Catherine Hill Bay Jetty

Prepared for The Department of Planning and Environment

July 2023
Project Number N23028
Version 001

Report No. 1 – History and Locality

OPPORTUNITIES THROUGH EXCELLENCE

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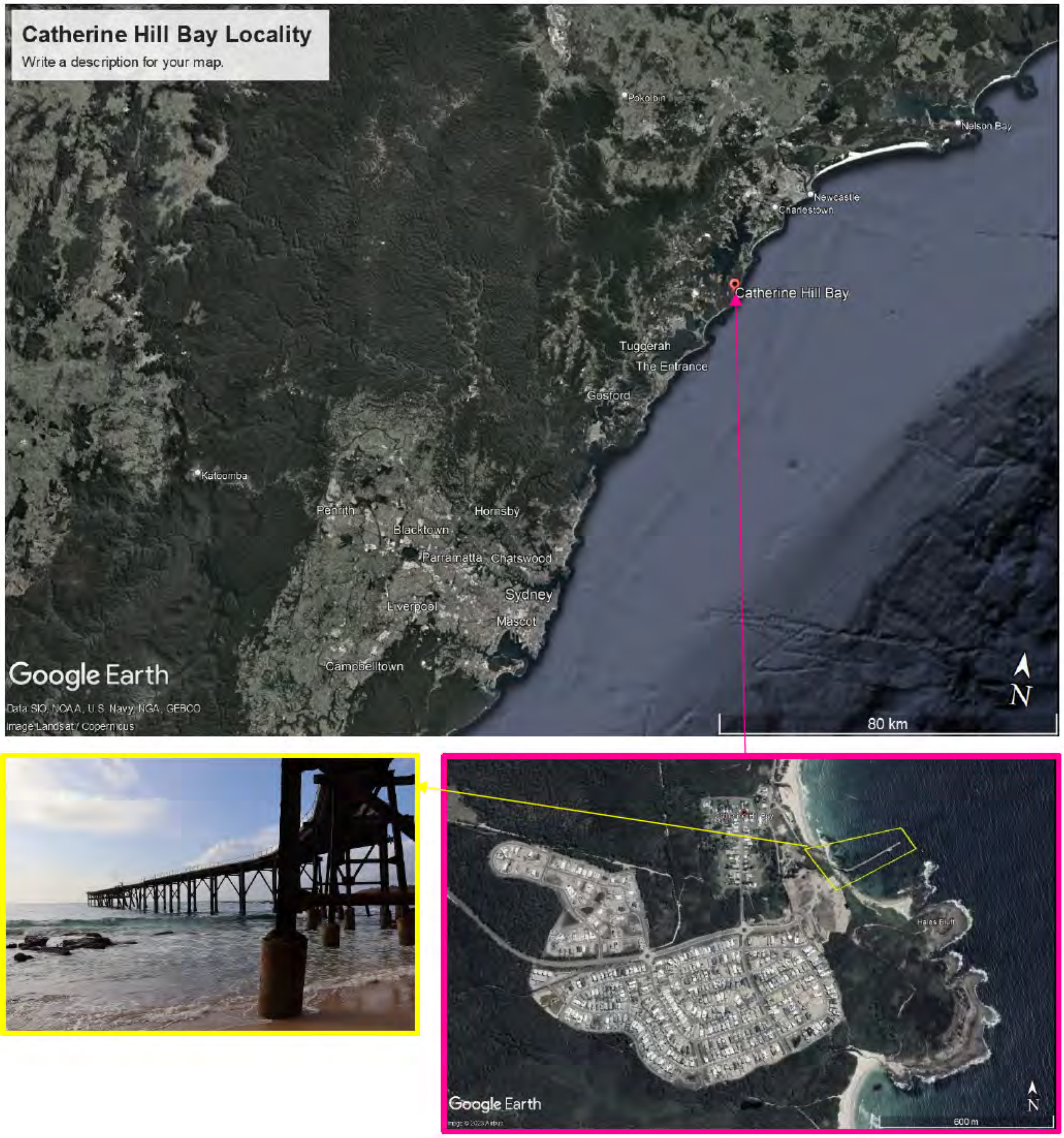
Contents

Document Control				
Revision	Date	Prepared	Reviewed	Approved
A	5/7/2023	[redacted]	[redacted]	[redacted]

1. Locality

Catherine Hill Bay, NSW 2281, is located approximately 1.5 hours drive from Sydney and a 45-minute drive from Newcastle. The main access to the wharf is via road that passes the Catherine Hill Bay surf lifesaving club at 93 Flowers Dr, Catherine Hill Bay.



2. History of Catherine Hill Bay Jetty

Most of this information has been paraphrased or extracted from Coal, Railways, and Mines – The Colliery Railways of the Newcastle District and the Early Coal Shipping Facilities – Volume 2 by Brian Robert Andrews, 2007.

2.1 Catherine Hill Bay Collieries

In 1873 there were four different mining ventures in the vicinity of Catherine Hill Bay under development. The Parbury, Lamb, and Saddington's colliery was one of the four mining ventures established in 1882. Parbury, Lamb, and Saddington's property at Lake Macquarie contained 3,000 acres of coal land near the harbour, which was currently under construction. Four seams were constructed within this parcel and composed of rich, splinty-bitumous coal. This coal was considered suitable for use in marine, smelting, household, and gas purposes.

Catherine Hill Bay had already been used for a considerable time as a shipping harbour and it was suggested that a new pier or jetty be constructed to approximately 600 feet from the shore. It was estimated that the new jetty, which would replace a previous jetty that had burned down in 1886, would cost around 45,000 pounds. This estimate would help construct the jetty, construct 2.5 miles of railway, shoots, screens, and purchase rolling stock to output 120,000 tons per year.

2.2 The 1890 Jetty

The jetty was constructed in the southern end of the bay in 30 feet of water at the maximum depth. Since the bottom of the bay was rock, every pile had to be fitted with an iron bolt and their end and fitted into the rock by divers. By February 1890, the wharf had been constructed at 1020 feet with another 40 feet to be completed. The wharf planking was 30 feet above high-water mark to enable vessels of 3,000 tons of coal to be loaded. To protect the structure during heavy easterly gales and seas, four large iron cylinders were sunk at the end and two fenders connected with separate piles so that the rolling of the vessel would not damage the main structure.

Figure 1 Jetty at Catherine Hill Bay photographed in 1894 with a Ship being Loaded

There was a double line of rails laid on the jetty with the full wagons being kept on one set and the empties being taken away on the other.

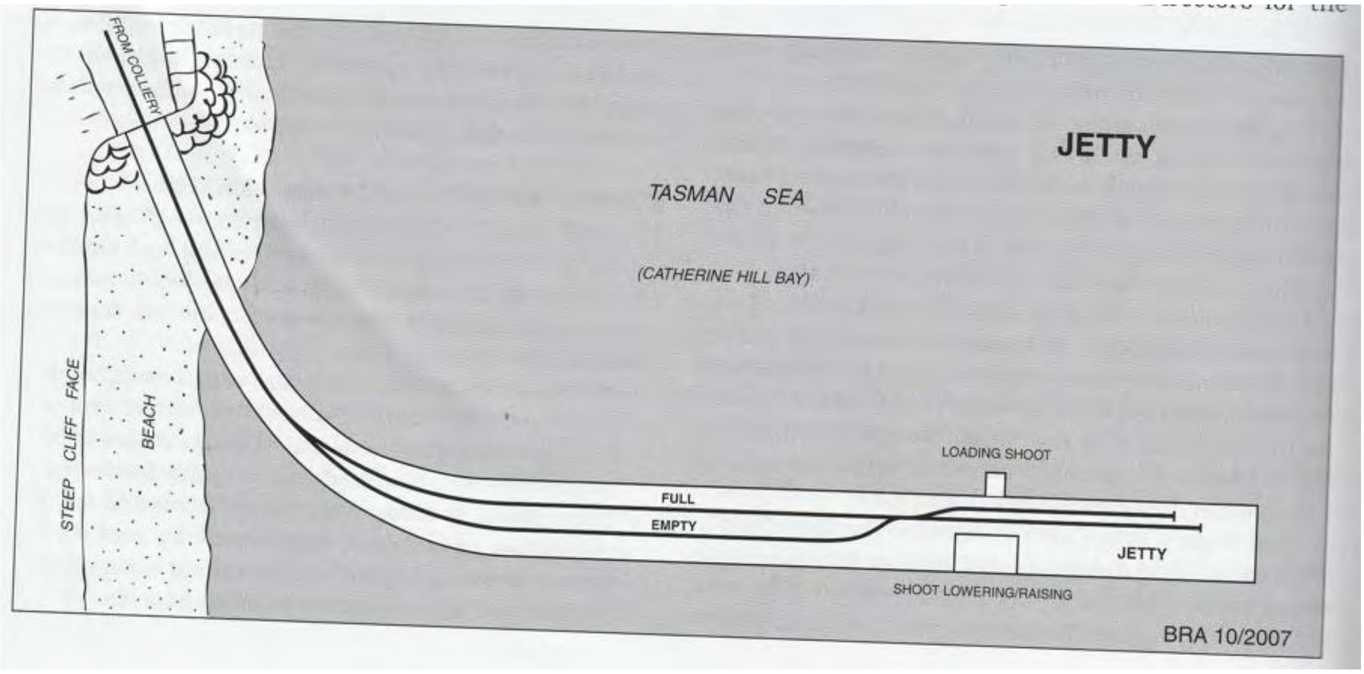


Figure 2 Rail Layout on Catherine Hill Bay Jetty

In 1912 it was reported that the jetty was lit by electric lights

2.3 Modern Jetty

The third and current iteration of the jetty was built in 1974 from concrete and steel to replace an older timber jetty that had been severely damaged from a cyclone. The current jetty was used for loading coal until 2002, and the last remaining parts of the timber jetty extension was destroyed in a fire in October 2013. When it was last operating as a coal loader, the jetty supported a 115T ship loader consisting of a boom conveyor with a 1400mm wide, 35-degree trough, 3 m/s belt, designed to load shipping of up to 5,400T capacity. The jetty structure was maintained to minimise its dilapidation until 2009, including regular replacing of underwater sacrificial zinc anodes, placing corrosion inhibitor on the inside of the steel tubular columns every 3 months, and sandblasting and repainting the steelwork every 10 years.

Please refer to N23028-REP-M-0002 – Structural Engineering Report for an overview of the structural system for the third iteration jetty built in 1974 and subject to the current 2023 assessment.

Figure 3 Modern Jetty

Figure 4 Modern Jetty

2.4 Historic Reviews and Documentation

Please refer to Appendix A for copies of engineering reviews and available documents. This includes:

- CATHERINE HILL BAY JETTY STRUCTURAL CONDITION REPORT - N17009-REP-001 / Rev A / Date 23/8/17 by BG&E Pty Limited
- STRUCTURAL ENGINEERS REPORT – CONDITION OF CATHERINE HILL BAY JETTY, for Lake Coal Pty Limited July 2009 by CSG Engineers Pty Limited
- ENGINEERING REPORT ON THE CONDITION OF CATHERINE HILL BAY JETTY 18th December 2012, by CSG Engineers Pty Limited
- STRUCTURAL ENGINEERS REPORT – CONDITION OF CATHERINE HILL BAY JETTY, for Lake Coal Pty Limited July 2016 by CSG Engineers Pty Limited
- CATHERINE HILL BAY JETTY INDEPENDENT COST ESTIMATE FOR JETTY MAINTENANCE WORKS by RPS

Appendices

Appendix A - Historic Documents and Engineering Reviews

STRUCTURAL ENGINEER'S REPORT

FOR THE CATHERINE HILL BAY JETTY

FOR LAKE COAL PTY LTD

AT

CATHERINE HILL BAY NSW

23 Sept 2016

REF: 164-16

Restrictions on Use

This report has been prepared specifically for Lake Coal Pty Ltd as the client. Neither the report nor its contents may be referred to or quoted in any statement, study report, application, prospectus, loan, other agreement or document, without the express approval of CSG Engineers Pty Ltd.

QA STATUS

Prepared	Reviewed	[redacted]	Issued
		[redacted]	23.9.16

Contents

1.0 Introduction

CSG Engineers were engaged Lake Coal to undertake a structural condition assessment of the Catherine Hill Bay Jetty and to make recommendations as to the most appropriate method of demolition. For a listing of the observations made, relevant locations, and supporting photographs refer to Appendices 1, 2, and 3 respectively attached at the end of this report.

We refer the reader to our earlier report 255-09 for further background information.

2.0 Fieldwork

The site was attended during the period from April to June 2016. The inspections consisted of visual inspections of the upper surfaces of the concrete decks, and visual inspections of the concrete deck support structure, made from both the beach and a camera operated from the jetty deck.

The steel work at the bases of bents 24 to 28, immediately above the concrete encasement, were visually checked for corrosion. At the locations of the worst corrosion the loose rust was removed by cold chisel and the steel thickness checked. Measurements were also taken near the locations of tests made for our previous report.

3.0 Background and assessment

The original jetty structure consisted of two parts: the new steel and reinforced concrete structure that started at the car park at the northern end and swept out to the mooring at the eastern end, and the original timber structure that started at a tunnel in the rock face at its western end and joined the new steel structure where the steel structure turned eastward, near Bent 19.

The jetty steel structure was built in two stages with Bents 1-17 being the newer structure and bents 18-28 being the older. We understand that the outer bents were, replaced after sustaining damage during a storm in 1974.

In its current configuration the timber jetty extension had been demolished after being badly damaged during a bushfire fire in 2013.

We were asked to consider what works would be required to enable the jetty to be demolished by the use of excavators traversing the deck, as suggested earlier by Southern Cross Demolition P/L. For the reasons outlined below we no longer think that this is an appropriate method.

A summary of the assessment findings is outlined below:

3.1 Concrete Deck

The concrete deck was formed mainly from precast concrete planks and to a minor extent, from cast-in-situ concrete formed on galvanised reinforcing panels, "Bondek" or equivalent, sheeting. The Bondek section, between Bents 19 and 20, supported a reinforced concrete block structure, and was located near the intersection between the concrete decks and now demolished timber deck.

Items of concern included:

- The Bondek slab between bents 19 and 20 was severely corroded on the soffit and is considered unsafe.
- The corrosion noted in our earlier report had not been addressed and was noted to be worse.
- The original manholes located near each bent were covered with a light steel plate suitable for pedestrian traffic only.
- The steel grate flooring that extends the width of the deck between Bents 1 to 7 was severely corroded and unsafe.
- The safety balustrades and kerbs on each side of the deck were in poor condition and unsafe.

3.3 Steel Super-Structure

The concrete deck was supported on a series of twenty eight (28) steel bents (frames). Bent 28 was built on a rock ledge at the northern edge of the jetty and Bent 1 was at the eastern most extent of the jetty, in open water. Refer to drawings in Appendix 2 for an illustration of the layout.

The inner Bents (bents 28 - 22) used 310UC118 universal columns sections for legs with the bases encased in concrete, and the rest used 760 diameter x14.3mm wall thickness CHS for legs, similarly encased in concrete and open to seawater internally.

Each of the legs was connected within the plane of the frame with horizontal ties and inclined bracing members.

The bents are joined together by universal beam sections with horizontal bracing bays connecting the universal steel beams.

We understand that the CHS legs were designed to be treated internally with a corrosion inhibitor every three (3) months and that concrete encasement was used to protect the base of all the columns by removing exposure to oxygen by provision of cover and reducing the tendency for corrosion by providing an alkaline environment.

Items of concern included:

- For the inner bents the piers were encased in concrete at base level. Corrosion related expansion of the legs had cracked the encasement. In addition, it was noted at one location that the concrete encasement did not extend to bedrock. At another location the steel leg was connected to the top of an exposed timber pile via concrete encasement. Limited testing by Bureau Veritas, "BV", in 2009 revealed the steel columns to be intact and in good condition. The same cannot be assumed for the steel near the base of the columns where the concrete does not contact the ground or where the concrete does not seal against competent bedrock.

- For the inner bents the primary deck beams and secondary steel including bearers and cross bracing were heavily corroded. At the top of the legs the connecting twin PFC members were damaged beyond repair and corrosion of the weld sites connecting the PFC's to the columns was so severe to render the connections unsafe and unpredictable. The top and bottom flanges of the primary beams had developed significant corrosion at the bend locations and under joints in the concrete panels.

- For the inner bents the legs and leg cross bracing had corrosion on the outer ends of the column flanges and bubbles of corrosion through the CHS sections. Connection plates had considerable rust also. Testing by BV in 2009 indicated flange widths of 305mm and flange thickness vary from 13 to 14mm. Current measurements indicate flange thicknesses of 12-13mm. This corresponds to a 33% reduction in axial capacity and a 45% reduction in flexural capacity, refer to Appendix 4 for calculations.

- For the inner bents light impact from a 2kg hammer on the base of the columns created showers of rust falling from both the columns and structure immediately over. Public access under the jetty is unsafe as the structure is unpredictable.

- For the outer bents corrosion was noted at the location of the secondary steel beams and cross bracing units running between bents but the steel in contact with the deck had only light corrosion, when compared to the inner bents. Corrosion was noted at primary beam splice locations and at the attachment points of ancillary structure where welding was more intense.

- For the outer bents the legs and in plane bracing had widely spaced, localized, bubbles of corrosion. In 2009 testing by BV indicated corrosion on the exterior with possible corrosion on the interior surfaces. Thickness for the pier walls varied from 18.8 to 26.8mm below water level, 19.3 to 20.3mm at the water level and 21.7 to 22.1mm above the water level. Using the corrosion rates referred to in the BV report the possible range of wall thickness would be 17.6-25.61mm below water level, 18.11-19.11mm at water level and 20.51 to 20.91mm above water level. Assuming a 26.8mm wall thickness originally this equals a 35% reduction in axial capacity. It is important to realise that the corrosion rate calculated in 2009 had the benefit of maintained anodes and oil protection systems to reduce the rate of corrosion. These systems have not been maintained which suggests that the corrosion and hence capacity have a greater reduction in capacity. Note: the testing of wall thickness for the CHS columns undertaken for the BV report indicated a residual steel thickness greater than the nominated original wall thickness so we really cannot be sure how much steel is left intact.

- The possibility of corrosion within the enclosed space of the CHS columns is concerning.

- In general the bolted connections had corroded plates, nuts, bolts, washers and associated welds.

- BV indicated that significant loss of weld strength had been observed at discrete location.

- The steel grate flooring and sub-deck platform between bents 1-7 was severely corroded and unsafe.

- The steel davit crane near bent 5 was severely corroded and is unsafe.

- The removal of the timber deck may have had a negative effect on the lateral stability of the superstructure, being unsure of the capacity of the raking pile sets.

4.0 Recommendations

The jetty structure from Bents 1-17 appears to be superficially in a fair condition which suggests that a maintenance program could be restarted to prolong its lifespan. However, the maintenance program would not be able to economically repair corrosion damaged legs at or below water level and the damage is unknown at this stage and difficult to check. From our previous report the costs for an upgrade to keep the jetty and a ten year maintenance program, in 2009 dollars, was $6 million and that assumed that all recommendations made were implemented.

The jetty structure from bents 18-28 is unsafe for the reasons outlined above, and requires demolition. Public access under the jetty is unsafe as the jetty is unpredictable.

With the link from the coast, bents 18-28, removed there is little point in retaining the remaining outer structure. We therefore recommend the complete removal of the jetty structure.

The demolition will involve two different techniques as follows:

- The demolition of the jetty over the beach will require demolition by land based machinery; and
- The remainder of the jetty will require demolition by barge mounted equipment.

To minimise the risks associated with land based demolition of the jetty the following recommendations are made:

- Public access on, over and under the deck must be prevented until the entire land based structure is removed;
- To limit the time of exposure to the risks associated with public safety it may be appropriate to use controlled explosions to bring the structure down onto the beach quickly enabling an easier process of cutting up and hauling away without the concern of structure or machinery hanging above the beach;
- If a more conventional approach of disassembly is used then people must not be working on the beach, under the deck, at the same time as works occur over or under the deck;
- If a more conventional approach of a disassembly is used then consideration needs to be given to hand demolition of the blockwork structure near Bent 19 and the cutting off of the welds securing the Bondek slab to the supporting steelwork under. However, it is not currently safe for people to be under the deck cutting the welds securing the Bondek;
- If a more conventional approach of disassembly is used then the bolts securing the concrete deck planks must be cut off first. However, it is not currently safe for people to be under the deck cutting the bolts securing the planks;
- To limit exposure to the risks associated with disassembly it may be appropriate to demolish that portion of the jetty with controlled explosions as discussed previously;

- If it is desired to use the jetty as a platform for some portion of the demolition strengthening works will be required prior to the commencement of demolition to repair the damaged members particularly the corroded PFC head units. The permissible size of equipment is yet to be quantified.

To minimise the risks associated with barge based demolition the following recommendations are made:

- Public access on, over and under the deck must be prevented until the entire off shore based structure is removed;
- The land based structure must be demolished completely prior to the commencement of the demolition of the water based structure, this will also be the best way of preventing public access.
- People must not be working on the barge, under the deck, at the same time as works occur over or under the deck;
- The bolts securing the concrete deck planks must be cut off prior to attempts to lift off the planks. However, it is not safe for people to be working on the barge under the deck whilst the bolts are being cut;
- A demolition plan needs to be prepared to identify the necessary cut locations to enable the steel sections to be released and loaded onto the barge;
- A plan needs to be developed to enable the removal of the oils from within the steel bent legs prior to their removal and an emergency plan of what to do clean up any leaks/spills.

To enable the rubble to be removed from the barges and beach it is important that the retaining walls supporting the access drive and abutments are maintained in good working order.

5. Conclusion

The jetty has not been used since 2002 and had been maintained in a manner suitable for a simplified demolition up until 2009. It should be noted that the jetty has deteriorated significantly since the previous assessment in 2009 to the extent that it is no longer recommended that the jetty be demolished from shore without significant structural reinforcement or repairs to the shore based sections of the jetty structure to support the weight of any proposed demolition equipment.

Advice should be sought from qualified demolition contractors to determine the appropriate structural rectification works needed if shore based demolition/dismantling methods are proposed to be used.

6. Contact

[redacted] on [redacted] or [redacted]

APPENDIX 1
SITE NOTES

1. Crash kerbs were not effective. This is a concern for the entire jetty.
2. Hand railing was damaged and not effective. This is a concern for the entire jetty.
3. Bent 28. The primary columns have significant corrosion to both the webs and flanges. The diagonal braces had corrosion holes at the connections with the legs and along their length. The twin members across the head of the columns, immediately under the primary deck support beams, were badly corroded, missing flange and web. The connections between the twin members and the columns were badly corroded and swollen. Refer to Photo's 1, 2,15,16,17 and 18.
4. Bent 27. The primary columns have significant corrosion to both the webs and flanges. The diagonal braces had corrosion holes at the connections with the legs and along their length. The twin members across the head of the columns, immediately under the primary deck support beams were badly corroded, missing flange and web. The connections between the twin members and the columns were badly corroded and swollen. Refer to Photo's 19, 20,21,22,23 and 24
5. Bent 25. The primary columns have significant corrosion to both the webs and flanges. The flanges had corroded with the thickness reduced to 12mm. The webs had localise but significant deep corrosion. The diagonal braces had corrosion holes at the connections with the legs and along their length. The twin members across the head of the columns, immediately under the primary deck support beams were badly corroded, missing flange and web. The connections between the twin members and the columns were badly corroded and had failed on one side with the member only restrained by the suspect welds on the opposite column. Refer to Photo's 3,4,5,7,8,10,25,26,27,28,29,30 and 31
6. The base of a bent leg was exposed. The leg was supported on a driven timber pile. The connection was poor and the ability of the pile to laterally restrain the leg of the bent was suspect and unreliable. Refer to Photo 32.
7. The old timber jetty had been removed by a recent fire. The old timber jetty conceivably provided a strut back to the ground. The integrity of the jetty against impact loads from ships or waves is suspect and unreliable.
8. Reinforcing corrosion was visible on the soffit of the deck with exposed steel and there were corrosion related cracks on the sides of the slab.
9. Ancillary structure between the deck and the cliff face was badly corroded. Between bents 23 and 25 the corrosion was so severe that hinges in the supported structure may form and collapse without warning. This structure was also supported on twin members that span between the columns which had significant corrosion between the twin members and the columns. Refer to Photo 6.
10. The primary beams spanning between the bents had corroded to the top and bottom flanges with the corrosion noted primarily over the bents and at the location of welding associated with the location of ancillary structure. Refer to Photo's 30 and 31.
11. The horizontal bracing ties and struts were corroded. Due to access the degree of corrosion was not ascertainable. Refer to Photo's 15, 23, 26,27,28,30 and 31.

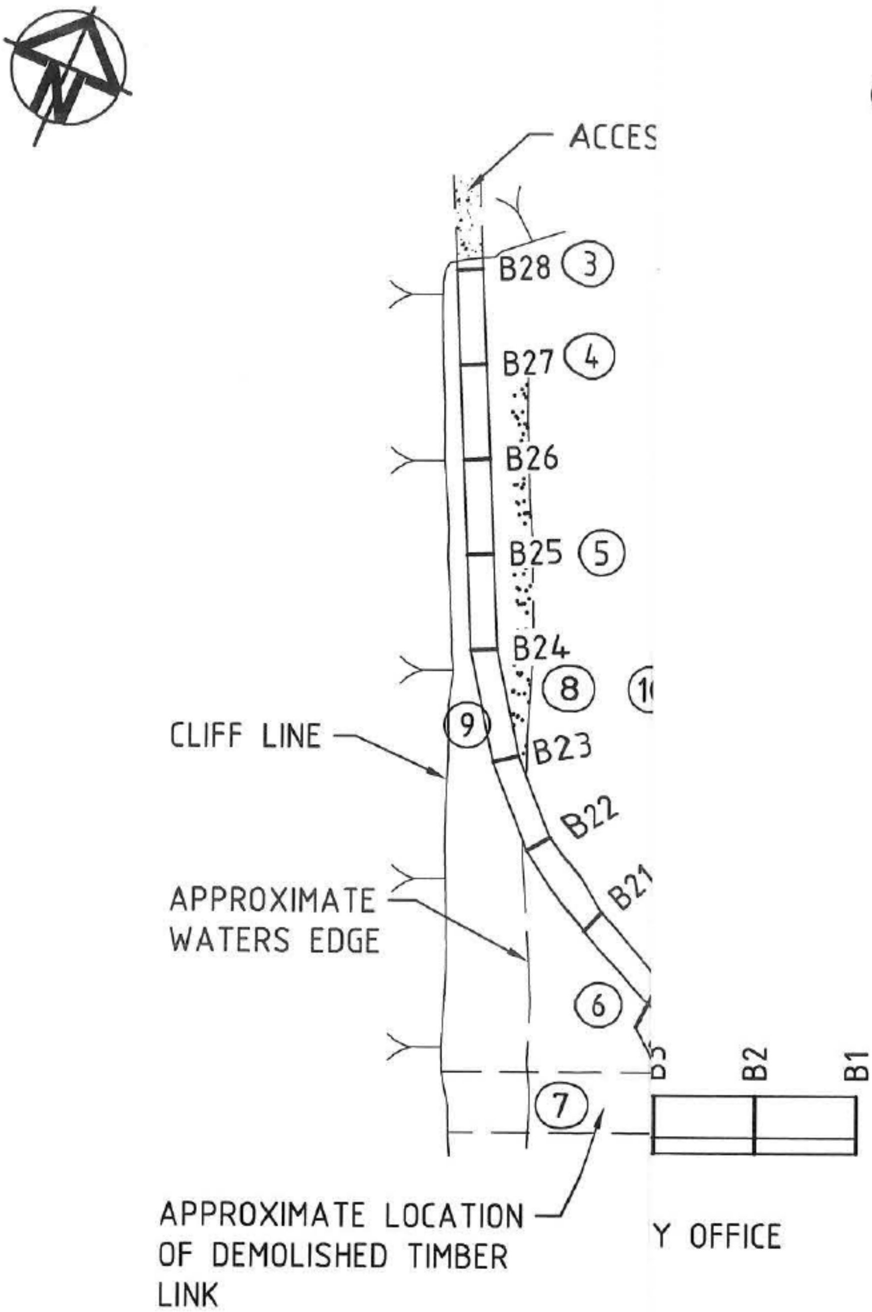
12. The base of the legs of the bents were encased in concrete. Gaps between the concrete and the legs were visible. Given the observable corrosion in the legs above the encasement it is reasonable to assume that the legs were corroded below the encasement where conditions for corrosion would be excellent. Refer o Photo's 1, 4, 7,8,19 and 32.
13. The columns for the Bents 1-17 were corroded, mainly at the weld sites, but the corrosion did not appear as bad as the damage observed on the older sections. These columns were hollow and filled with sea water. The original method of corrosion protection was to fill the column void with an anti-corrosion oil that floated on the surface of the water and coated the inside of the column with a skin of oil with the rise and fall of the tide. In addition the columns had sacrificial anodes fixed in place. Bubbling corrosion was noted on the side of the columns above high water mark. Refer to Photo 13.
14. The caps of the new columns were corroded and the bottom flanges of the primary beams were also corrode over the cap plates. Refer to Photo 11.
15. The heads spanning between the columns had localised corrosion mainly at the weld sites. Due to access limitations the degree of corrosion was not determined.
16. The primary support beams for the newer section were corroded but not as badly as the original beams. The corrosion was also around the location of the ancillary structure. Refer to Photo 9.
17. The primary support beams for the newer section were badly corroded at the location of beam splices. Refer to Photo 12.
18. The soffit of the concrete deck on the newer section appeared to be in a better condition than the original deck.
19. The concrete block building near the connection location of the timber leg of the jetty was supported on steel sheet reinforcing, Bondek or equivalent. The sheeting was heavily corroded on the soffit. The building was cracked but not alarmingly so.
20. The structure on the southern side of the newer section of the jetty, which supports a works shed, was formed from steel mesh flooring supported on steel work. This also included a sub-deck gallery. The steelwork was severely corroded, visibly, and unsafe.
21. A steel crane associated with the deck above was badly corroded and in danger of toppling. Refer to Photo 14.
22. The manholes were covered with steel plates. The plates were sufficient for pedestrian traffic only.

APPENDIX 2
SITE SKETCH

LEGEND:

(1) REFER TO ITEM 1 IN APPENDIX 1

B1 REFERS TO BENT 1



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G ENGINEERS PTY LTD
CIVIL STRUCTURAL GEOTECHNICAL
CONSULTING ENGINEERS
057 568 215 ACN 057 568 215
UNIT 13, No. 78 ALBERT STREET, WARNERS BAY, N.S.W. 2282
Phone: (02) 4948 0266 Email: mail@csgeng.com.au

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APPENDIX 3
PHOTOGRAPHS

Photo 1. A view down the outer leg of a Bent. Note the overall corrosion and the corrosion damage to the interconnecting PFC's and their welded connections.

Photo 2. A detailed view of corrosion on the face of a column Bent shown in Photo 1.

Photo 3. A detailed view of corrosion damage to the top of a Bent column.

Photo 4. A detailed view of severe corrosion at the top of a Bent.

Photo 5. A detailed view of corrosion damage to the top of a Bent leg and the interconnecting PFC's shown in Photo 4. Note the failure of the welds between the PFC's and the leg.

Photo 6. A detailed view of corrosion damage to ancilliary structure connected to Bent 24.

Photo 7. A detailed view down the length of a Bent leg. Note the damage to the concrete encasement and the PFC ties that run between the legs of the bent.

Photo 8. A detailed view of corrosion damage to the bracing members for the Bent shown in Photo 7.

Photo 9. A detailed view of corrosion to the bottom flanges of PFC tie members that connect the Bent legs immediately under the primary deck beams.

Photo 10. A detailed view of corrosion in the brace elements of a Bent frame.

Photo 11. A typical view of corrosion on the CHS Bent leg cap plate. Note the corrosion of the primary beam flange.

Photo 12. A detailed view of corrosion at a primary beam splice for the newer section of the jetty. Note: the degree of corrosion around the heavily welded sections.

Photo 13. A typical view of corrosion at the base of a CHS Bent.

Photo 14. A detailed view of corrosion damage to a derrick near bent 4. Note: the concentration of rust around the heavily welded sections.

Photo 15. A detailed view of the outer leg of a Bent. Note the corrosion damage to the leg and brace members.

Photo 16. A detailed view of a corrosion reduced Bent leg flange. Note: the flange thickness was originally 18.5mm.

Photo 17. A detailed view of corrosion damage to both the inner and outer faces of a Bent leg.

Photo 18. A detailed view of a corrosion reduced Bent leg. Note the flange thickness was originally 18.5mm.

Photo 19. A detailed view of the base of a Bent leg. Note the rust staining and the swelling of the flanges.

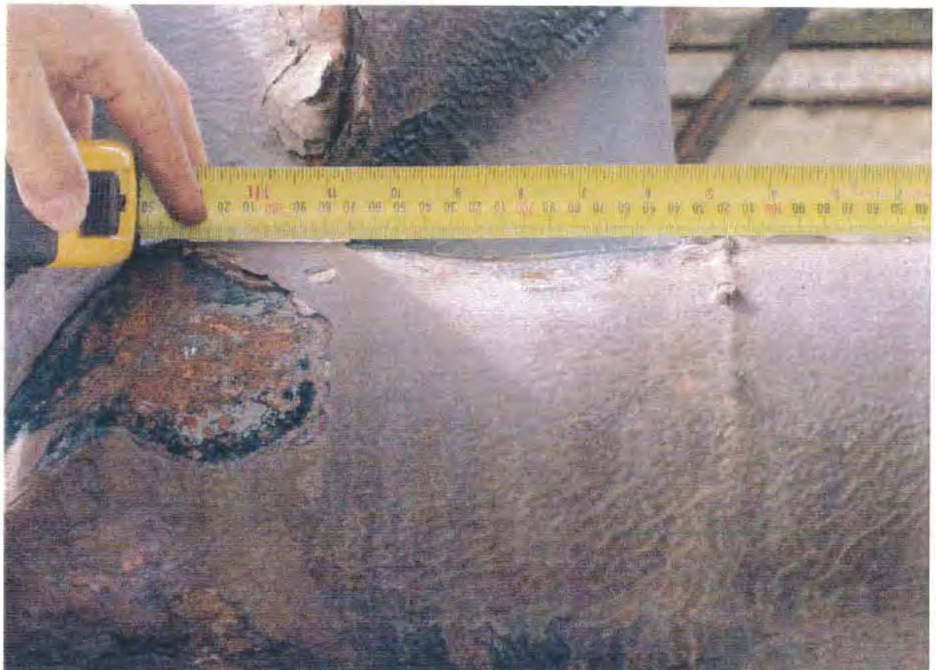

Photo 20. A detailed view of corrosion damage to a Bent brace member. Note the dent in the top of the member.

Photo 21. A detailed view of corrosion damage Bent brace member.

Photo 22. A detailed view of a corrosion reduced flange.

Photo 23. A detailed view of corrosion damage to the interconnecting PFC members. Note the failed welded connections between the PFC's and the leg.

Photo 24. A view of corrosion reduced flange thickness. The original thickness was 18.5mm and is now 12mm.

Photo 25. A detailed view of corrosion at the base of a Bent leg. Note the amount of rust scale.

Photo 26. A detailed view of a corroded Bent bracing connection.

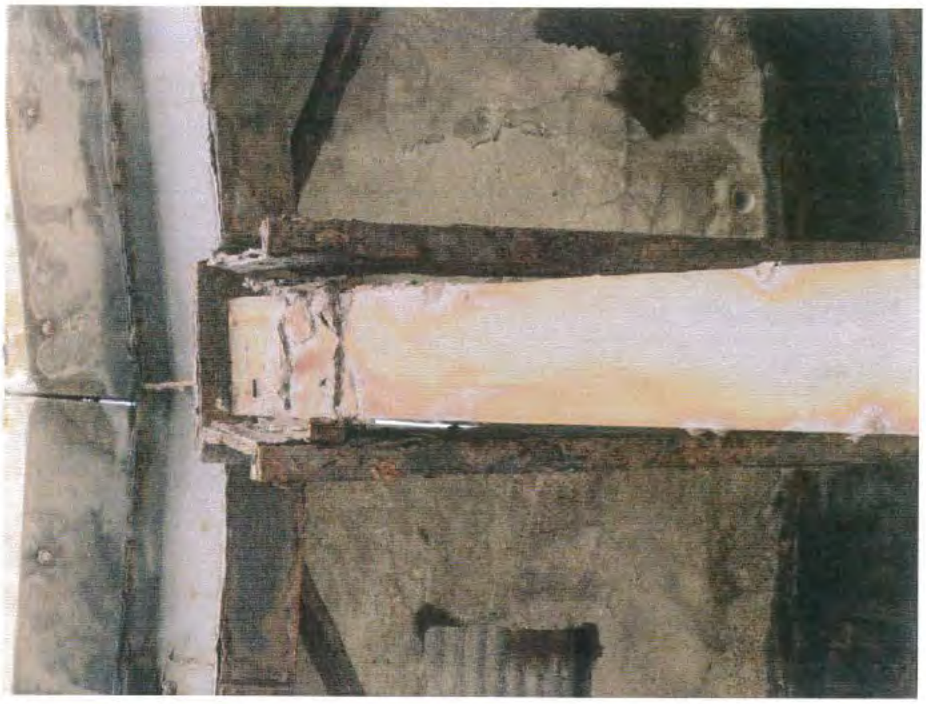

Photo 27. A detailed view of failed welded connections between the Bent legs and interconnecting PFC's.

Photo 28. A detailed view of the soffit of a deck section. Note the corrosion to the reinforcing, deck brace, primary beam flanges, inter-leg PFC and the failed weld connection between the PFC and leg.

Photo 29. A detailed view of corrosion damage to the base of a Bent. Note the damage to the connection plate.

Photo 30. A view of the outer leg of the Bent shown in Photo 29. Note the rust staining on the concrete encasement.

Photo 31. A detailed view of the top of Photo 30. Note the corrosion damage to the steelwork and in particular the separation of the left hand PFC from the leg due to weld failure from corrosion.

Photo 32. A detailed view of the base of a steel leg. Note the leg is supported on a timber pile with a connection that appears to be a damaged concrete encasement.

APPENDIX 4
CAPACITY REDUCTION CALCULATIONS

Design capacity reduction calculations

Consider a 310UC118 section

In as new condition:

$A=15000\ mm^2$

$Zx=1960x10^3\ mm^3$

Axial capacity

ϕNs=0.9x250x15000 =3375000 N

Moment capacity

ϕMsx=0.9x250x1930=441000 Nm

Existing condition with:

Flange width 300mm

Flange thickness 13mm

Web thickness 8mm

A=10072mm

$Zx=1113x10^3\ mm^3$

Axial capacity

ϕNs=2266200 N 33% reduction in capacity

Moment capacity

ϕMsx=250600 Nm 45% reduction in capacity

Newcastle Office
Ground Floor, 241 Denison Street, Broadmeadow, NSW Australia 2292
PO Box 428, Hamilton, NSW Australia 2303
T +61 2 4940 4200 F +61 2 4961 6794 E newcastle@rpsgroup.com.au W rpsgroup.com.au

Our Ref: PR108049letter
Date: 1 April 2011

Attn: [redacted]

Via: Email

Dear Sir,

**RE: CATHERINE HILL BAY JETTY
INDEPENDENT COST ESTIMATE FOR JETTY MAINTENANCE WORKS**

As requested and in accordance with your supplied documentation including:

- minutes from the EIS Submission meeting with particular reference to the notation therein, re: "...PJ suggested quantity surveyor reassess costs..."; and
- Structural Engineer's Report Condition of the Catherine Hill Bay Jetty prepared by CSG Engineers Pty Ltd (CSG) dated July 2009, re: 10 Year Maintenance Budget

and our subsequent written and verbal communications plus our written and verbal communications with various industry suppliers and trades please find attached our calculation of the 10 year maintenance budget totalling **$3,734,073** ***including GST.***
Please note:

- The above/attached compares with CSG's supplied allowances for same of **$3,806,000** with the difference between the two amounting to **$71,927** ***excluding GST***, or **1.89%**
- We advise that we consider the above discrepancy to be within the acceptable industry norm
- Therefore we confirm we believe CSG's allowances to be realistic; and
- Finally, we refer you to the *Schedule of Exclusions*.

We trust this information is sufficient for your purposes, however should you require any further details or clarification, please do not hesitate to contact the writer.

Yours sincerely
RPS

[redacted]

Catherine Hill Bay Jetty

Job Name : PR108049CATHO
Client's Name: Lake Coal Pty Ltd

Job Description
Catherione Hill Bay Jetty - Maintenance costs review

Trd No.	Trade Description	Trade %	Cost/m2	Trade Total
1	The following items are maintenance recommendations as specified by CSG Engineers Pty Ltd in their Structural Engineers Report on the condition of the Catherine Hill Bay Jetty dated July 2009, Ref: 255-09:-			
2	Oil in Piles	1.15	19.24	43,000
3	Corrosion Inhibitor for Piles	3.68	61.57	137,600
4	Check Jetty Pile Anodes	3.11	51.95	116,100
5	Replace Jetty Anodes	1.55	25.97	58,050
6	General Maintenance & Repairs	7.72	128.90	288,100
7	Scaffolding for Protective Painting of the Jetty	34.20	571.35	1,276,957
8	Removal of Conveyor Housing (NB: Works Completed)			
9	Grit Blast & Paint Jetty Structure	21.21	354.35	791,968
10	Full Structural Assessment of Jetty Condition	5.36	89.49	200,000
11	Concrete Deck Repairs	1.07	17.92	40,060
12	Maintenance Management Fees (NB: Management costs to carry out weekly inspections, organise & supervise any repair work (15%))	11.86	198.11	442,776
13	GST exclusive subtotal			*3,394,611*
14	GST (10%)	9.09	151.88	339,462
15	GST inclusive total			*3,734,073*
16	SCHEDULE OF EXCLUSIONS			
GFA: 2,235 m2.		**100.00**	**1,670.73**	**3,734,073**

Final Total : $ **3,734,073**

Trade break-up

Job Name : PR108049CATHO

Client's Name: Lake Coal Pty Ltd

Job Description

Catherione Hill Bay Jetty - Maintenance costs review

Item No.	Item Description	Quantity	Unit	Rate	Amount
Trade : 1	***The following items are maintenance recommendations as specified by CSG Engineers Pty Ltd in their Structural Engineers Report on the condition of the Catherine Hill Bay Jetty dated July 2009, Ref: 255-09:-***				
1					
	The following items are maintenance recommendations as specified by CSG Engineers Pty Ltd in their Structural Engineers Report on the condition of the Catherine Hill Bay Jetty dated July 2009, Ref: 255-09:			**Total :**	
Trade : 2	***Oil in Piles***				
	A corrosion inhibitor is applied into each steel pile every three months. The steel piles are open to the sea & the inhibitor floats on the water inside the pile & prevents corrosion at sea level & it also vaporises & puts a protective coating on the inside of the pile. The inhibitor is applied 3 monthly				
1	Allowance to remove metal capping to access internal surface of piles, apply corrosion inhibitor & replace capping (NB: Rate based on envisaged time expended)	10.00	Year	4,300.00	43,000.00
	Oil in Piles			**Total :**	**43,000.00**
Trade : 3	***Corrosion Inhibitor for Piles***				
	The inhibitor is called "Magnacote"				
1	Supply of "Magnacote" corrosion inhibitor for application to Steel PIles allowed as 344 litres per year (NB: Quantity required as per CSG Engineers Pty Ltd report dated July 2009/rate based on Ryan from Bulbecks advice of $8,000 for a 200 litre barrel)	3,440.00	Litres	40.00	137,600.00
	Corrosion Inhibitor for Piles			**Total :**	**137,600.00**
Trade : 4	***Check Jetty Pile Anodes***				
	The steel piles are protected from external corrosion by zinc anodes which are welded to the outside of each pile. These anodes are checked & cleaned by divers each 6 months				
1	Allowance to check & clean jetty pile anodes (NB: Rate based on Hunter Allied Diving's advice of $1,800/day for a three man team (1 person in water & 2 on the surface) & envisaged time expended to perform the task)	20.00	Times	5,805.00	116,100.00
	Check Jetty Pile Anodes			**Total :**	**116,100.00**

Trade break-up

Job Name :	PR108049CATHO		**Job Description**
Client's Name:	Lake Coal Pty Ltd		Catherione Hill Bay Jetty - Maintenance costs review

Item No.	Item Description	Quantity	Unit	Rate	Amount
Trade :	**5** ***Replace Jetty Anodes***				
	The anodes last approximately 8 years. There are 3 No. anodes welded to each pile. The anodes themselves are 100mm square x 1000mm long zinc blocks. In July 2009 the anodes are about 30% eroded away				
1	The following assumed to be requiring replacement once over the 10 year period		Note		
2	Supply of zinc anodes (NB: As per verbally advised "budget" amount received from AMAC Corrosion)	129.00	No.	250.00	32,250.00
3	Welded installation of last (NB: Rate based on discussions with Hunter Allied Diving's advice of $1800/day for a 3 man dive team (1 person in water & 2 on the surface), plus welding rods etc & average installation time of approx. 45 minutes per anode in varying weather conditions)	129.00	No.	200.00	25,800.00
		Replace Jetty Anodes		**Total :**	**58,050.00**
Trade :	**6** ***General Maintenance & Repairs***				
	General maintenance on the jetty which includes minor repairs, maintenance of security gates & fences & the general upkeep including access roads				
1	General maintenance of the jetty (NB: Rate based on Jetty area)	10.00	Year	22,350.00	223,500.00
2	Maintenance of gates & fences (NB: Rate based on envisaged labour & materials)	10.00	Year	1,460.00	14,600.00
3	Access road works allowance (NB: Assumed no major works would be required)	10.00	Year	5,000.00	50,000.00
		General Maintenance & Repairs		**Total :**	**288,100.00**
Trade :	**7** ***Scaffolding for Protective Painting of the Jetty***				
	Scaffolding & cocooning the complete jetty during the blasting & painting process to meet todays pollution, environmental & OH&S standards				
1	Scaffolding to jetty (NB: As per Instant Access quotation dated 12 May 2008)	1.00	Item	1,122,540.00	1,122,540.00
2	Hire fees to last assumed for 1 week to each section (Ditto)	1.00	Item	90,800.00	90,800.00
3	Subtotal				*1,213,340.00*
4	Indexation applied to last	1.00	Item	18,616.95	18,616.96
5	Subtotal				*1,231,956.96*

Trade break-up

Job Name :	PR108049CATHO		**Job Description**
Client's Name:	Lake Coal Pty Ltd		Catherione Hill Bay Jetty - Maintenance costs review

Item No.	Item Description	Quantity	Unit	Rate	Amount
Trade : 7	***Scaffolding for Protective Painting of the Jetty***				*(Continued)*
6	Allowance for cocooning of the scaffold	1.00	Item	45,000.00	45,000.00
	Scaffolding for Protective Painting of the Jetty			**Total :**	**1,276,956.96**
Trade : 8	***Removal of Conveyor Housing (NB: Works Completed)***				
	The structure on the jetty that was used to house the ship loading conveyor is unlikely to last another 10 years in the harsh conditions the jetty experiences. It is likely that it would have to be removed long before it deteriorated to a point where pieces of debris fell off the jetty. As the conveyor house also acts as a handrail for a significant length of the jetty once it was removed it would have to be replaced with a handrail				
1	Conveyor housing has been removed	1.00	Item		**EXCL**
	Removal of Conveyor Housing (NB: Works Completed)			**Total :**	
Trade : 9	***Grit Blast & Paint Jetty Structure***				
	The jetty has traditionally been painted every 10 to 12 years. When the jetty was last painted in the late 1990's it was painted with a tar based paint so there would be no real pollution concerns as there would have been if a lead based paint had been used				
1	As per supplied NTJ Mining Maintenance written quotation dated 10 May 2008	1.00	Item	780,000.00	780,000.00
2	Indexation applied to last	1.00	Item	11,967.97	11,967.98
	Grit Blast & Paint Jetty Structure			**Total :**	**791,967.98**
Trade : 10	***Full Structural Assessment of Jetty Condition***				
	For the jetty to be left in a "useable condition" at the end of the lease period in 2017 we would need to carry out a full structural assessment of the jetty condition with paying particular attention to the timber section of the jetty				
1	Structural assessment costs based on "Budget Estimate" advice received from Specialist (eg: Underwater etc) Engineering company	1.00	Item	200,000.00	200,000.00
	Full Structural Assessment of Jetty Condition			**Total :**	**200,000.00**

Trade break-up

Job Name : PR108049CATHO

Client's Name: Lake Coal Pty Ltd

Job Description

Catherione Hill Bay Jetty - Maintenance costs review

Item No.	Item Description	Quantity	Unit	Rate	Amount
Trade :	**11** ***Concrete Deck Repairs***				
	Some areas of the deck & concrete manhole covers are deteriorating & will have to be replaced through time (including timber deck)				
1	Specific concrete repairs allowance (NB: Rate based on deck area)	1.00	Item	40,060.00	40,060.00
	Concrete Deck Repairs			**Total :**	**40,060.00**
Trade :	**12** ***Maintenance Management Fees (NB: Management costs to carry out weekly inspections, organise & supervise any repair work (15%))***				
	Maintenance Management Fees (NB: Management costs to carry out weekly inspections, organise & supervise any repair work (15%))			**Total :**	
Trade :	**13** ***GST exclusive subtotal***				
1					
	GST exclusive subtotal			**Total :**	
Trade :	**14** ***GST (10%)***				
1					
	GST (10%)			**Total :**	
Trade :	**15** ***GST inclusive total***				
1					
	GST inclusive total			**Total :**	
Trade :	**16** ***SCHEDULE OF EXCLUSIONS***				
1	Land costs & legal fees		Note		**EXCL**
2	Authorities/Consultants fees & charges UNO		Note		**EXCL**
3	Holding costs & interest charges		Note		**EXCL**
4	Future costs escalation		Note		**EXCL**
5	Unknown ground conditions or Engineering design		Note		**EXCL**
6	Work outside site boundaries		Note		**EXCL**
7	All items denoted as EXCL in the foregoing estimate		Note		**EXCL**

Trade break-up

Job Name : PR108049CATHO

Client's Name: Lake Coal Pty Ltd

Job Description

Catherione Hill Bay Jetty - Maintenance costs review

Item No.	Item Description	Quantity	Unit	Rate	Amount
		SCHEDULE OF EXCLUSIONS		Total :	

SECTION 1

PRINCIPAL SPECIFICATION.

(A) FORMAT:-

Refer Malco Drawing No's.2003300-B1-1, -B1-4 & -B1-5.

(B) PERFORMANCE:-

1. BOOM CONVEYOR. (C 22)............

1.1 CAPACITY: ~~1800 T.P.H. Rated.~~
2000 T.P.H. Design Peak.

1.2 MATERIAL: COAL, All minus 50 mm. 800kg./m^3.

1.3 BELT FORM: 1400 mm.wide, 35 deg.Trough. (45 deg.at Load Points).

1.4 SPEED: 3.0 m./ sec.

1.5 DRIVE: 22 kw. 4-Pole, TEFC Motor, driving thru' fluid coupling & brake, to shaft-mounted helical/bevel reducer on Tailend drive pulley.

1.6 TAKE-UP: Spring-cushioned screws to Tailend drive frame.

1.7 OPER.ANGLE: Horizontal to minus 15 deg.

2. INCLINED CONVEYOR. (C 21)........

2.1 CAPACITY: >
>
2.2 MATERIAL: >
> All as Boom Conveyor above.
2.3 BELT FORM: >
>
2.4 SPEED: >

2.5 DRIVE: 2 x 22 kw. 4-Pole TEFC motors, driving thru' fluid couplings and brakes to shaft-mounted, helical/bevel reducers on Headend drive pulley shaft.

2.6 TAKE-UP: Spring-cushioned screws to Tail Pulley.

3. BOOM-SLEWING SYSTEM..............

3.1 SPEED: 0.28 rpm., giving 0.25 m./sec. at Boom tip. (17 m. Nom.Radius.)

3.2 POWER: 1.2 kw.-Normal, 4.3 kw.-Peak; shares common 15 kw. hydraulic power pack with boom-luffing drive.

3.3 DRIVE: (1) 'Danfoss' OMS 160 hydraulic motor, driving thru. 'Brevini' FL6400 fail/safe brake, and 'Brevini' ED2150 MR 45:1 reducer,fitted with 15T. m18 pinion, meshing with 122T. m18 external gear of RKS 52802-0101 slew ring.

3.4 RANGE: 0 deg.(parked along Wharf) to 150 deg., interlocked with Luff as per item (4) below. Excess slew travel prevented by Stops incorporating size 100 NO 17:10 'Gummipuffers'.

Continued -->

SECTION 1. Continues......

4. BOOM-LUFFING SYSTEM..............

4.1 FORM: Dual hydraulic cylinders(4" bore / 3' rod.), acting directly against (counter-weighted) boom structure.

4.2 SPEED: 0.033 m./ sec. cylinder speed, giving 0.25 m./ sec. at boom tip. (17 m. Nom.Radius).

4.3 POWER: 8.5 kw.-Normal, 9.6 kw.-Peak; shares common 15 kw. hydraulic power pack with boom-slewing drive.

4.4 RANGE: +15 to -15 degrees, subject to interlocking with Slew position, as follows.....................

Slew: 0 to 30 deg. | Luff: +15 to 0 deg.
'' : 30 '' 135 '' . | '' : +15 ''-15 " .
'' : 135 '' 150 '' . | '' : 0 ''-15 " .

Excess Luff prevented by Cylinder Stroke..... (cushioned both ends).

5. DISCHARGE DEFLECTOR..............

5.1 FORM: Single hydraulic cylinder (2.5" Bore x 1.75" Rod.) actuated and cushioned both ends.

5.2 POWER: Approx.1 kw., Shares common hydraulic power pack with Boom Luff & Slew drives.

5.3 RANGE: 75 deg.-Total, (45 deg.Outwards from Vertical, 30 deg.Inwards.)

6. LONG TRAVEL SYSTEM..............

6.1 SPEED: 0.24 m./sec. (14.4 m./min.)

6.2 FORM: Shiploader; 3 off, 2-wheeled Bogies of which one wheel on each is driven.

Inclined Conveyor; 4 off, single-wheel, Wheel-Boxes, non-driven.

6.3 POWER: 4.7 kw.-Nominal per Drive Bogie

6.4 DRIVE: 7.5 kw.; 4-Pole, TEFC Motor, driving thru' fluid coupling and brake to base-mounted helical/bevel reducer fitted with 41T./m8 pinon, driving a 54T.idler, to a 70T.Ring-gear, on the 610 mm.diameter Track-wheel.

6.5 RANGE: Excess Travel is prevented by :-

(1) Full-current switching back-up to normal control limits.

(2) End-stops incorporating size 160 ND 17110 'Gummipuffers'

Continued -->

SECTION 1. Continues.......

7. FEATURES........................

7.1 Manually set deflector at transfer from the Inclined Conveyor to the Boom Conveyor.

7.2 Shiploader connects (via 2 Pins) to existing Wharf Conveyor C20. for loading. Conveyor C20 has its own travel drive which must be disengaged (via Dog Clutch) when connected to the Shiploader.

7.3 Power & control to the machine is via 'Specimas' Cable Reelers mounted on the inclined conveyor Platform.

7.4 Automatic lubrication of anti-friction Bearings and Seals.

7.5 Manual hoist on the slewing platform to facilitate transferring of a Stretcher from ship to shore.

7.6 Fire Protection equipment provided, consisting of an automatic 'HALON' system in the Switchroom and fire extinguishers elsewhere.

8. DESIGN CONDITIONS................

The Shiploader installation is designed to load shipping of up to 5400 tonnes capacity! in the configuration nominated by the Specification No.456, and for the duty rating of up to 7 days/week, 10 hours/day, 52 weeks/year.

Unit designed to operate in winds up to 20m./sec. For winds in excess of this velocity, the Shiploader must be parked with the Boom engaged in the Park-Cradle provided. In this condition, the Unit is designed as per AS:1170 Part 2. i.e. 47 x 1.12 = 52.6 m./sec. effective wind velocity.

9. UNIT MASS........................

SHIPLOADER:--------- 80 t. (includes 29t.Ballast.)

INCLINED CONVEYOR:- 35 t.

TOTAL:------------- 115 tonnes

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