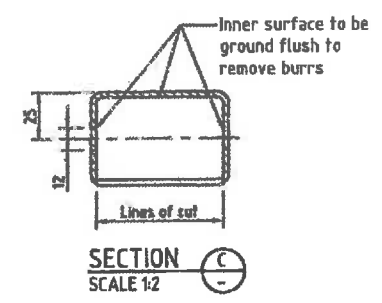
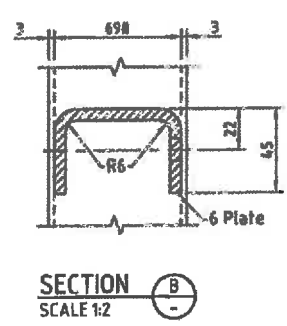
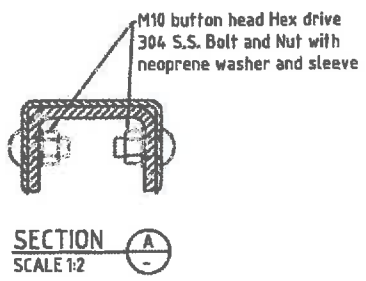
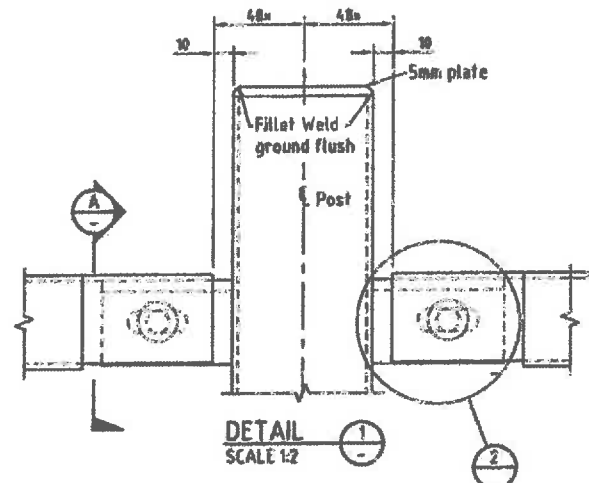
STOCKLAND BUDDINA PTY LTD
BUNDILLA DEVELOPMENT
OUTLET WEIR
BRIDGE LAYOUT AND REINFORCEMENT PLAN

DATE: 30/06/2005
Drawing No: 147841-03-16
Rev: D

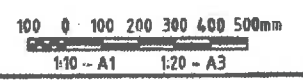
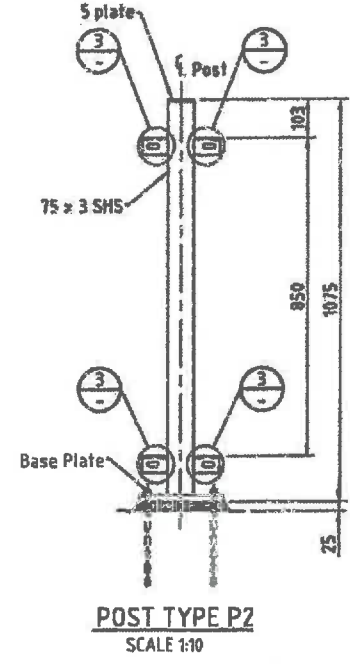
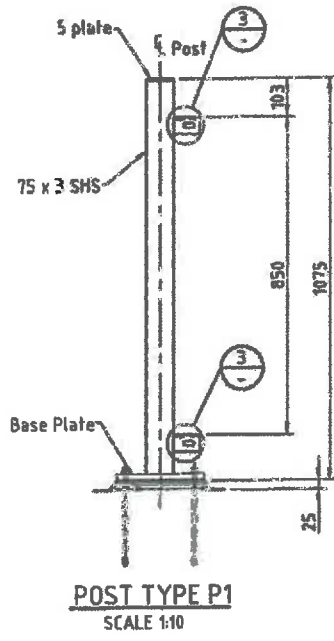


PANEL ELEVATION
SCALE 1:10

- NOTES:**
- All posts to be truly vertical and all horizontal rails to be parallel.
 - Dimensions marked thus # are approximate dimension only, allowance to be made for protective treatment, after which rail connector shall be a sliding fit inside rails.
 - Dimensions marked thus x are nominal dimensions only, the holes as galvanised shall provide for neoprene sleeve and bolt.
 - Rectangular hollow sections for rails may contain only one shop butt welded splice in any direction. Butt weld shall be ground flush.
 - Corners and exposed edges shall be rounded to a radius of approximately 2mm or as shown.
 - Steel Grade:- Plate-250, RHS, SHS, CHS-350
 - Electrode Grade E41XX except where noted otherwise.
 - After fabrication, panels and connectors to be cleaned, welding slag removed and then hot dip galvanised.
 - Bolts, nuts and washers to be Stainless Steel U.N.O.
 - Protective Coatings to AS/NZS 2312/ HDG600 P7
Surface Preparation Class 2.5
HDG = Hot Dip Galvanised 600g/m²
1st Coat = Epoxy primer 75µm PRN C06
2nd Coat = Polyurethane Gloss 75µm PRN C26
 - Design loading to AS1170 - C3 Balustrade
 - Rendered block work to be painted with one coat of sealer and two coats of Wattyl Industrial Coatings "Ti-Tree G65" applied in accordance with manufacturers specifications.



WORKS AS CONSTRUCTED
This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
Signature: [Signature] Date of Completion: 28 May 2015
For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
Shaun Pilcher RPEQ 14593
In making this certificate we have relied upon information provided by others.
NOTE: Design drawings produced by Cardno
Amendments shown made by Calibre Consulting Survey Model by RPS



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Appendix B: Salinity exchange overview plan

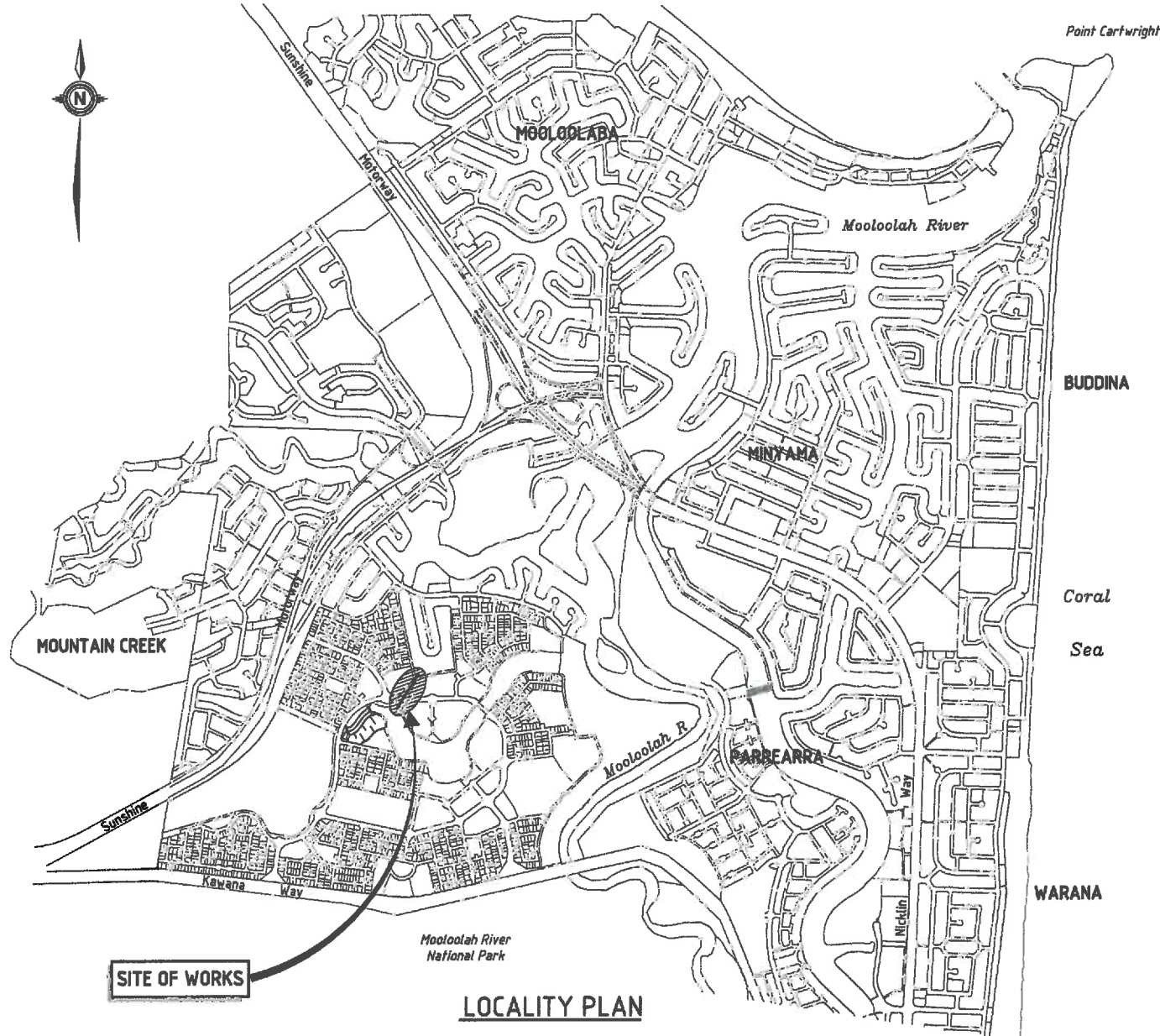


SALINITY PUMPING SYSTEM

SCHEDULE OF DRAWINGS

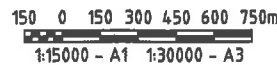
DRAWING No	DESCRIPTION
147841-02-01	LOCALITY PLAN AND SCHEDULE OF DRAWINGS
147841-02-02	RISING MAIN PLAN AND LONGITUDINAL SECTION
147841-02-03	INTAKE STRUCTURE AND PUMP STATION DETAILED LAYOUT PLAN
147841-02-04	INTAKE STRUCTURE PLAN AND ELEVATION
147841-02-05	INTAKE STRUCTURE SECTIONS AND DETAILS
147841-02-06	INTAKE STRUCTURE ACCESS HATCH - SECTIONS AND DETAILS
147841-02-07	INTAKE STRUCTURE SAFETY SCREEN DETAILS - SHEET 1
147841-02-08	INTAKE STRUCTURE SAFETY SCREEN DETAILS - SHEET 2
147841-02-09	INTAKE STRUCTURE HEADSTOCK DETAILS AND CONCRETE NOTES
147841-02-10	INTAKE STRUCTURE SECURITY GATE DETAILS - DELETED
147841-02-11 TO 147841-02-21 - DELETED	
147841-02-22	OUTLET STRUCTURE PLAN AND ELEVATION
147841-02-23	OUTLET STRUCTURE SECTIONS AND DETAILS - SHEET 1
147841-02-24 TO 147841-02-40 - DELETED	
147841-02-50	ARRANGEMENT AND NOTES
147841-02-51	R.L. SECTION / DIMENSION PLAN - SHEET 1
147841-02-52	R.L. SECTION / DIMENSION PLAN - SHEET 2
147841-02-53	PUMP WELL SECTION DIMENSION PLAN
147841-02-54	PUMP WELL DIMENSION & REINFORCEMENT SECTIONS
147841-02-55	PUMP WELL REINFORCEMENT PLANS
147841-02-56	VALVE PIT DIMENSION PLAN & DETAILS
147841-02-57	GEOTECHNICAL BORELOG SECTION

PREVIOUSLY APPROVED OPW 05-272



COORDINATE DATUM NOTE:
THIS PROJECT HAS BEEN DESIGNED ON AN ARBITRARY COORDINATE BASE SUPPLIED BY CONICS (Sunshine Coast) Pty Ltd. THE SCALE FACTOR USED IS ONE(1).

LEVEL SOURCE : PSM 101235, R.L.29.930



EXISTING SERVICES NOTE:

- Services shown on these plans are only those evident at the time of survey, from As Constructed survey and from 'Dial Before You Dig' searches. There may be more services not shown on these drawings.
- It is the responsibility of the Contractor to contact the relevant service utility providers to confirm the location of all existing services prior to commencement of works.
- Any damage to services shall be repaired by the Contractor or the relevant authority at the Contractor's expense.

WORKS AS CONSTRUCTED
This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
Signature: *[Signature]* Date of Completion: 28 May 2015
For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
Shaun Pilcher RPEQ 14593
In making this certificate we have relied upon information provided by others.
NOTE: Design drawings produced by Cardno
Amendments shown made by Calibre Consulting
Survey Model by RPS

FOR CONSTRUCTION

Rv.	DATE	REVISIONS	REC.	APPR.
K	13/02/2013	FOR APPROVAL ISSUE	J.H.	A.R.
J	07/02/2013	SALINITY WELL & VALVE PIT RE-DESIGN	A.R.	T.H.
I	28/06/2012	TIMBER INTAKE STRUCTURE RE-INSTATED		
H	23/04/2012	INTAKE STRUCTURE REVISED	A.R.	T.H.
G	06/04/2012	INTAKE STRUCTURE REDESIGN	A.R.	T.H.
F	06/09/2011	CULVERT HEADWALL & APRON ADDED	A.R.	T.H.
E	25/07/2011	OUTLET STRUCTURE REMOVED	A.R.	A.H.
D	24/03/2009	PAGE 25 REMOVED	P.M.	G.G.T.
C	15/08/2008	LOGOS UPDATED, SERVICES NOTE ADDED	N.J.W.	P.K.
B	18/03/2008	PREVIOUSLY APPROVED DWGS NOTED & DWG 27 TITLE AMENDED	P.M.	G.G.T.
A	26/02/2008	DRAWING TITLE AMENDED	P.M.	G.G.T.

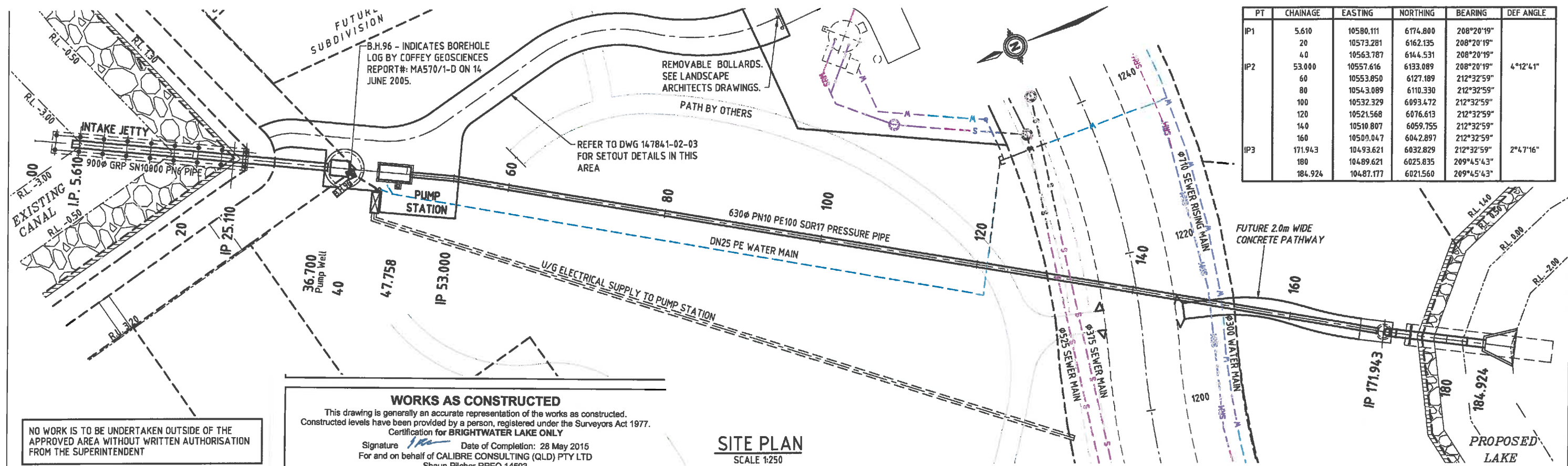
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DESIGNED: <i>[Signature]</i>	RECOMMENDED: PROJ. MAN. <i>P. McKay</i>	APPROVED: PROJ. DIR. <i>G. G. Tamblyn</i>
DRAWN: <i>[Signature]</i>	CHECKED: <i>[Signature]</i>	REQD: 1723
A1 DATUM: A.H.D.		

Cardno (Qld) Pty Ltd
ABN 67 051 074 952
SUNSHINE COAST OFFICE: Level 1, 8 Maud Street Maroochydore, Qld 4558
Email: soo@cardno.com.au Ph: (07) 5443 2856 Fax: (07) 5443 6842

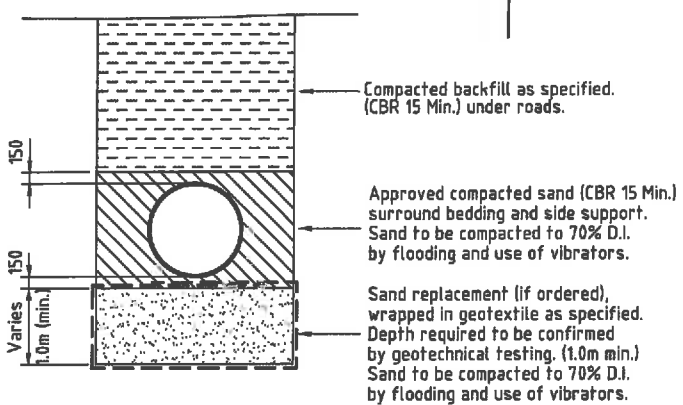
OFFICES	TELEPHONE	FAX
Sunshine Coast	(07) 5443 2855	(07) 5443 6842
Brisbane	(07) 3368 9122	(07) 3368 9722
Sydney	(02) 9418 8233	(02) 9418 6529
Gold Coast	(07) 5539 6232	(07) 5539 4847
Townsville	(07) 4772 1188	(07) 4721 2506
Hervey Bay	(07) 4184 3405	(07) 4124 5155
Cairns	(07) 4033 2836	(07) 4001 2662
Rockhampton	(07) 4924 7500	(07) 4926 4376
Darling Downs	(07) 4687 8122	(07) 4687 8125
Darwin	(08) 6961 0919	(08) 6941 1758

STOCKLAND BUDDINA PTY LTD		DATE: 30/06/2005	Rv.
BUNDILLA DEVELOPMENT SALINITY PUMPING SYSTEM		DRAWING No:	
LOCALITY PLAN AND SCHEDULE OF DRAWINGS		147841-02-01	K



PT	CHAINAGE	EASTING	NORTHING	BEARING	DEF ANGLE
IP1	5.610	10580.111	6174.800	208°20'19"	4°12'41"
	20	10573.281	6162.135	208°20'19"	
	40	10563.787	6144.531	208°20'19"	
	53.000	10557.616	6133.089	208°20'19"	
IP2	60	10553.850	6127.189	212°32'59"	2°47'16"
	80	10543.089	6110.330	212°32'59"	
	100	10532.329	6093.472	212°32'59"	
	120	10521.568	6076.613	212°32'59"	
	140	10510.807	6059.755	212°32'59"	
	160	10500.047	6042.897	212°32'59"	
	171.943	10493.621	6032.829	212°32'59"	
IP3	180	10489.621	6025.835	209°45'43"	2°47'16"
	184.924	10487.177	6021.560	209°45'43"	

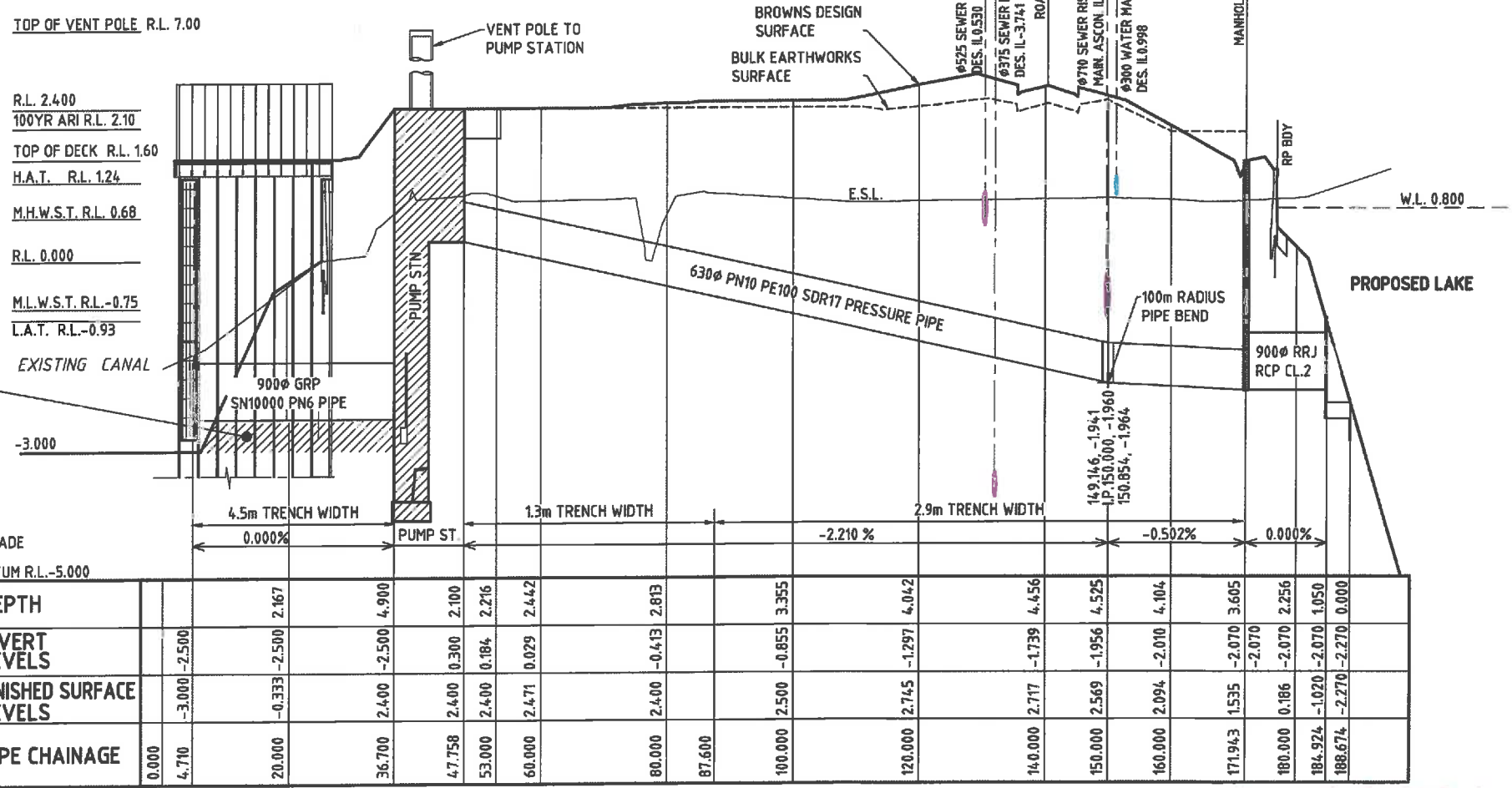
NO WORK IS TO BE UNDERTAKEN OUTSIDE OF THE APPROVED AREA WITHOUT WRITTEN AUTHORISATION FROM THE SUPERINTENDENT



- NOTES:**
- Compaction testing of trench backfill shall be undertaken at a frequency of 1 test per 2 layers per 40 linear metres.
 - Thrust block concrete shall be N32 in accordance with AS 1379 and AS 3600.
 - Geotechnical testing is required to be undertaken during excavation to verify soil modulus.
 If less than 0.2MPa trench width will need to be widened.
 If greater than 0.2MPa trench width may be reduced.
 - 2m wide turf strip to be placed on either side of driveway.

U	13/02/2013	630 DIA PIPE GRADE REVISED	CK	A.R.
T	07/02/2013	PUMP WELL & VALVE PIT RE-DESIGN	JM	A.R.
S	28/06/2012	TIMBER INTAKE STRUCTURE RE-INSTATED		
R	23/04/2012	INTAKE STRUCTURE REVISED	A.R.	T.H.
Q	06/04/2011	INTAKE STRUCTURE REDESIGN	A.R.	T.H.
P	23/09/2011	OUTLET PIPE CHANGED TO RCP CLASS 2	CH	A.R.
O	06/09/2011	CULVERT HEADWALL & APRON ADDED	CH	A.R.
N	25/07/2011	OUTLET STRUCTURE REMOVED	A.R.	A.H.
M	15/07/2011	DRIVEWAY LAYOUT & VENT POLE LOCATION REVISED	A.H.	A.H.
L	07/02/2011	ABUTMENTS & INLET PIPE CHAINAGE REVISED	A.R.	R.C.
K	12/01/2009	NOTE 4 ADDED.	R.C.	P.H.
J	10/11/2008	PLAN, SECTION & DETAIL AMENDED	D.E.	P.H.
I	15/08/2008	VENT POLE NOTED	N.J.W.	P.H.
H	02/06/2008	SALINITY PIPE LONGITUDINAL SECTION & PIPE CLASSES REVISED	P.Mc.	G.G.T.
G	01/04/2008	SIZE AND CLASS OF RISING MAIN AMENDED. AIR VALVE REMOVED	P.Mc.	G.G.T.
F	18/03/2008	TIMBER BOLLARDS REMOVED FROM PLAN.	P.Mc.	G.G.T.
E	26/02/2008	DRAWING TITLE AND NOTES AMENDED	P.Mc.	G.G.T.
D	03/12/2007	R.L.'s AMENDED	P.Mc.	G.G.T.
C	09/11/2007	R.L.'s AMENDED	P.Mc.	G.G.T.
B	27/10/2005	ACCESS DRIVEWAY & PATHWAY AMENDED TO LANDSCAPE DETAILS	P.Mc.	G.G.T.
A	14/07/2005	CLIENT NAME CHANGE	P.Mc.	G.G.T.

UN SOUND MATERIALS TO BE EXCAVATED AS DIRECTED BY THE SUPERINTENDENT AND REPLACED WITH SELECTED SITE MATERIAL COMPACTED TO:
 (A) COHESIVE MATERIAL - IN ACCORDANCE WITH AS.3798 TO ACHIEVE 98% OF MAXIMUM DRY DENSITY.
 (B) NON-COHESIVE MATERIAL - IN ACCORDANCE WITH AS.3798 TO ACHIEVE A MINIMUM DENSITY INDEX OF 70%.



DEPTH	INVERT LEVELS	FINISHED SURFACE LEVELS	PIPE CHAINAGE
			0.000
			4.710
			20.000
			36.700
			47.758
			53.000
			60.000
			80.000
			87.600
			100.000
			120.000
			140.000
			150.000
			160.000
			171.943
			180.000
			184.924
			188.674

HOR. 5 0 5 10 15 20 25m 1:50-A1 1:1000-A3
 VERT. 0.5 0 0.5 1.0 1.5 2.0 2.5m 1:50-A1 1:100-A3

DESIGNED: [Signature] **DRAWN:** [Signature] **CHECKED:** [Signature] **RECOMMENDED:** PROJ. MAN. **APPROVED:** PROJ. DIR. **DATE:** 30/08/2005

Cardno (Qld) Pty Ltd
 A1 DATUM: A.H.D.
 Cardno (Qld) Pty Ltd
 AEN: 07 031 074 992
 1 level 1, 9 Maud Street Maroochydore, Qld 4558
 Email: eoc@cardno.com.au Ph: (07) 5443 2855 Fax: (07) 5443 2862

STOCKLAND BUDDINA PTY LTD
 BUNDILLA DEVELOPMENT
 SALINITY PUMPING SYSTEM
 RISING MAIN
 PLAN AND LONGITUDINAL SECTION

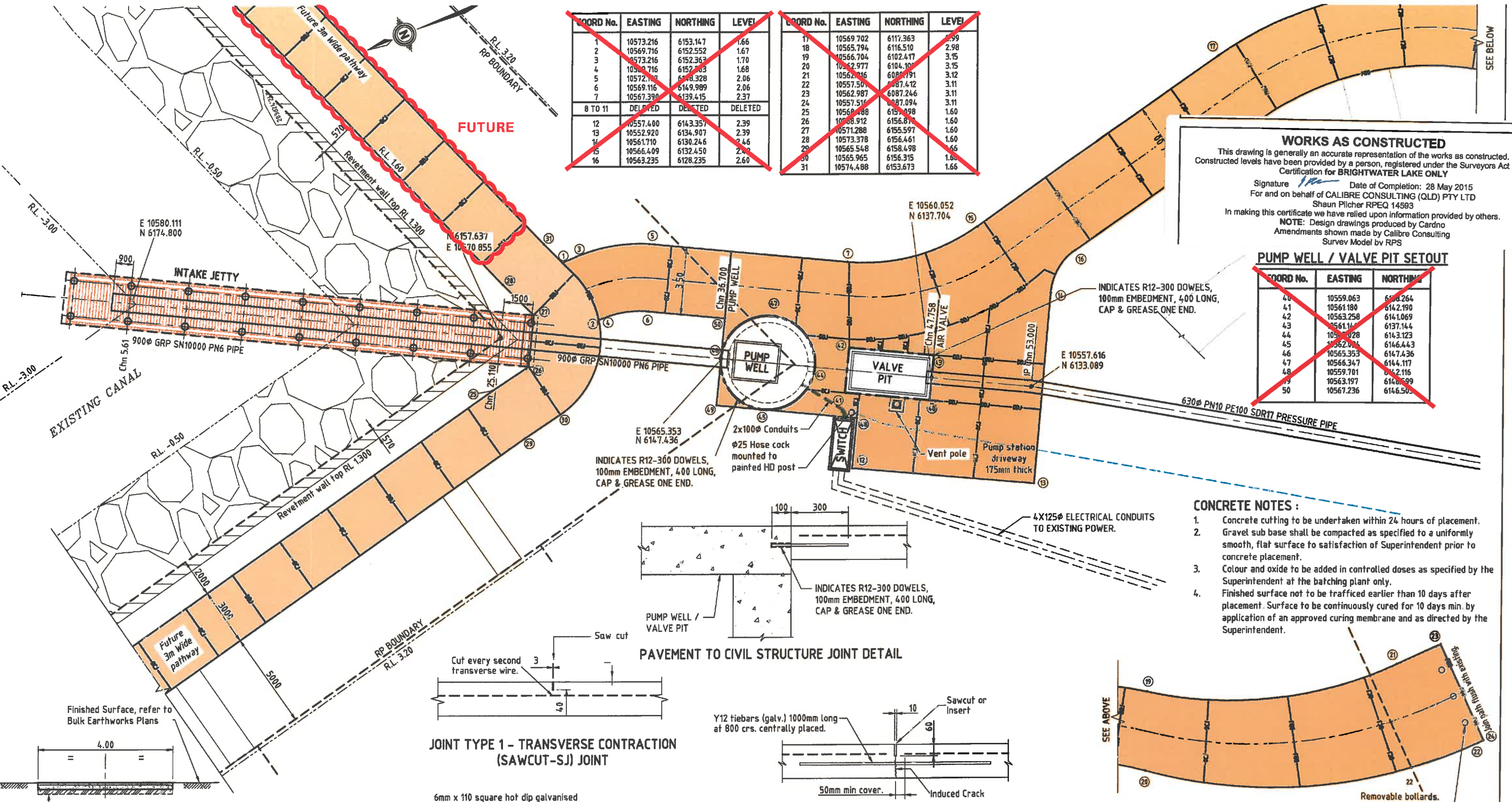
DATE: 30/08/2005
Drawn No: 147841-02-02 U

COORD No.	EASTING	NORTHING	LEVEL	COORD No.	EASTING	NORTHING	LEVEL
1	10573.216	6153.147	1.66	17	10569.702	6117.363	2.99
2	10569.716	6152.552	1.67	18	10565.794	6116.510	2.98
3	10573.216	6152.363	1.70	19	10566.704	6102.417	3.15
4	10573.216	6152.363	1.68	20	10572.977	6104.100	3.15
5	10572.107	6148.328	2.06	21	10567.216	6087.791	3.12
6	10569.116	6149.989	2.06	22	10557.500	6087.412	3.11
7	10567.390	6139.415	2.37	23	10562.987	6087.246	3.11
8 TO 11	DELETED	DELETED	DELETED	24	10557.516	6087.094	3.11
12	10557.400	6143.357	2.39	25	10560.088	6150.098	1.60
13	10552.920	6134.907	2.39	26	10560.912	6156.810	1.60
14	10561.710	6130.246	2.46	27	10571.288	6155.597	1.60
15	10566.409	6132.450	2.47	28	10573.378	6156.461	1.60
16	10563.235	6128.235	2.60	29	10565.548	6158.498	1.66
				30	10565.965	6156.315	1.80
				31	10574.488	6153.673	1.66

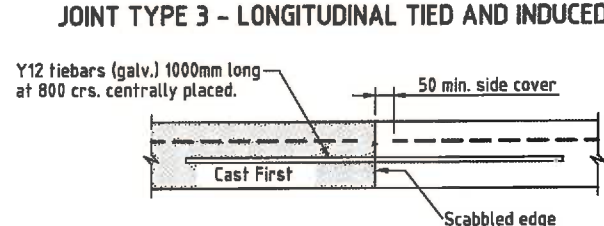
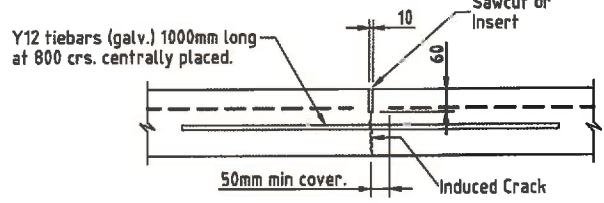
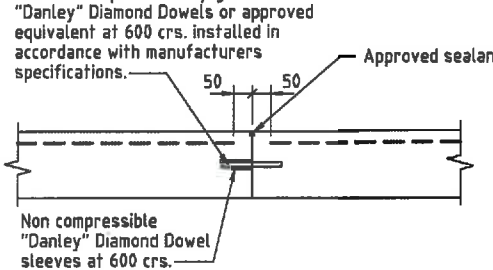
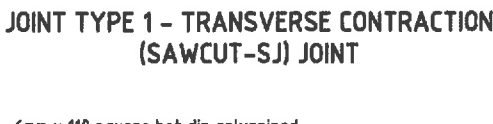
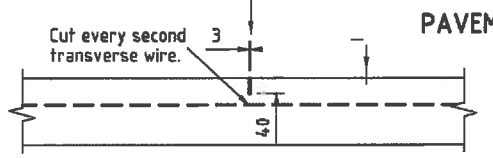
WORKS AS CONSTRUCTED
 This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
 Signature: [Signature] Date of Completion: 28 May 2015
 For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
 Shaun Pilcher RPEQ 14583
 In making this certificate we have relied upon information provided by others.
 NOTE: Design drawings produced by Cardno
 Amendments shown made by Calibre Consulting
 Survey Model by RPS

PUMP WELL / VALVE PIT SETOUT

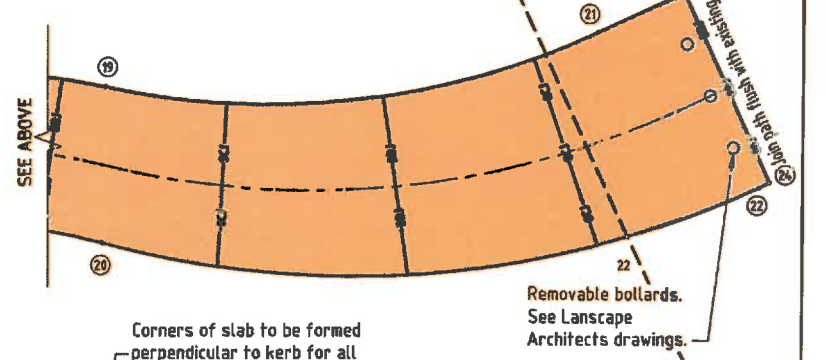
COORD No.	EASTING	NORTHING
40	10559.063	6144.264
41	10561.180	6142.190
42	10563.258	6141.069
43	10561.144	6137.144
44	10559.028	6143.123
45	10562.084	6146.443
46	10565.353	6147.436
47	10566.347	6144.117
48	10559.701	6142.116
49	10563.197	6140.099
50	10567.236	6146.500



- CONCRETE NOTES:**
- Concrete cutting to be undertaken within 24 hours of placement.
 - Gravel sub base shall be compacted as specified to a uniformly smooth, flat surface to satisfaction of Superintendent prior to concrete placement.
 - Colour and oxide to be added in controlled doses as specified by the Superintendent at the batching plant only.
 - Finished surface not to be trafficked earlier than 10 days after placement. Surface to be continuously cured for 10 days min. by application of an approved curing membrane and as directed by the Superintendent.



CONCRETE JOINT DETAILS
 SCALE 1:10
 OR AS SHOWN



LEGEND

- 125mm thick N32 Concrete, SL82
- 175mm thick N32 Concrete, SL82
- INDICATES R12-300 DOWELS, 100mm EMBEDMENT, 400 LONG, CAP & GREASE ONE END.

FOR CONSTRUCTION

DRIVEWAY TYPICAL SECTION
 SCALE 1:50

175mm thick N32 Concrete reinforced with SL82 fabric (60 tc) - to pump station driveway only
 125mm compacted gravel sub-base Type 2.3 (Min CBR45)
 Traverse Joints:-
 Joint Type 1 (saw-cut) at 3m crs max.
 Joint Type 2 (construction joints - diamond dowel) at 6m crs max.
 Longitudinal Joints:-
 Joint Types 3 or 4 at 3.5m crs or road centre.

REV.	DATE	REVISIONS	REC.	APPR.
0	13/02/2013	FOR APPROVAL ISSUE	J.M.	A.R.
N	07/02/2013	PUMP WELL & VALVE PIT RE-DESIGN	J.M.	A.R.
M	28/06/2012	TIMBER INTAKE STRUCTURE RE-INSTATED & PATHWAY REVISED		
L	23/04/2012	INTAKE STRUCTURE REVISED	A.R.	T.H.
K	06/04/2011	INTAKE STRUCTURE REDESIGN	A.R.	T.H.
J	13/07/2011	PUMPING STATION DRIVEWAY LAYOUT & SLAB JOINTS REVISED.	A.R.	T.H.
I	9/02/2011	HEADSTOCK AND SETOUT REVISED INCLUDING PILES	A.R.	R.C.
H	24/02/2009	DRIVEWAY AND SWITCH REPOSITIONED	P.M.	G.G.T.
G	02/06/2008	RISE MAIN CLASS REVISION	N.J.W.	P.M.
F	01/04/2008	RISE MAIN CLASS, SIZE AND FITTINGS REVISED	P.M.	G.G.T.
E	18/03/2008	PATHWAYS 125MM & 170MM THICK SHADED DIFFERENTLY	P.M.	G.G.T.
D	26/02/2008	DRAWING TITLE AND NOTES AMENDED	P.M.	G.G.T.
C	03/12/2007	RL'S AMENDED	P.M.	G.G.T.
B	09/11/2007	RL'S AMENDED	P.M.	G.G.T.
A	27/10/2005	ACCESS DRIVEWAY & PATHWAY AMENDED TO LANDSCAPE DETAILS	P.M.	G.G.T.

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DESIGNED: **SS**
 DRAWN: **SS**
 CHECKED: **AR**
 RECOMMENDED: **PROJ. MAN. P. McKay**
 APPROVED: **PROJ. DIR. G.G. Tamblyn**
 A1 DATUM: A.H.D.
 RPEQ: 1728

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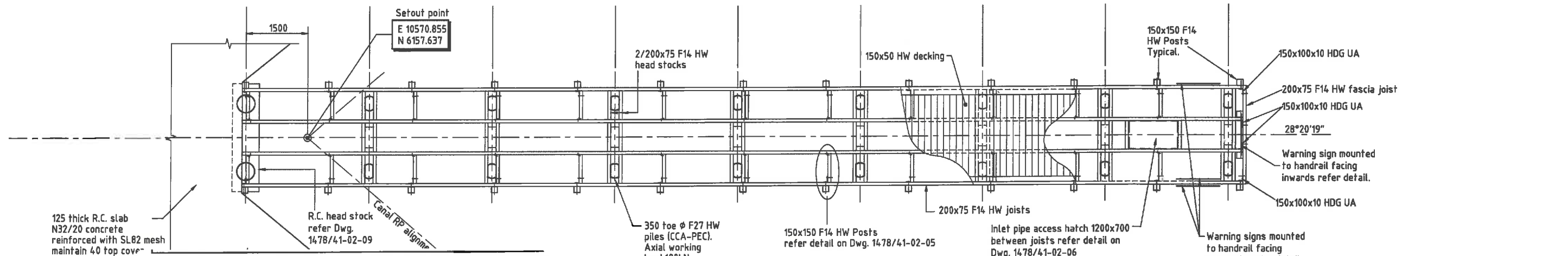
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 Sydney
 Gold Coast
 Townsville
 Hervey Bay
 Cairns
 Rockhampton
 Darling Downs
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STOCKLAND BUDDINA PTY LTD
 BUNDILLA DEVELOPMENT
 SALINITY PUMPING SYSTEM
 INTAKE STRUCTURE AND PUMP STATION
 DETAILED LAYOUT PLAN

DATE: 30/08/2005
 DRAWING No: 147841-02-03



WORKS AS CONSTRUCTED

This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY

Signature: [Signature] Date of Completion: 28 May 2015

For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
Shaun Pilcher RPEQ 14593

In making this certificate we have relied upon information provided by others.

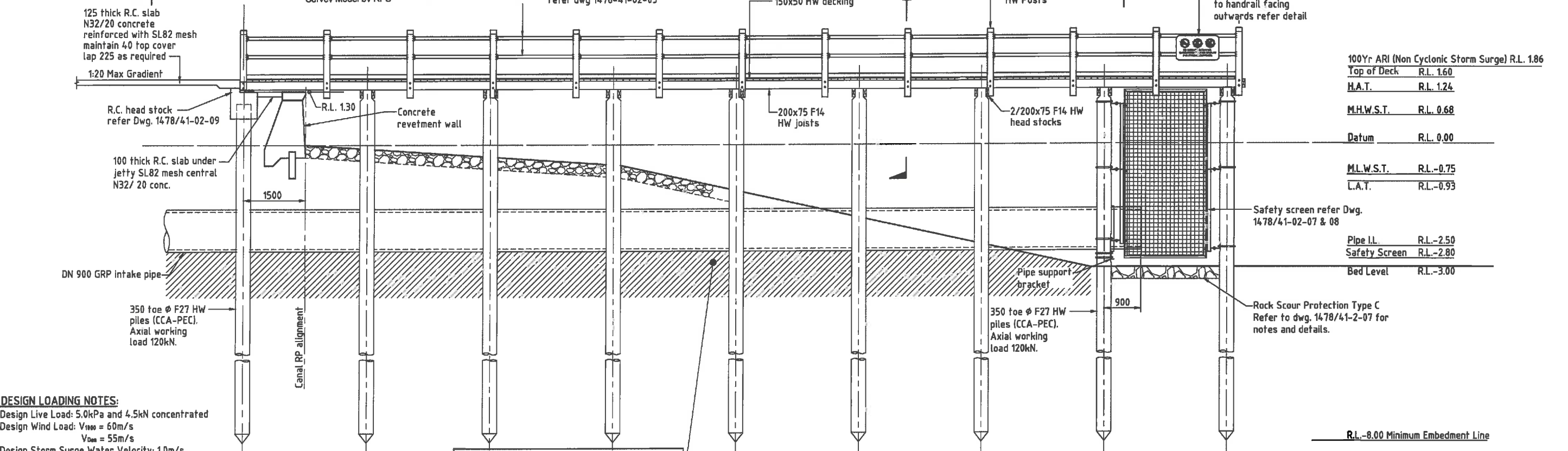
NOTE: Design drawings produced by Cardno
Amendments shown made by Calibre Consulting
Survey Model by RPS

LAYOUT PLAN

Scale 1:50

13 Posts @ 2025 crs = 24300

-76.1x3.2 CHS painted galvanised tubular handrail refer dwg 1478-41-02-05



100Yr ARI (Non Cyclonic Storm Surge) R.L.	1.86
Top of Deck	R.L. 1.60
M.A.T.	R.L. 1.24
M.H.W.S.T.	R.L. 0.68
Datum	R.L. 0.00
M.L.W.S.T.	R.L. -0.75
L.A.T.	R.L. -0.93
Pipe I.L.	R.L. -2.50
Safety Screen	R.L. -2.80
Bed Level	R.L. -3.00

Unsound materials to be excavated as directed by the Superintendent and replaced with selected site material compacted to:
(a) Cohesive Material - in accordance with AS.3798 to achieve 98% of maximum dry density.
(b) Non-cohesive Material - in accordance with AS.3798 to achieve a minimum density index of 70%.

DESIGN LOADING NOTES:

Design Live Load: 5.0kPa and 4.5kN concentrated
Design Wind Load: $V_{100} = 60\text{m/s}$
 $V_{50} = 55\text{m/s}$
Design Storm Surge Water Velocity: 1.0m/s

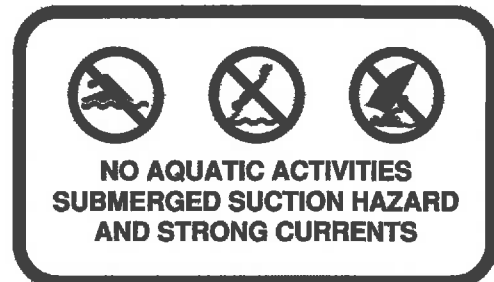
STEEL WORK CORROSION PROTECTION - AS/NZS 2312/HDG600P7:

- All corners and exposed edges shall be rounded to a radius of 2mm.
- Hot Dip Galvanise HDG600.
- Remove all traces of oil, salts and acids with solvent or alkaline degreaser (AS 1627.1).
- Sweep abrasive blast.
- Paint coating specification P7.

COAT	TYPE	PRN	DFT
1st.	Epoxy primer.	C06	75
2nd.	Polyurethane gloss	C26	75
	Total		150

TIMBER JETTY NOTES:

- All bolts, nuts, washers, screws and nails shall be stainless steel. Neoprene isolation washers and sleeves to be provided to all hot dip galvanised steel work, unless noted otherwise.
- All timber shall be strength group S2 hardwood, durability class 1 & 2 with sap wood treated for H5 use.
- Decking and balustrade posts shall be untreated F22, durability class 2 (sapwood removed). Decking to be dressed and shall have 5mm arris. Decking and balustrade posts shall have 2 coats of Koppers CN Timber oil all round.
- On completion of sawing the end grain, all timber shall be coated with an approved wax emulsion.
- Piles to be treated as follows :- CCA, type 1 preservative complying with AS 1604 (Class H6) - PEC, Pigment Emulsified Creosote containing 65 ± 2 % m/m creosote complying with AS 1143. Piles are to be durability Class 1 or 2, any cutting or scarfing of piles shall be treated with Copper Naphthenate emulsion



WARNING SIGN
N.T.S.

500 0 500 1000 1500 2000 2500mm
1:50 - A1 1:100 - A3

REV.	DATE	REVISIONS	REC.	APPR.
M	28/06/2012	JETTY SHORTENED BY 3.0m, DECK LEVEL LOWERED BY 0.4m		
L	9/02/2011	CONCRETE HEADSTOCK AND SETOUT REVISED	A.R.	R.C.
K	13/10/2009	INWARD FACING WARNING SIGN ADDED	R.C.	P.M.
J	24/02/2009	NOTES AMENDED	P.M.	G.G.T.
I	15/08/2008	RPEQ ADDED, DRAWING NUMBER REVISED	N.J.W.	P.M.
H	30/05/2008	900 DIA. INTAKE PIPE CLASS REVISED	P.M.	G.G.T.
G	01/04/2008	INTAKE PIPE DIAMETER AMENDED	P.M.	G.G.T.
F	19/03/2008	REINFORCED CONCRETE SLAB THICKNESS AMENDED	P.M.	G.G.T.
E	26/02/2008	CONCRETE THICKNESS AMENDED	P.M.	G.G.T.
D	03/12/2007	R.L.'s AMENDED	P.M.	G.G.T.
C	09/11/2007	R.L.'s AMENDED	P.M.	G.G.T.
B	15/05/2006	PATHWAY NOTE AMENDED	P.M.	G.G.T.
A	14/07/2005	CLIENT NAME CHANGE	P.M.	G.G.T.

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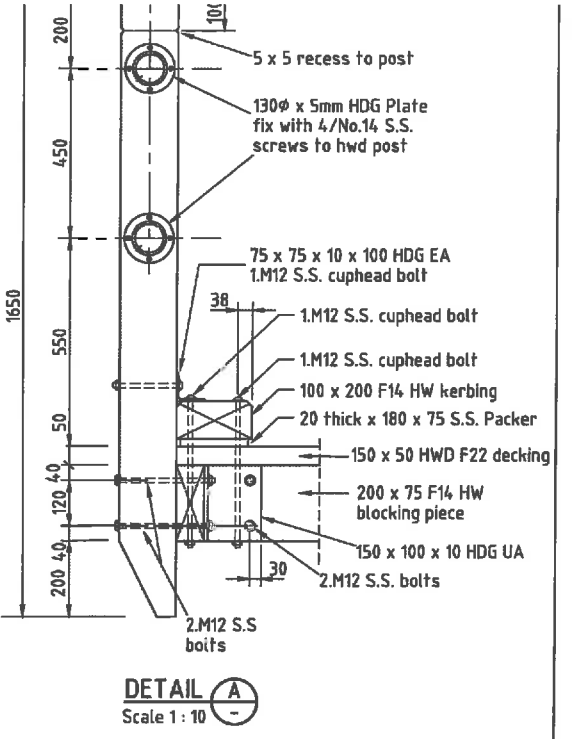
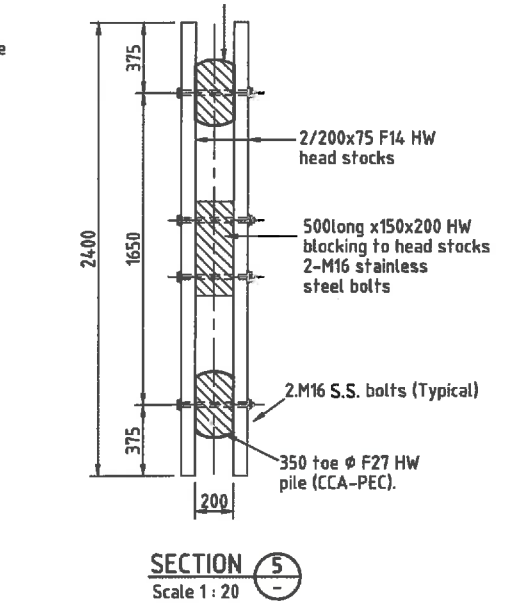
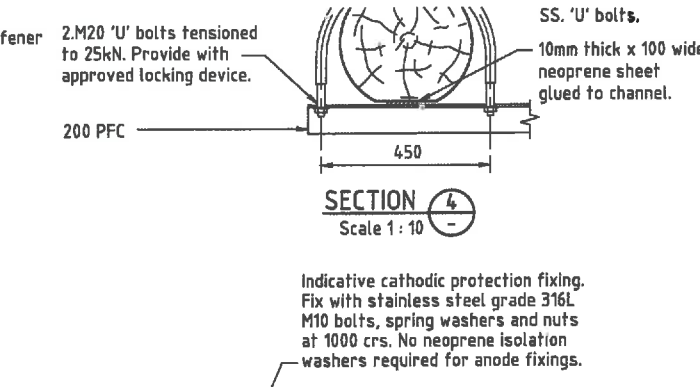
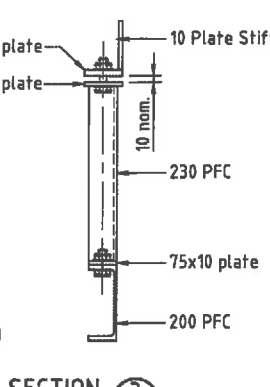
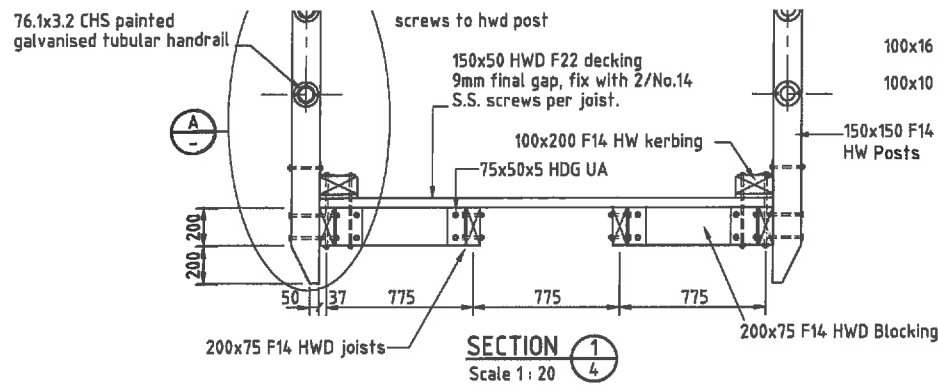
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DESIGNED: <i>J.R.</i>	A1	DATUM: A.H.D.
DRAWN: <i>J.R.</i>		
CHECKED: <i>J.R.</i>		
RECOMMENDED: PROJ. MAN. <i>P. McKay</i>		
APPROVED: PROJ. DIR. <i>G.G. Tamblyn</i>		
CAD FILE: 147841-02-04-11.dwg		

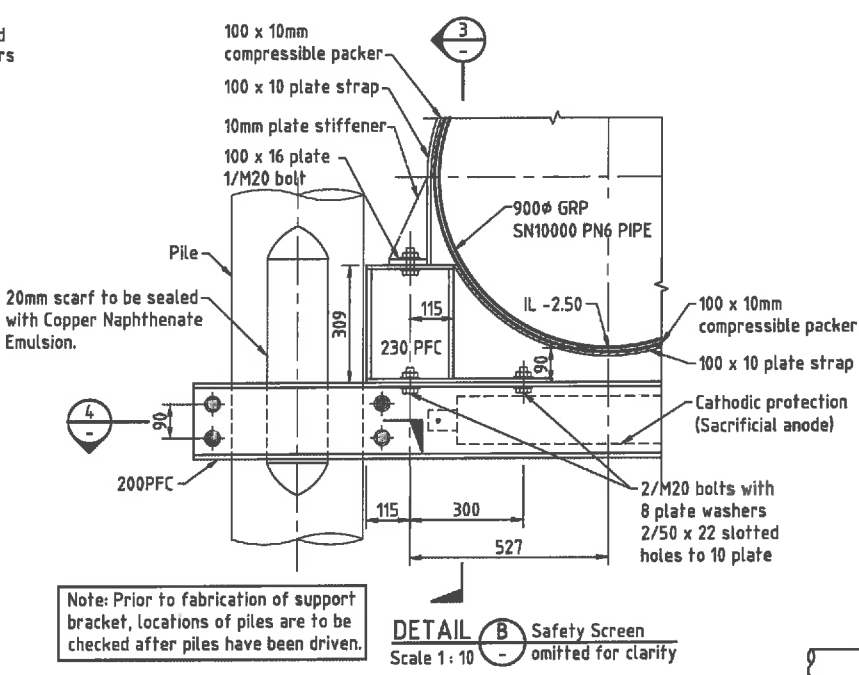
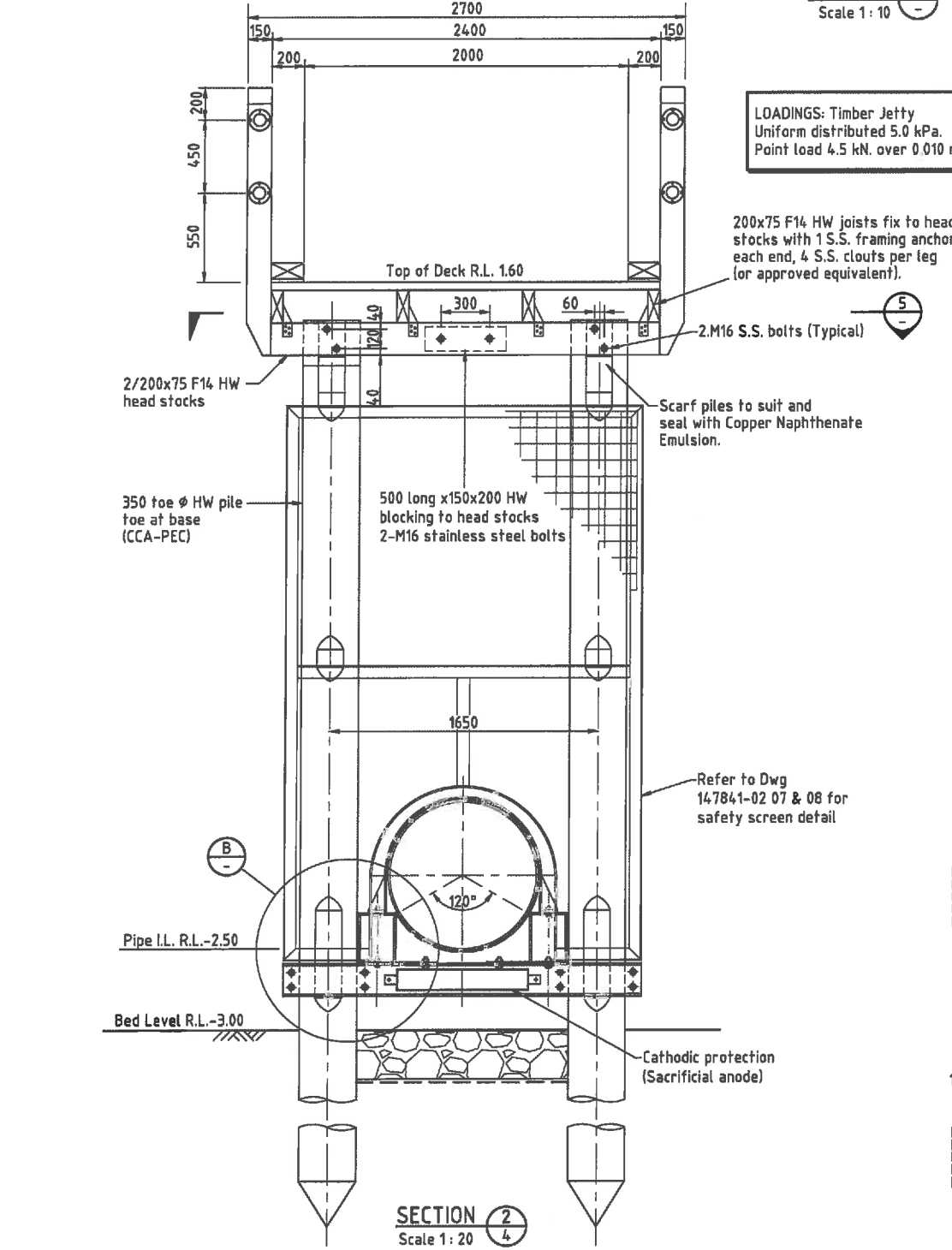
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Bundaberg	(09) 5418 8533	(09) 5418 8539
Gold Coast	(07) 5638 9333	(07) 5638 4847
Townsville	(07) 4772 1186	(07) 4721 2538
Hayward Bay	(07) 1124 5463	(07) 4124 5155
Cairns	(07) 4023 2996	(07) 4023 2992
Rockhampton	(07) 4924 7800	(07) 4928 4375
Darling Downs	(07) 4937 9122	(07) 4637 8166
Derwin	(08) 8531 3613	(08) 8941 1766

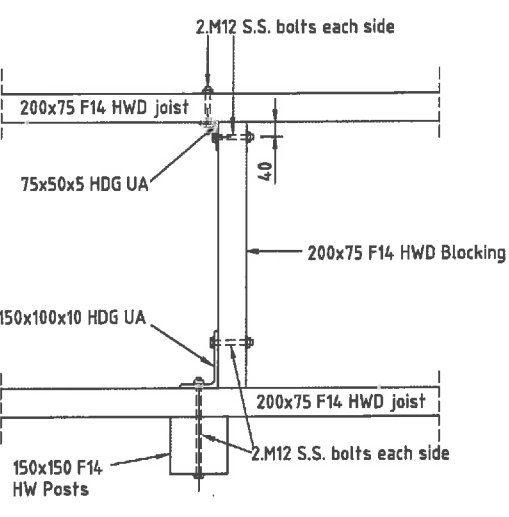
STOCKLAND BUDDINA PTY LTD	DATE: 30/06/2005	Rev.
BUNDILLA DEVELOPMENT SALINITY PUMPING SYSTEM INTAKE STRUCTURE PLAN AND ELEVATION	DRAWING No:	
	147841-02-04	M



LOADINGS: Timber Jetty
Uniform distributed 5.0 kPa.
Point load 4.5 kN over 0.010 m²

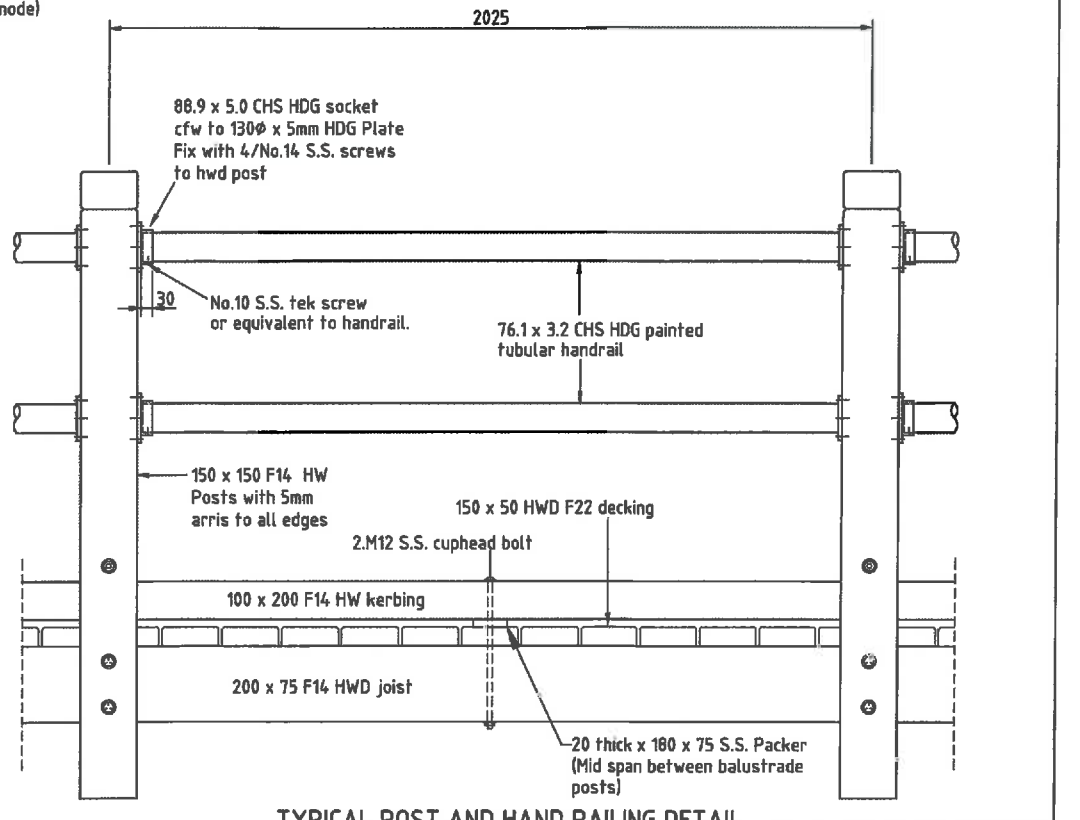


Note: Prior to fabrication of support bracket, locations of piles are to be checked after piles have been driven.



TYPICAL POST FIXING TO JOIST DETAIL
Scale 1:10

WORKS AS CONSTRUCTED
This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
Signature: [Signature] Date of Completion: 28 May 2015
For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
Shaun Pilcher RPEQ 14593
In making this certificate we have relied upon information provided by others.
NOTE: Design drawings produced by Cardno
Amendments shown made by Calibre Consulting
Survey Model by RPS



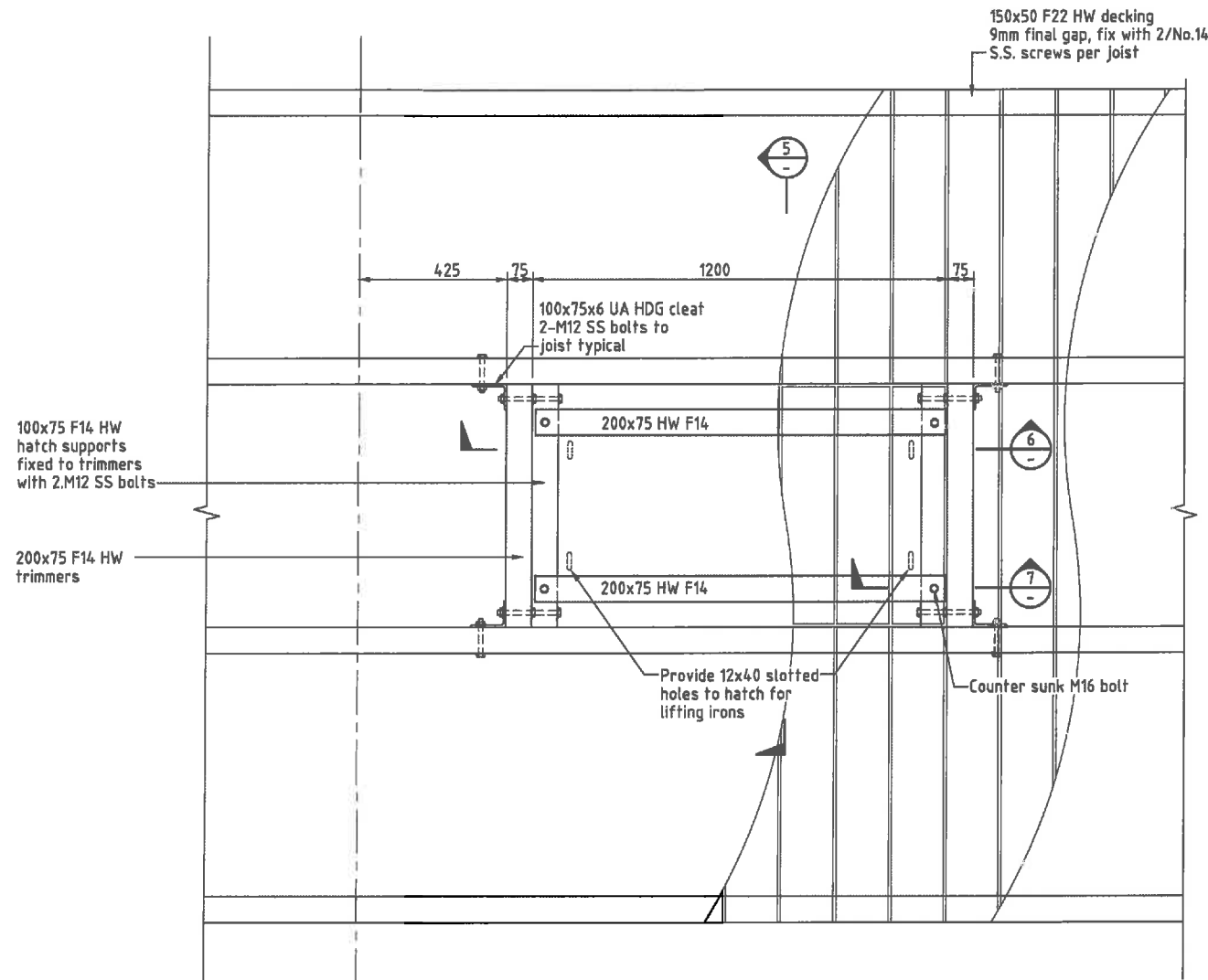
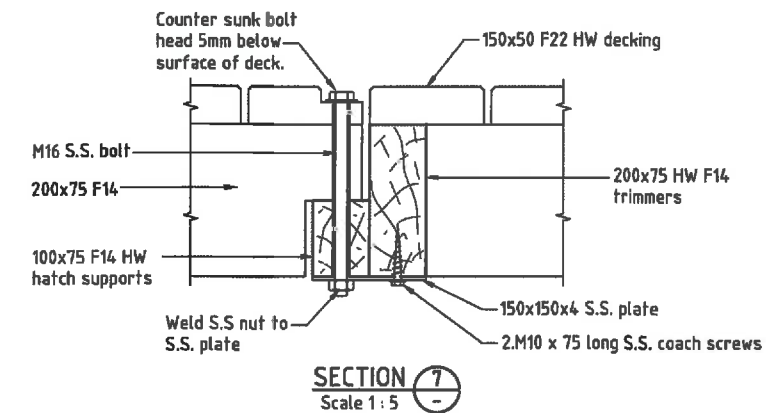
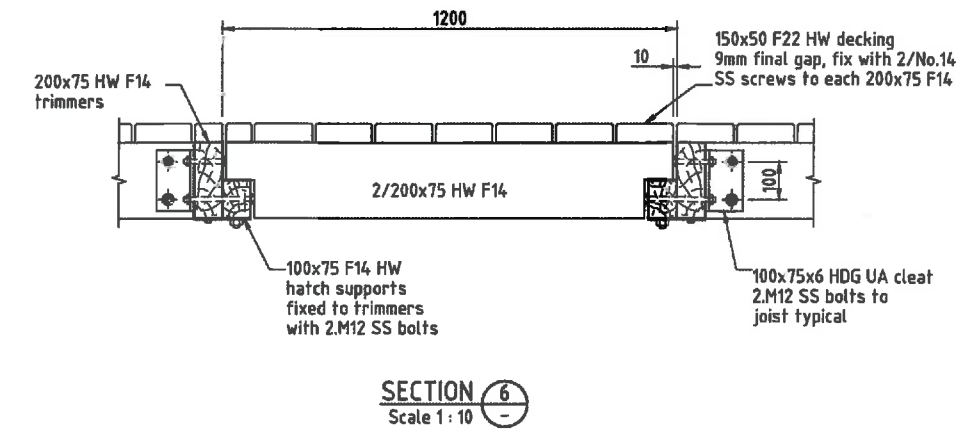
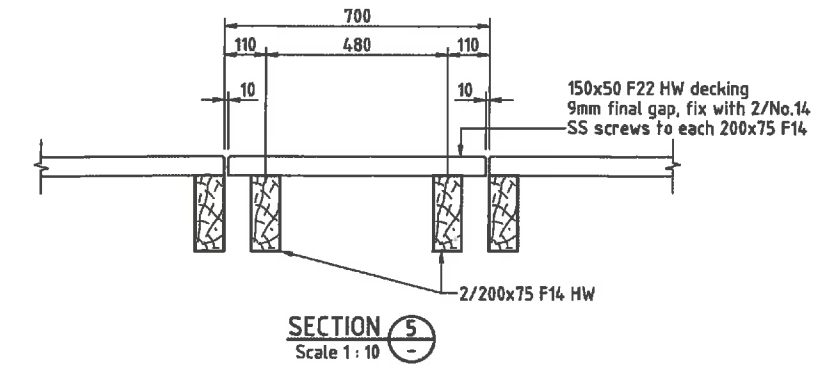
TYPICAL POST AND HAND RAILING DETAIL
Scale 1:10
200 0 200 400 600 800 1000mm
1:20 - A1 1:40 - A3
OR AS SHOWN

DESIGNED: A.R.	DATE: 28/06/2012	SECTION 2, DETAIL B & TYP. POST & HAND RAILING DETAIL REVISED
DRAWN: B.B.	DATE: 24/02/2009	NOTES AMENDED
CHECKED: A.R.	DATE: 15/08/2008	RPEQ ADDED, DRAWING NUMBER REVISED
RECOMMENDED: PROJ. MAN.	DATE: 03/06/2008	PIPE DIAMETER REVISED, SECTION 2/4 AND DETAIL B AMENDED
APPROVED: PROJ. DIR.	DATE: 26/02/2008	DRAWING TITLE AMENDED
DATE: 14/07/2005	DATE: 14/07/2005	CLIENT NAME CHANGE

DESIGNED: A.R.	DATE: 28/06/2012	SECTION 2, DETAIL B & TYP. POST & HAND RAILING DETAIL REVISED
DRAWN: B.B.	DATE: 24/02/2009	NOTES AMENDED
CHECKED: A.R.	DATE: 15/08/2008	RPEQ ADDED, DRAWING NUMBER REVISED
RECOMMENDED: PROJ. MAN.	DATE: 03/06/2008	PIPE DIAMETER REVISED, SECTION 2/4 AND DETAIL B AMENDED
APPROVED: PROJ. DIR.	DATE: 26/02/2008	DRAWING TITLE AMENDED
DATE: 14/07/2005	DATE: 14/07/2005	CLIENT NAME CHANGE

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Cardno (Qld) Pty Ltd
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Email: scn@cardno.com.au Ph: (07) 5443 2666 Fax: (07) 5443 2642

STOCKLAND BUDDINA PTY LTD
BUNDILLA DEVELOPMENT
SALINITY PUMPING SYSTEM
INTAKE STRUCTURE
SECTIONS AND DETAILS
DATE: 30/06/2005
DRAWING No: 147841-02-05
Rv: F



* Balustrade and toe rail omitted for clarity.

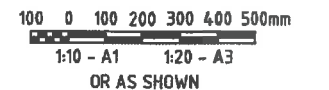
WORKS AS CONSTRUCTED

This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY

Signature: *[Signature]* Date of Completion: 28 May 2015
For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
Shaun Pilcher RPEQ 14593

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NOTE: Design drawings produced by Cardno
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DESIGNED: <i>A.R.</i>	A1 DATUM: A.H.D.
DRAWN: <i>G.G.</i>	
CHECKED: <i>A.R.</i>	
RECOMMENDED: PROJ. MAN. <i>P. McKay</i>	APPROVED: PROJ. DIR. <i>G.G. Tamblyn</i> RPEQ 1728
CAD FILE: 147841-02-04-10.dwg	

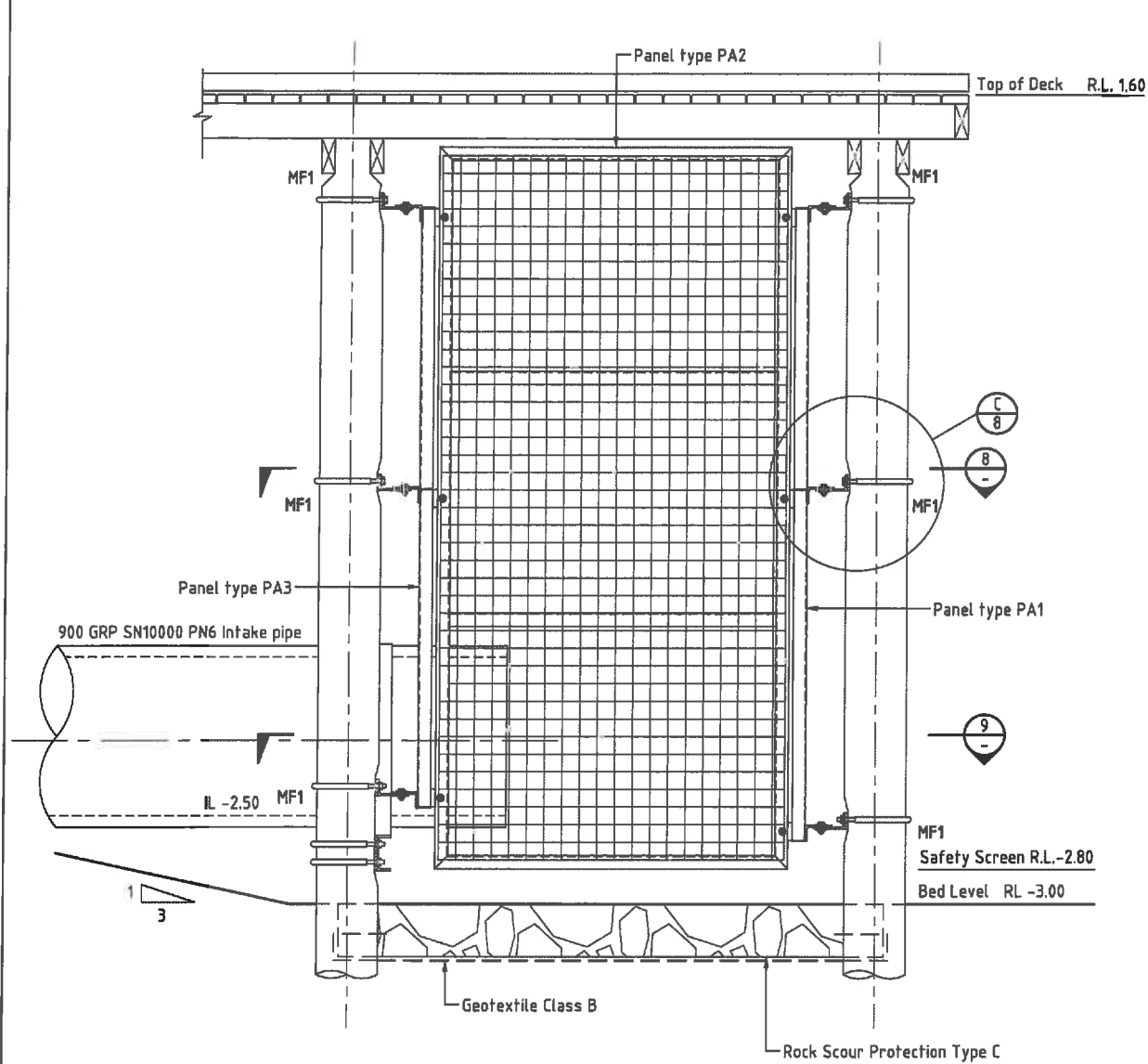
Cardno
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Email: soo@sun.cardno.com.au Ph: (07) 5443 2656 Fax: (07) 5443 6642

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Calva	(07) 4633 2366	(07) 4633 2562
Rockhampton	(07) 4624 7500	(07) 4628 4575
Darling Downs	(07) 4637 5122	(07) 4637 6165
Dawson	(08) 9381 3613	(08) 9341 1786

STOCKLAND BUDDINA PTY LTD
BUNDILLA DEVELOPMENT
SALINITY PUMPING SYSTEM
INTAKE STRUCTURE
ACCESS HATCH - SECTIONS AND DETAILS

DATE: 30/08/2006	Rv.
DRAWING No:	
147841-02-06	C

Rv.	DATE	REVISIONS	REC.	APPR.
C	15/08/2008	RPEQ ADDED, DRAWING NUMBER REVISED	N.J.W.	P.M.
B	26/02/2008	DRAWING TITLE AMENDED	P.M.	G.G.T.
A	14/07/2005	CLIENT NAME CHANGE	P.M.	G.G.T.

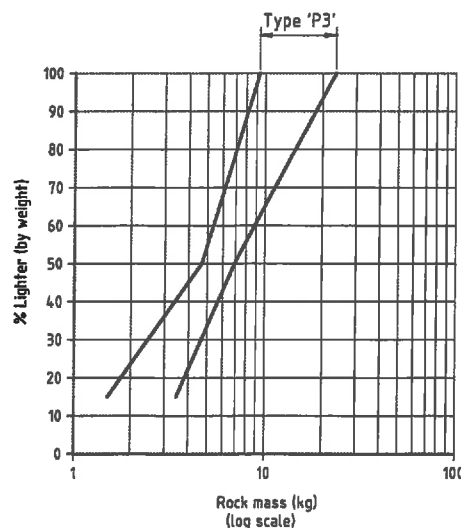


**INTAKE SAFETY SCREEN
TYPICAL ELEVATION**

SCALE 1:20

NOTE:

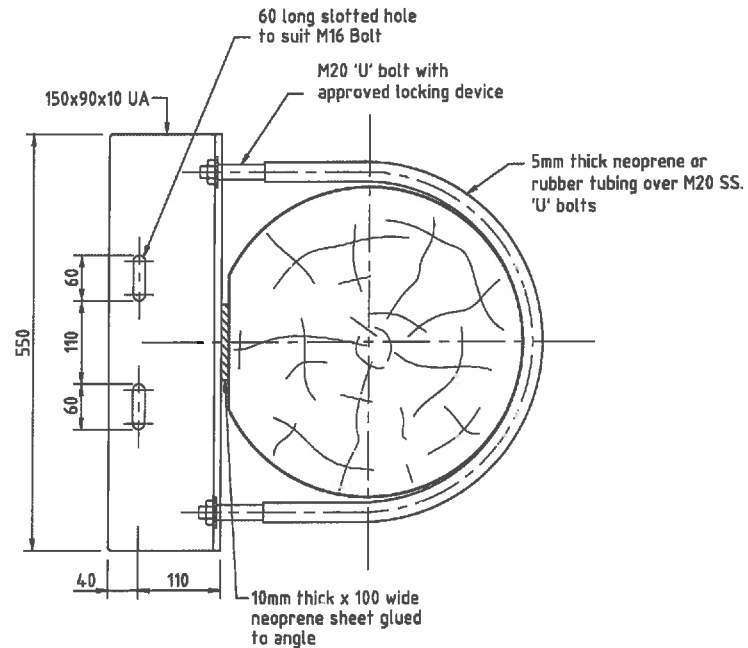
For Panel Types PA1, PA2 and PA3 refer to Drawing 147841-02-08. Balustrading omitted for clarity.



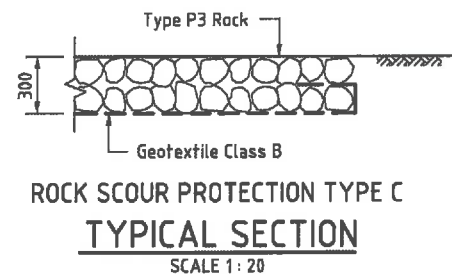
ROCK GRADING GRAPH

RIP RAP NOTES:

1. A representative sample of rock shall be obtained from the quarry in accordance with AS114.1.3.
2. The dry density of the rock shall not be less than 2500 kg/m³ in accordance with AS4133.2.1.2.
3. The ratio of maximum to minimum dimensions of any rock shall not exceed three.
4. The Los Angeles value of the rock shall not exceed 20 in accordance with AS114.1.23.
5. The maximum permissible loss for each fraction shall be 12% in accordance with AS114.1.24.
6. Geotextile fabric shall be lapped 500mm minimum and shall be keyed at the edges to the satisfaction of the Superintendent.
7. Rock of larger size may be substituted if approved by the Superintendent. If larger rock is used, specified layer thickness must be increased whilst maintaining nominated finished levels and profiles.
8. Geotextiles shall be non-woven, needle punched fabrics consisting of polyester or polypropylene polymers.



MOUNTING FIXTURE - MF1
Scale 1:5



**ROCK SCOUR PROTECTION TYPE C
TYPICAL SECTION**
SCALE 1:20

GEOTEXTILE SPECIFICATION TABLE :

Property	Test	Geotextile Class
		B
Minimum grab tensile strength (N)	AS2001.2.3	1000
Minimum G Rating	Austrroads	2500
Minimum trapezoidal tear strength (N)	AS3706.3	400
Maximum pore size (EOS um)	AS3706.7	200
Minimum permittivity (s ⁻¹)	AS3706.9	0.5

Refer Note No.8

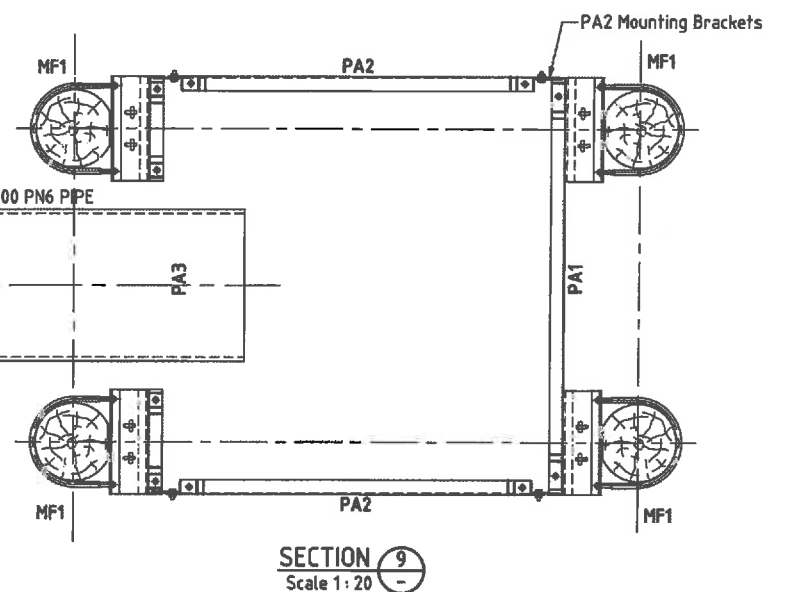
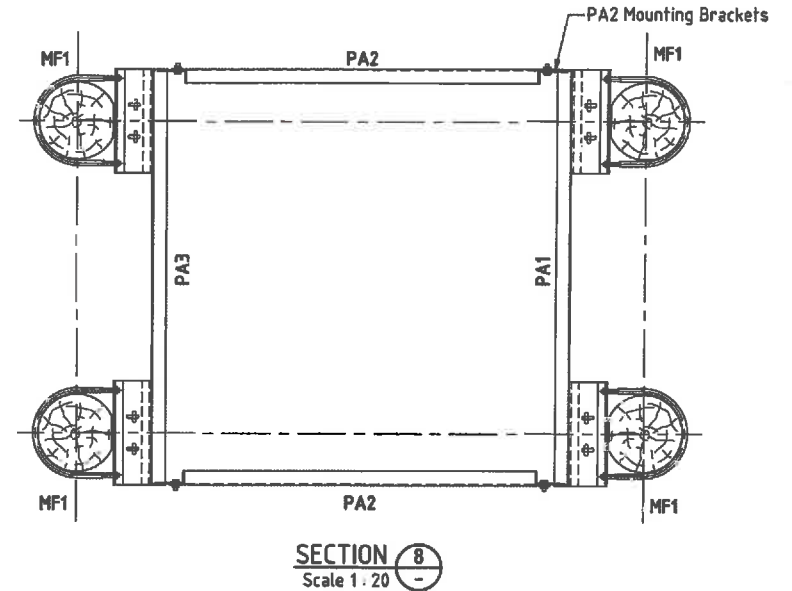
ROCK GRADING TABLE :

PARAMETER		ROCK TYPE
SIZE	RANGE	P3
W ₁₅	min.	1.50
	max.	3.50
W ₅₀	min.	4.70
	max.	7.00
W ₁₀₀	min.	9.40
	max.	24.00

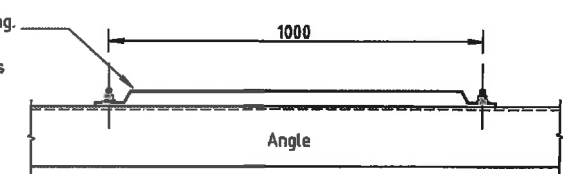
All gradings given in dry mass (kg)

Indicative cathodic protection fixing. Fix with S.S. Grade 316L M10 x 30 studs, spring washers and nuts at 1000 crs. (Drill Anode strip to suit)

LOCATIONS OF DRIVEN PILES SHALL BE CONFIRMED ON SITE PRIOR TO FABRICATION OF INTAKE SCREENS AND COMPONENTS



LOCATIONS OF DRIVEN PILES SHALL BE CONFIRMED ON SITE PRIOR TO FABRICATION OF INTAKE SCREENS AND COMPONENTS



L ANODE MOUNTING
Scale 1:20

WORKS AS CONSTRUCTED

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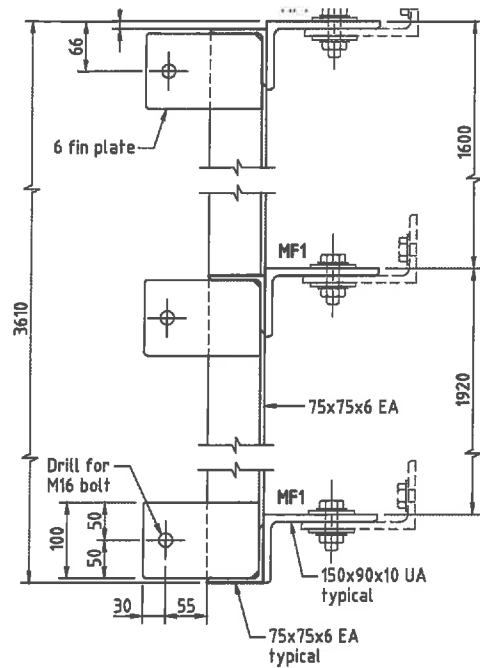
Signature: [Signature] Date of Completion: 28 May 2015
For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
Shaun Pilcher RPEQ 14593

In making this certificate we have relied upon information provided by others.

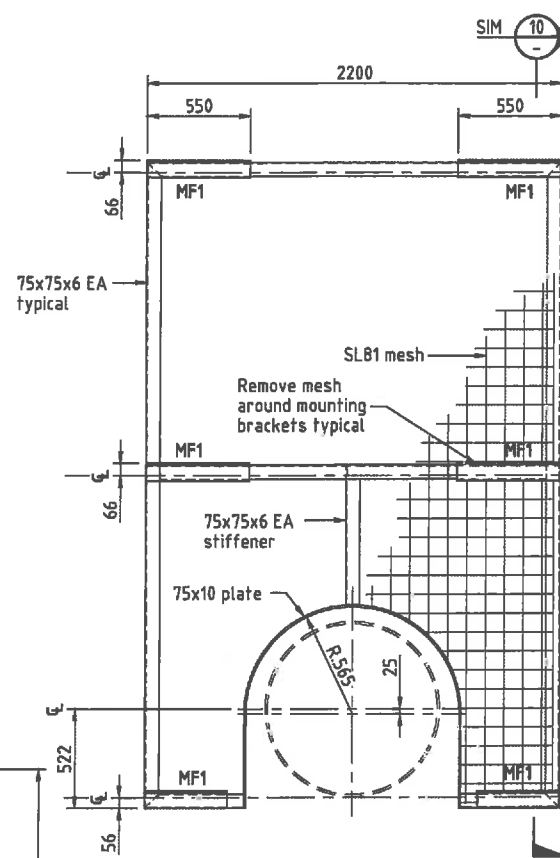
NOTE: Design drawings produced by Cardno
Amendments shown made by Calibre Consulting
Survey Model by RPS

200 0 200 400 600 800 1000mm
1:20 - A1 1:40 - A3
OR AS SHOWN

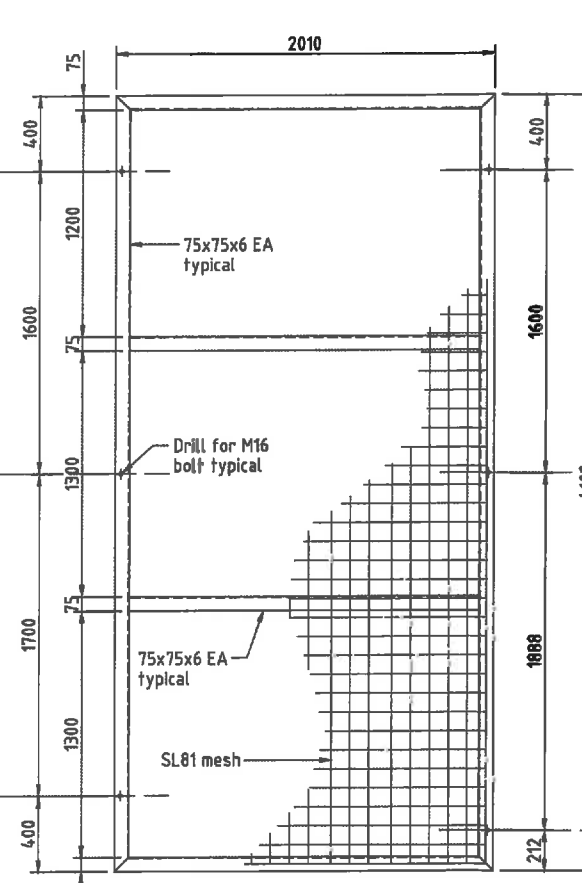
<p>28/06/2012 SAFETY SCREEN AND SECTION 9 REVISED</p> <p>13/10/2009 RIP RAP TYPE C CHANGED TO ROCK SCOUR PROTECTION TYPE C</p> <p>10/11/2008 ANODES ADDED SECTION 9</p> <p>15/08/2008 SAFETY SCREEN NOTE AMENDED, DRAWING NUMBER REVISED</p> <p>02/06/2008 INTAKE PIPE DIAMETER REVISED</p> <p>26/02/2008 DRAWING TITLE AMENDED</p> <p>14/07/2005 CLIENT NAME CHANGE</p>	<p>DESIGNED: A.R.</p> <p>DRAWN: B.B.</p> <p>CHECKED: A.R.</p> <p>RECOMMENDED: PROJ. MAN. P. McKay</p> <p>APPROVED: PROJ. DIR. G.G. Tamblyn</p>	<p>A1 DATUM: A.H.D.</p> <p>Cardno (Qld) Pty Ltd</p> <p>Cardno (Qld) Pty Ltd ABN 57 051 074 962</p> <p>SUNSHINE COAST OFFICE: Level 1, 9 Mac. Street Maroochydore, Qld 4558 Email: sco@sun.cardno.com.au Ph: (07) 5443 2050 Fax: (07) 5443 2442</p>	<p>OFFICES</p> <p>Sunshine Coast Brisbane Sydney Gold Coast Townsville Hervey Bay Cairns Rockhampton Darling Downs Darwin</p> <p>TELEPHONE</p> <p>(07) 5443 2050 (07) 3359 9222 (02) 9418 8293 (07) 5538 9333 (07) 4772 1198 (07) 4124 8486 (07) 4033 2095 (07) 4834 7000 (07) 4637 8122 (08) 8061 7810</p> <p>FAX</p> <p>(07) 5443 2442 (07) 3359 9222 (02) 9418 8293 (07) 5538 4547 (07) 4721 2506 (07) 4124 8155 (07) 4033 2992 (07) 4637 8122 (08) 8041 1788</p>	<p>STOCKLAND BUDDINA PTY LTD</p> <p>BUNDILLA DEVELOPMENT SALINITY PUMPING SYSTEM INTAKE STRUCTURE SAFETY SCREEN DETAILS - SHEET 1</p>	<p>DATE: 30/08/2005</p> <p>DRAWING No: 147841-02-07</p>	<p>Rv: G</p>
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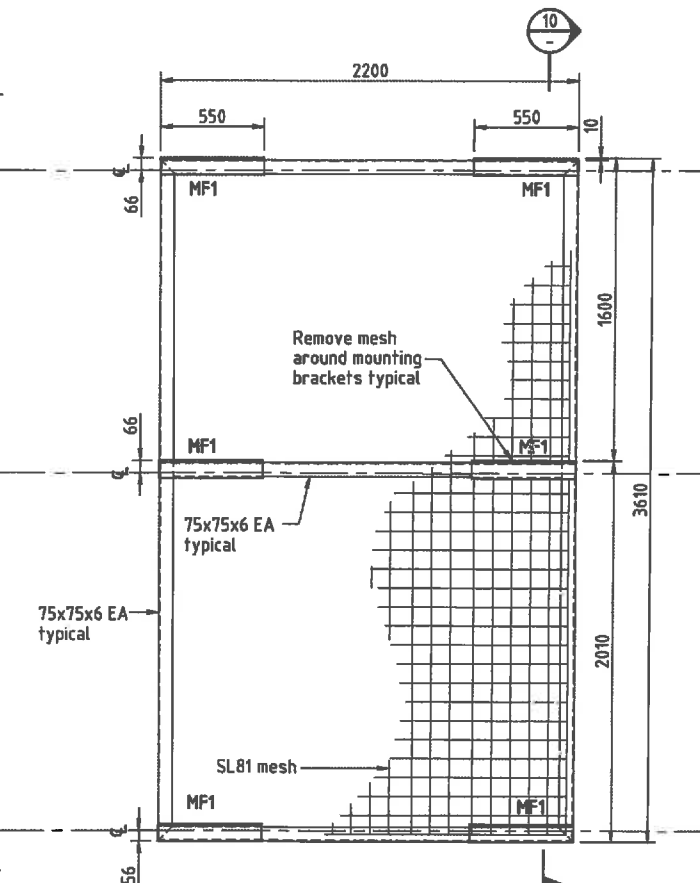
SECTION 10
Scale 1:5



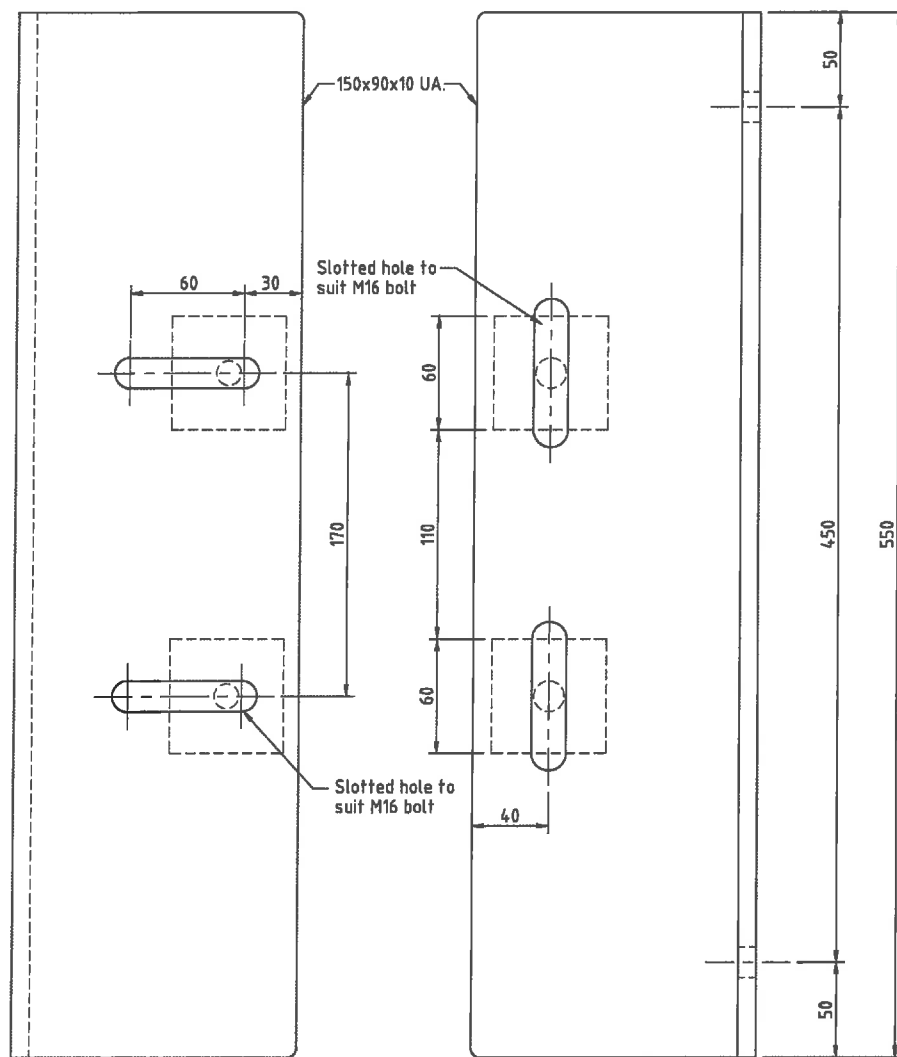
MESH PANEL TYPE PA3
Scale 1:20



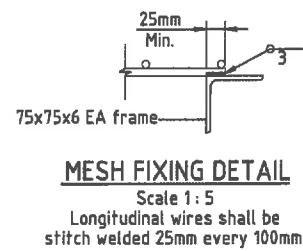
MESH PANEL TYPE PA2 (x2)
Scale 1:20



MESH PANEL TYPE PA1
Scale 1:20



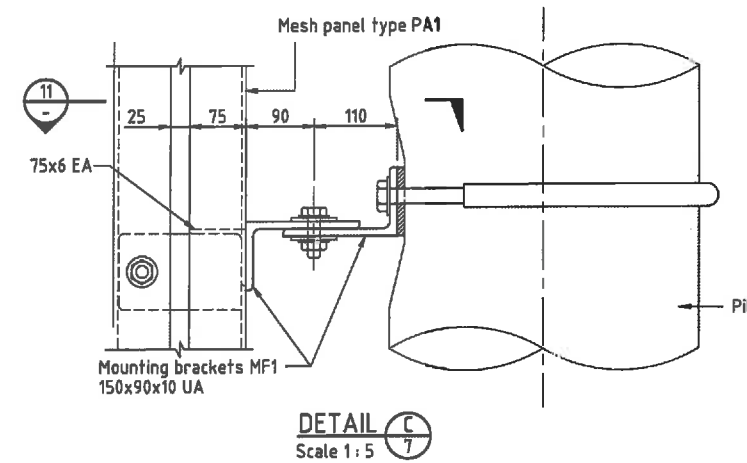
MOUNTING PLATES MF1
Scale 1:2



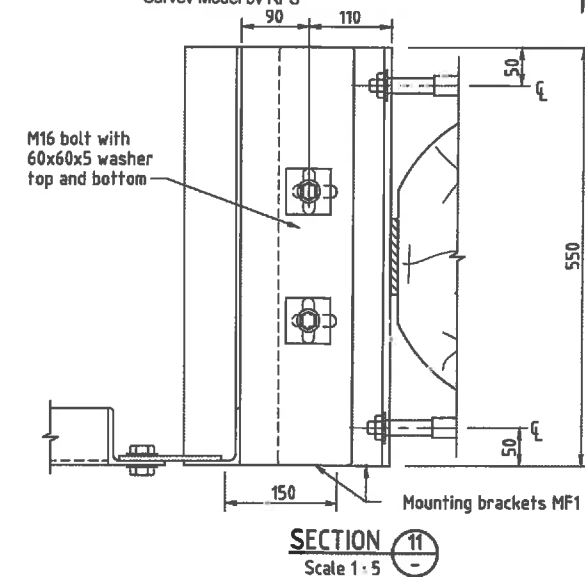
MESH FIXING DETAIL
Scale 1:5
Longitudinal wires shall be
stitch welded 25mm every 100mm.

LOCATIONS OF DRIVEN PILES SHALL BE CONFIRMED ON SITE
PRIOR TO FABRICATION OF SAFETY SCREENS AND COMPONENTS

WORKS AS CONSTRUCTED
This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
Signature: [Signature] Date of Completion: 28 May 2015
For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
Shaun Pilcher RPEQ 14593
In making this certificate we have relied upon information provided by others.
NOTE: Design drawings produced by Cardno
Amendments shown made by Calibre Consulting
Survey Model by RPS



DETAIL C
Scale 1:5



SECTION 11
Scale 1:5

- NOTES:
1. All nuts, bolts and washers are to be Grade 316L stainless steel
 2. Each panel is to be fitted with a sacrificial zinc anode.
 3. All cut edges to be rounded to radius of 5mm.

200 0 200 400 600 800 1000mm
1:20 - A1 1:40 - A3
OR AS SHOWN

REV.	DATE	REVISIONS	REC.	APPR.
E	28/06/2012	SCREENS REVISED		
D	15/08/2008	DRAWING NUMBER REVISED, RPEQ ADDED	N.J.W.	P.M.
C	03/06/2008	PIPE DIAMETER REVISED ON MESH PANEL TYPE PA3	P.M.	G.E.T.
B	26/02/2008	DRAWING TITLE AMENDED	P.M.	G.E.T.
A	14/07/2005	CLIENT NAME CHANGE	P.M.	G.E.T.

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DRAWN: <i>AR</i>	
CHECKED: <i>AR</i>	
RECOMMENDED: PROJ. MAN. <i>P. McKay</i>	APPROVED: PROJ. DIR. <i>G.G. Tamblyn</i>
CAD FILE: 147841-02-04-10.dwg	
XREF:	

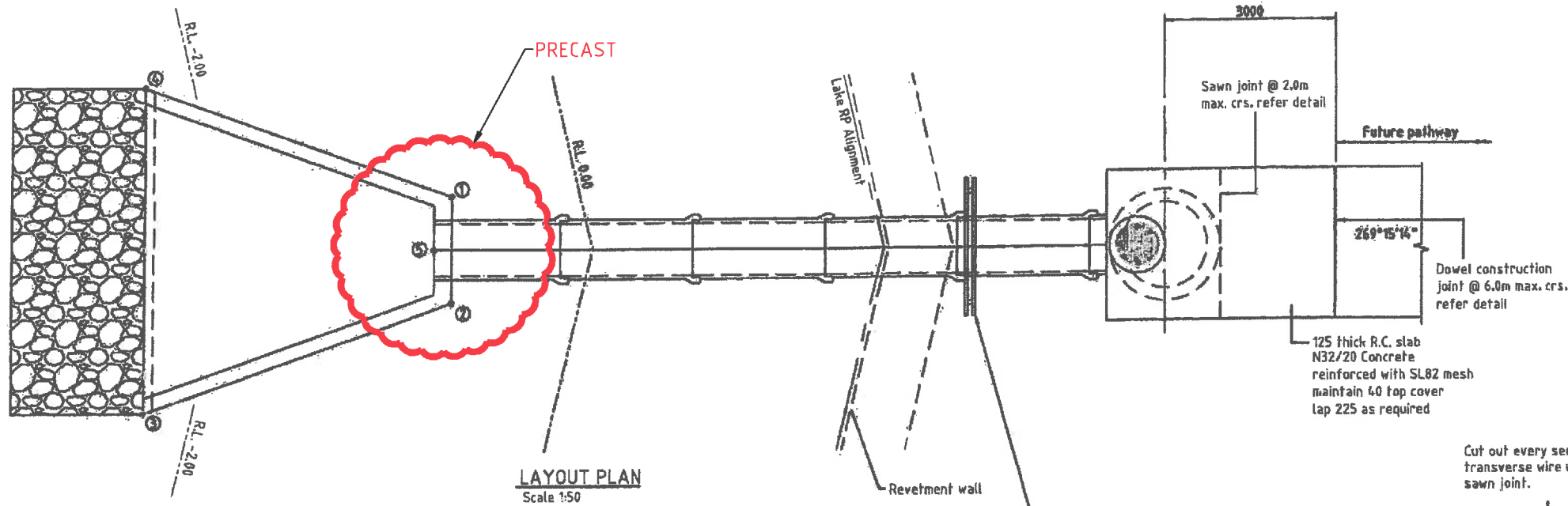
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ABN: 57 081 374 982
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Email: enq@cardno.com.au Ph: (07) 5443 8858 Fax: (07) 5443 8848

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Darwin

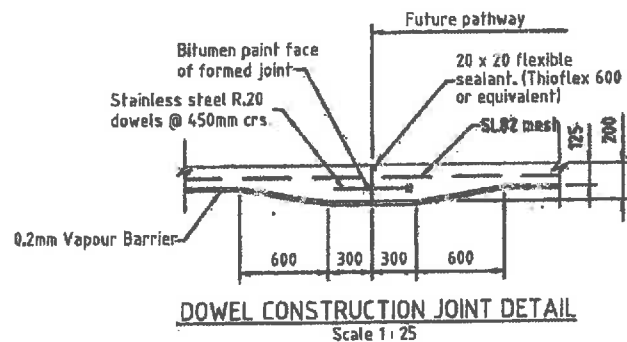
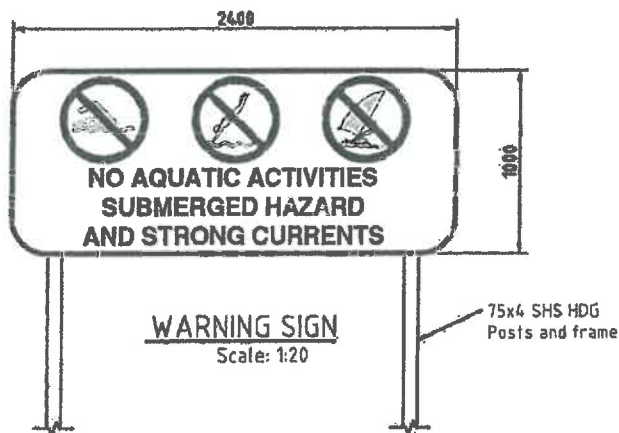
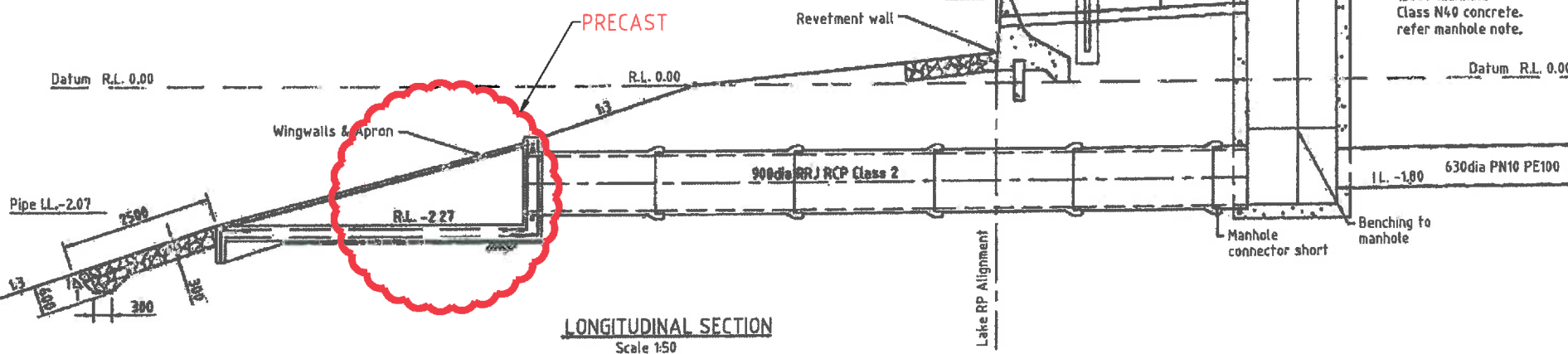
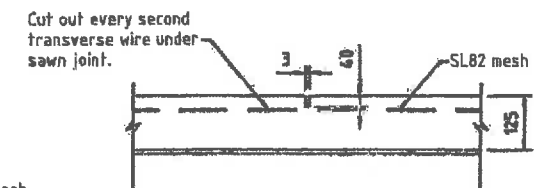
TELEPHONE
(07) 5443 2955
(07) 3399 0822
(02) 9416 8233
(07) 4038 9533
(07) 4772 1196
(07) 4124 5468
(07) 4038 2956
(07) 4824 7800
(07) 4837 8122
(02) 8681 3812

FAX
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(07) 3399 0722
(02) 9416 8259
(07) 8838 4547
(07) 4721 2608
(07) 4124 5155
(07) 4038 2952
(07) 4828 4378
(07) 4837 8156
(02) 8641 1765

STOCKLAND BUDDINA PTY LTD	
BUNDILLA DEVELOPMENT SALINITY PUMPING SYSTEM INTAKE STRUCTURE SAFETY SCREEN DETAILS - SHEET 2	
DATE: 30/06/2005	REV:
DRAWING No: 147841-02-08	E



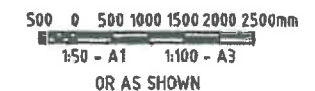
Headwall - Setout		
Point No.	Easting	Northing
1	10486.626	6022.474
2	10488.244	6021.548
3	10487.295	6016.035
4	10482.355	6018.860
5	10487.435	6022.011



MANHOLE NOTES:

- 1500Ø manhole shall have 225mm thick walls and shall be reinforced with N16@200 both ways centrally placed.
- Provide N16@200 starter bars from manhole base 300 btm cog and lap 600 vertically. Base shall be 250 thick reinforced with N16@200 both ways centrally placed. Manhole top shall be reinforced per IPWEAQ Standard Drawing D-0011. Concrete shall be class S50.
- All manholes shall be benched.
- All manholes shall have bolt down water tight access covers.
- All internal concrete surfaces of manhole shall be finished with Watlyl Sigmaguard CSF75 Epoxy grouting or approved equivalent to the manufacturer's specifications.

WORKS AS CONSTRUCTED
 This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
 Signature: [Signature] Date of Completion: 28 May 2015
 For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
 Shaun Pilcher RPEQ 14593
 In making this certificate we have relied upon information provided by others.
 NOTE: Design drawings produced by Cardno
 Amendments shown made by Calibre Consulting
 Survey Model by RPS



REV	DATE	REVISIONS	REC.	APPROV.
B	15/05/2006	PATHWAY NOTE AND MANHOLE NOTE AMENDED	P.M.	G.G.T.
A	15/05/2006	REVISIONS	REC.	APPROV.

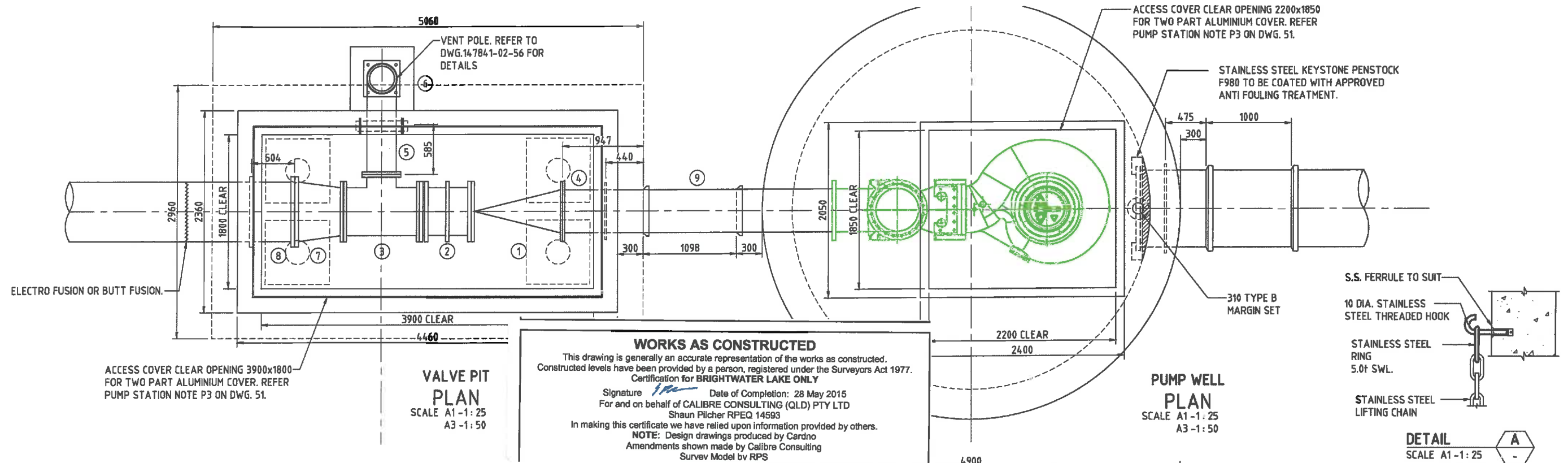
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DESIGNED: J.R.
 DRAWN: S.S.
 CHECKED: T.H.
 RECOMMENDED: PROJ. MAN. P. McKay
 APPROVED: PROJ. DIR. G.G. Tambllyn
 A1 DATUM: A.H.D.

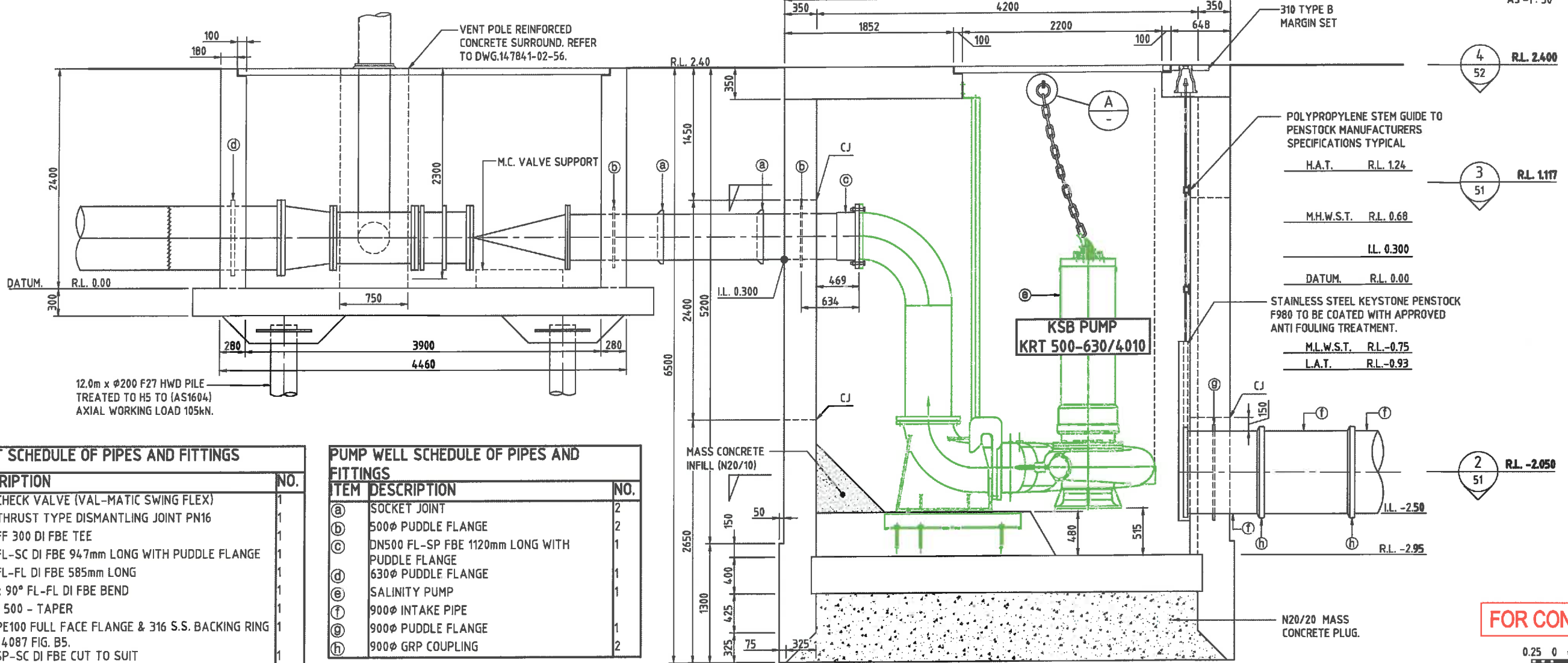
OFFICES:
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 Brisbane
 Sydney
 Gold Coast
 Townsville
 Hervey Bay
 Cairns
 Rockhampton
 Darling Downs
 Darwin

STOCKLAND BUDDINA PTY LTD
 BUNDILLA DEVELOPMENT
 SALINITY PUMPING SYSTEM
 OUTLET STRUCTURE
 PLAN AND ELEVATION

DATE: 20/06/2008
 DRAWING No: 147841-02-22
 Rev: K



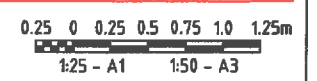
WORKS AS CONSTRUCTED
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 Signature: *[Signature]* Date of Completion: 28 May 2015
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 Shaun Pilcher RPEQ 14593
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 Amendments shown made by Calibre Consulting
 Survey Model by RPS



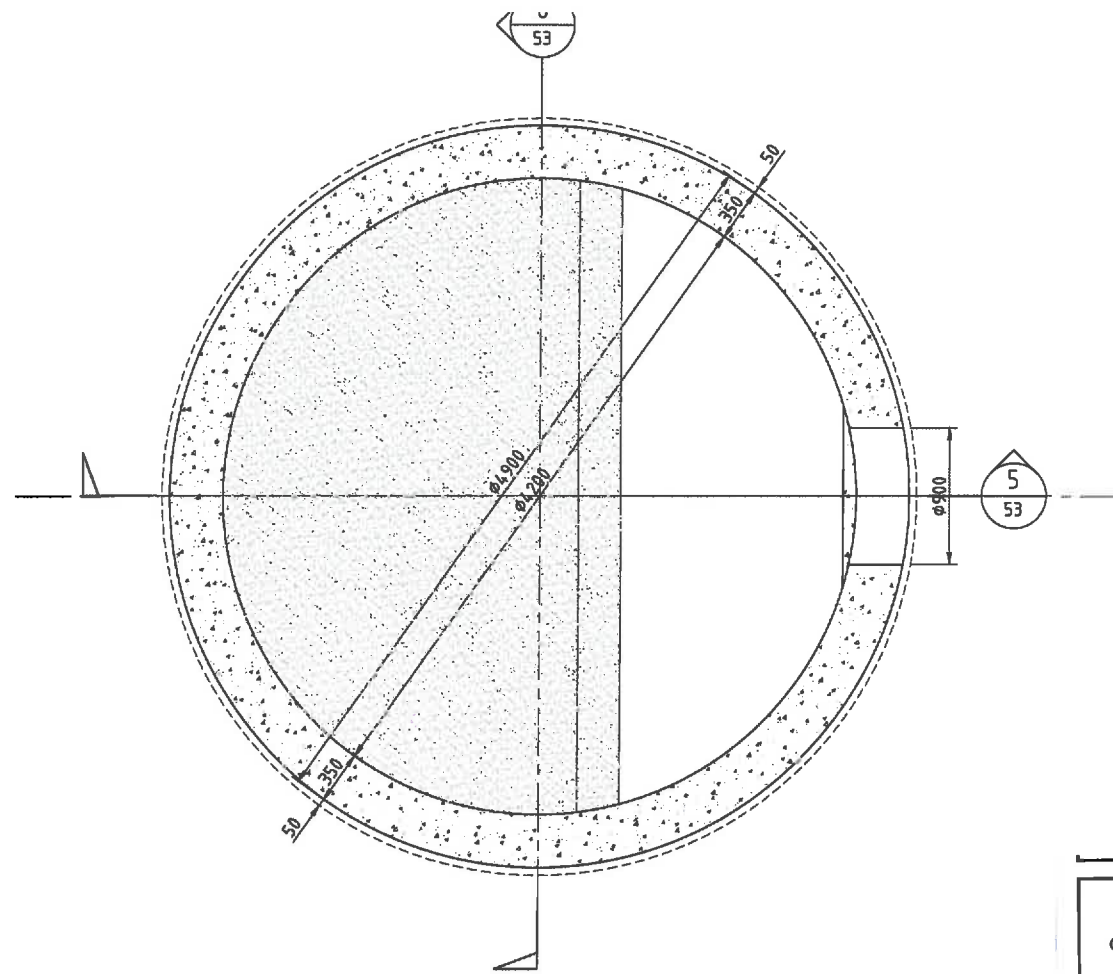
VALVE PIT SCHEDULE OF PIPES AND FITTINGS		
ITEM	DESCRIPTION	NO.
①	500φ CHECK VALVE (VAL-MATIC SWING FLEX)	1
②	500φ THRUST TYPE DISMANTLING JOINT PN16	1
③	500φ FF 300 DI FBE TEE	1
④	500φ FL-SC DI FBE 947mm LONG WITH PUDDLE FLANGE	1
⑤	300φ FL-FL DI FBE 585mm LONG	1
⑥	300φ x 90° FL-FL DI FBE BEND	1
⑦	600 FF 500 - TAPER	1
⑧	630φ PE100 FULL FACE FLANGE & 316 S.S. BACKING RING TO AS 4087 FIG. B5.	1
⑨	500φ SP-SC DI FBE CUT TO SUIT	1

PUMP WELL SCHEDULE OF PIPES AND FITTINGS		
ITEM	DESCRIPTION	NO.
Ⓐ	SOCKET JOINT	2
Ⓑ	500φ PUDDLE FLANGE	2
Ⓒ	DN500 FL-SP FBE 1120mm LONG WITH PUDDLE FLANGE	1
Ⓓ	630φ PUDDLE FLANGE	1
Ⓔ	SALINITY PUMP	1
Ⓕ	900φ INTAKE PIPE	1
Ⓖ	900φ PUDDLE FLANGE	1
Ⓗ	900φ GRP COUPLING	2

FOR CONSTRUCTION

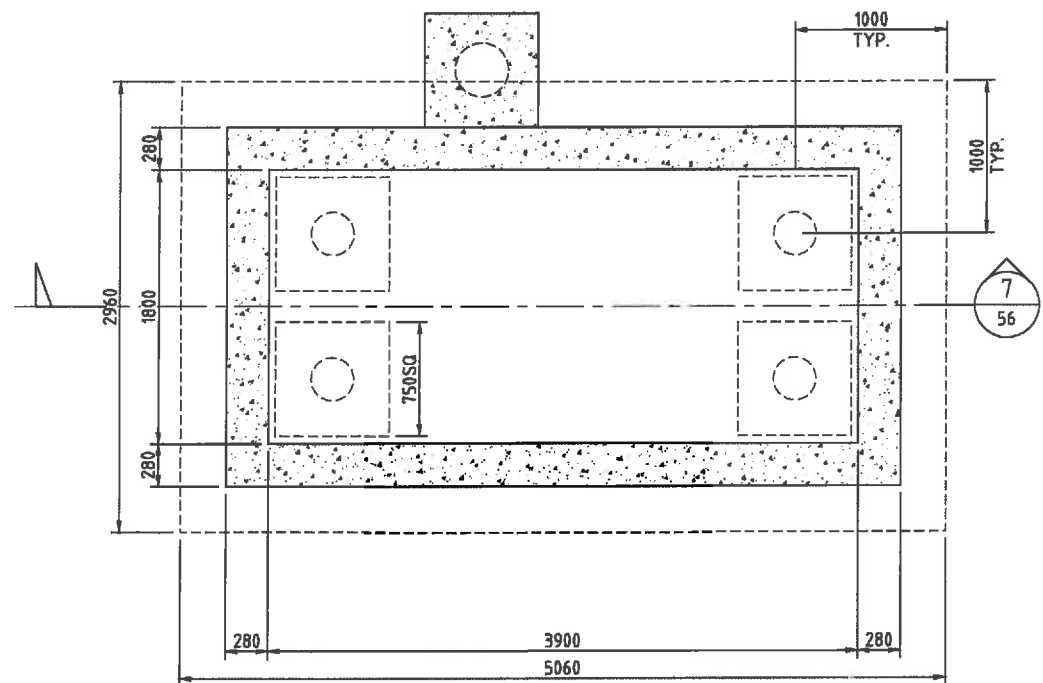


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SECTION 2 R.L. -2.050
SCALE A1 -1: 25
A3 -1: 50

WORKS AS CONSTRUCTED
This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
Signature: [Signature] Date of Completion: 28 May 2015
For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
Shaun Pilcher RPEQ 14593
In making this certificate we have relied upon information provided by others.
NOTE: Design drawings produced by Cardno
Amendments shown made by Calibre Consulting
Survey Model by RPS



SECTION 3 R.L. 1.117
SCALE A1 -1: 25
A3 -1: 50

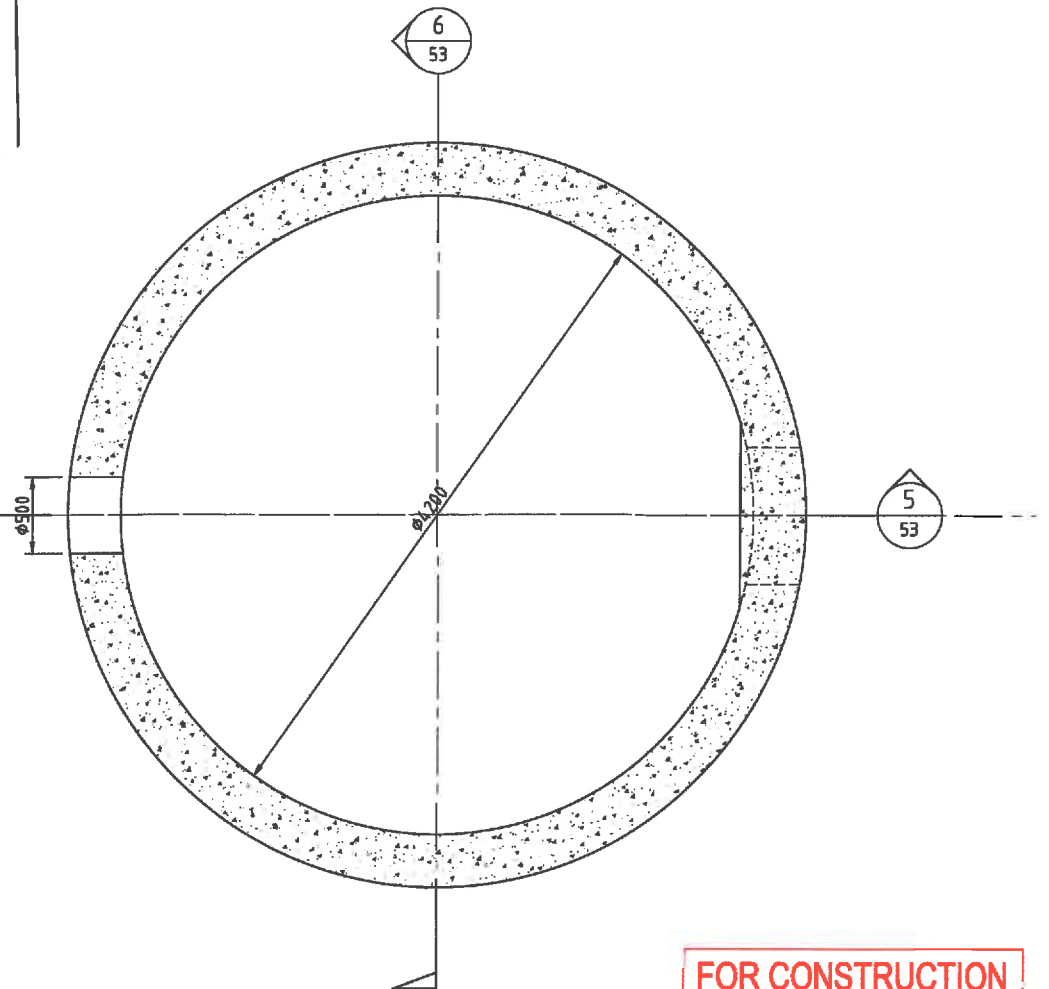
- P1. All pumps shall be protected for permanent submergence and shall be coated with approved anti fouling treatment. soft starters or VSD's shall be installed.
- P2. All internal surfaces to pumpwell and pressure chamber to be treated with approved anti-foul such as Watty Minimum 5 year life span.
- P3. Access hatch covers including frame, hinges, etc. shall be manufactured from marine grade aluminium. The covers shall be Class 'B' (80 kN) to AS3996 load classification. Aluminium used shall be alloy 6061 Temper T6. All welds shall be continuous and full penetration butt welds using filler alloy 5356. All bolts, nuts and washers shall be stainless steel type 316. The cover shall be fitted with hinges of the flush type with cover plate. The cover shall be latched so that it can be held at 10° past vertical when fully opened. All edges shall be ground smooth. The cover shall incorporate flush type lifting handle and locks. Locks shall require a special tool (to be supplied) for opening. The access cover shall be capable of being opened in 2 sections. The cover shall be of a design acceptable to Council and the details shall be submitted to the Superintendent for approval.
- P4. All interface between Aluminium and Concrete shall be insulated to prevent corrosion. Details of insulation shall be submitted to Superintendent prior to construction.

STAINLESS STEEL:

- 1. All steelwork shall be grade 316L stainless steel.
- 2. Welding consumables to be grade E316L. Welding shall be carried out in accordance with AS 1554.6. All welds to be SP category unless noted otherwise. Minimum fillet weld shall be 6mm unless shown elsewhere.
- 3. All welds to be cleaned by stainless steel wire brush and pickled with nitric/hydrofluoric acid. Welds to be washed after pickling and passivated with nitric acid and thoroughly washed.
- 4. Parts of the structure likely to coolest water shall be provided with drainage holes in locations approved by the superintendent.

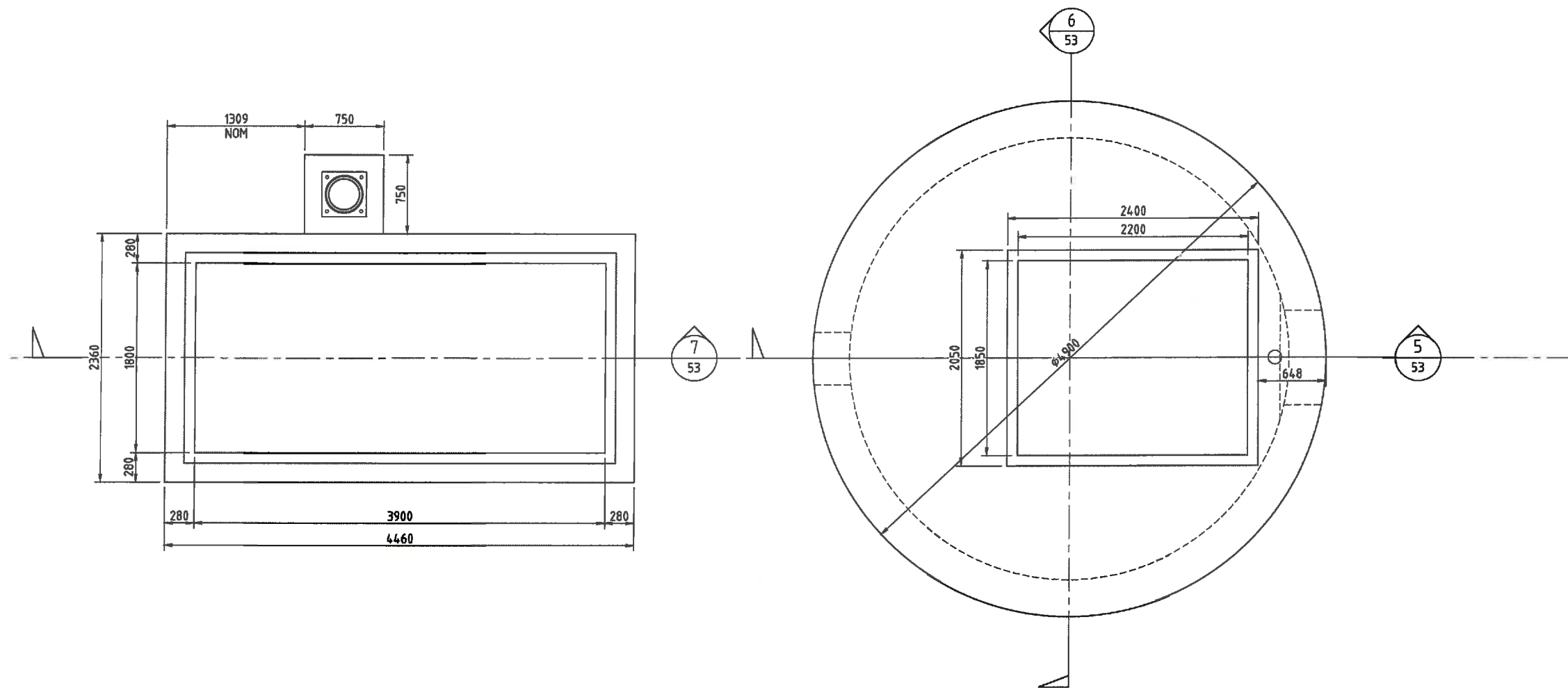
CONCRETE

- C1. Concrete shall comply with the requirements of AS3600. Concrete grade to the minimum 28 day compressive strength F_c in MPa and the prefix N or S refers to Normal Class or Special Class concrete as specified.
- | ELEMENT | GRADE (MPa) | MIN. COVER (mm) | MAX. AGGREGATE SIZE (mm) |
|--------------|-----------------|-----------------|--------------------------|
| Pump Station | S50 Refer below | 70 | 20 |
| Valve Pit | N40 | 50 | 20 |
-
- | GRADE | MIN. CEMENT CONTENT (kg/m ³) | MAX. W/C RATIO | MAX. AGGREGATE SIZE (mm) |
|-------|--|----------------|--------------------------|
| S50 | 550 | 0.40 | 20 |
- C2. The following finishes shall be provided to concrete surfaces.
- | ELEMENT | FINISH |
|---------|--------------|
| Roof | Broom Finish |
- Where not specified, formed finishes shall be Class 2 to AS3610 and unformed surfaces shall be a steel trowelled finish.
- C3. Exposed edges shall be chamfered 20mm.
 - C4. Concrete shall not be placed until reinforcement, form work etc. are inspected and approved by the Superintendent.
 - C5. Concrete shall be mechanically vibrated to give maximum compaction without segregation.
 - C6. Concrete elements shall be cured by methods appropriate to their final application.



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B 12/02/2013 FOR APPROVAL ISSUE A 07/02/2013 REVISED R.L. PUMP WELL / VALVE PIT SECTIONS	J.M. A.R. J.M. A.R.	This document is produced by Cardno (Qld) Pty Ltd solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno (Qld) Pty Ltd does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.	CAD FILE: 147841-02-50-43.dwg XREF:	REVISIONS REC. APPR.	REVISIONS REC. APPR.	REVISIONS REC. APPR.	REVISIONS REC. APPR.	



SECTION 4 R.L. 2.400
 SCALE A1 - 1:25
 A3 - 1:50

WORKS AS CONSTRUCTED
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 Signature *[Signature]* Date of Completion: 28 May 2015
 For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
 Shaun Pilcher RPEQ 14593
 In making this certificate we have relied upon information provided by others.
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 DRAWN: *J.M.*
 CHECKED: *A.R.*
 RECOMMENDED: PROJ. MAN. *P. McKay*
 APPROVED: PROJ. DIR. *G.G. Tamblyn* RPEQ 1723
 A1 DATUM: A.H.D.

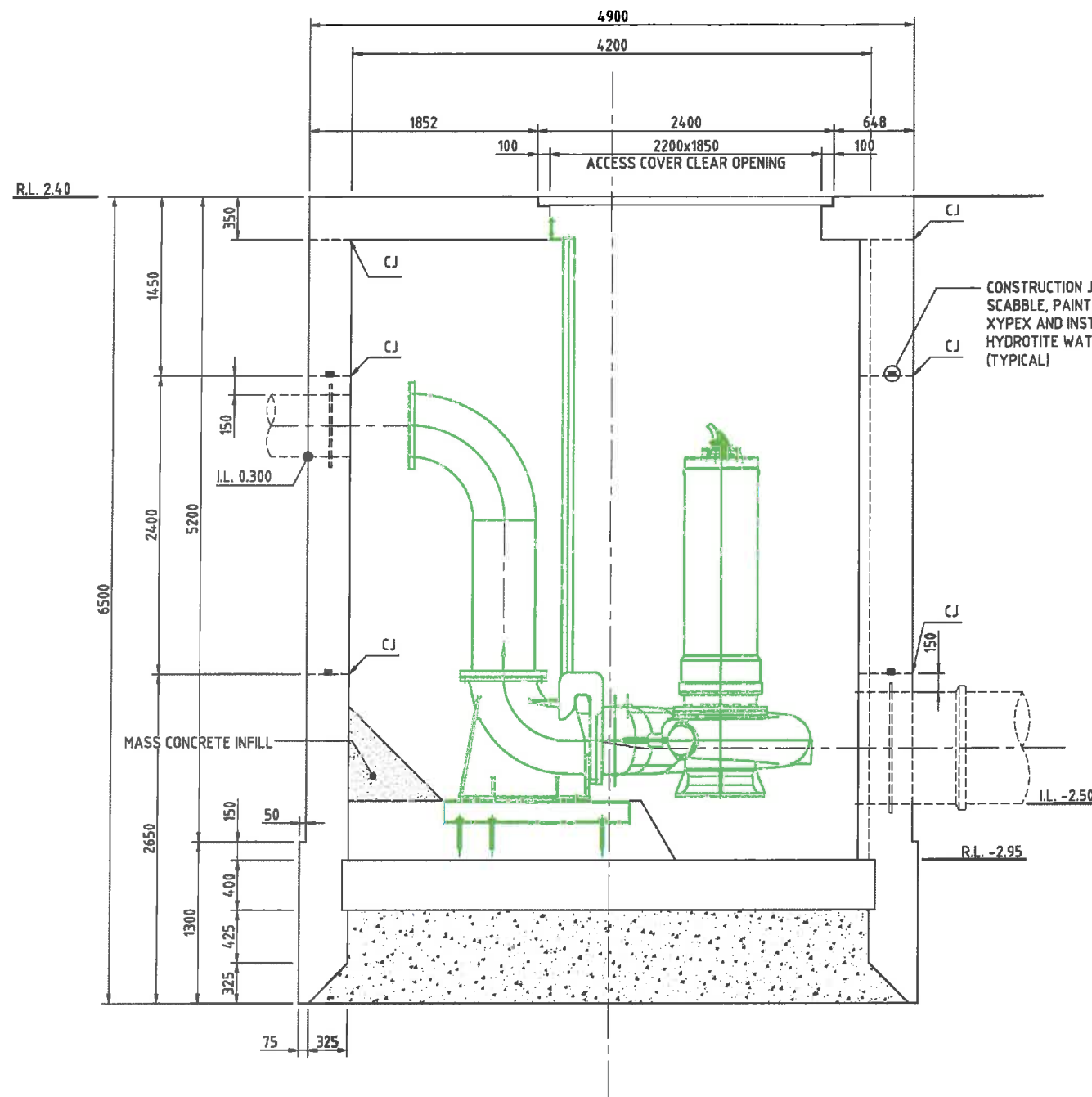
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 (07) 4721 2508
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 (07) 4826 4376
 (07) 4637 8166
 (08) 3641 1765

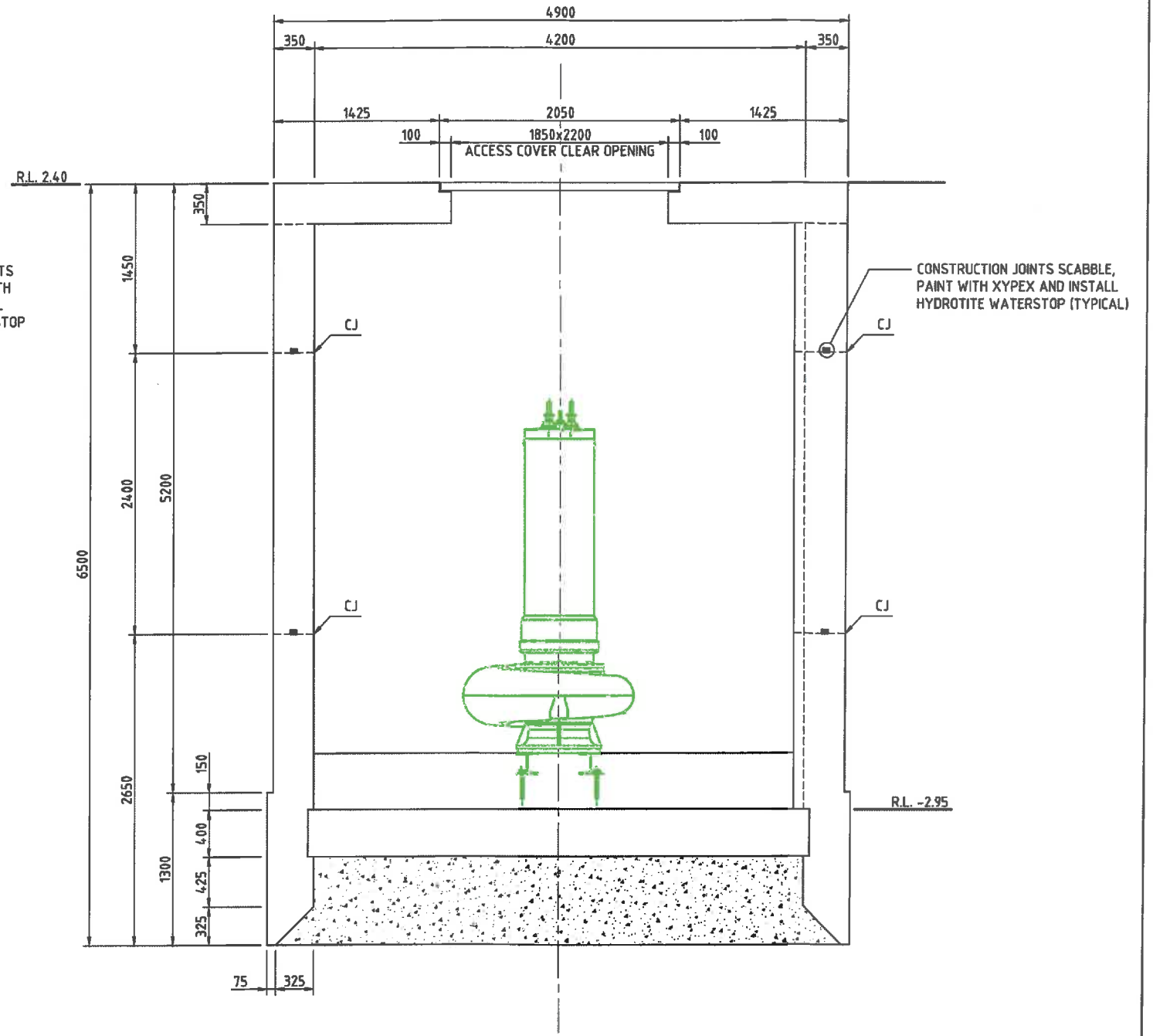
STOCKLAND BUDDINA PTY LTD		DATE: 30/06/2005	Rv.
BUNDILLA DEVELOPMENT SALINITY PUMPING SYSTEM PUMP STATION		DRAWING No:	
R.L. SECTION / DIMENSION PLAN - SHEET 2		147841-02-52	B

B	12/02/2013	FOR APPROVAL ISSUE	J.M.	A.R.
A	07/02/2013	REVISED R.L. PUMP WELL / VALVE PIT SECTIONS	J.M.	A.R.
Rv.	DATE	REVISIONS	REC.	APPR.



SECTION 5 DIMENSION PLAN
 SCALE A1 - 1:25
 A3 - 1:50

CJ - DENOTES CONSTRUCTION JOINT



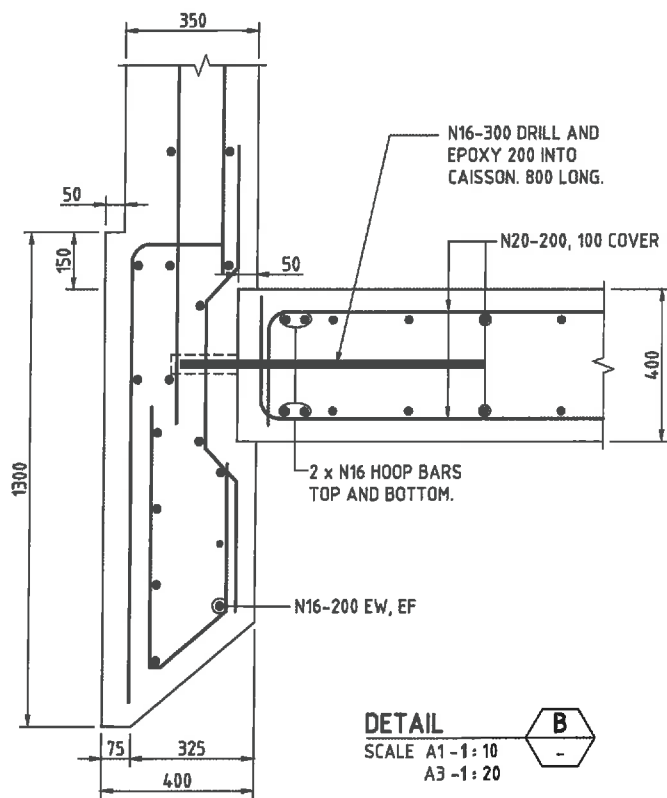
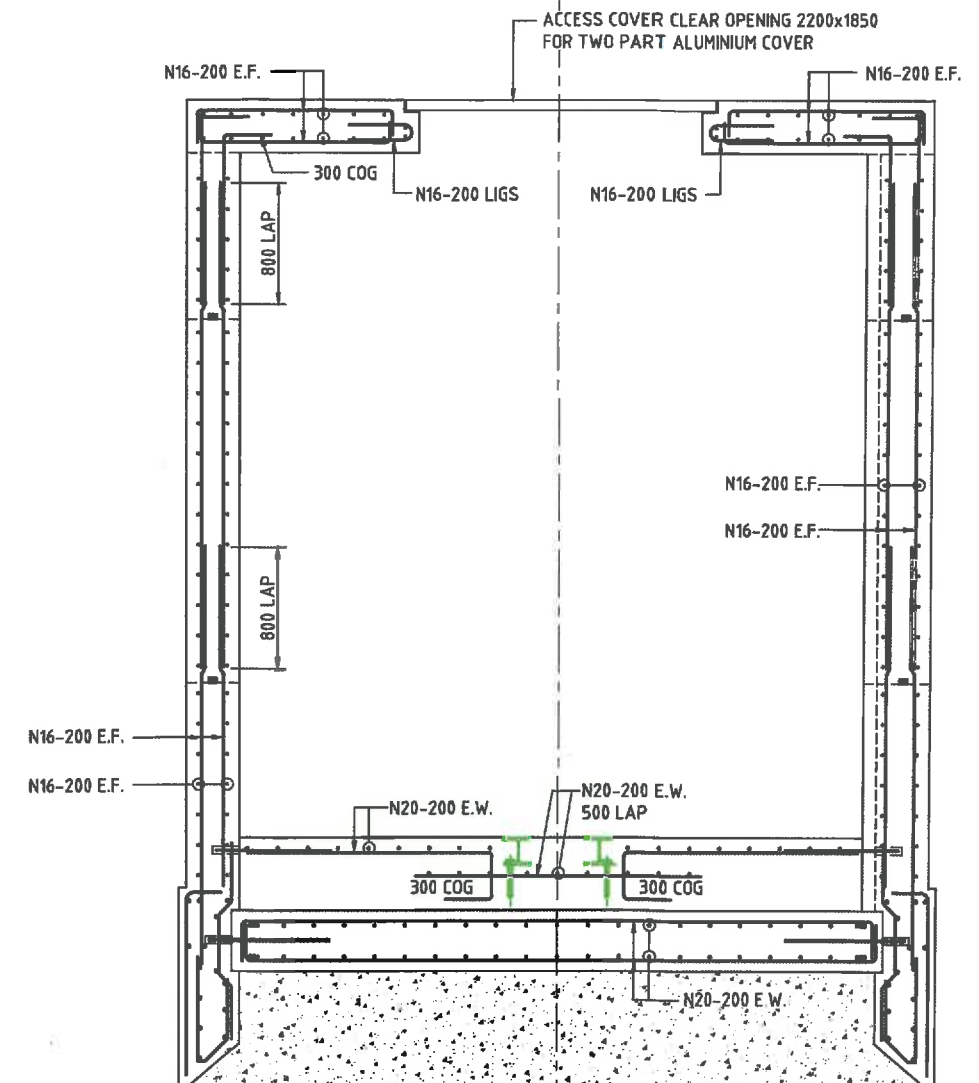
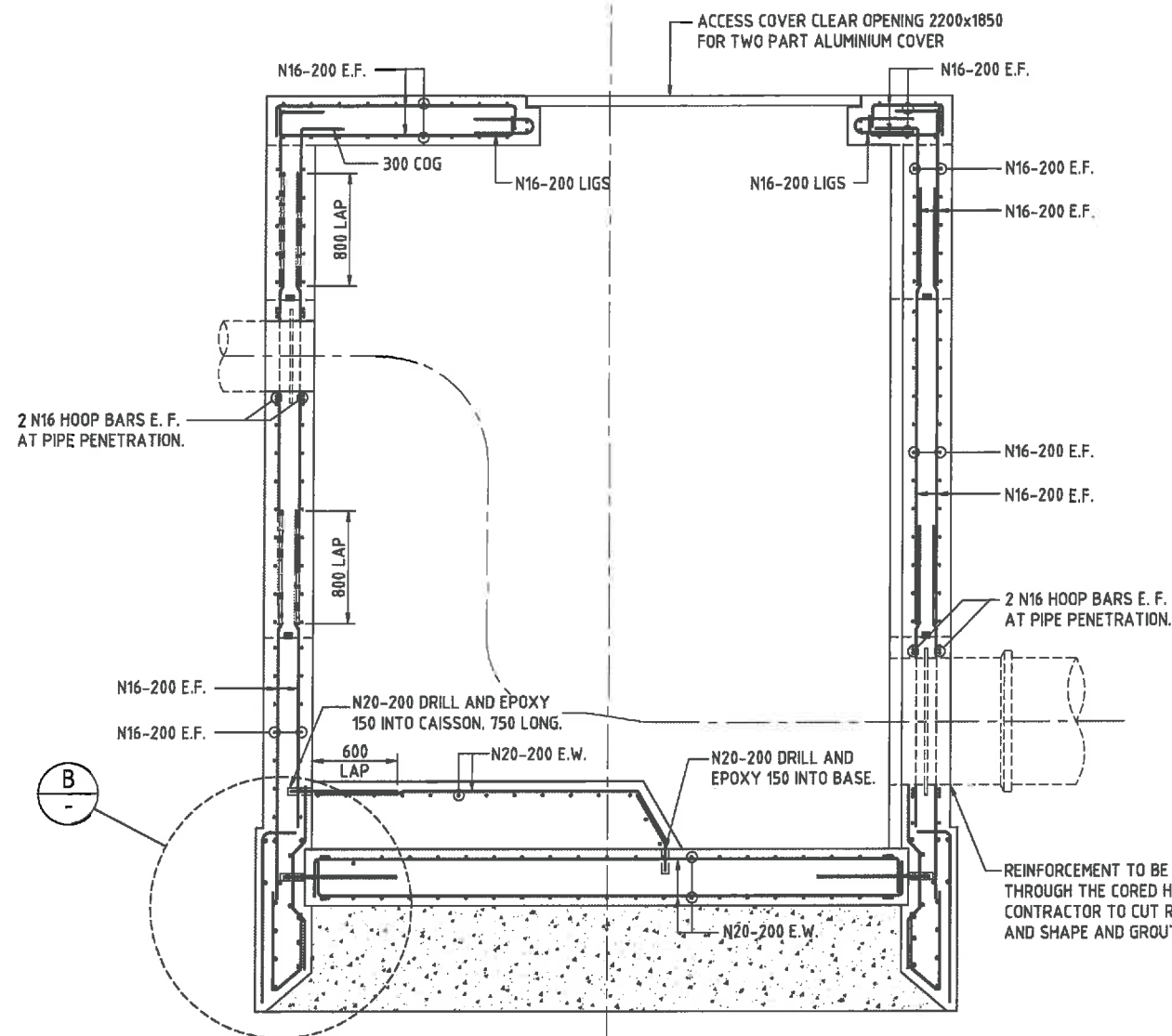
SECTION 6 DIMENSION PLAN
 SCALE A1 - 1:25
 A3 - 1:50

CJ - DENOTES CONSTRUCTION JOINT

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 This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
 Signature: *[Signature]* Date of Completion: 28 May 2015
 For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
 Shaun Pilcher RPEQ 14593
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B 12/02/2013 FOR APPROVAL ISSUE A 07/02/2013 NEW PUMP WELL SECTIONS	J.M. A.R. J.M. A.R.	RECOMMENDED: PROJ. MAN. <i>P. McKay</i> APPROVED: PROJ. DIR. <i>G.G. Tamblyn</i> RPEQ 1723	CAD FILE: 147841-02-53-03.dwg XREF:						



SECTION 5 REINFORCEMENT

SCALE A1-1:25
A3-1:50

CONCRETE SHALL BE CLASS S50 AS NOTED ON DWG.147841-02-51

SECTION 6 REINFORCEMENT

SCALE A1-1:25
A3-1:50

CONCRETE SHALL BE CLASS S50 AS NOTED ON DWG.147841-02-51

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CHECKED: <i>A.R.</i>	RPEQ: 1723
DATE: <i>12/02/2013</i>	CAD FILE: 147841-02-50-03.dwg
REVISIONS:	XREF:

A1	DATUM: A.H.D.
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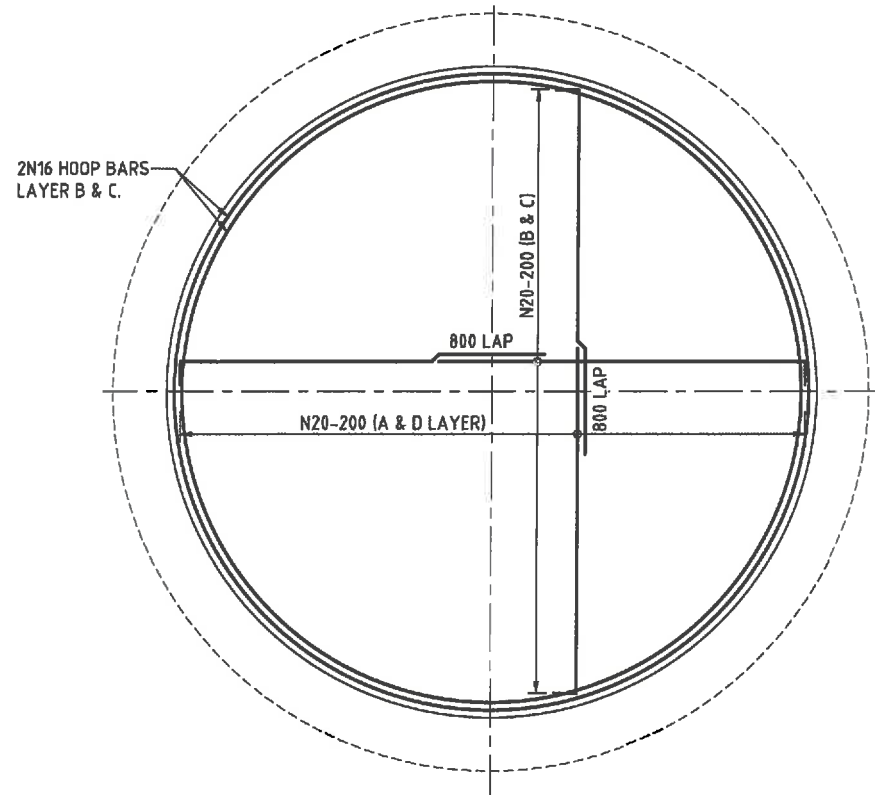
Cardno (Qld) Pty Ltd
ABN: 57 081 074 982

SUNSHINE COAST OFFICE: Level 1, 8 Maud Street Maroochydore, Qld 4558
Email: sooc@cn.cardno.com.au Ph: (07) 5443 2955 Fax: (07) 5443 8842

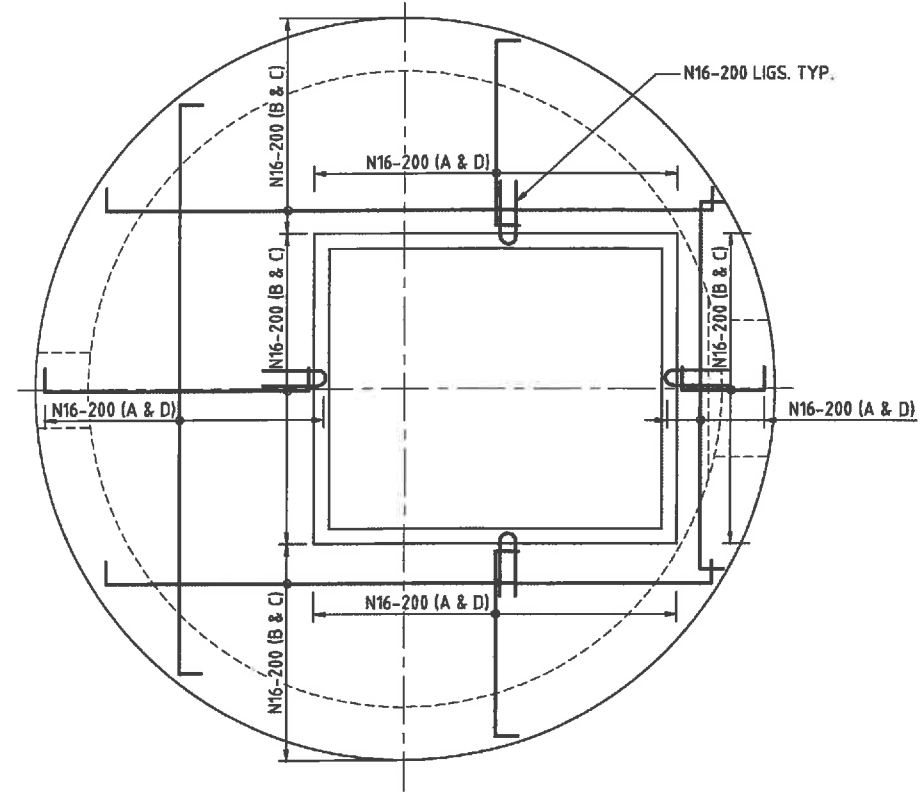
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STOCKLAND BUDDINA PTY LTD	
BUNDILLA DEVELOPMENT SALINITY PUMPING SYSTEM PUMP STATION PUMP WELL DIMENSION & REINFORCEMENT SECTIONS	

DATE: 30/08/2005	Rv.
DRAWING No:	
147841-02-54	B



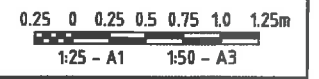
**PUMP WELL BASE
REINFORCEMENT PLAN**
SCALE A1-1:25
A3-1:50



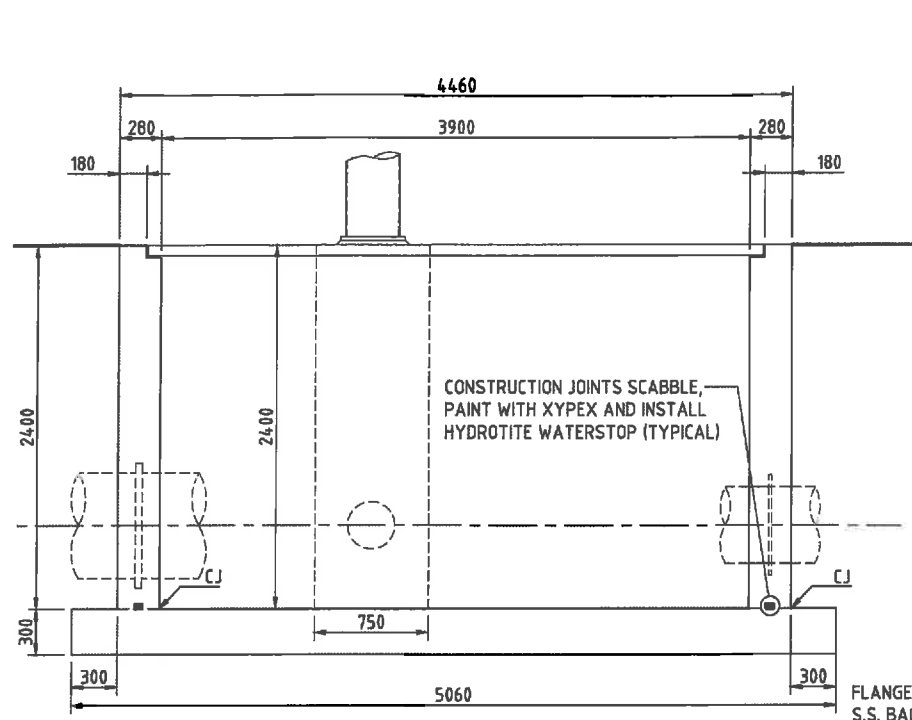
**PUMP WELL COVER
REINFORCEMENT PLAN**
SCALE A1-1:25
A3-1:50

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Shaun Pilcher RPEQ 14593
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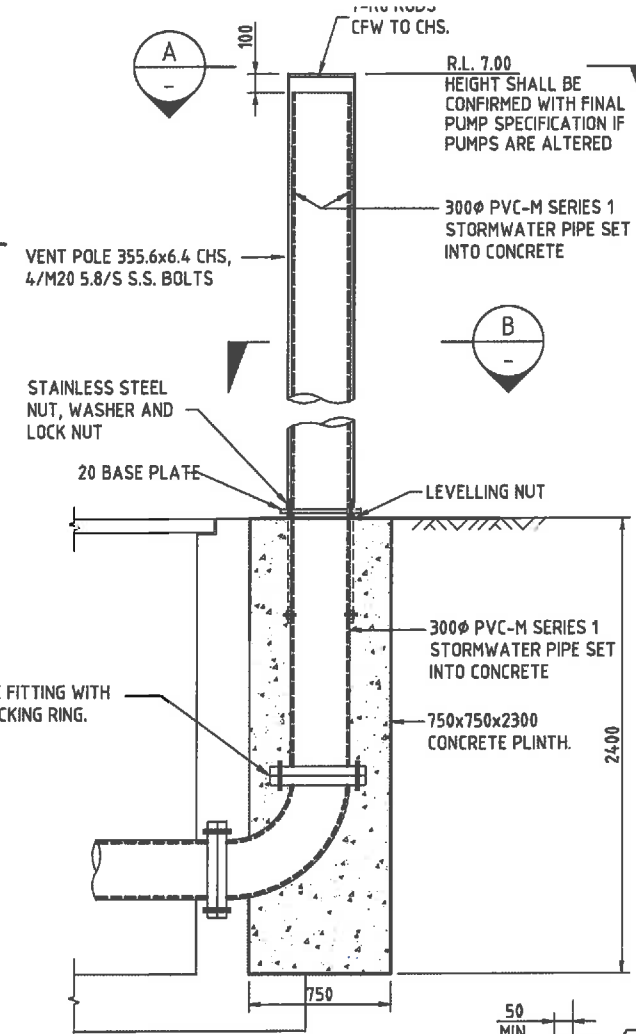
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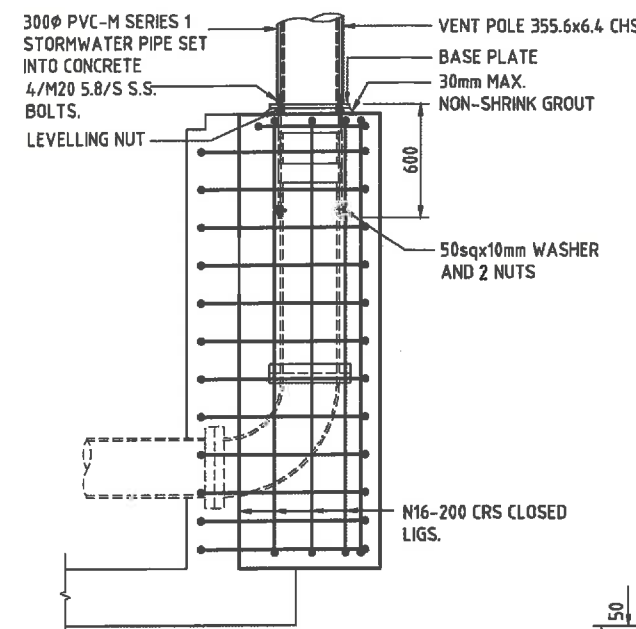
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B 12/02/2013 FOR APPROVAL ISSUE A 07/02/2013 NEW PUMP STATION REINFORCEMENT PLANS	J.M. A.R. J.M. A.R.	RECOMMENDED: PROJ. MAN. <i>P. McKay</i> APPROVED: PROJ. DIR. <i>G.G. Tamblyn</i> RPEQ: 1723	CAD FILE: 147841-02-50-43.dwg XREF:		BUNSHINE COAST OFFICE: Level 1, 9 Fife Street Maroochydore, Qld 4556 Email: sco@sun.cardno.com.au Ph: (07) 5443 2888 Fax: (07) 5443 8842	147841-02-55	B	



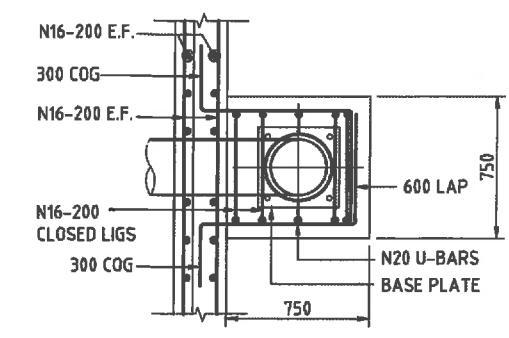
SECTION 7 DIMENSION
SCALE A1-1:25
A3-1:50



SURCHARGE VENT POLE
SCALE A1-1:20
A3-1:40

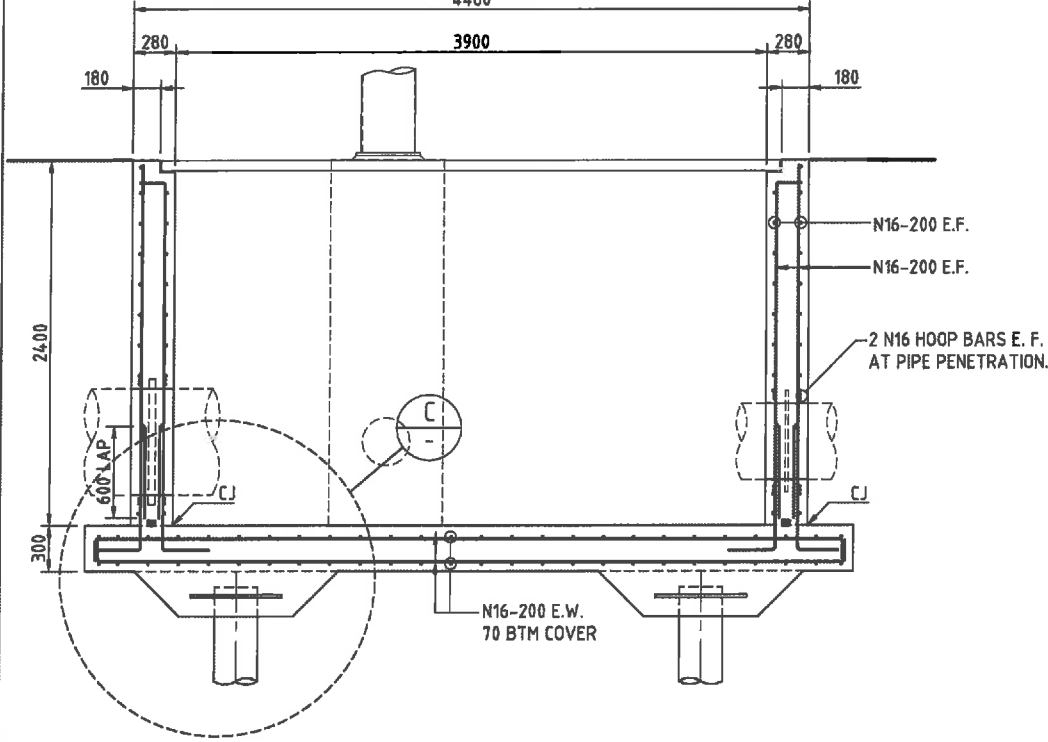


ELEVATION REINFORCEMENT DETAIL
SCALE A1-1:20
A3-1:40

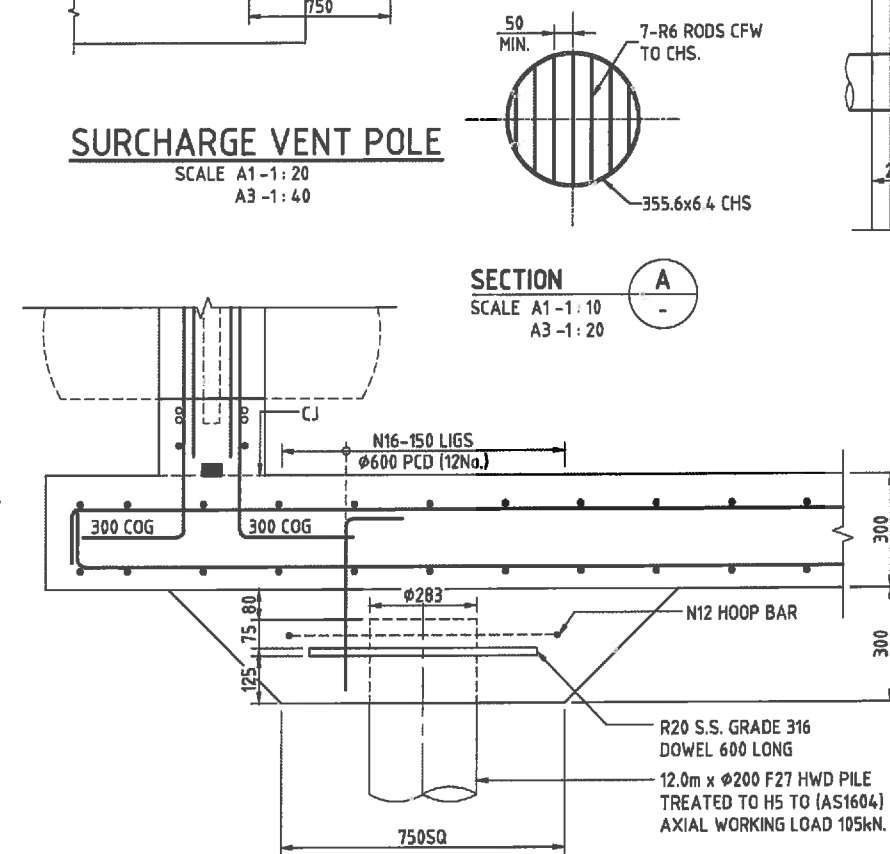


PLAN REINFORCEMENT DETAIL
SCALE A1-1:20
A3-1:40

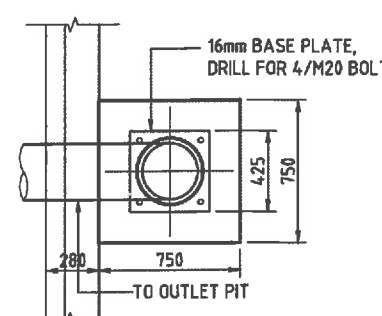
WORKS AS CONSTRUCTED
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Signature: [Signature] Date of Completion: 28 May 2015
For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
Shaun Pilcher RPEQ 14593
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Amendments shown made by Calibre Consulting
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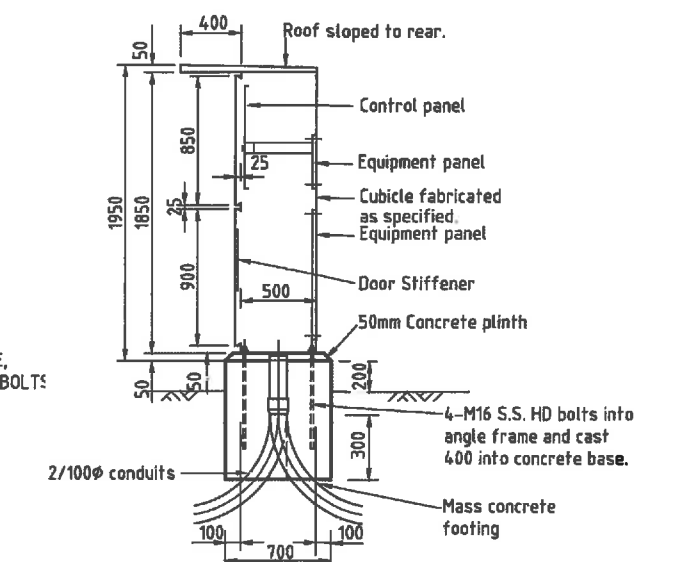
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A3-1:50



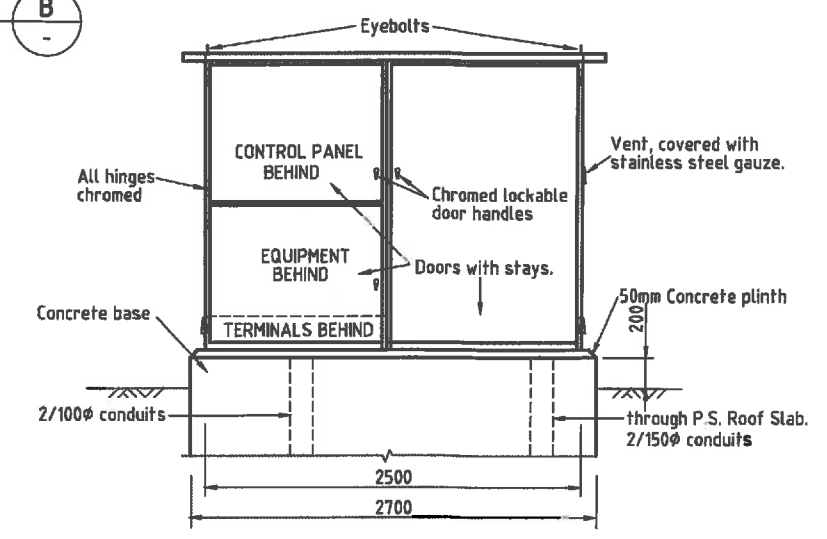
DETAIL
SCALE A1-1:10
A3-1:20



SECTION B
SCALE A1-1:20
A3-1:40



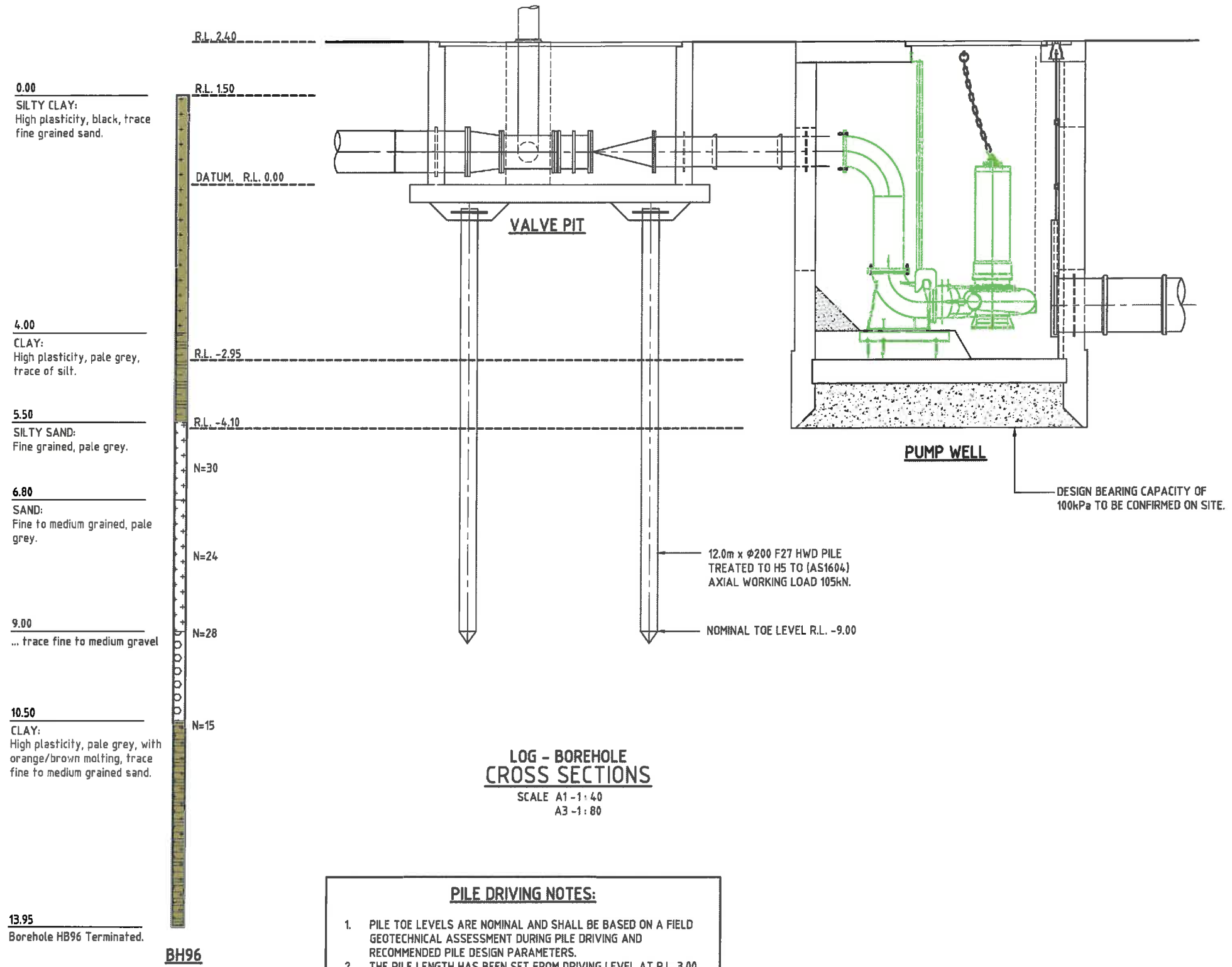
END ELEVATION



SIDE ELEVATION SWITCHBOARD
SCALE A1-1:25
A3-1:50

FOR CONSTRUCTION

DESIGNED: <i>A.R.</i>		A1 DATUM: A.H.D.			OFFICES: Sunshine Coast Brisbane Sydney Gold Coast Townsville Harvey Bay Cairns Rockhampton Darling Downs Darwin	TELEPHONE: (07) 5443 2555 (07) 3986 6322 (02) 9416 8233 (07) 5598 6333 (07) 4772 1188 (07) 4124 5455 (07) 4033 2990 (07) 4924 7900 (07) 4827 8122 (08) 8981 3013	FAX: (07) 5443 8642 (07) 3986 8722 (02) 9419 8229 (07) 5598 4647 (07) 4721 2526 (07) 4124 5155 (07) 4033 2992 (07) 4928 4375 (07) 4827 8122 (08) 8941 1705	STOCKLAND BUDDINA PTY LTD		DATE: 05/10/2005	Rv:
DRAWN: <i>J.M.</i>		RECOMMENDED: PROJ. MAN. <i>P. McKay</i>						APPROVED: PROJ. DIR. <i>G.G. Tamblyn</i>		BUNDILLA DEVELOPMENT SALINITY PUMPING SYSTEM VALVE PIT	
CHECKED: <i>A.R.</i>		CAD FILE: 147841-02-50-63.dwg		CARDNO (Qld) Pty Ltd		VALVE PIT DIMENSION PLAN & DETAILS		147841-02-56			
REVISIONS:		REVISIONS:		REVISIONS:		REVISIONS:					



LOG - BOREHOLE CROSS SECTIONS
 SCALE A1 - 1:40
 A3 - 1:80

PILE DRIVING NOTES:

1. PILE TOE LEVELS ARE NOMINAL AND SHALL BE BASED ON A FIELD GEOTECHNICAL ASSESSMENT DURING PILE DRIVING AND RECOMMENDED PILE DESIGN PARAMETERS.
2. THE PILE LENGTH HAS BEEN SET FROM DRIVING LEVEL AT R.L. 3.00.
3. REFERENCE SHALL BE MADE TO THE GEOTECHNICAL INVESTIGATION BY COFFEY GEOTECHNICS. REFER TO REPORT NO. MA570/1-D DATED 14 JUNUE 2005.

WORKS AS CONSTRUCTED
 This drawing is generally an accurate representation of the works as constructed. Constructed levels have been provided by a person, registered under the Surveyors Act 1977. Certification for BRIGHTWATER LAKE ONLY
 Signature: *[Signature]* Date of Completion: 28 May 2015
 For and on behalf of CALIBRE CONSULTING (QLD) PTY LTD
 Shaun Pilcher RPEQ 14593
 In making this certificate we have relied upon information provided by others.
 NOTE: Design drawings produced by Cardno
 Amendments shown made by Calibre Consulting
 Survey Model by RPS

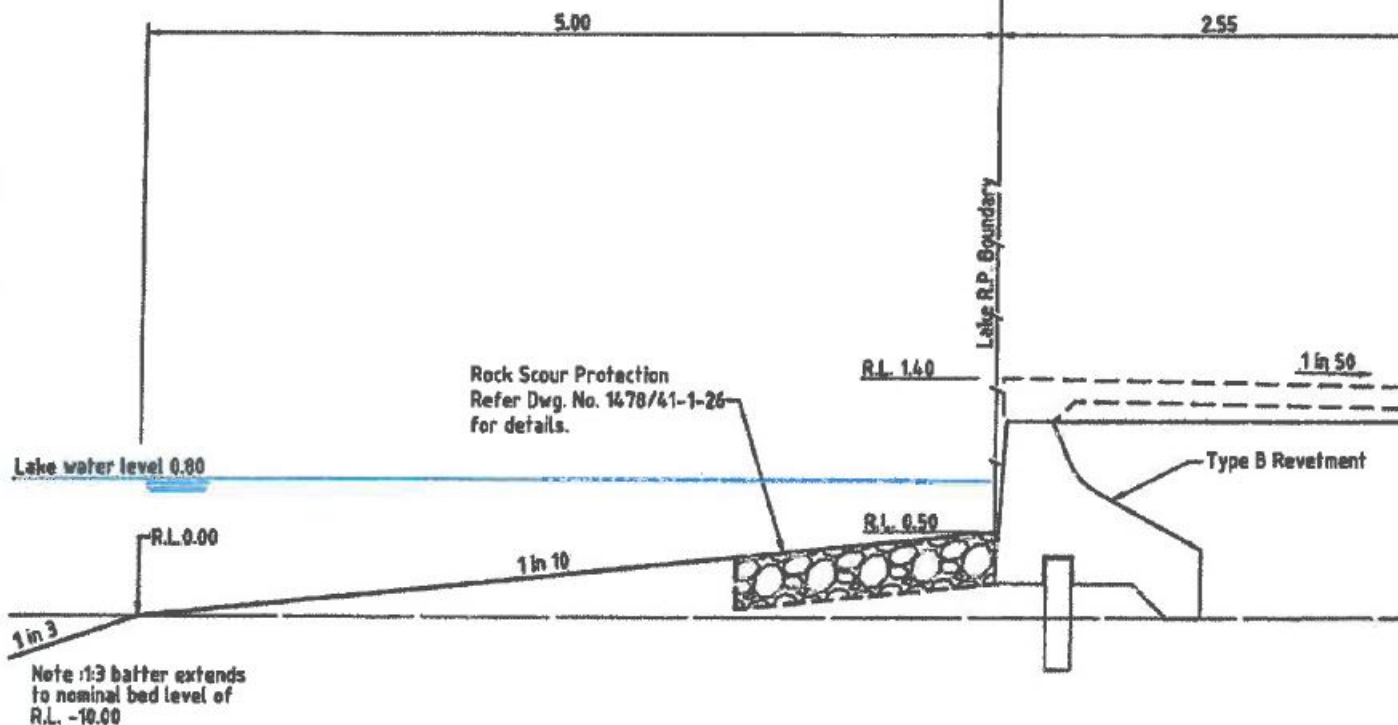
FOR CONSTRUCTION

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B 12/02/2013 FOR APPROVAL ISSUE A 07/02/2013 ADDITIONAL BORELOG SECTION	J.M. A.R. J.M. A.R.	This document is produced by Cardno (Qld) Pty Ltd solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno (Qld) Pty Ltd does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.	CAD FILE: 147841-02-57-43.dwg XREF:	SUNSHINE COAST OFFICE: Level 1, 8 Maud Street Maroochydore, Qld 4553 Email: soos@sun.coardno.com.au Ph: (07) 5443 3655 Fax: (07) 5443 6542						

Appendix C: Typical revetment wall section

Design Surchage Loads Adopted for Global Slope Stability Analysis
Refer to Coffey Geoscience Report 231/1 - FF RFM, dated 2/3/2005

**Design Surchage Loads Adopted for
Revetment Wall and Rock Retaining Wall Design**





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