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DELIVERY REIMAGINED

Condition Assessment Report

Flinders Pier

Parks Victoria

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1. Executive Summary

The timber and steel-piled structures associated with Flinders Pier have been inspected by FSC Range (Range) and Southern Divers in accordance with WSCAM's basic visual assessment method and results have been collated in accordance with Parks Victoria requirements.

The following general observations were made during the condition inspection:

- Suspected termite activity was observed in the superstructure of the landside section of the Timber Pier. This had lead to numerous timber being classed as failed (primarily the timber bearers). Insects that resembled termites were visually observed nesting as far as Bent 20 whilst undertaking timber drummy testing. The condition of timber beams beyond this location were also found to be drummy.
- One pile (20C) has failed at the landside section of the Timber Pier. The cause for this failure is not certain however the pile has noticeably settled causing a significant depression in the level of the timber deck above.
- The majority of the timber piles were in fair condition (56%). 25% of the timber piles were in poor to very poor condition and the most common deterioration mechanism was pile section loss and cavities due to marine borer activity.
- Pile condition ratings and observations were markedly different from previous inspections. Pile diameter measurements at seabed level for the same piles differed by up to 200mm (170mm at failed Pile 20C as an example) from the 2016 inspection.
- The Concrete Pier was in good condition and steel piles were all assessed as Condition Rating 2 or 3. No ALWC was observed during the dive inspection.

Since the inspection, an independent termite detection inspection has been undertaken in March 2022 with the use of specialist termite sniffer dogs. The inspection validated the presence of termites at Piles 1C and 3C, as well as in the timber capping beams between Bent 20-23 and 25-26. There was interest shown in the timber capping from Bent 26-31 and at Bent 56 which may indicate termite activity at these locations.

Table 1-1: Critical recommendations

Structure	Recommendation
Timber Pier	Undertake a termite baiting program by installing baiting stations at locations of active termite activity. Ensure monthly monitoring and top-up of the stations is undertaken for a minimum of 6 months. Perform additional detection inspection after this time. This is considered critical to prevent/mitigate migration of termites to the newer seaward section of the pier and subsequent further widespread damage and expensive repairs.
Timber Pier	Ensure that the restricted access section of the Closed Pier remains closed-off to pedestrians. Extend the restricted access fencing from its current location at Bent 25 to Bent 39 or undertake timber integrity testing to validate condition of members (Note: This may be replaced by undertaking further works to the Timber Pier – Refer Options 1A to 1C in Section 5).

2. Introduction

2.1 Project Overview

Range were engaged by Parks Victoria to undertake a structural condition assessment of Flinders Pier. Range performed the above-water inspections and in conjunction subconsulted Southern Divers who were responsible for the inspection of all below water structural elements.

The aim of this project is to provide Parks Victoria with an up to date understanding of the current condition of each of the structures and to inform both short and long term remediation planning, including any immediate actions required to ensure the structures are made safe.

2.2 Location & Site Context

Flinders Pier is located within Western Port Bay on the eastern shore of the Mornington Peninsula adjacent to the town of Flinders. As the local port manager, Parks Victoria manages facilities for navigational safety and port infrastructure for commercial activities, including Flinders Pier.

The historic pier is comprised of a timber pier structure 325m long (herein referred to as the 'Timber Pier') constructed circa 1970 and a concrete pier structure 190m long (herein referred to as the 'Concrete Pier') constructed in 2011. Refer Figure 2-1 below for an overview of the two structures.

During 2016/17 repairs were undertaken to the superstructure and handrail components from Bent 39 to Bent 71 at the pier end. Repairs were not undertaken to the structure from landside to Bent 39 as access is provided by the adjacent concrete pier and recently, in early 2020 the pier was closed between Bent 1 to Bent 25 to public access due to safety concerns. Hence for the sake of condition reporting and remediation recommendations, the Timber Pier is split into two sections; the 'Landside Section' up to Bent 39, and the 'Seaward Section' from Bent 39 to Bent 71.

Figure 2-1: Locality Plan – Flinders Pier

2.3 VISUAL, PHYSICAL AND DIVING INSPECTION

2.3.1 VISUAL INSPECTION

Range engineers completed above water and on-deck inspections during October 2021. The inspection was primarily visual in nature, however, investigative non-destructive drum testing on timber and concrete elements was carried out where necessary to assess the competency of the material. Representative photographs and video recordings were taken during the inspections to show defect types recorded and allow for cross referencing to previous reports and diving inspections.

2.3.2 DIVING INSPECTION

Southern Divers undertook condition inspections of piles in the submerged zone across both structures. Prior to the inspection, a methodology was agreed with Parks Victoria (refer Appendix C) in order to minimise the impact on the marine environment at the site from cleaning the piles.

As part of Southern Divers' inspection, timber pile diameter measurements were recorded at various levels and all defects were noted (including presence of marine borer).

For the steel piles, a swim through inspection was undertaken to identify any immediate defects present (including presence of ALWC) requiring further investigation and ultrasonic thickness testing (UTT) at six (6 No.) steel piles was undertaken at high-water, mid-water, low-water and seabed levels and for every cardinal direction, totalling 12 tests per pile.

To ensure consistency of the recorded results Range and Southern Divers underwent a quality audit review process to calibrate results above and below water. Range engineers also undertook real-time monitoring of dive video to ensure inspection metholodogy expectations were met.

2.4 CONDITION RATING METHODS

The condition assessment for both above and below water was undertaken in accordance with the Wharf Structures Condition Assessment Manual (WSCAM, 2014) with results captured in condition inspection proforma and member defect heat maps produced for both structures. The WSCAM condition rating scale prescribes structural elements a rating of 1-7, as seen in Table 2-1.

Table 2-1: WSCAM Generic Condition Rating Scale

Condition State	Generic Description	Expected Rem. Life (%)	Actions	Overall
1	New with no visible defects/damage.	100	No repairs required. Inspection at next scheduled inspection.	New
2	No or very minor defects which do not affect the overall integrity or durability of the element or component	55-100	No repairs required. Inspection at next scheduled inspection.	Very Good
3	Limited defects present may affect the long term durability of the element or component. Minor deterioration of protective coating or parent material is evident.	40-55	Inspect at next scheduled inspection. Continue planned and preventative maintenance. No repairs required.	Good
4	Defects present may have minor impact on integrity. The short term durability of the element or component may be affected. Localised areas of moderate to advanced deterioration may be present.	25-40	Further testing is recommended and mostly reactive maintenance and some minor upgrades. Priority of repairs is low.	Fair
5	Advanced deterioration present. Defects present may have a moderate impact on integrity. The immediate durability of the element or component may be affected.	15-25	Maintenance; upgrade or rehabilitation works are required within 5 years or as dictated by expected remaining life. Structural assessment is recommended.	Poor
6	Advanced deterioration. Defects present likely to have major impact on integrity. Further deterioration will compromise the safety of the structure.	0-15	Rehabilitation or renewal required immediately. Structural assessment is recommended.	Very Poor
7	Very advanced deterioration present. Defects present likely to have an extreme impact on integrity and may constitute failure of the element.	0	Rehabilitation required immediately or replace component/asset. Structural assessment is recommended where rehabilitation works are to be undertaken.	Failed

These condition ratings have also been adapted to align with the Parks Victoria Condition Rating System (as seen in Table 2-2) to ensure consistent reporting of recommendations and actions.

Table 2-2: Parks Victoria Condition Rating System

Condition Rating	Condition	Action Required	Description	WSCAM Rating
1	Excellent	Preventative Maintenance	The asset is generally in as new condition. Exhibits no significant signs of deterioration. Only preventative maintenance is required.	1/2
2	Good	Condition-based Maintenance; Minor Repairs	The asset is in good physical condition. Exhibits only superficial wear and tear, minor defects or signs of surface deterioration. Requires minor maintenance.	3
3	Average	Repairs Required	The asset is in fair condition. Deterioration is evident but the asset is still serviceable. Failure is unlikely in the near future but deferred maintenance works exist.	4
4	Poor	Major Repairs/Renewal/Replacement or Decommisioning	The asset is reaching the end of its serviceable life. It has deteriorated badly or suffered structural damage and serviceability is likely affected.	5
		Increased Monitoring	Major repairs, renewal, replacement or decommissioning required.	
5	Very Poor	Closure	The asset has reached the end of its serviceable life. It has failed or is in a condition that provides an unacceptable safety risk. The asset is closed to public access if unsafe.	6/7
		Decommissioning/Replacement	-	

3. Review of Existing Data

3.1 CONSTRUCTION DESCRIPTION

3.1.1 TIMBER PIER

The Timber Pier is approximately 325m long, 3.6m wide and contains four lower landings and a jetty head. No construction records for the pier exist, although it is reported the pier was built in the 1970's to replace the original pier which was built in the early 1860's. The pier is used for recreational fishing, diving and swimming and serves as a base for commercial aquaculture activities and the Sea Pilots of Western Port. The pier consists of hardwood timber piles (original diameter estimated 350mm) at approximately 4.5 metre centres that support a typical timber pier superstructure arrangement of crossheads, beams and timber deck planks. A proprietary guardrail is installed along the northern edge of the pier and at locations where there is a risk of falling down onto a lower landing. Figure 3-1 below shows a typical cross section of the pier at the lower landing locations.

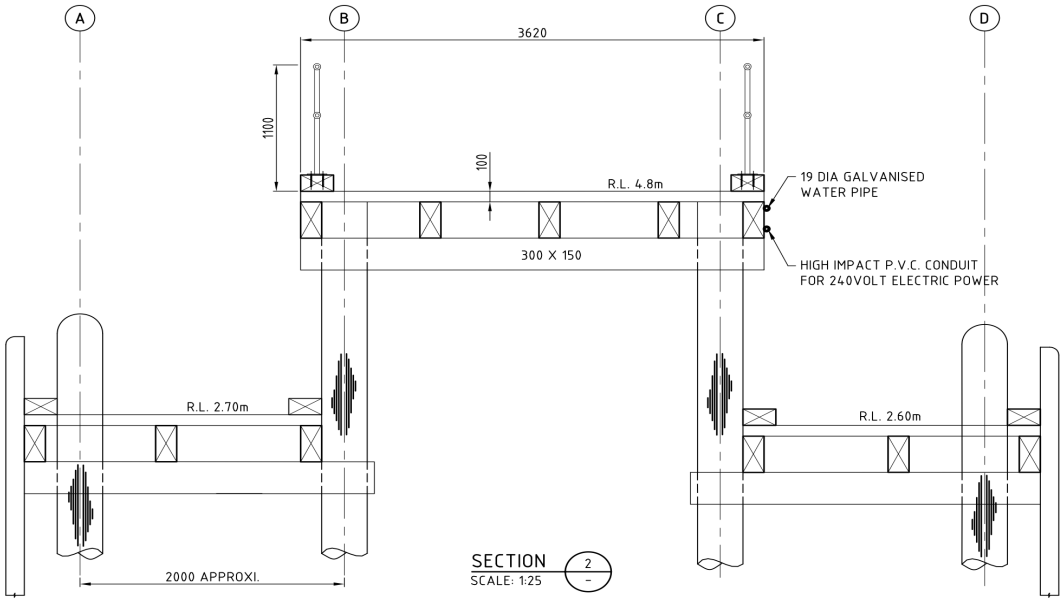


Figure 3-1: Timber Pier Typical Cross-Section (Lower Landing locations)

3.1.2 CONCRETE PIER

The Concrete Pier is approximately 190m long, 4.5m wide and contains a turning bay and lower landing at the jetty head. The pier sits immediately adjacent to the north of the Timber Pier and was purposely built to interface with the older pier at the jetty head. The pier was constructed in 2011 in order to continue to service commercial activities at the site.

The structure is comprised of tubular steel 323 Ø CHS piles at 9 metre centres and two steel 250 PFC crossheads that support a 230mm thick precast concrete deck with insitu topping slab. A guardrail has

been installed around the outer exposed perimeter of the pier. Figure 3-2 below shows the typical cross section of the pier whilst Figure 3-3 highlights the proximity of the two structures. The pier was built to accommodate 5 kPa pedestrian live loads in addition to a 9 tonne single axle (16.5 tonne dual axle) vehicular load and 20 tonne displacement lateral loads at the lower landing location.

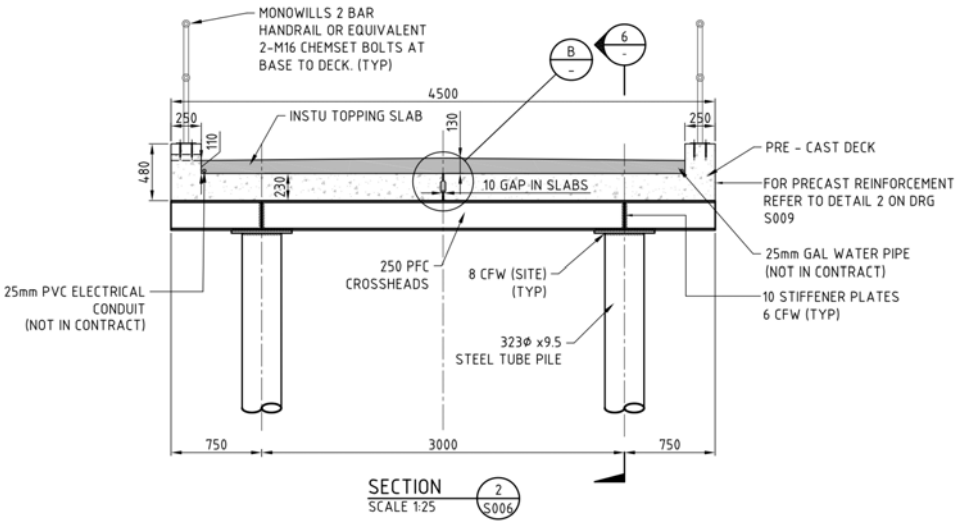


Figure 3-2: Concrete Pier Typical Cross-Section

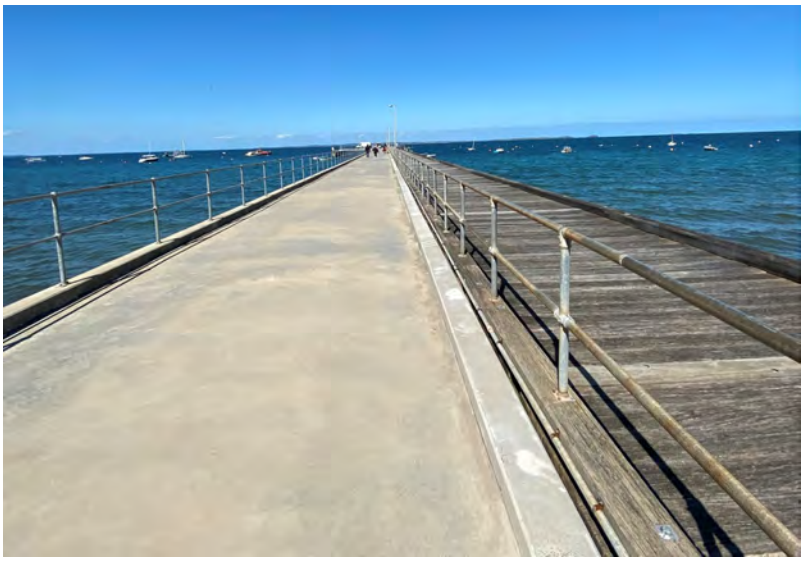


Figure 3-3: Section of the two adjacent structures

3.2 PREVIOUS CONDITION ASSESSMENTS

A desktop review of available existing condition reports was undertaken to understand previous findings of the condition of the structures. Table 3-1 summarises the previous condition inspection reports (where applicable) and their main findings. Previous recommendations and repairs are not captured in the table below as limited records are available. Previously conducted replacement of timber superstructure members was observed during the visual inspections. Some of the defects discussed in the tables below appear to have already been remediated.

Table 3-1: Previous condition assessments

Report	Structure	Author	Year	Relevant Key Findings
In-water Inspection of the Flinders Pier Structure	Timber Pier	Kina Diving	2016	Inspection was solely undertaken by divers. Basic pile diameter measurements and defects were recorded. In summary: • 10 piles were rated as POOR • 47 piles were rated as FAIR • 122 piles were rated as GOOD Only light marine borer activity was noted with some moderate-heavy infestations towards the jetty head. No records exist of an accompanying above-water inspection by engineering consultant to remark on condition of the timber superstructure (crossheads, beams and decking).
Structural Condition Assessment of the Timber Structure	Timber Pier	Hyder	2011	Above and below-water inspection conducted. Piles generally in good condition: • 33 piles were rated as 3 (Parks Victoria rating) • 149 piles were rated as 2 (Parks Victoria rating) Only light marine borer on all piles below water was noted. The end landing was of primary concern and had been shut due to poor condition of the deck planks. Central landing deck planks (left and right side) were moderately rotted and in need of replacement within 2 years.

4. Key Findings

A summary of element conditions and representative photographs observed during inspections at both structures is outlined below. All detailed condition rating and deterioration particulars (size, location and type) for each of the elements observed (above and below water) is provided in Appendices A and B.

All condition ratings specificified in this section of the report relate to the WSCAM condition rating unless noted otherwise.

4.1 Timber Pier

4.1.1 Timber Piles

There are a total of 176 No. timber piles that support the Timber Pier and low landing structures. Overall, the majority of the piles were in fair condition typically assessed as Condition Rating 4 (56%) and only 8% assessed as Condition Rating 6 or 7 (equivalent to a Parks Victoria Rating 5).

One pile - Pile 20C which is located within the 'Landside Section' of the jetty – was assessed as Condition Rating 7 indicating that the pile has failed and is no longer serviceable. Failure of this pile is identifiable due to a significant settlement of the deck over the pile and is believed to be one of the main reasons that pedestrian access was closed to this section. Figure 4-1 highlights this deflection in the deck in comparison to the remainder of the pier.

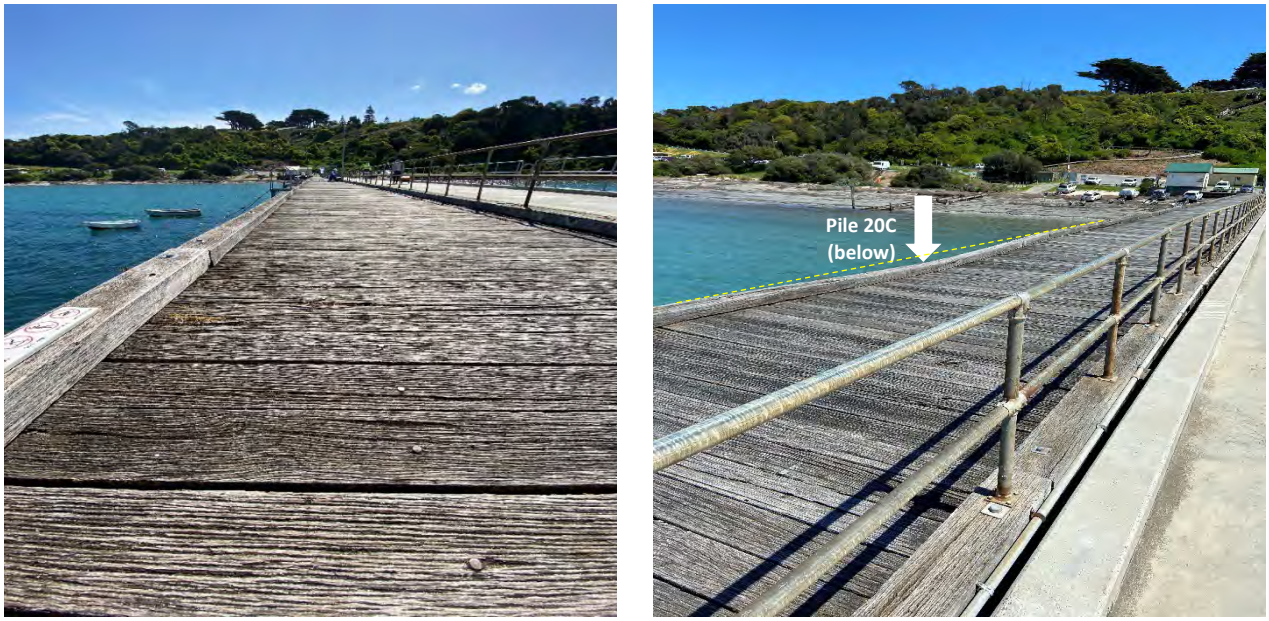


Figure 4-1: General overview of pier (left) and noticeable sag in deck at Bent 20 (right)

The cause of failure of pile 20C is unclear despite diver's attempts to excavate the silty sand to ascertain if the pile had broken off below seabed level. A number of mechanisms may have led to the failure of the pile including complete section loss due to marine borer attack (borer activity identified within the pile),

seabed scour (causing a loss of geotechnical capacity and consequent settlement), localised pile driving issues (ie early termination) or defective construction material however no direct evidence pointing to the cause was identified. Previous dive inspections did not note this pile or area of piles to be in poor condition which also may indicate that sediment transport and deposition is fairly significant at the site.

The dive inspection also found that Piles 16B, 19C, 20B, 21B and 22B (which are all in close proximity to 20C) were in poor condition (Condition Rating 6) based on depleted sections resulting for borer activity. This region also corresponds to the most severe area where marine borer activity was identified across the entire 325 metre length of the pier. Southern Divers noted that the borer activity was most severe at the seabed in this area and even extended below the mudline. Figure 4-2 highlights this comparison between borer depletion at water level and and at seabed level for Pile 20B.

Figure 4-2: Pile 20B at the water line (left) and at seabed level (right)

Generally, as the inspection continued along the length of the pier past Bent 22, the condition of the piles below water improved. Whilst some piles contained localised cavities (refer Figure 4-3) resulting in Condition Rating 6, piles without major defects were typically in excess of 300mm in diameter across the length of the piles and were categorised as fair condition (refer Figure 4-4).

Figure 4-3: Localised cavity in Pile 44A (Condition 6 - left) and sound condition at seabed level (right)

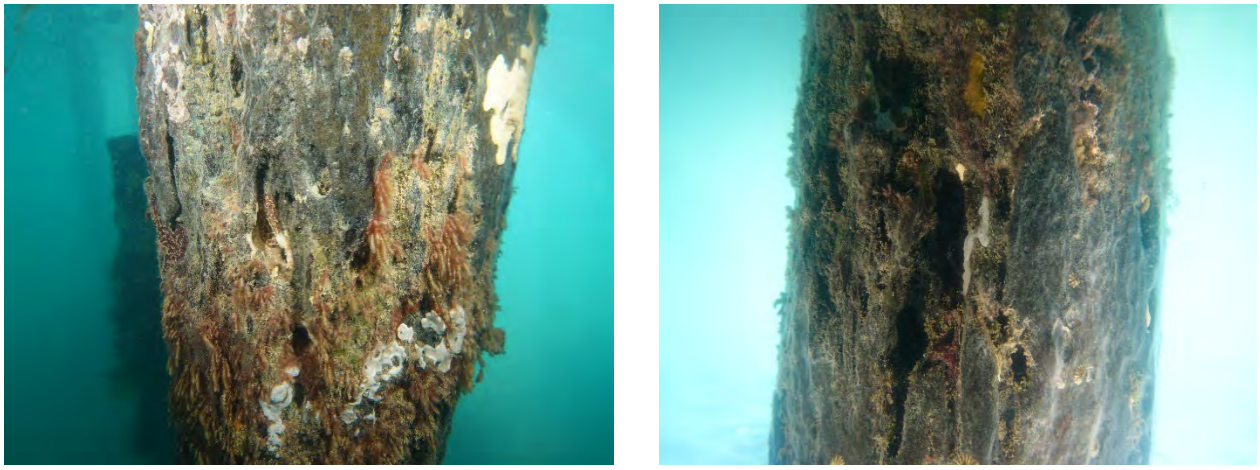


Figure 4-4: Typical condition of fair piles (Condition 4)

For the purpose of keeping the pier open and in a serviceable state for the immediate future under the current operating conditions, a formal load rating is required to accurately quantify the minimum required pile thicknesses necessary to be maintained. Regardless of this, piles that were assessed as Condition Rating 6 (7 No.) require repairs through splicing as they were heavily deteriorated and failure may occur in the near future without maintenance intervention.

4.1.2 TIMBER BEAMS

As noted in Section 3.2 of this report, the timber running beams for the Seaward Section of the Timber Pier were recently replaced and as such were all assessed as Condition Rating 3.

Within the Landside Section of the Timber Pier, insects that resembled termites were identified to be present in numerous beams ranging in severity. Video evidence was obtained where a current insect nest was identified at Bent 20.

In some severe cases the beams were rated Condition 6 or 7 and were found to be completely hollowed out causing crushing of the beam or distinct hollow drummy sounding when tapped with a hammer.

Figure 4-5 highlights examples of termite activity where the beams have bowed out laterally and lost all structural integrity. Figure 4-6 also demonstrates beams where heavy termite frass was identified and where the timber essentially disintegrated at the touch.

Figure 4-5: Hollowed out and crushed timber beams due to termite infestation

Figure 4-6: Beam 1E that has completely failed (left) and a close up view of termite attack (right)

Whilst only 30 of the 190 running beams of the landside section of the pier were identified with deterioration due to termite activity though drum testing of the beams it is important to note that this process is a relatively rudimentary process of identifying structural defects and that the severity of termite impact may be more advanced than what has been detected. Consequently, no load rating is able to be justified for this section of the pier without further timber integrity testing and ratification of ongoing termite activity.

Another item to note is that at the Landside Section of the pier, the tops of the running beams were soft and beginning to deteriorate from rot. A typical mechanism of avoiding such degradation is through installing an impervious membrane atop the individual members to protect from the elements. Range engineers identified that this has been performed during the replacement of the Seaward Section timber members (refer Figure 4-7).

Figure 4-7: Top rot (left) and preventative membrane on newer members (right)

All lower landing beams were assessed as Condition Rating 4 despite constant wetting and drying from the tides and waves. Drummy testing indicated that despite the constant wetting of the timber, the condition beyond the damp outer surface was solid and sound timber. At the northern section of the central lower landing, the timber beams have been recently replaced with new timber (assessed as Condition Rating 2) and the difference in condition can be seen in Figure 4-8.

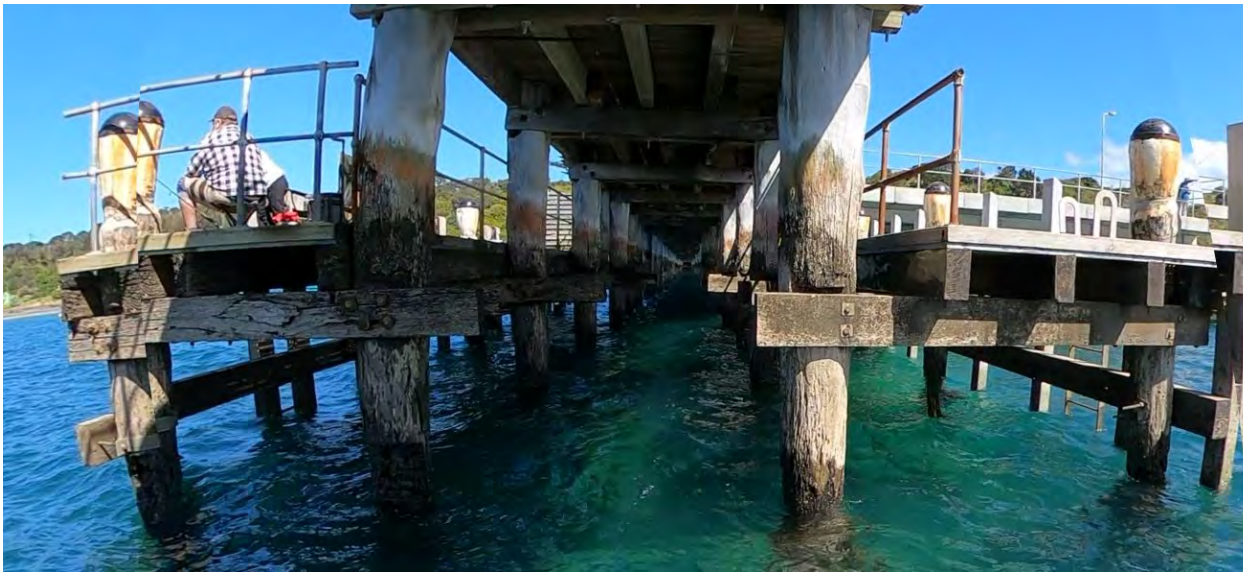


Figure 4-8: Older and newer central north lower landing members (crossheads)

4.1.3 TIMBER CROSSHEADS

The majority of the timber crossheads were in fair condition with 95% of the members assessed as Condition Rating 3 or 4. Most of the crossheads were exhibiting splitting and checks at the ends of the member where they are more exposed to the elements; however, the splits had not propagated to the bolts connecting to the piles and hence were not affecting the structural integrity of the members. This is highlighted in Figure 4-9. Drummy testing only identified two crossheads that may be affected by

termite activity however as with the timber running beams, termite infestation is likely to be more widespread and not fully detected.

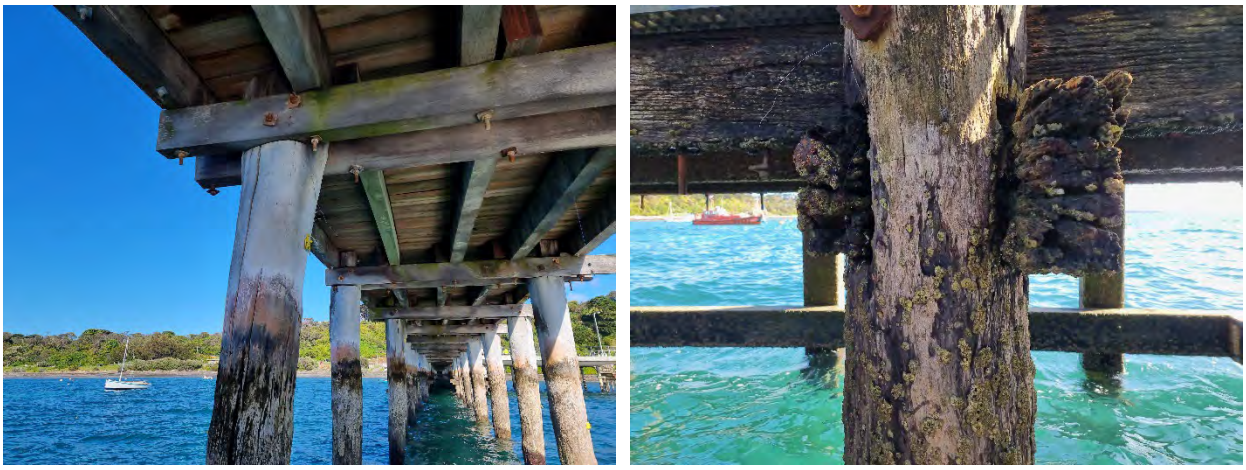


Figure 4-9: General condition of crossheads (left) and typical deterioration of member ends (right)

At the central lower landing northern section, the crossheads had also been recently replaced and were assessed as Condition 3. At the remaining lower landing locations where the crossheads were assessed as Condition Rating 4, the ends of the bolts connecting the crossheads to the piles had moderately corroded and the secions of bolt through the timber could not be inspected. A sample of bolts should be removed and inspected from all lower landing locations to check for section loss due to corrosion as this may limit the overall capacity of the lower landings.

4.1.4 TIMBER/FRP DECKING

The timber decking at the landside section of the pier is evidently older than the seaward section of the pier and was assessed as Condition Rating 5 as it has weathered over time. The seaward section's timber decking was in good condition due to it's recent installation and hence was assessed as Condition Rating 2. Figure 4-10 shows a direct comparison between the condition of the two sections.

Figure 4-10: Comparison between new and older deck members (left) and localized fire damage (right)

Localised fire damage was observed to the underside of two members at Bent 30 as shown in Figure 4-10 although this area is now not accessible to the public.

Recently, it appears the timber decking on the lower landing that was mentioned in previous inspection reports has been replaced with FRP decking which is attached to the timber superstructure and is in good condition.

4.1.5 ANCILLARY ITEMS

The lower landings are equipped with timber bollards, benches and steel or timber ladders. Refer Figure 4-11 for an overview of the general configuration of the lower landings and associated infrastructure.

Figure 4-11: General condition of lower landing and barrier with corrosion

The galvanised steel Monowills guardrails were in fair condition with minor to moderate rust staining. The lower landing barriers were in a more advanced state of deterioration as they often become submerged due to the Western Port tidal range. The guardrails are equipped with simple expansion joints to allow for expansion and contraction and appear to be in working order as no buckling of the rails were observed.

Figure 4-12 below highlights the general barrier conditions and demonstrates a local failure to the weld connection observed on the landside section of the timber pier, whilst Figure 4-13 shows inundation of the lower landing at high tide and the impact on the condition of the associated guardrail.

Figure 4-12: General condition of steel barrier (left) and localised failure at barrier connection (right)

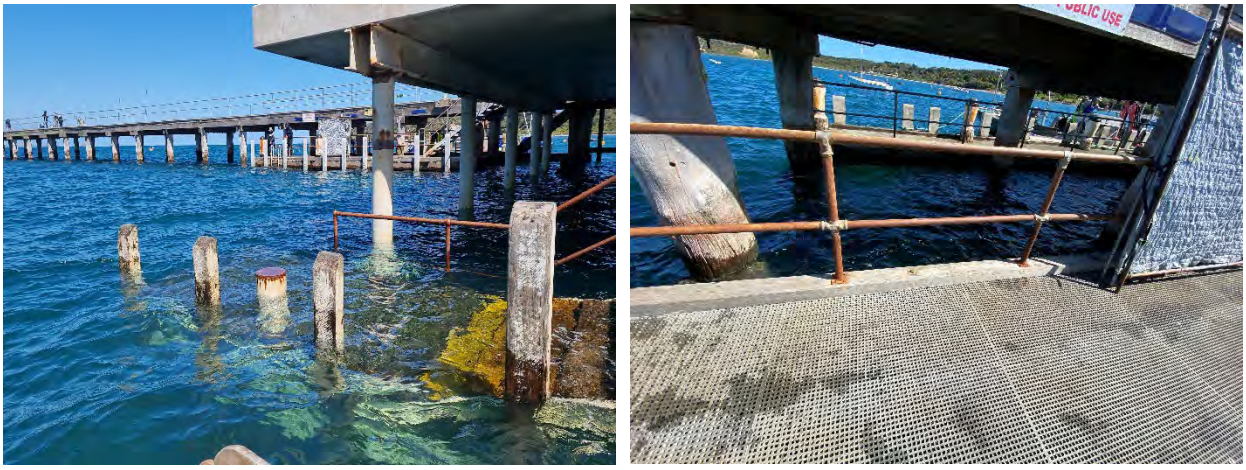


Figure 4-13: Difference in tidal levels at Flinders Pier and impact on infrastructure

Timber fenders are installed to all lower landings and at the jetty head. In order to install the timber fenders, longitudinal timber members have been connected between piles at the lower landings. The timber fenders at the central lower landing (north and south) are in good condition as it appears they have recently been replaced. This is also the case for the northern lower landing at the jetty head. Only the south side landing fenders at the jetty head are in fair to poor condition (refer Figure 4-15).

Figure 4-14: New timber walers and fenders at jetty head (left) and older members remaining (right)

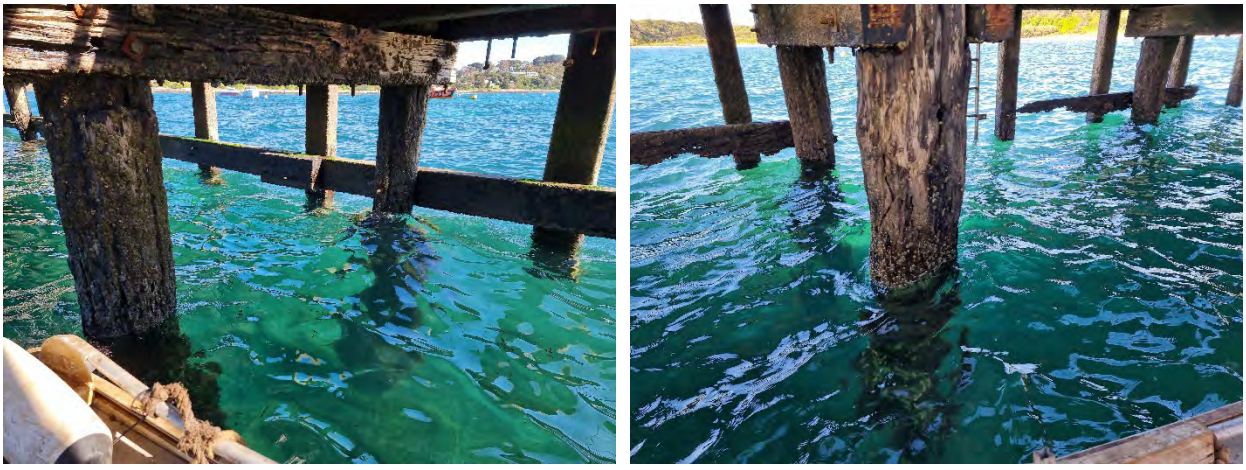


Figure 4-15: New timber walers and fenders at jetty head lower landing (north) compared to old (south)

A number of steel and timber ladders have been installed along the length of the Timber Pier, atop the main jetty and also at lower landing levels. The condition of all the ladders ranged along their length and exposure to the tidal zone (refer Figure 4-16), however were still deemed serviceable.

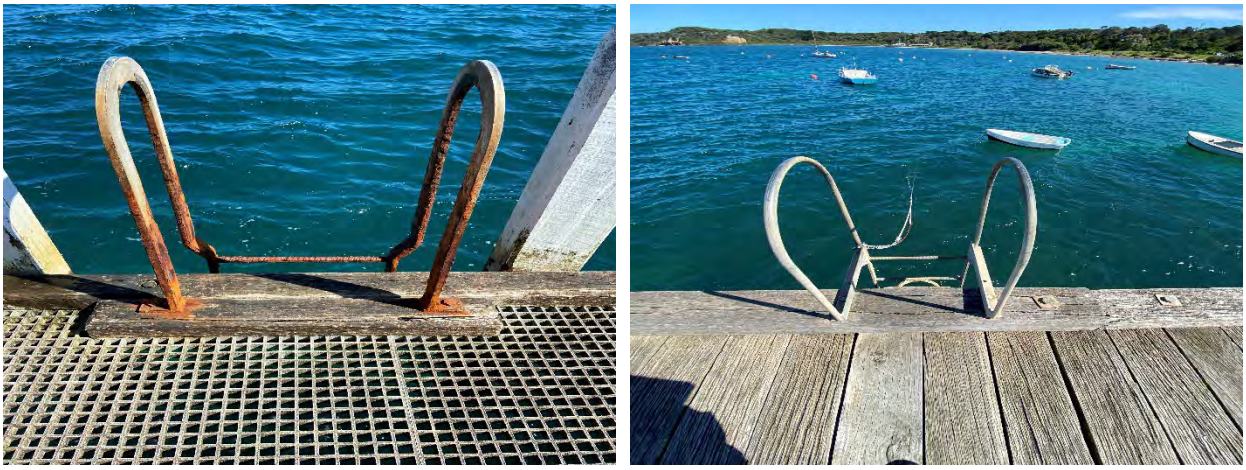


Figure 4-16: General condition of ladders atop main jetty and installed to lower landing

The condition of the timber capping beams that run along the length of the timber pier and act as kerbs ranged between Condition Rating 3 and Condition Rating 6 depending on location. Evidently, select members have been replaced over time due to localised degradation. Figure 4-17 outlines the typical condition of capping members and the most deteriorated member which was identified on the landside section of the Timber Pier.

Figure 4-17: General condition of timber capping (left) and localized damage (right)

4.1.6 TIMBER PIER CONDITION SUMMARY

A summary of the condition of all elements is provided in Table 4-1 to Table 4-2 below.

Table 4-1: Timber Pier 'Landside Section' Condition Rating Summary

WSCAM Condition Rating	Timber Piles (No.)	Timber Crossheads (No.)	Timber Beams (No.)	Timber Decking (m^2)
1	-	-	-	-
2	4 (5%)	-	-	-
3	11 (14%)	49 (62%)	159 (83%)	-
4	41 (52%)	27 (36%)	1 (0.5%)	-
5	16 (22%)	1 (1%)	19 (11%)	600 (100%)
6	5 (6%)	-	8 (4%)	-
7	1 (1%)	1 (1%)	3 (1.5%)	-

Table 4-2: Timber Pier 'Seaward Section' Condition Rating Summary

WSCAM Condition Rating	Timber Piles (No.)	Timber Crossheads (No.)	Timber Beams (No.)	Timber Decking (m^2)
1	-	-	-	-
2	-	8 (6%)	12 (5%)	630 (100%)
3	16 (16%)	61 (53%)	183 (76%)	-
4	58 (60%)	47 (41%)	45 (19%)	-
5	17 (17%)	-	-	-
6	7 (7%)	-	-	-
7	-	-	-	-

4.2 CONCRETE PIER

4.2.1 STEEL PILES

There are a total of 56 steel piles that support the superstructure of the Concrete Pier. Range engineers performed an above-water inspection of the piles, whilst Southern Divers conducted a swim-through of all the piles and UTT on 6 piles, as noted in Section 1.3.2 and detailed in the dive report in Appendix D.

The piles were found to be in very good to good condition with all the piles assessed as Condition Rating 2 or 3. The piles were identified to be coated with a protective paint layer however noted that this coating was beginning to break down (as evidenced by scattered corrosion) affecting 70% of the piles. No evidence of accelerated low water corrosion (ALWC) was not observed. Refer Figure 4-18 and Figure 4-19 for a representation of the condition of the steel piles above and below-water.

Figure 4-18: General condition of steel piles below water

Figure 4-19: General condition of steel piles above water

There also appeared to be some form of protective membrane (thought to be marine piling tape) covering the area of the pile which was welded to the pile cap plates supporting the crossheads. This

membrane was often peeling away from the surface of the steel allowing for top of the pile to develop surface rust to the exposed areas as shown in Figure 4-20.

Figure 4-20: Material noted at top of steel piles and base plate location

Southern Divers performed ultrasonic thickness testing at piles 11B, 14A, 17B, 20B, 21C and 22E. The piles in question were chosen to garner a representative understanding of pile thicknesses across the extent of the Concrete Pier and the condition of the pile at various levels above and below the water. According to the supplied construction drawings, the original wall thickness of the steel CHS piles was 9.5mm. The UTT test results showed that the average steel thickness readings across the 6 steel piles was 9.26mm, whilst the minimum observed reading was 9.0mm as seen in Table 4-3 below.

Table 4-3: UTT Results

Pile	Min. Thickness (mm)	Max. Thickness (mm)	Avg. Thickness (mm)
11B	9.0	9.3	9.12
14A	9.0	9.3	9.13
17B	9.3	9.5	9.36
20B	9.3	9.4	9.37
21C	9.2	9.4	9.29
22E	9.2	9.4	9.30
ALL	**9.0**	**9.5**	**9.26**

4.2.2 STEEL CROSSHEADS

The steel PFC crossheads were generally in good condition with all crossheads assessed as Condition Rating 3. As with the steel piles, the PFC's have been painted with a protective coating. Each pair of PFCs were connected via a continuous steel plate welded to the top surface of the PFC flanges. This appears

to be a significant source of deterioration for the crossheads with the top plate in most cases found to be severely corroding.

It is believed this is likely due to poor detailing or fabrication where the weld has not provided a continuous seal between elements leaving abutting surfaces of the steel plates unable to be coated and exposed to the marine environment.

It is unclear if the top plate is intended to contribute to the structural capacity of the crosshead and upon review of the construction drawings the plate detail cannot be found. However, if left untreated, the corrosion is likely to extend (if not already) to the PFC members causing progressive deterioration of the crossheads. Many of the PFCs are currently stained with rust product from the plate above which will typically lead to an advanced rate of coating degradation. Refer Figure 4-21 and Figure 4-22 for a typical PFC configuration and rust staining.

Figure 4-21: Rust staining of crossheads from plate above

Figure 4-22: General condition of steel crossheads

4.2.3 CONCRETE DECK

The concrete deck was generally in very good condition and assessed as Condition Rating 2, however at the jetty head turning bay, numerous longitudinal cracks in the topping slab were found to propagate the full length of the jetty head and hence were assessed as Condition Rating 4. These cracks were found to coincide with the longitudinal joints between the underlying precast deck elements and is likely due to shrinkage of the insitu topping slab or differential movement from thermal expansion and contraction over the larger footprint as compared to the narrower approach.

Figure 4-23: Longitudinal cracking in turning bay

The concrete deck soffit was also in very good condition (refer Figure 4-24).

Figure 4-24: General condition of concrete deck soffit

4.2.4 LOW LANDING CONDITION

The condition of the lower landing and all ancillary infrastructure for the Concrete Pier was largely in good condition. It is worth noting however that the steel walers that accommodate the newer timber fenders at the lower landing are UC members oriented about the minor axis. This is considered a poor

design practice because as this area becomes inundated during high tide events, water pools within the channel of the UC and is not adequately draining through the drainage holes provided (often these will become blocked and require ongoing maintenance). The water held within these channels has already lead to onset of corrosion (refer Figure 4-26). The steel beams that support the FRP was also beginning to corrode.

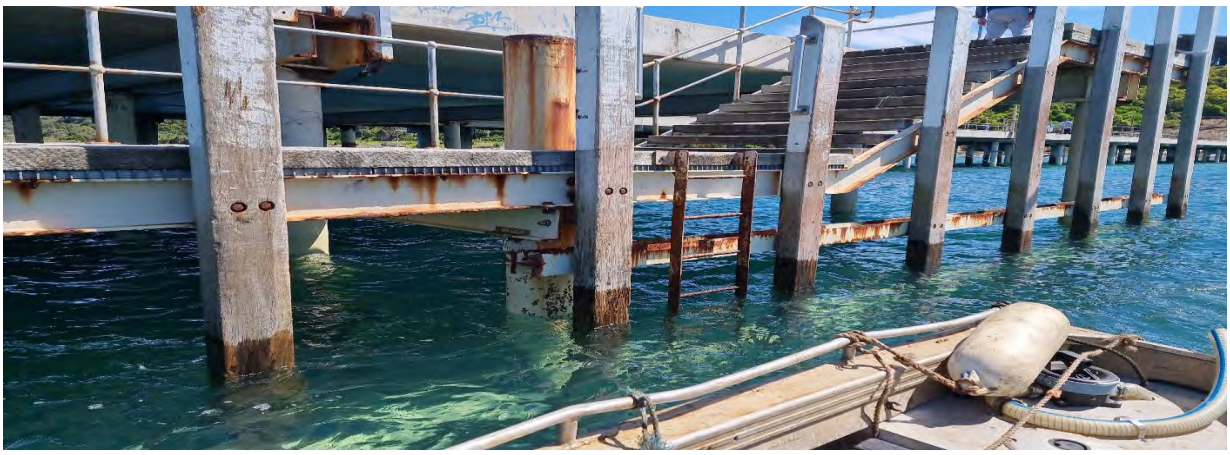


Figure 4-26: UC waler member collecting water and onset of corrosion

4.2.5 CONCRETE PIER CONDITION SUMMARY

A summary of the condition of all elements is provided in Table 4-4 below.

Table 4-4: Concrete Pier Condition Rating Summary

WSCAM Condition Rating	Steel Piles (No.)	Steel Crossheads (No.)	Concrete Deck (m^2)
1	-	-	-
2	17 (30%)	-	850 (75%)
3	39 (70%)	44 (100%)	-
4	-	-	297 (25%)
5	-	-	-
6	-	-	-
7	-	-	-

4.3 SAFETY ASSESSMENT

Parks Victoria requested Range to comment on the adequacy of the gap between the two piers from a safety perspective.

The distance between adjacent structures is approximately 30mm wide which is considered reasonably close allowing for construction tolerances and potential deviations in the alignment. There are also service conduits (water and electrical) that run along the northern edge of the Timber Pier which would have contributed to the need to provide for this gap.

Whilst the gap does exceed the recommended 10mm maximum gap size for a pedestrian walkway, the gap is typically protected by the respective timber and concrete kerbs of each structure and not considered to form part of the walkway and hence mitigates the risk. Where pedestrian access is intended to cross between the two structures, a chequer cover plate has been installed.

Chequer plates have also been installed at locations where light poles exist which is deemed to be a good measure to protect individuals from the junction of services.

Figure 4-27: General elevation of concrete pier

5. Load Rating & Structural Analysis

Range has undertaken a load rating of the Timber Pier using finite element analysis software ''SpaceGass'' in order to determine the minimum pile diameters required to ensure that the pier can remain open and serviceable to current operating loads (5 kPa). The structural analysis considers only vertical loading (no provision for lateral loads) as the structure is no longer utilised for berthing.

For the purpose of this assessment, it is assumed the piles have sufficient geotechnical capacity and do not limit the capacity of the structure.

5.1 Design parameters

Range were provided IFC construction drawings by Parks Victoria (SKM, 2010) of the new Concrete Pier that included details pertaining to the existing Timber Pier and enabled an accurate modelling of the structural configuration, including span lengths, member dimensions and any other pertinent information. This information was verified during the site inspections. However, in absence of any construction drawings of the Timber Pier which was built in circa 1970, Range have used their experience and engineering judgement to assume the following timber material characteristics:

Table 5-1: Assumed timber materials and corresponding properties (AS5100.9 Table A1)

Member Type	Timber Material	Characteristic Values (MPa)				
		Elasticity (E)	Bending (f'b)	Shear (f's)	Compression (f'c)	Tension (f't)
Piles	F17 hardwood	14,000	42	3.6	34	25
Superstructure	F14 hardwood	12,000	36	3.3	27	22

Range also assumed the following loads:

- Dead load material self-weights (AS1170.1 - Appendix A)
  - Timber 11 kN/m^3
- Live loads
  - 5 kPa applied to the entire width of the deck structure (including capping beams)

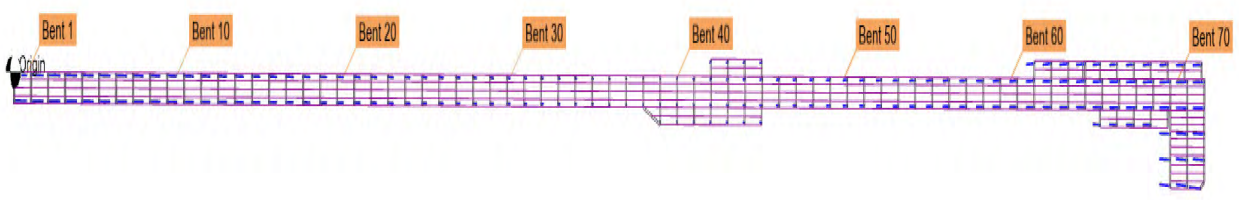


Figure 5-1: Plan view of Flinders Pier SpaceGass model

Figure 5-2: Rendererd view of jetty head

5.2 Substructure Results

The SpaceGass model of Flinders Pier validated that piles supporting the main deck and lower landing attracted significantly larger load than the main jetty piles without a lower landing adjacent (refer Figure 5-3 below). This was also the case at the jetty head where the piles are spaced out at greater centres and supporting a larger tributary area.

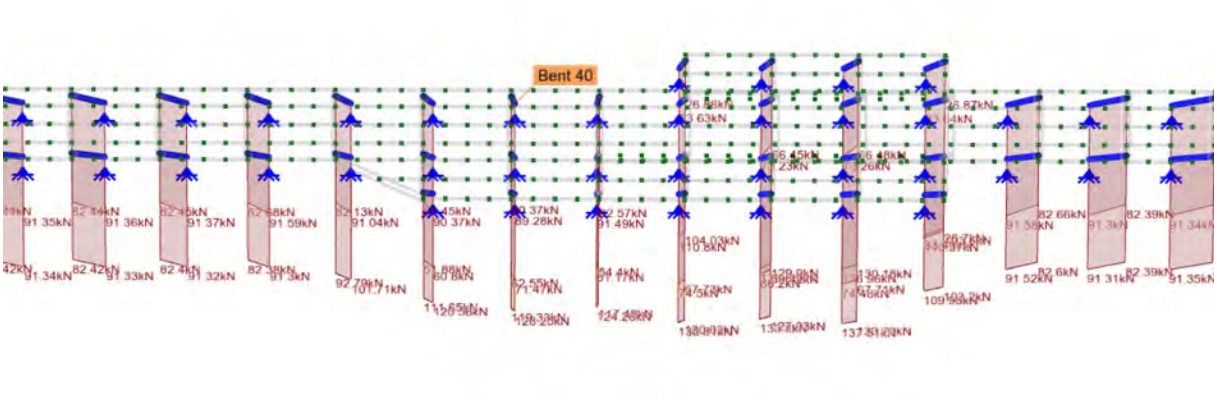


Figure 5-3: Greater axial loads at lower landing locations compared to the main deck

As such, for the purpose of quantifying the minimum diameters required in order to keep the pier open for serviceable loads (5 kPa), the piles have been categorised to distinguish between the two requirements. Calculations determined that the main pier piles require a minimum of 230mm diameter, whilst the main pier and lower landing support piles require a minimum of 270mm diameter. Refer to Table 5-2 below for a summary of reactions and Appendix E for detailed calculations.

Table 5-2: Pile Results

Pile Type	Axial Force (kN)	Bending Moment (kNm)	Combined Axial + Bending (< 1.0)	Minimum Diameter Required (mm)
Main Pier Piles	91.3	1.52	0.99	230
Lower Landing Support / Jetty Head Piles	170.33	2.12	0.97	270

6. Recommendations

A summary of short term (<5 years) recommended actions to be undertaken based on above and below water inspection findings for each structure is provided in Table 6-1 to Table 6-4. These recommendations are provided to address current defects/issues necessary to keep the piers open and serviceable for the immediate future under the current operating conditions. Furthermore, proactive maintenance has also been recommended where necessary in the short term to prevent further deterioration from occurring which may lead to more significant and costly issues in future.

The recommendations have been largely based off Parks Victoria's rating scale and action required based on observed condition:

- Parks Victoria Rating 3 (WSCAM 4): Repairs Required
- Parks Victoria Rating 4 (WSCAM 5): Major Repairs / Renewal / Replacement or Decommissioning
- Parks Victoria Rating 5 (WSCAM 6/7): Closure / Decommissioning / Replacement

The recommendations listed in Table 6-1 present the absolute minimum actions recommended to be undertaken under a "do nothing" approach. Whilst the works to eliminate termites from the structure may be viewed as a preventitave measure from further ongoing deterioration, the closure of the Landside Section of the pier is evidence of the possible outcome which may affect the remaining serviceable section of the timber pier. Given the potential risk this imposes on an otherwise serviceable structure, undertaking no action on the matter is strongly discouraged.

Table 6-1: Minimum Recommendations

Actions	Justification/Potential consequence of no action	Works Required	Cost Estimate (ex. GST)
Conduct termite baiting program for a minimum of 6 months	It is critical to prevent migration of termites to the newer seaward section of the pier and mitigate widespread damage and expensive repairs.	• Commence baiting program • Conduct additional sniffer dog inspection after 6 months • Conduct annual termite inspections there-on	$6,000
Maintain closure of the landside section of the timber pier – extend closure from Bent 25 to Bent 39	As a load rating cannot be justified for this section of the pier, this section must remain closed and access prevention maintained. Moreover, based on the deteriorated condition of the timber superstructure between Bent 25 and	• PV to maintain access prevention • Relocate fencing from Bent 25 to Bent 39	$25,000 (timber integrity testing and engineering advice)

Actions	Justification/Potential consequence of no action	Works Required	Cost Estimate (ex. GST)
	Bent 39, the closure should be extended to restrict access up to Bent 39. (Note: timber integrity testing could be undertaken to more accurately quantify the residual member thicknesses remaining and a load rating conducted to potentially warrant re-opening this section). Parks Victoria should also assess whether the current guardrail is sufficiently adequate to mitigate the risk of pedestrian access to the section of pier.	• PV to conduct a risk assessment of current access prevention measures	

Noting the current state of the Landside Section of the timber pier, no load rating can be assigned to the superstructure. Given this section of the pier is not required to maintain the serviceability of the pier (ie alternate access is provided via the adjacent concrete pier) the following options are presented as options only rather than recommendations for Parks Victoria's consideration. It is also recognised that other factors beyond the condition of the pier may also influence the approach to be undertaken.

Table 6-2: Timber Pier 'Landside Section' Options

Option	Justification/Potential consequence of no action	Works Required	Cost Estimate (ex. GST)
Option 1a: Demolish pier superstructure (retain piles)	Removing the superstructure members that are in poor condition reduces the risk of total failure and collapse of sections of pier in the future. The landside pier's timber piles were visually observed to be in fair condition and could remain in-situ for many years.	• Remove and dispose of timber superstructure between Bent 1 and Bent 39 • Install new guardrail to southern edge of concrete pier	$90,000
Option 1b: Demolish pier superstructure (including piles)	This option reduces the hazard of public injury from accessing the piles.	• Remove and dispose of timber superstructure between Bent 1 and Bent 39	$181,000

Option	Justification/Potential consequence of no action	Works Required	Cost Estimate (ex. GST)
		• Remove and dispose 76 timber piles • Install new guardrail to southern edge of concrete pier	
Option 1c: Replace pier superstructure and repair deteriorated piles	This option would restore the pier to original capacity.	• Replace timber superstructure between Bent 1 and Bent 39 • Encasement repair of piles deemed necessary to facilitate design loadings (13B, 16B, 20C, 24B)	$650,000 (replace superstructure) $64,000 (Pile repair)
Option 1d: Replace entire pier structure	Parks Victoria have sought to understand the total cost of reconstruction to guarantee a design life of 50 years.	• Replace timber piles (78 No.) • Replace timber decking (616 m^2 approx.) • Replace beams and crossheads (1140 lin.m approx.) • Replace capping beams (342 lin.m approx.)	$1,235,000

The following recommendations are presented to Parks Victoria to maintain serviceability to the remaining Seaward section of the pier.

Table 6-3: Timber Pier 'Seaward Section' Recommendations

Recommendation	Justification/Potential consequence of no action	Works Required	Cost Estimate (ex. GST)
Repair deteriorated piles	Piles that are Condition Rating 6 require splice repairs as they are heavily deteriorated and may soon fail without maintenance intervention. Piles that do not meet the minimum diameter requirements require repair through encasement (e.g. strengthening via a system like Denso SeaShield 400).	• Encasement repair of 6 piles deemed necessary to facilitate design loadings (59B, 69A, 69D, 70D, 70E, 71D)	$84,000
		• Splice repair of 7 piles that are Condition Rating 6 (42A, 44A, 43D, 45A, 45D, 63A, 71E)	$140,000
Investigate lower landing connections	The condition of the lower landing bolts were rusted at each end however the condtion of the bolt through the timber sections could not be inspected. As the lower landing areas are constantly inundated with rising and falling tides, a sample size of bolts across the low landings should be removed and measured for section loss due to corrosion. All bolts should have a nominal diameter of at least 20mm.	• Engage contractor to investigate a sample size of bolts at all lower landings	$6,000

Table 6-4: Concrete Pier Recommendations

Recommendation	Justification/Potential consequence of no action	Works Required	Cost Estimate (ex. GST)
Install Protective Pile Wraps	As the piles are approximately 10 years old, the protective coating applied to the piles is nearing the end of its serviceable life and has failed in most areas cause the	• Install 56 No. pile wraps (e.g. a system	$67,000

Recommendation	Justification/Potential consequence of no action	Works Required	Cost Estimate (ex. GST)
	piles to rust. Piles were measured to have lost up to 0.5mm of section. Given the piles are only 9.5mm thick, preventative action is required to achieve a 50 year design life.	like Denso SeaShield 2000FD wraps)	
Blast and recoat all crossheads	Significant corrosion was identified to have occurred to the top plate welded to the steel crossheads. Furthermore, the overall coating system was observed to be at the end of its design life. Due to the limited access to the top surface of the crossheads, the efficacy of this treatment may only partially extend the life of the crossheads before they require further strengthening due to continued corrosion of the top flange of the PFCs. It is recommended that an assessment is undertaken to determine an appropriate allowable minimum flange thickness threshold before additional strengthening is required. This can therefore be monitored on a regular ongoing basis by PV or an engineer.	• Blast and re-paint 22 No. steel crossheads • Assess structural capacity requirements of steel crossheads • Regular ongoing monitoring of steel crosshead condition to identify need for intervention.	$10,000 (blast and re-coat) $3,000 (capacity of crossheads)
Ongoing monitoring of topping slab cracks	The concrete deck top was exhibiting minor cracking along the length of the turning bay. Concrete cracks in the marine environment can have highly deleterious effects to the steel reinforcement and it is important to continually monitor the crack width or signs of corroding reinforcement to determine if repairs are required.	• Routine inspections	N/A

Appendix A – Pile Inspection Proforma

Pile ID: Pile ID	Bent (number)	Row (letter)	Survey Date	Supervisor	Measurements: Tide RL (m CD)	Crosshead Soffit to Waterline (mm)	Crosshead soffit to Seabed	Longitudinal beam soffit to Seabed = total exposed length of pile	Movement of pile at seabed	Pile tags present	Diameters: High Water (RL+-.--m) Dia	High Water Dia	Low Water (RL+-.--m) Dia	Low Water Dia	Mid Water (RL+-.--m) Dia	Mid Water Dia	Above Repair If any Dia	Below Repair If any Dia	Seabed (measure Dia. at lowest seabed level) Dia	Seabed Dia	Seabed Depth	RL at Seabed	Min. Dia. Dia	Min. Dia. Dia	Min. Dia. RL	Defects and Comments: Recorded Defect 1 (if any) Type	Max width (mm)	Max Depth (mm)	Top Distance (m) to crosshead soffit	Bottom Distance (m) to crosshead soffit	Recorded Defect 2 (if any) Type	Max width (mm)	Max Depth (mm)	Top Distance (m) to crosshead soffit	Bottom Distance (m) to crosshead soffit	Marine Borers Nil / L / M / H / Severe: HW to MW	MW to LW	LW to Seabed	Depletion Nil / L / M / H: HW to MW	MW to LW	LW to Seabed	Overall Condition: Thickness of Marine Growth (mm)	Condition based on WSCAM (if applicable) (Condition 1 - 7)	PV Rating	Comments	Existing Repairs: Repair: Description of existing repair	RL at top of repair	RL at bottom of repair	Repair extends into Seabed? (Y/N)	Length of exposed timber below repair	Defects recorded on existing repair: Description	Comments	Image	Image	Image	Image
1B	1	B	28/10/2021	AB	N/A	N/A	0.4	0.7	N	Y	360	370	\	\	\	\	\	\	\	\	\	2.1														NIL	NIL	NIL	NIL	NIL	NIL	NIL	2	1		N/A	\	\	\	\	\	\				
1C	1	C	28/10/2021	AB	N/A	N/A	0.4	0.7	N	Y	360	370	\	\	\	\	\	\	\	\	\	2.1				Crack	10	50	0	300						NIL	NIL	NIL	NIL	NIL	NIL	NIL	2	1		N/A	\	\	\	\	\	\				
2B	2	B	28/10/2021	AB	N/A	N/A	1.0	1.3	N	Y	370	380	\	\	\	\	\	\	340	340	0.0	1.9				Crack			0	3.1						NIL	NIL	NIL	L	\	\	NIL	4	3		N/A	\	\	\	\	\	\				
2C	2	C	28/10/2021	AB	N/A	N/A	1.0	1.3	N	Y	340	350	\	\	\	\	\	\	310	310	0.0	1.9				Vertical cavities	50				Split			0	1.2	NIL	NIL	NIL	L	\	\	NIL	4	3		N/A	\	\	\	\	\	\				
3B	3	B	28/10/2021	AB	N/A	N/A	1.3	1.6	N	Y	420	420	\	\	\	\	\	\	380	380	0.0	1.7														NIL	NIL	NIL	L	\	\	NIL	3	2		N/A	\	\	\	\	\	\				
3C	3	C	28/10/2021	AB	N/A	N/A	1.3	1.6	N	Y	360	360	\	\	\	\	\	\	310	320	0.0	1.7														NIL	NIL	NIL	L	\	\	NIL	3	2		N/A	\	\	\	\	\	\				
4B	4	B	28/10/2021	AB	N/A	N/A	1.6	1.9	N	Y	330	320	\	\	\	\	\	\	310	300	0.0	1.5				Vertical cavities		20								NIL	NIL	NIL	L	\	\	NIL	4	3		N/A	\	\	\	\	\	\				
4C	4	C	28/10/2021	AB	N/A	N/A	1.6	1.9	N	Y	400	390	\	\	\	\	\	\	350	360	0.0	1.5				Termites & light borer					Vertical cavities	60				L	\	\	M	L	L	NIL	4	3		N/A	\	\	\	\	\	\				
5B	5	B	28/10/2021	AB	N/A	N/A	2.0	2.3	N	Y	430	430	\	\	\	\	\	\	380	400	0.0	1.4				Vertical cavities		30								NIL	NIL	NIL	L	\	\	NIL	3	2		N/A	\	\	\	\	\	\				
5C	5	C	28/10/2021	AB	N/A	N/A	2.0	2.3	N	Y	400	370	\	\	\	\	\	\	370	370	0.0	1.4				Vertical cavities		110								NIL	NIL	NIL	M	\	\	NIL	4	3		N/A	\	\	\	\	\	\				
6B	6	B	28/10/2021	AB	N/A	N/A	2.4	2.7	N	Y	390	410	\	\	\	\	\	\	380	380	0.0	1.3				Vertical cavities		30								NIL	NIL	NIL	L	\	\	NIL	4	3		N/A	\	\	\	\	\	\				
6C	6	C	28/10/2021	AB	N/A	N/A	2.4	2.7	N	Y	340	360	\	\	\	\	\	\	330	310	0.0	1.3														NIL	L	L	L	\	\	NIL	4	3		N/A	\	\	\	\	\	\				
7B	7	B	28/10/2021	AB	N/A	N/A	2.9	3.2	N	Y	380	380	\	\	\	\	\	\	340	370	0.0	1.2				Vertical cavities		60								NIL	NIL	NIL	M	\	\	NIL	4	3		N/A	\	\	\	\	\	\				
7C	7	C	28/10/2021	AB	N/A	N/A	2.9	3.2	N	Y	390	360	\	\	\	\	\	\	350	340	0.0	1.2														NIL	NIL	NIL	L	\	\	NIL	3	2		N/A	\	\	\	\	\	\				
8B	8	B	28/10/2021	AB	N/A	N/A	3.4	3.7	N	Y	380	380	\	\	\	\	\	\	330	330	0.0	1.1														NIL	NIL	NIL	L	\	\	NIL	2	1		N/A	\	\	\	\	\	\				
8C	8	C	28/10/2021	AB	N/A	N/A	3.4	3.7	N	Y	340	340	\	\	\	\	\	\	360	300	0.0	1.1														NIL	NIL	NIL	L	\	\	NIL	2	1		N/A	\	\	\	\	\	\				
9B	9	B	28/10/2021	AB	1.0	3.5	3.5	3.8	N	Y	360	360	\	\	\	\	\	\	320	320	0.0	1.0				Vertical cavities from depletion		30								NIL	NIL	NIL	M	\	\	10	4	3		N/A	\	\	\	\	\	\				
9C	9	C	28/10/2021	AB	1.0	3.5	3.5	3.8	N	Y	430	390	\	\	\	\	\	\	380	360	0.0	1.0				Vertical cavities		30								NIL	NIL	NIL	L	\	\	10	3	2		N/A	\	\	\	\	\	\				
10B	10	B	28/10/2021	AB	1.0	3.5	3.7	4.0	N	Y	430	400	\	\	\	\	\	\	340	370	0.2	0.8														L	\	\	L	\	\	10	4	3		N/A	\	\	\	\	\	\				
10C	10	C	28/10/2021	AB	1.0	3.5	3.7	4.0	N	Y	400	390	\	\	\	\	\	\	320	330	0.2	0.8														L	\	\	L	\	\	10	3	2		N/A	\	\	\	\	\	\				
11B	11	B	28/10/2021	AB	1.0	3.5	3.9	4.2	N	Y	360	350	\	\	\	\	\	\	310	320	0.4	0.6														H	\	\	L	\	\	10	5	4		N/A	\	\	\	\	\	\	DSC04383	DSC04384	DSC04385	DSC04387
11C	11	C	28/10/2021	AB	1.0	3.5	3.9	4.2	N	Y	400	380	\	\	\	\	\	\	320	320	0.4	0.6														L	\	\	L	\	\	10	4	3		N/A	\	\	\	\	\	\				
12B	12	B	28/10/2021	AB	1.0	3.5	3.9	4.2	N	Y	390	400	\	\	\	\	\	\	350	360	0.4	0.6														L	\	\	M	\	\	10	4	3		N/A	\	\	\	\	\	\				
12C	12	C	28/10/2021	AB	1.0	3.5	3.9	4.2	N	Y	380	370	\	\	\	\	\	\	290	290	0.4	0.6														M	\	\	M	\	\	10	4	3		N/A	\	\	\	\	\	\				
13B	13	B	28/10/2021	AB	1.0	3.5	4.0	4.3	N	Y	360	350	\	\	\	\	\	\	200	290	0.5	0.5														M	\	\	H	\	\	10	5	4		N/A	\	\	\	\	\	\	DSC04379	DSC04380	DSC04381	
13C	13	C	28/10/2021	AB	1.0	3.5	3.9	4.2	N	Y	330	340	\	\	\	\	\	\	270	270	0.4	0.6														L	\	\	L	\	\	10	4	3		N/A	\	\	\	\	\	\				
14B	14	B	28/10/2021	AB	1.0	3.5	4.0	4.3	N	Y	420	420	\	\	\	\	\	\	320	350	0.5	0.5														H	\	\	M	\	\	10	5	4		N/A	\	\	\	\	\	\	DSC04377	DSC04376	DSC04375	

Pile ID: Pile ID	Pile ID: Bent (number)	Pile ID: Row (letter)	Pile ID: Survey Date	Pile ID: Supervisor	Measurements: Tide RL (m CD)	Measurements: Crosshead Soffit to Waterline (mm)	Measurements: Crosshead soffit to Seabed	Measurements: Longitudinal beam soffit to Seabed = total exposed length of pile	Measurements: Movement of pile at seabed	Measurements: Pile tags present	Diameters: High Water (RL+-.--m) Dia	Diameters: High Water (RL+-.--m) Dia	Diameters: Low Water (RL+-.--m) Dia	Diameters: Low Water (RL+-.--m) Dia	Diameters: Mid Water (RL+-.--m) Dia	Diameters: Mid Water (RL+-.--m) Dia	Diameters: Above Repair If any Dia	Diameters: Below Repair If any Dia	Diameters: Seabed (measure Dia. at lowest seabed level) Dia	Diameters: Seabed Dia	Diameters: Seabed Depth	RL at Seabed	Min. Dia. Dia	Min. Dia. Dia	Min. Dia. RL	Recorded Defect 1 (if any): Type	Recorded Defect 1: Max width (mm)	Recorded Defect 1: Max Depth (mm)	Recorded Defect 1: Top Distance (m) to crosshead soffit	Recorded Defect 1: Bottom Distance (m) to crosshead soffit	Recorded Defect 2 (if any): Type	Recorded Defect 2: Max width (mm)	Recorded Defect 2: Max Depth (mm)	Recorded Defect 2: Top Distance (m) to crosshead soffit	Recorded Defect 2: Bottom Distance (m) to crosshead soffit	Marine Borers Nil / L / M / H / Severe: HW to MW	Marine Borers: MW to LW	Marine Borers: LW to Seabed	Depletion Nil / L / M / H: HW to MW	Depletion: MW to LW	Depletion: LW to Seabed	Overall Condition: Thickness of Marine Growth (mm)	Overall Condition: Condition based on WSCAM (if applicable) (Condition 1 - 7)	Overall Condition: PV Rating	Overall Condition: Comments	Repair: Description of existing repair	Repair: RL at top of repair	Repair: RL at bottom of repair	Repair: Repair extends into Seabed? (Y/N)	Repair: Length of exposed timber below repair	Defects recorded on existing repair: Description	Defects recorded on existing repair: Comments	Image	Image	Image	Image
14C	14	C	28/10/2021	AB	1.0	3.5	4.0	4.3	N	Y	360	360	\	\	\	\	\	\	280	280	0.5	0.5														M	\	\	M	\	\	10	4	3		N/A	\	\	\	\	\	\				
15B	15	B	28/10/2021	AB	1.1	3.4	4.1	4.4	N	Y	420	370	\	\	\	\	\	\	280	280	0.7	0.4														M	\	\	M	\	\	10	4	3		N/A	\	\	\	\	\	\				
15C	15	C	28/10/2021	AB	1.1	3.4	4.1	4.4	N	Y	400	400	\	\	\	\	\	\	300	280	0.7	0.4														M	\	\	M	\	\	10	4	3		N/A	\	\	\	\	\	\				
16B	16	B	28/10/2021	AB	1.1	3.4	4.2	4.5	N	Y	420	460	\	\	\	\	\	\	200	290	0.8	0.3	190		0.1	Necking 50% at 0.3										H	\	\	H	\	\	10	6	5	Excavated to check timber	N/A	\	\	\	\	\	\	DSC04366	DSC04367	DSC04368	
16C	16	C	28/10/2021	AB	1.1	3.4	4.1	4.4	N	Y	410	450	\	\	\	\	\	\	260	310	0.7	0.4														H	\	\	H	\	\	10	5	4		N/A	\	\	\	\	\	\	DSC04370	DSC04371	DSC04372	DSC04373
17B	17	B	28/10/2021	AB	1.1	3.4	4.2	4.5	N	Y	420	400	\	\	\	\	\	\	310	300	0.8	0.3														H	\	\	M	\	\	10	5	4		N/A	\	\	\	\	\	\	DSC04364	DSC04361	DSC04360	DSC04359
17C	17	C	28/10/2021	AB	1.1	3.4	4.2	4.5	N	Y	420	400	\	\	\	\	\	\	310	310	0.8	0.3				Borer holes sparse	10				Cavity	100 x 100	50	0.2		M	\	\	M	\	\		4	3		N/A	\	\	\	\	\	\				
18B	18	B	28/10/2021	AB	1.1	3.4	4.3	4.6	N	Y	370	420	\	\	\	\	\	\	330	330	0.9	0.2				Cavity	200 x 150	80	0	0.2						H	\	\	H	\	\	10	5	4		N/A	\	\	\	\	\	\	DSC04346	DSC04348	DSC04349	DSC04350
18C	18	C	28/10/2021	AB	1.1	3.4	4.3	4.6	N	Y	450	430	\	\	\	\	\	\	330	290	0.9	0.2														H	\	\	H	\	\	10	5	4		N/A	\	\	\	\	\	\	DSC04352	DSC04353	DSC04355	DSC04356
19B	19	B	28/10/2021	AB	1.1	3.4	4.5	4.8	N	Y	430	460	\	\	\	\	\	\	340	380	1.1	0.0				Crack	30	50		1.2						H	\	\	M	\	\	10	5	4		N/A	\	\	\	\	\	\	DSC04334	DSC04337	DSC04338	DSC04335
19C	19	C	28/10/2021	AB	1.1	3.4	4.4	4.7	N	Y	390	410	\	\	\	\	\	\	300	290	1.0	0.1														H	\	\	H	\	\	10	6	5		N/A	\	\	\	\	\	\	DSC04340	DSC04342	DSC04344	DSC04343
20B	20	B	28/10/2021	AB	1.1	3.4	4.4	4.7	N	Y	380	380	\	\	\	\	\	\	280	270	\	0.1	200		0.9	Depletion & cavities 60mm										H	\	\	H	\	\	10	6	5		N/A	\	\	\	\	\	\	DSC04321	DSC04322	DSC04324	DSC04323
20C	20	C	28/10/2021	AB	1.1	3.4	4.5	4.8	Y	Y	460	430	\	\	\	\	\	\	200	140	1.1	0.0				Broken			-0.2							H	\	\	H	\	\	10	7	5	Timber is broken below seabed	N/A	\	\	\	\	\	\	DSC04332	DSC04329	DSC04330	DSC04331
21B	21	B	28/10/2021	AB	1.2	3.3	4.5	4.8	N	Y	490	480	420	420	\	\	\	\	290	380	1.2	0.0				Pile away from seabed at seabed					Borer holes	15	50			H	\	H	H	\	H	10	6	5	Very heavy borer at seabed. Depletion contiunes under the seabed	N/A	\	\	\	\	\	\	DSC04311	DSC04309	DSC04313	DSC04308
21C	21	C	28/10/2021	AB	1.2	3.3	4.5	4.8	N	Y	500	480	390	390	\	\	\	\	360	340	1.2	0.0				Borer holes	15	50								H	\	H	M	\	M	10	5	4		N/A	\	\	\	\	\	\	DSC04315	DSC04316	DSC04319	DSC04318
22B	22	B	28/10/2021	AB	1.3	3.2	4.4	4.7	N	Y	420	410	330	320	\	\	\	\	310	310	1.4	0.1														H	\	M	H	\	M	10	6	5	Large cavities	N/A	\	\	\	\	\	\	DSC04299	DSC04296	DSC04297	DSC04298
22C	22	C	28/10/2021	AB	1.3	3.2	4.5	4.8	N	Y	470	450	340	340	\	\	\	\	300	340	1.3	0.0				Borer holes	15	50								H	\	H	H	\	M	10	5	4		N/A	\	\	\	\	\	\	DSC04306	DSC04302	DSC04303	DSC04305
23B	23	B	28/10/2021	AB	1.4	3.1	4.7	5.0	N	Y	470	470	340	300	\	\	\	\	320	300	1.6	-0.2				Borer holes sparse	10									H	\	M	M	\	M	10	4	3		N/A	\	\	\	\	\	\				
23C	23	C	28/10/2021	AB	1.4	3.1	4.6	4.9	N	Y	380	380	320	330	\	\	\	\	290	270	1.5	-0.1				Borer holes sparse	12									H	\	L	M	\	L	10	4	3		N/A	\	\	\	\	\	\				
24B	24	B	28/10/2021	AB	1.4	3.1	4.9	5.2	N	Y	420	410	350	340	\	\	\	\	290	210	1.8	-0.4														H	\	M	H	\	M	10	5	4		N/A	\	\	\	\	\	\	DSC04290	DSC04294	DSC04293	DSC04292
24C	24	C	28/10/2021	AB	1.4	3.1	4.7	5.0	N	Y	460	430	380	400	\	\	\	\	350	340	1.6	-0.2														M	\	L	L	\	L	10	4	3		N/A	\	\	\	\	\	\				
25B	25	B	28/10/2021	AB	1.5	3.0	4.9	5.2	N	Y	400	400	340	340	\	\	\	\	300	310	1.9	-0.4				Cavities	250 x 50	50	0.5		Cavity	150 x 100	50	0.5		H	\	H	H	\	H	200	5	4	Depletion & cavities	N/A	\	\	\	\	\	\	DSC04276	DSC04278	DSC04279	DSC04280

Pile ID	Bent (number)	Row (letter)	Survey Date	Supervisor	Tide RL (m CD)	Crosshead Soffit to Waterline (mm)	Crosshead soffit to Seabed	Longitudinal beam soffit to Seabed = total exposed length of pile	Movement of pile at seabed	Pile tags present	Diameters: High Water (RL+-.--m) Dia	High Water Dia	Low Water (RL+-.--m) Dia	Low Water Dia	Mid Water (RL+-.--m) Dia	Mid Water Dia	Above Repair If any Dia	Below Repair If any Dia	Seabed (measure Dia. at lowest seabed level) Dia	Seabed Dia	Seabed Depth	RL at Seabed	Min. Dia. Dia	Min. Dia. Dia	Min. Dia. RL
25C	25	C	28/10/2021	AB	1.5	3.0	4.8	5.1	N	Y	450	420	320	330	\	\	\	\	320	340	1.8	-0.3			
26B	26	B	28/10/2021	AB	1.5	3.0	4.9	5.2	N	Y	420	420	340	350	\	\	\	\	270	300	1.9	-0.4			
26C	26	C	28/10/2021	AB	1.5	3.0	5.0	5.3	N	Y	470	480	380	370	\	\	\	\	340	330	2	-0.5			
27B	27	B	28/10/2021	AB	1.5	3.0	5.1	5.4	N	Y	390	370	380	380	380	380	\	\	390	380	2.1	-0.6			
27C	27	C	28/10/2021	AB	1.5	3.0	5.1	5.4	N	Y	440	440	320	310	270	270	\	\	260	270	2.1	-0.6			
28B	28	B	27/10/2021	AB	1.5	3.0	5.5	5.8	N	Y	430	490	390	360	360	340	\	\	330	35	2.5	-1.0			
28C	28	C	27/10/2021	AB	1.5	3.0	5.3	5.6	N	Y	390	400	310	320	300	320	\	\	290	310	2.3	-0.8			
29B	29	B	27/10/2021	AB	1.5	3.0	5.4	5.7	N	Y	420	420	360	340	350	320	\	\	300	320	2.4	-0.9			
29C	29	C	27/10/2021	AB	1.5	3.0	5.5	5.8	N	Y	420	430	370	380	340	360	\	\	340	320	2.5	-1.0			
30B	30	B	27/10/2021	AB	1.8	2.7	5.5	5.8	N	Y	370	370	360	340	310	300	\	\	270	280	2.8	-1.0			
30C	30	C	27/10/2021	AB	1.8	2.7	5.5	5.8	N	Y	460	450	360	70	330	330	\	\	320	320	2.8	-1.0			
31B	31	B	27/10/2021	AB	1.8	2.7	5.7	6.0	N	Y	390	430	370	360	330	330	\	\	300	310	3	-1.2			
31C	31	C	27/10/2021	AB	1.8	2.7	5.6	5.9	N	Y	440	430	320	330	320	330	\	\	280	320	2.9	-1.1			
32B	32	B	27/10/2021	AB	1.8	2.7	5.8	6.1	N	Y	410	410	320	330	340	330	\	\	310	310	3.1	-1.3			
32C	32	C	27/10/2021	AB	1.8	2.7	5.8	6.1	N	Y	480	440	320	300	370	330	\	\	310	270	3.1	-1.3			
33B	33	B	27/10/2021	AB	1.7	2.8	6.0	6.3	N	Y	450	440	350	300	340	330	\	\	330	310	3.2	-1.5			
33C	33	C	27/10/2021	AB	1.7	2.8	6.1	6.4	N	Y	470	490	330	320	330	320	\	\	300	260	3.3	-1.6	260		
34B	34	B	27/10/2021	AB	1.7	2.8	6.0	6.3	N	Y	430	440	350	380	330	340	\	\	380	330	3.2	-1.5			
34C	34	C	27/10/2021	AB	1.7	2.8	6.0	6.3	N	Y	430	450	370	370	360	300	\	\	330	320	3.2	-1.5			
35B	35	B	27/10/2021	AB	1.7	2.8	6.1	6.4	N	Y	420	420	330	350	330	360	\	\	300	300	3.3	-1.6			
35C	35	C	27/10/2021	AB	1.7	2.8	6.0	6.3	N	Y	410	410	330	300	340	320	\	\	300	310	3.2	-1.5	280	0.4	
36B	36	B	27/10/2021	AB	1.6	2.9	6.1	6.4	N	Y	430	410	340	350	340	340	\	\	340	330	3.2	-1.6			

Pile ID	Recorded Defect 1 (if any) Type	Max width (mm)	Max Depth (mm)	Top: Distance (m) to crosshead soffit	Bottom: Distance (m) to crosshead soffit	Recorded Defect 2 (if any) Type	Max width (mm)	Max Depth (mm)	Top: Distance (m) to crosshead soffit	Bottom: Distance (m) to crosshead soffit	Marine Borers Nil / L / M / H / Severe: HW to MW	MW to LW	LW to Seabed	Depletion Nil / L / M / H: HW to MW	MW to LW	LW to Seabed	Overall Condition: Thickness of Marine Growth (mm)	Condition based on WSCAM (if applicable) (Condition 1 - 7)	PV Rating	Comments
25C	Cavity	400 x 150	80	0.5	0.9						H	\	M	H	\	M	200	5	4	
26B											H	\	M	M	\	H	200	5	4	Errosion
26C	Cavity	100 X 200	30	0.5							H	\	L	M	\	M	200	5	4	
27B	Borer holes	10									M	M	M	L	L	L	300	4	3	
27C	Cavity	300 x 100	30	0.4							H	M	L	M	M	M	300	4	3	
28B	Split	30	150	0	1.4						L	L	L	L	L	M	300	4	3	Errosion
28C											M	L	L	M	NIL	L	300	4	3	
29B											M	L	L	M	L	M	300	4	3	Errosion, cavities at seabed
29C	Borer holes	8				Split	20	100	0	1.5	M	L	L	L	L	L	300	4	3	Errosion & depletion
30B											L	L	L	L	L	L	500	3	2	Errosion
30C											M	M	L	M	M	L	500	4	3	Errosion
31B	Cavity x2	100	50	-0.2	-0.3						M	M	M	M	M	L	500	4	3	
31C											L	L	L	L	L	L	500	3	2	Errosion, ladder bracket
32B											M	L	L	M	M	L	500	4	3	
32C											M	L	L	H	M	M	500	4	3	Errosion, ladder bracket
33B											H	L	L	M	L	L	500	4	3	Errosion
33C	Split in timber from 0.0 to -1.6										M	H	H	H	H	H	500	5	4	Errosion, holes creating neck 30mm
34B											M	L	L	M	L	L	500	4	3	Errosion
34C											M	L	L	M	L	L	500	4	3	Errosion
35B											H	M	M	H	M	L	500	4	3	Errosion
35C											H	NIL	NIL	H	L	L	500	4	3	Errosion
36B											L	L	L	L	L	L	500	3	2	Errosion

Pile ID	Existing Repairs – Repair: Description of existing repair	RL at top of repair	RL at bottom of repair	Repair extends into Seabed? (Y/N)	Length of exposed timber below repair	Defects recorded on existing repair: Description	Comments	Image	Image	Image	Image
25C	N/A	\	\	\	\	\	\	DSC04288	DSC04284	DSC04282	DSC04287
26B	N/A	\	\	\	\	\	\	DSC04263	DSC04264	DSC04267	DSC04268
26C	N/A	\	\	\	\	\	\	DSC04274	DSC04273	DSC04272	DSC04271
27B	N/A	\	\	\	\	\	\				
27C	N/A	\	\	\	\	\	\				
28B	N/A	\	\	\	\	\	\				
28C	N/A	\	\	\	\	\	\				
29B	N/A	\	\	\	\	\	\				
29C	N/A	\	\	\	\	\	\				
30B	N/A	\	\	\	\	\	\				
30C	N/A	\	\	\	\	\	\				
31B	N/A	\	\	\	\	\	\				
31C	N/A	\	\	\	\	\	\				
32B	N/A	\	\	\	\	\	\				
32C	N/A	\	\	\	\	\	\				
33B	N/A	\	\	\	\	\	\				
33C	N/A	\	\	\	\	\	\	DSC04253	DSC04251	DSC04255	DSC04256
34B	N/A	\	\	\	\	\	\				
34C	N/A	\	\	\	\	\	\				
35B	N/A	\	\	\	\	\	\				
35C	N/A	\	\	\	\	\	\				
36B	N/A	\	\	\	\	\	\				

Pile ID	Bent (number)	Row (letter)	Survey Date	Supervisor	Tide RL (m CD)	Crosshead Soffit to Waterline (mm)	Crosshead soffit to Seabed	Longitudinal beam soffit to Seabed = total exposed length of pile	Movement of pile at seabed	Pile tags present	High Water (RL+-.-m) Dia	High Water (RL+-.-m) Dia	Low Water (RL+-.-m) Dia	Low Water (RL+-.-m) Dia	Mid Water (RL+-.-m) Dia	Mid Water (RL+-.-m) Dia	Above Repair If any Dia	Below Repair If any Dia	Seabed (measure Dia. at lowest seabed level) Dia	Seabed Dia	Seabed Depth	RL at Seabed	Min. Dia. Dia	Min. Dia. Dia	Min. Dia. RL	Recorded Defect 1 (if any) Type	Max width (mm)	Max Depth (mm)	Top Distance (m) to crosshead soffit	Bottom Distance (m) to crosshead soffit	Recorded Defect 2 (if any) Type	Max width (mm)	Max Depth (mm)	Top Distance (m) to crosshead soffit	Bottom Distance (m) to crosshead soffit	Marine Borers Nil / L / M / H / Severe HW to MW	MW to LW	LW to Seabed	Depletion Nil / L / M / H HW to MW	MW to LW	LW to Seabed	Overall Condition Thickness of Marine Growth (mm)	Condition based on WSCAM (if applicable) (Condition 1 - 7)	PV Rating	Comments	Repair Description of existing repair	RL at top of repair	RL at bottom of repair	Repair extends into Seabed? (Y/N)	Length of exposed timber below repair	Defects recorded on existing repair Description	Comments	Image	Image	Image	Image
36C	36	C	27/10/2021	AB	1.6	2.9	6.0	6.3	N	Y	410	420	350	370	360	360	\	\	320	310	3.1	-1.5														M	M	M	L	L	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
37B	37	B	27/10/2021	AB	1.6	2.9	6.3	6.6	N	Y	470	430	340	340	370	360	\	\	320	320	3.4	-1.8														L	L	M	L	L	L	500	3	2	Errosion	N/A	\	\	\	\	\	\				
37C	37	C	27/10/2021	AB	1.6	2.9	6.0	6.3	N	Y	430	450	300	310	320	340	\	\	310	310	3.1	-1.5														L	L	L	H	L	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
38B	38	B	27/10/2021	AB	1.5	3.0	6.4	6.7	N	Y	400	470	330	320	350	330	\	\	320	300	3.4	-1.9														L	M	M	M	L	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
38C	38	C	27/10/2021	AB	1.5	3.0	6.2	6.5	N	Y	490	480	400	390	390	390	\	\	350	380	3.2	-1.7														L	L	L	M	L	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
39B	39	B	27/10/2021	AB	1.5	3.0	6.3	6.6	N	Y	480	510	420	400	410	420	\	\	370	340	3.3	-1.8	300		1											L	L	L	L	L	L	500	3	2	Errosion	N/A	\	\	\	\	\	\				
39C	39	C	27/10/2021	AB	1.5	3.0	6.4	6.7	N	Y	440	440	300	310	360	360	\	\	350	340	3.4	-1.9														L	L	L	H	M	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
40B	40	B	27/10/2021	AB	1.5	3.0	6.2	6.5	N	Y	490	510	410	430	3390	320	\	\	380	360	3.2	-1.7														L	L	L	M	L	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
40C	40	C	27/10/2021	AB	1.5	3.0	6.1	6.4	N	Y	500	490	400	400	400	390	\	\	370	370	3.1	-1.6														M	L	L	L	L	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
40D	40	D	27/10/2021	AB	1.5	3.0	6.3	6.6	N	Y	390	470	320	330	320	340	\	\	310	370	3.3	-1.8				Cavity	50	30	-1.5	-1.8	Holes x2	50	150	0.3	0.15	L	L	L	M	M	M	500	4	3	Errosion	N/A	\	\	\	\	\	\				
41B	41	B	27/10/2021	AB	1.4	3.1	6.3	6.6	N	Y	460	470	380	370	380	370	\	\	340	380	3.2	-1.8														L	L	L	M	L	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
41C	41	C	27/10/2021	AB	1.4	3.1	6.2	6.5	N	Y	430	430	340	330	320	330	\	\	320	310	3.1	-1.7														H	M	M	M	M	M	500	4	3	Errosion	N/A	\	\	\	\	\	\				
41D	41	D	27/10/2021	AB	1.4	1.2	4.3	4.6	N	Y	360	350	280	290	290	300	\	\	270	270	3.1	-1.7														M	M	M	M	M	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
42A	42	A	27/10/2021	AB	1.3	1.3	4.6	4.9	N	Y	430	430	340	330	370	330	\	\	350	380	3.3	-2.0	260	270	0.5	Hollowing 50% loss										H	M	L	H	M	L	500	6	5	Errosion	N/A	\	\	\	\	\	\	DSC04248	DSC04249	DSC04245	DSC04243
42B	42	B	27/10/2021	AB	1.3	3.2	6.2	6.5	N	Y	490	430	420	400	410	400	\	\	420	380	3.0	-1.7														L	L	L	L	L	L	500	3	2	Errosion	N/A	\	\	\	\	\	\				
42C	42	C	27/10/2021	AB	1.3	3.2	6.3	6.6	N	Y	430	460	340	360	350	360	\	\	320	340	3.1	-1.8														L	L	L	M	L	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
42D	42	D	27/10/2021	AB	1.3	1.3	4.3	4.6	N	Y	340	340	310	330	370	370	\	\	300	310	3.0	-1.7														L	L	L	L	L	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
43A	43	A	27/10/2021	AB	1.2	1.4	4.5	4.8	N	Y	420	430	330	340	330	340	\	\	330	320	3.1	-1.9														M	M	M	L	L	L		4	3	Errosion	N/A	\	\	\	\	\	\				
43B	43	B	27/10/2021	AB	1.2	3.3	6.4	6.7	N	Y	410	390	330	340	330	330	\	\	270	270	3.1	-1.9														L	L	L	L	L	M		4	3	Errosion	N/A	\	\	\	\	\	\				
43C	43	C	27/10/2021	AB	1.2	3.3	6.3	6.6	N	Y	440	480	380	390	380	380	\	\	330	350	3.0	-1.8	330			Cavity	200 x 150	80	1.1	1.8						L	L	L	L	L	L		4	3	Errosion	N/A	\	\	\	\	\	\				
43D	43	D	27/10/2021	AB	1.2	1.4	4.4	4.7	N	Y	390	380	330	330	330	320	\	\	280	320	3.0	-1.8				80% hollow			1.2							M	M	M	H	H	H		6	5	Errosion	N/A	\	\	\	\	\	\	DSC04238	DSC04239	DSC04237	DSC04233
44A	44	A	27/10/2021	AB	1.0	1.6	4.5	4.8	N	Y	410	370	340	220	310	390	\	\	310	190	2.9	-1.9	190	-2		80% material loss with cavities & hollowing			0	-1.9						H	M	H	H	M	H		6	5	Errosion	N/A	\	\	\	\	\	\	DSC04212	DSC04210	DSC04209	DSC04205

Pile ID / Measurements

Pile ID	Bent (number)	Row (letter)	Survey Date	Supervisor	Tide RL (m CD)	Crosshead Soffit to Waterline (mm)	Crosshead soffit to Seabed	Longitudinal beam soffit to Seabed = total exposed length of pile	Movement of pile at seabed	Pile tags present	Diameters: High Water (RL+-.--m) Dia	High Water Dia	Low Water (RL+-.--m) Dia	Low Water Dia	Mid Water (RL+-.--m) Dia	Mid Water Dia	Above Repair If any Dia	Below Repair If any Dia	Seabed (measure Dia. at lowest seabed level) Dia	Seabed Dia	Seabed Depth	RL at Seabed	Min. Dia. Dia	Min. Dia. Dia	Min. Dia. RL
44B	44	B	27/10/2021	AB	1.0	3.5	6.5	6.8	N	Y	460	430	390	390	360	360	\	\	360	330	3.0	-2.0			
44C	44	C	27/10/2021	AB	1.0	3.5	6.4	6.7	N	Y	450	450	380	370	380	380	\	\	360	350	2.9	-1.9			
44D	44	D	27/10/2021	AB	1.0	1.6	4.6	4.9	N	Y	360	380	310	320	330	340	\	\	290	280	3.0	-2.0			
45A	45	A	27/10/2021	AB	1.0	1.6	4.5	4.8	N	Y	340	360	300	300	310	310	\	\	260	250	2.9	-1.9	260		
45B	45	B	27/10/2021	AB	1.0	3.5	6.4	6.7	N	Y	460	460	400	400	400	400	\	\	390	380	2.9	-1.9			
45C	45	C	27/10/2021	AB	1.0	3.5	6.5	6.8	N	Y	460	450	420	410	390	400	\	\	430	410	3.0	-2.0			
45D	45	D	27/10/2021	AB	1.0	1.6	4.5	4.8	N	Y	390	380	290	280	340	340	\	\	260	310	2.9	-1.9	260	-2	
46B	46	B	27/10/2021	AB	0.9	3.6	6.6	6.9	N	Y	480	490	420	410	400	420	\	\	360	360	3.0	-2.1			
46C	46	C	27/10/2021	AB	0.9	3.6	6.6	6.9	N	Y	460	460	370	390	410	390	\	\	380	370	3.0	-2.1			
47B	47	B	27/10/2021	AB	0.9	3.6	6.6	6.9	N	Y	470	480	400	420	380	380	\	\	340	360	3.0	-2.1			
47C	47	C	27/10/2021	AB	0.9	3.6	6.7	7.0	N	Y	520	530	420	410	420	410	\	\	370	360	3.1	-2.2			
48B	48	B	27/10/2021	AB	0.9	3.6	6.5	6.8	N	Y	520	500	370	380	360	380	\	\	340	320	2.9	-2.0			
48C	48	C	27/10/2021	AB	0.9	3.6	6.7	7.0	N	Y	490	500	390	390	400	400	\	\	370	360	3.1	-2.2			
49B	49	B	27/10/2021	AB	0.9	3.6	6.5	6.8	N	Y	490	500	410	400	410	390	\	\	360	380	2.9	-2.0			
49C	49	C	27/10/2021	AB	0.9	3.6	6.7	7.0	N	Y	480	480	430	420	390	380	\	\	380	390	3.1	-2.2			
50B	50	B	27/10/2021	AB	0.9	3.6	6.5	6.8	N	Y	520	480	400	400	380	400	\	\	360	370	2.9	-2.0			
50C	50	C	27/10/2021	AB	0.9	3.6	6.5	6.8	N	Y	490	480	400	410	340	360	\	\	340	320	2.9	-2.0			
51B	51	B	27/10/2021	AB	0.9	3.6	6.5	6.8	N	Y	480	500	420	440	420	480	\	\	370	390	2.9	-2.0			
51C	51	C	27/10/2021	AB	0.9	3.6	6.6	6.9	N	Y	470	520	390	410	410	400	\	\	390	360	3	-2.1			
52B	52	B	27/10/2021	AB	1.0	3.5	6.4	6.7	N	Y	480	460	390	390	390	400	\	\	360	380	2.9	-1.9			
52C	52	C	27/10/2021	AB	1.0	3.5	6.6	6.9	N	Y	450	450	330	340	340	360	\	\	300	260	3.1	-2.1	260		SB
53B	53	B	27/10/2021	AB	1.0	3.5	6.6	6.9	N	Y	420	430	380	360	340	340	\	\	330	320	3.1	-2.1			

Defects and Comments

Pile ID	Recorded Defect 1 (if any) Type	Max width (mm)	Max Depth (mm)	Top: Distance (m) to crosshead soffit	Bottom: Distance (m) to crosshead soffit	Recorded Defect 2 (if any) Type	Max width (mm)	Max Depth (mm)	Top: Distance (m) to crosshead soffit	Bottom: Distance (m) to crosshead soffit	Marine Borers Nil / L / M / H / Severe: HW to MW	MW to LW	LW to Seabed	Depletion Nil / L / M / H: HW to MW	MW to LW	LW to Seabed	Overall Condition: Thickness of Marine Growth (mm)	Condition based on WSCAM (if applicable) (Condition 1 - 7)	PV Rating	Comments
44B	Cavity	150 x 400	20	-0.7	-1.1						M	M	M	H	L	M		5	4	Errosion
44C											M	L	L	M	L	L		4	3	Errosion
44D	Bolt holes. Hollowing 30% loss	1									M	L	L	M	L	L		5	4	
45A	Old bolt holes	30				Holes through to piles	100		1	1.1	H	M	H	H	M	H		6	5	Rotting behind where whaler was located
45B											L	L	M	L	L	L		4	3	Errosion
45C											H	NIL	NIL	H	L	L		5	4	Errosion
45D	Hollow			1.3	0.7						H	L	M	H	L	H		6	5	Errosion
46B	Cavity	100	80								M	M	M	L	L	L		4	3	
46C											M	L	L	L	L	M		4	3	Enlarged whaler beam holes
47B											M	L	M	L	L	M	500	4	3	
47C											M	L	M	L	L	L	500	4	3	Errosion
48B											M	L	M	M	L	M	500	5	4	
48C											H	L	L	M	L	L	500	5	4	
49B											M	M	M	M	M	M	500	5	4	Errosion
49C											M	L	L	H	L	M	500	5	4	
50B											M	L	L	M	L	L	500	4	3	Errosion
50C											M	NIL	L	M	L	L	500	4	3	Errosion
51B											M	L	L	M	M	L		4	3	Errosion
51C											M	L	NIL	M	L	NIL		4	3	Errosion
52B											M	L	NIL	L	L	L	500	3	2	
52C	Cavity										M	L	L	M	L	M	500	5	4	Errosion
53B											L	L	NIL	L	L	L	500	3	2	Errosion

Existing Repairs

Pile ID	Repair: Description of existing repair	RL at top of repair	RL at bottom of repair	Repair extends into Seabed? (Y/N)	Length of exposed timber below repair	Defects recorded on existing repair: Description	Comments	Image	Image	Image	Image
44B	N/A	\	\	\	\	\	\	DSC04223	DSC04221	DSC04219	DSC04215
44C	N/A	\	\	\	\	\	\				
44D	N/A	\	\	\	\	\	\	DSC04227	DSC04225	DSC04226	DSC04229
45A	N/A	\	\	\	\	\	\	DSC04181	DSC04179	DSC04183	DSC04184
45B	N/A	\	\	\	\	\	\				
45C	N/A	\	\	\	\	\	\	DSC04195	DSC04193	DSC04192	DSC04188
45D	N/A	\	\	\	\	\	\	DSC04197	DSC04199	DSC04200	DSC04203
46B	N/A	\	\	\	\	\	\				
46C	N/A	\	\	\	\	\	\				
47B	N/A	\	\	\	\	\	\				
47C	N/A	\	\	\	\	\	\				
48B	N/A	\	\	\	\	\	\	DSC04166	DSC04165	DSC04162	DSC04159
48C	N/A	\	\	\	\	\	\	DSC04170	DSC04169	DSC04171	DSC04173
49B	N/A	\	\	\	\	\	\	DSC04142	DSC04143	DSC04144	DSC04146
49C	N/A	\	\	\	\	\	\	DSC04157	DSC04156	DSC04154	DSC04150
50B	N/A	\	\	\	\	\	\				
50C	N/A	\	\	\	\	\	\				
51B	N/A	\	\	\	\	\	\				
51C	N/A	\	\	\	\	\	\				
52B	N/A	\	\	\	\	\	\	DSC00356	DSC00357	DSC00355	DSC00354
52C	N/A	\	\	\	\	\	\				
53B	N/A	\	\	\	\	\	\				

Pile ID					Measurements																					Defects and Comments																				Existing Repairs										
											Diameters															Recorded Defect 1 (if any)					Recorded Defect 2 (if any)					Marine Borers Nil / L / M / H / Severe			Depletion Nil / L / M / H			Overall Condition				Repair					Defects recorded on existing repair					
											High Water (RL+-.-m)		Low Water (RL+-.-m)		Mid Water (RL+-.-m)		Above Repair If any	Below Repair If any	Seabed (measure Dia. at lowest seabed level)			RL at Seabed	Min. Dia.						Top	Bottom				Top	Bottom																			
Pile ID	Bent (number)	Row (letter)	Survey Date	Supervisor	Tide RL (m CD)	Crosshead Soffit to Waterline (mm)	Crosshead soffit to Seabed	Longitudinal beam soffit to Seabed = total exposed length of pile	Movement of pile at seabed	Pile tags present	Dia	Dia	Dia	Dia	Dia	Dia	Dia	Dia	Dia	Dia	Seabed Depth		Dia	Dia	RL	Type	Max width (mm)	Max Depth (mm)	Distance (m) to crosshead soffit	Distance (m) to crosshead soffit	Type	Max width (mm)	Max Depth (mm)	Distance (m) to crosshead soffit	Distance (m) to crosshead soffit	HW to MW	MW to LW	LW to Seabed	HW to MW	MW to LW	LW to Seabed	Thickness of Marine Growth (mm)	Condition based on WSCAM (if applicable) (Condition 1 - 7)	PV Rating	Comments	Description of existing repair	RL at top of repair	RL at bottom of repair	Repair extends into Seabed? (Y/N)	Length of exposed timber below repair	Description	Comments	Image	Image	Image	Image
53C	53	C	27/10/2021	AB	1.0	3.5	6.7	7.0	N	Y	460	460	420	400	390	390	\	\	370	340	3.2	-2.2	330		SB											L	L	NIL	L	L	L	500	3	2	Errosion	N/A	\	\	\	\	\	\				
54B	54	B	27/10/2021	AB	1.1	3.4	6.5	6.8	N	Y	460	460	360	380	370	360	\	\	360	350	3.1	-2.0				Cavity	60 x 200	80	-0.2							M	L	NIL	L	L	L	520	3	2		N/A	\	\	\	\	\	\				
54C	54	C	27/10/2021	AB	1.1	3.4	6.6	6.9	N	Y	430	430	350	330	360	340	\	\	300	280	3.2	-2.1				Borer hole	8									H	L	L	M	L	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
55B	55	B	27/10/2021	AB	1.2	3.3	6.4	6.7	N	Y	420	440	340	360	340	350	\	\	300	310	3.1	-1.9														NIL	NIL	NIL	NIL	L	L	520	3	2	Errosion	N/A	\	\	\	\	\	\	DSC00351	DSC00352	DSC00349	DSC00345
55C	55	C	27/10/2021	AB	1.2	3.3	6.5	6.8	N	Y	500	480	380	380	350	380	\	\	340	310	3.2	-2.0														H	L	M	M	L	M	500	5	4	Errosion	N/A	\	\	\	\	\	\				
56B	56	B	27/10/2021	AB	1.2	3.3	6.5	6.8	N	Y	470	450	360	360	380	380	\	\	300	300	3.2	-2.0	280		SB	Borer holes	8									M	L	L	M	L	M	500	5	4	Errosion. Very rough	N/A	\	\	\	\	\	\				
56C	56	C	27/10/2021	AB	1.2	3.3	6.6	6.9	N	Y	510	530	420	410	400	400	\	\	350	360	3.3	-2.1				Borer holes	10									H	NIL	N	L	L	L	500	4	3	Sparse borer. Heavy errosion	N/A	\	\	\	\	\	\				
57B	57	B	27/10/2021	AB	1.3	3.2	6.5	6.8	N	Y	490	450	360	380	380	370	\	\	310	260	3.3	-2.0				Borer holes	6				Cavity	150	100	-2		L	NIL	L	L	L	M	500	5	4	Sparse borer	N/A	\	\	\	\	\	\				
57C	57	C	27/10/2021	AB	1.2	3.3	6.6	6.9	N	Y	520	480	430	440	410	410	\	\	350	380	3.3	-2.1				Holes	15	50								L	NIL	N	M	L	L	500	4	3	Holes are sparse. Low water errosion	N/A	\	\	\	\	\	\				
58B	58	B	26/10/2021	AB	2.3	2.2	6.7	7.0	N	Y	470	450	390	390	360	380	\	\	340	340	4.5	-2.2														L	L	L	\	M	L	500	3	2		N/A	\	\	\	\	\	\				
58C	58	C	26/10/2021	AB	2.3	2.2	6.7	7.0	N	Y	500	470	400	380	400	410	\	\	350	370	4.5	-2.2														L	L	L	L	L	L	500	3	2	Errosion	N/A	\	\	\	\	\	\				
59B	59	B	26/10/2021	AB	2.3	2.2	6.5	6.8	N	Y	420	420	320	320	320	350	\	\	220	230	4.3	-2.0														L	L	L	M	M	M	500	4	3	Errosion 300 to 220	N/A	\	\	\	\	\	\				
59C	59	C	26/10/2021	AB	2.3	2.2	6.6	6.9	N	Y	490	490	430	430	420	450	\	\	360	390	4.4	-2.1														L	L	M	M	L	L	500	3	2		N/A	\	\	\	\	\	\				
60B	60	B	26/10/2021	AB	2.3	2.2	6.6	6.9	N	Y	390	400	340	340	360	340	\	\	360	340	4.4	-2.1														L	L	M	M	M	M	520	4	3		N/A	\	\	\	\	\	\				
60C	60	C	26/10/2021	AB	2.3	2.2	6.6	6.9	N	Y	450	475	380	380	330	380	\	\	290	320	4.4	-2.1														L	L	L	M	M	L	500	4	3		N/A	\	\	\	\	\	\				
61A	61	A	26/10/2021	AB	2.3	2.2	6.7	7.0	N	Y	370	370	310	310	320	310	\	\	290	290	4.4	-2.2														L	M	M	M	M	L	500	4	3		N/A	\	\	\	\	\	\				
61B	61	B	26/10/2021	AB	2.3	2.2	6.6	6.9	N	Y	400	410	320	320	330	320	\	\	360	290	4.3	-2.1														L	M	L	M	M	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
61C	61	C	26/10/2021	AB	2.3	2.2	6.8	7.1	N	Y	470	470	390	430	370	370	\	\	360	370	4.5	-2.3														L	L	L	M	L	L	500	4	3	Odd shape pile	N/A	\	\	\	\	\	\				
62A	62	A	26/10/2021	AB	2.2	2.3	6.7	7.0	N	Y	370	380	300	300	320	330	\	\	250	280	4.4	-2.2														L	L	L	M	L	L	520	4	3	Errosion	N/A	\	\	\	\	\	\				
62B	62	B	26/10/2021	AB	2.2	2.3	6.8	7.1	N	Y	410	410	330	340	310	330	\	\	300	320	4.5	-2.3														L	L	M	M	M	M	520	4	3	Errosion	N/A	\	\	\	\	\	\				
62C	62	C	26/10/2021	AB	2.2	2.3	7.0	7.3	N	Y	500	450	400	410	430	390	\	\	370	370	4.7	-2.5														L	M	M	L	L	M	500	4	3		N/A	\	\	\	\	\	\				
63A	63	A	26/10/2021	AB	2.1	2.4	6.9	7.2	N	Y	410	400	250	280	280	280	\	\	300	280	4.5	-2.4				Cavity	200 x 80	100	6.1		Hollow 50%			3.4	4	M	M	M	H	M	M	500	6	5		N/A	\	\	\	\	\	\	DSC00307	DSC00308	DSC00305	DSC00300

Pile ID	Bent (number)	Row (letter)	Survey Date	Supervisor	Tide RL (m CD)	Crosshead Soffit to Waterline (mm)	Crosshead soffit to Seabed	Longitudinal beam soffit to Seabed = total exposed length of pile	Movement of pile at seabed	Pile tags present	Diameters: High Water (RL+-.--m) Dia	High Water Dia	Low Water (RL+-.--m) Dia	Low Water Dia	Mid Water (RL+-.--m) Dia	Mid Water Dia	Above Repair If any Dia	Below Repair If any Dia	Seabed (measure Dia. at lowest seabed level) Dia	Seabed Dia	Seabed Depth	RL at Seabed	Min. Dia. Dia	Min. Dia. Dia	Min. Dia. RL	Recorded Defect 1 (if any) Type	Max width (mm)	Max Depth (mm)	Top: Distance (m) to crosshead soffit	Bottom: Distance (m) to crosshead soffit	Recorded Defect 2 (if any) Type	Max width (mm)	Max Depth (mm)	Top: Distance (m) to crosshead soffit	Bottom: Distance (m) to crosshead soffit	Marine Borers Nil / L / M / H / Severe: HW to MW	MW to LW	LW to Seabed	Depletion Nil / L / M / H: HW to MW	MW to LW	LW to Seabed	Overall Condition: Thickness of Marine Growth (mm)	Condition based on WSCAM (if applicable) (Condition 1 - 7)	PV Rating	Comments	Existing Repairs: Repair: Description of existing repair	RL at top of repair	RL at bottom of repair	Repair extends into Seabed? (Y/N)	Length of exposed timber below repair	Defects recorded on existing repair: Description	Comments	Image	Image	Image	Image
63B	63	B	26/10/2021	AB	2.1	2.4	7.0	7.3	N	Y	470	500	350	350	370	380	\	\	340	360	4.6	-2.5				Cavities all around pile 20%			6.1	6.6						M	M	M	H	H	M	500	5	4	Errosion	N/A	\	\	\	\	\	\	DSC00315	DSC00314	DSC00312	DSC00310
63C	63	C	26/10/2021	AB	2.1	2.4	6.6	6.9	N	Y	410	430	330	340	330	360	\	\	290	300	4.2	-2.1														M	M	M	M	M	M	500	4	3		N/A	\	\	\	\	\	\	DSC00323	DSC00322	DSC00324	DSC00319
64A	64	A	26/10/2021	AB	2.0	2.5	6.9	7.2	N	Y	400	380	320	290	320	290	\	\	290	280	4.5	-2.4														M	M	M	M	L	L	500	4	3		N/A	\	\	\	\	\	\				
64B	64	B	26/10/2021	AB	2.0	2.5	6.9	7.2	N	Y	500	480	420	420	440	420	\	\	400	390	4.5	-2.4				Cavity	100 x 80	100	6							L	L	L	M	L	L	500	3	2		N/A	\	\	\	\	\	\				
64C	64	C	26/10/2021	AB	2.1	2.4	7.1	7.4	N	Y	410	460	370	370	410	400	\	\	320	340	4.7	-2.6														M	M	M	M	L	L	500	4	3		N/A	\	\	\	\	\	\				
65A	65	A	26/10/2021	AB	2.0	0.6	4.9	5.2	N	Y	380	380	320	320	310	310	\	\	280	80	4.3	-2.3				Borer holes	8									M	M	M	L	L	L	520	4	3		N/A	\	\	\	\	\	\				
65B	65	B	26/10/2021	AB	2.0	2.5	7.1	7.4	N	Y	\	\	430	440	420	410	\	\	380	370	4.6	-2.6														M	L	L	L	L	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
65C	65	C	26/10/2021	AB	2.0	2.5	7.2	7.5	N	Y	470	480	390	410	400	410	\	\	380	370	4.7	-2.7														L	L	L	L	L	L	500	3	2		N/A	\	\	\	\	\	\	DSC00297	DSC00296	DSC00298	DSC00295
65D	65	D	26/10/2021	AB	2.0	0.6	5.3	5.6	N	Y	360	350	310	310	320	320	\	\	290	280	4.8	-2.7														L	L	L	M	L	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
66A	66	A	26/10/2021	AB	2.0	0.6	5.1	5.4	N	Y	360	360	325	330	320	340	\	\	310	320	4.5	-2.5														L	L	L	L	L	L	500	4	3		N/A	\	\	\	\	\	\				
66B	66	B	26/10/2021	AB	2.0	2.5	7.0	7.3	N	Y	440	440	360	370	380	410	\	\	310	320	4.5	-2.5				Hole	50	100	4500							L	L	L	L	L	L	500	4	3	Errosion	N/A	\	\	\	\	\	\				
66C	66	C	26/10/2021	AB	2.0	2.5	7.0	7.3	N	Y	430	450	380	370	380	370	\	\	340	340	4.5	-2.5														L	L	L	L	L	L	500	3	2	Errosion	N/A	\	\	\	\	\	\	DSC00292	DSC00291	DSC00289	DSC00290
66D	66	D	26/10/2021	AB	2.0	0.6	5.2	5.5	N	Y	350	390	310	320	300	290	\	\	280	270	4.6	-2.6														L	L	L	L	M	L	520	4	3	Errosion	N/A	\	\	\	\	\	\				
67A	67	A	26/10/2021	AB	1.4	1.2	4.9	5.2	N	Y	340	330	270	280	280	280	\	\	260	310	3.7	-2.3														H	L	M	M	L	L	500	4	3	Erosion	N/A	\	\	\	\	\	\				
67B	67	B	26/10/2021	AB	1.4	3.1	6.8	7.1	N	Y	420	420	380	390	370	390	\	\	360	350	3.7	-2.3														M	L	L	L	L	L	500	4	3		N/A	\	\	\	\	\	\	DSC00285	DSC00282	DSC00283	DSC00286
67C	67	C	26/10/2021	AB	1.4	3.1	6.9	7.2	N	Y	490	500	410	440	410	390	\	\	340	360	3.8	-2.4				Borer holes	8									M	L	L	L	L	L	500	4	3	Erosion	N/A	\	\	\	\	\	\				
67D	67	D	26/10/2021	AB	1.4	1.2	4.8	5.1	N	Y	360	360	310	330	300	320	\	\	270	290	3.6	-2.2														M	NIL	M	M	L	M	500	4	3		N/A	\	\	\	\	\	\				
68A	68	A	26/10/2021	AB	1.3	1.3	4.9	5.2	N	Y	380	390	360	350	350	350	\	\	280	300	3.6	-2.3														H	L	M	M	L	L	500	4	3	Heavy borer around whaler beam	N/A	\	\	\	\	\	\				
68B	68	B	26/10/2021	AB	1.3	3.2	6.9	7.2	N	Y	420	360	350	380	340	380	\	\	310	310	3.7	-2.4														M	NIL	M	M	L	L	500	4	3	Erosion	N/A	\	\	\	\	\	\				
68C	68	C	26/10/2021	AB	1.3	3.2	6.6	6.9	N	Y	470	450	360	360	350	350	\	\	320	310	3.4	-2.1				Borer holes	10									M	NIL	H	M	L	M	500	4	3	Erosion	N/A	\	\	\	\	\	\				
68D	68	D	26/10/2021	AB	1.3	1.3	4.8	5.1	N	Y	390	360	330	330	310	330	\	\	270	290	3.5	-2.2														M	L	L	M	L	L	500	4	3	Erosion	N/A	\	\	\	\	\	\				
69A	69	A	26/10/2021	AB	1.2	1.4	5.0	5.3	N	Y	350	360	300	280	300	330	\	\	260	240	3.6	-2.4	230		-2.1	Hole	10									H	M	M	M	L	M	500	5	4		N/A	\	\	\	\	\	\	DSC00274	DSC00273	DSC00269	DSC00267

Pile ID					Measurements						Diameters															
Pile ID	Bent (number)	Row (letter)	Survey Date	Supervisor	Tide RL (m CD)	Crosshead Soffit to Waterline (mm)	Crosshead soffit to Seabed	Longitudinal beam soffit to Seabed = total exposed length of pile	Movement of pile at seabed	Pile tags present	High Water (RL+-.--m)		Low Water (RL+-.--m)		Mid Water (RL+-.--m)		Above Repair If any	Below Repair If any	Seabed (measure Dia. at lowest seabed level)			RL at Seabed	Min. Dia.		
											Dia	Dia	Dia	Dia	Dia	Dia	Dia	Dia	Dia	Dia	Seabed Depth		Dia	Dia	RL
69B	69	B	26/10/2021	AB	1.2	3.3	7.0	7.3	N	Y	430	420	360	340	360	370	\	\	320	390	3.7	-2.5			
69C	69	C	26/10/2021	AB	1.2	3.3	6.6	6.9	N	Y	430	390	320	320	320	330	\	\	290	300	3.3	-2.1			
69D	69	D	26/10/2021	AB	1.2	3.3	7.0	7.3	N	Y	420	370	300	300	300	300	\	\	270	230	3.7	-2.5			
69E	69	E	26/10/2021	AB	1.2	3.3	7.0	7.3	N	Y	420	420	360	360	380	370	\	\	340	330	3.7	-2.5			
69F	69	F	26/10/2021	AB	1.2	3.3	7.2	7.5	N	Y	440	400	380	360	380	340	\	\	300	320	3.9	-2.7			
70A	70	A	26/10/2021	AB	1.1	1.5	5.2	5.5	N	Y	390	400	360	360	360	340	\	\	350	340	3.7	-2.6			
70B	70	B	26/10/2021	AB	1.1	3.4	7.0	7.3	N	Y	420	450	370	360	360	360	\	\	360	340	3.6	-2.5			
70C	70	C	26/10/2021	AB	1.1	3.4	7.2	7.5	N	Y	440	430	340	320	320	320	\	\	280	300	3.8	-2.7			
70D	70	D	26/10/2021	AB	1.1	3.4	7.1	7.4	N	Y	380	390	300	320	290	300	\	\	250	260	3.7	-2.6	200		-2.9
70E	70	E	26/10/2021	AB	1.0	3.5	6.6	6.9	N	Y	370	400	310	330	340	340	\	\	290	260	3.7	-2.1			
70F	70	F	26/10/2021	AB	0.9	3.6	7.3	7.6	N	Y	470	480	380	380	360	360	\	\	310	350	3.7	-2.8			
71A	71	A	26/10/2021	AB	0.9	1.7	5.3	5.6	N	Y	370	360	300	310	330	320	\	\	280	280	3.6	-2.7			
71B	71	B	26/10/2021	AB	0.9	1.4	7.2	7.5	N	Y	390	360	320	300	320	300	\	\	280	300	3.6	-2.7			
71C	71	C	26/10/2021	AB	0.9	3.6	7.4	7.7	N	Y	440	450	380	350	350	360	\	\	320	320	3.8	-2.9			
71D	71	D	26/10/2021	AB	0.9	3.6	7.3	7.6	N	Y	380	360	300	280	290	280	\	\	210	250	3.7	-2.8			
71E	71	E	26/10/2021	AB	0.9	3.6	7.3	7.6	N	Y	440	400	320	320	360	320	\	\	280	380	3.7	-2.8			
71F	71	F	26/10/2021	AB	0.9	3.6	7.4	7.7	N	Y	490	490	410	390	400	400	\	\	360	390	3.8	-2.9			

Pile ID	Defects and Comments																			
	Recorded Defect 1 (if any)					Recorded Defect 2 (if any)					Marine Borers Nil / L / M / H / Severe			Depletion Nil / L / M / H			Overall Condition			
	Type	Max width (mm)	Max Depth (mm)	Top: Distance (m) to crosshead soffit	Bottom: Distance (m) to crosshead soffit	Type	Max width (mm)	Max Depth (mm)	Top: Distance (m) to crosshead soffit	Bottom: Distance (m) to crosshead soffit	HW to MW	MW to LW	LW to Seabed	HW to MW	MW to LW	LW to Seabed	Thickness of Marine Growth (mm)	Condition based on WSCAM (if applicable) (Condition 1 - 7)	PV Rating	Comments
69B											L	NIL	M	M	L	L	500	4	3	Errosion
69C	Borer holes	8									L	NIL	M	L	L	L	500	4	3	Wide
69D	Borer holes	8									M	NIL	L	M	L	M	500	4	3	Errosion
69E											L	L	L	L	L	L	500	3	2	
69F											H	L	L	M	L	M	500	5	4	
70A	Borer holes	8									M	NIL	NIL	L	L	L	500	4	3	
70B											L	NIL	NIL	L	L	L	500	3	2	
70C											M	L	M	M	L	L	500	4	3	
70D	Borer holes	8									M	NIL	L	M	L	L	500	4	3	Errosion & surface rot
70E	Borer holes	10									H	M	L	H	M	L	500	5	4	Light errosion
70F	Split coming off	250	80	3600	4600	Borer holes	5				M	NIL	NIL	L	L	NIL	500	4	3	Surface rot, split at whaler
71A	Borer holes	80	1			Cavity	100 x 300	50	4000		L	M	M	M	M	M	500	5	4	
71B											L	L	L	L	L	L	500	4	3	
71C											M	L	L	L	L	L	500	3	2	Surface rot
71D	Holes	20	60	3600	3620	Cavity	120 x 100	100	3600	3720	L	L	L	L	L	L	500	5	4	Sand erroding pile
71E	Cavity		100	3600	4500						H	M	NIL	H	L	M	500	6	5	Cavities 50% depleted. Errosion
71F	Borer holes	8									L	NIL	NIL	L	L	L	500	3	2	Minor errosion

Pile ID	Existing Repairs										
	Repair					Defects recorded on existing repair					
	Description of existing repair	RL at top of repair	RL at bottom of repair	Repair extends into Seabed? (Y/N)	Length of exposed timber below repair	Description	Comments	Image	Image	Image	Image
69B	N/A	\	\	\	\	\	\	DSC00278	DSC00276	DSC00277	DSC00279
69C	N/A	\	\	\	\	\	\				
69D	N/A	\	\	\	\	\	\				
69E	N/A	\	\	\	\	\	\				
69F	N/A	\	\	\	\	\	\				
70A	N/A	\	\	\	\	\	\				
70B	N/A	\	\	\	\	\	\				
70C	N/A	\	\	\	\	\	\				
70D	N/A	\	\	\	\	\	\				
70E	N/A	\	\	\	\	\	\	DSC00262	DSC00264	DSC00260	DSC00259
70F	N/A	\	\	\	\	\	\				
71A	N/A	\	\	\	\	\	\	DSC00213	DSC00212	DSC00210	DSC00208
71B	N/A	\	\	\	\	\	\	DSC00222	DSC00221	DSC00218	DSC00215
71C	N/A	\	\	\	\	\	\	DSC00225	DSC00227	DSC00230	DSC00228
71D	N/A	\	\	\	\	\	\	DSC00239	DSC02235	DSC00238	DSC00233
71E	N/A	\	\	\	\	\	\	DSC00252	DSC00251	DSC00249	DSC00242
71F	N/A	\	\	\	\	\	\	DSC00257	DSC00256	DSC00255	DSC00254

Appendix B – Condition Rating Drawings

DATE PLOTTED: 25-03-2022 11:44:52 BY : IM

FLINDERS PIER CONDITION ASSESSMENT

FLINDERS, VICTORIA, 3929

FOR

PARKS VICTORIA

SCHEDULE OF DRAWINGS	
DRAWING NUMBER	DESCRIPTION
S001	COVER PAGE
S002	CONCRETE PIER SHEET 01 OF 02
S003	CONCRETE PIER SHEET 02 OF 02
S004	TIMBER PIER SHEET 01 OF 03
S005	TIMBER PIER SHEET 02 OF 03
S006	TIMBER PIER SHEET 03 OF 03

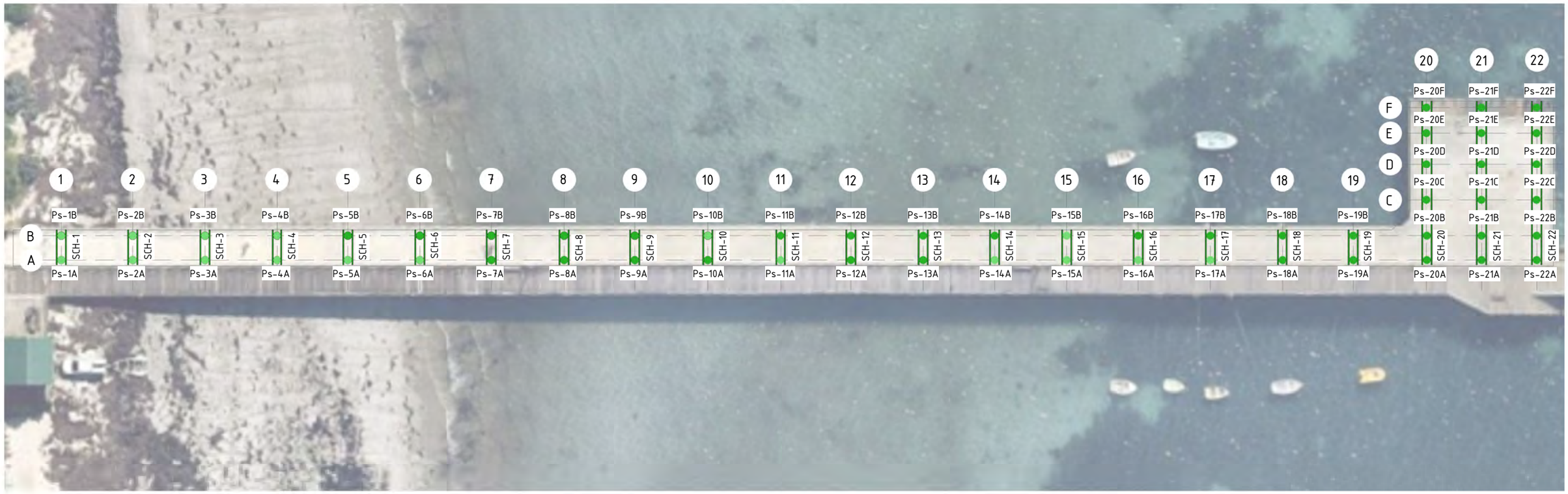
REV.	DATE	DESCRIPTION	DES.	VER.	APPD.
2	2022-03-24	ISSUED FOR INFORMATION	MP	AD	NB
1	2021-11-12	ISSUED FOR CLIENT REVIEW	MP	AD	NB

FSC | RANGE
ABN 97 644 088 344,
LEVEL 1, 366 Bridge Rd,
Richmond VIC Australia 3121.
Phone 1300 372 477
Email: projects@fsc-range.com
Web: www.fsc-range.com

DRAWN	IM	2022-03-24
CHECKED	BB	2022-03-24
DESIGNED	MP	2022-03-24
VERIFIED	AD	2022-03-24
APPROVED	NB	2022-03-24

CLIENT: PARKS VICTORIA
PROJECT: FLINDERS PIER CONDITION ASSESSMENT
TITLE: COVER PAGE
STATUS: ISSUED FOR INFORMATION
SCALE: NTS
SIZE: A3
DRAWING NUMBER: S001
REV: 2

BIM 360://FSC Range/FSC Range - Flinders Pier Heat Map Drawings.rvt



CONCRETE PIER PLAN - STEEL PILES AND CROSSHEADS

1:500

LEGEND - STEEL PILE CONDITION RATING SCALE		QUANTITY	
SYMBOL	DESCRIPTION	PILES (No.)	CROSS HEADS (No.)
1	NEW WITH NO VISIBLE DEFECTS/DAMAGE. NO RUST STAINS, COATING INTACT AND FREE FROM DEFECTS.	0	0
2	AS NEW. PAINT STILL IN-TACT, WITH LITTLE OR NO CHALKING, MINOR FADING OR DISCOLORATION MAY BE PRESENT.	17	0
3	COATING DETERIORATION TO <10% OF SURFACE AREA; MINOR SUBSTRATE ADHESION FAILURE AND/OR MINOR INTERCOAT ADHESION FAILURE; ADVANCED CHALKING.	39	44
4	COATING DETERIORATION TO >10 % OF SURFACE AREA: ADVANCED SUBSTRATE ADHESION FAILURE AND/OR ADVANCED INTERCOAT ADHESION FAILURE AND/OR SCATTERED/SURFACE CORROSION OF BASE METAL TO 5-10% OF SURFACE AREA, ESPECIALLY AT WELDS AND ALONG EDGES.	0	0
5	WIDESPREAD SCATTERED/SURFACE CORROSION (10-30% OF SURFACE AREA) AND/OR CORROSION WITH SCALE RUST FORMATION AND FREQUENT PITTING (<10% SECTION LOSS), AND MINOR PITTING ALONG WELDS.	0	0
6	WIDESPREAD SCATTERED/SURFACE CORROSION (>30% OF SURFACE AREA) AND/OR WIDESPREAD CORROSION WITH SCALE RUST FORMATION AND FREQUENT PITTING (10-20% SECTION LOSS), AND MAJOR PITTING ALONG WELDS. EVIDENCE OF ALWC MINOR TO MODERATE CRACK IN METAL OR AT WELDS.	0	0
7	LOCALISED METAL LOSS EXCEEDING 20% OF SECTION THICKNESS OR AS OTHERWISE INDICATED BY STRUCTURAL ANALYSIS. COMPONENT HAS FAILED.	0	0
	TOTAL	56	44

LEGEND

STR - xx : STRINGERS (TIMBER)
CH - xx : CROSS HEADS (TIMBER)
SCH - xx : CROSS HEADS (STEEL)
Ps - xx : PILE (TIMBER)
Pt - xx : PILE (STEEL)
xx : WSCAM TIMBER PILE CONDITION STATE (REFER TABLE)
Y/N : ACCELERATED LOW WATER CORROSION (ALWC) PRESENT (YES/NO) FOR STEEL PILE ONLY.

NOTES:

1. CONDITION RATINGS ARE BASED ON ABOVE AND BELOW WATER VISUAL SURVEY UNDERTAKEN OCTOBER 2021. CONDITION OF TIMBERS BEFORE BENT 39 INDICATIVE ONLY AND MAY ONLY BE VALIDATED THROUGH TIMBER INTEGRITY TESTING
2. STRUCTURAL LAYOUT IS INDICATIVE ONLY.
3. AREIAL IMAGE RETRIEVED FROM NEARMAP PHOTO DATED 11 NOVEMBER 2021.

REV.	DATE	DESCRIPTION	DES.	VER.	APPD.
2	2022-03-24	ISSUED FOR INFORMATION	MP	AD	NB
1	2021-11-12	ISSUED FOR CLIENT REVIEW	MP	AD	NB

FSC | RANGE
ABN 97 644 088 344,
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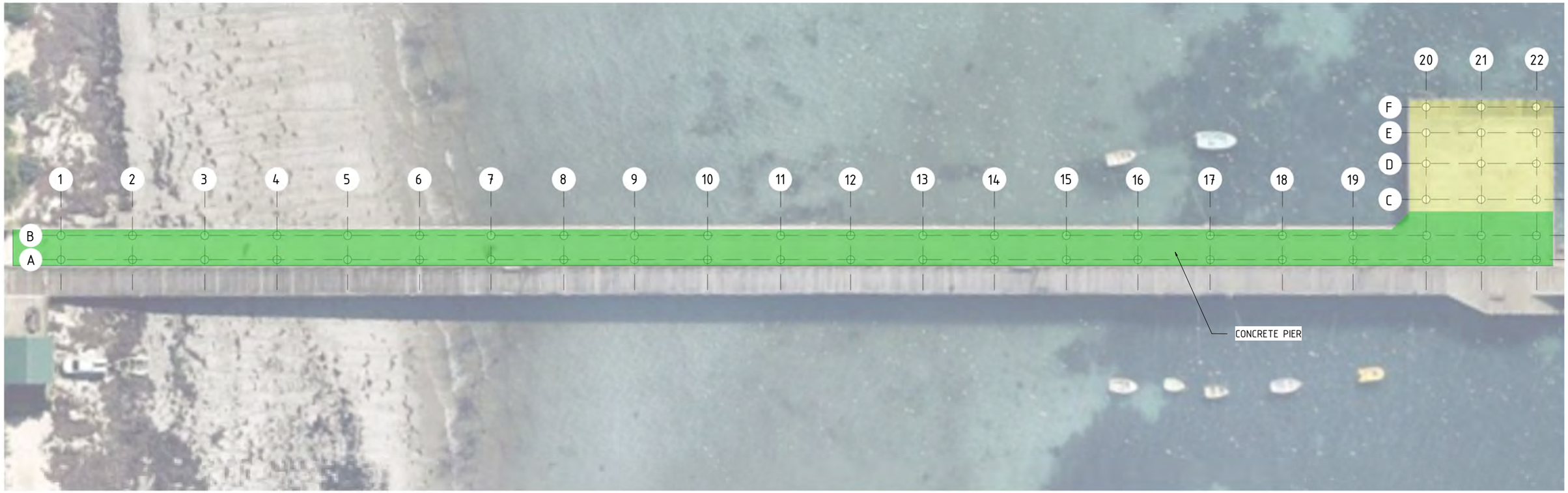
DRAWN	IM	2022-03-24	
CHECKED	BB	2022-03-24	
DESIGNED	MP	2022-03-24	
VERIFIED	AD	2022-03-24	
APPROVED	NB	2022-03-24	

CLIENT: PARKS VICTORIA
PROJECT: FLINDERS PIER CONDITION ASSESSMENT
TITLE: CONCRETE PIER SHEET 01 OF 02
STATUS: ISSUED FOR INFORMATION
SCALE:
SIZE: A3
DRAWING NUMBER: S002
REV: 2

DATE PLOTTED: 25-03-2022 11:44:56 BY : IM



CONCRETE PIER PLAN - CONCRETE DECK

1:500

CONCRETE DECK TOP/SOFFIT CONDITION RATING SCALE		QUANTITY
SYMBOL	DESCRIPTION	DECK (m^2)
	NEW WITH NO VISIBLE DEFECTS/DAMAGE.	0
	AS NEW. HAIRLINE CRACKS (<0.1MM). NO EXPOSED REINFORCEMENT OR SURFACE EVIDENCE OF CORROSION OF REINFORCEMENT. MINOR EFFLORESCENCE, NO OBSERVABLE DAMPNESS OR LEAKAGE.	850
	FINE CRACKING (0.1MM-<0.3MM), SURFACE STAINING FROM WEATHERING, MINOR VOIDS, RUST STAINS, MINOR SURFACE EROSION OR HONEYCOMBING.	0
	MEDIUM CRACKING (0.3MM-0.5MM) AND RUST STAINING PRESENT. MINOR SPALLING AND EXPOSED REINFORCEMENT AFFECTING LESS THAN 5 PERCENT OF SURFACE AREA; <20% OF SURFACE AREA UNDERGOING DELAMINATION. MODERATE SURFACE EROSION.	297
	LARGE CRACKS (>0.5MM-2MM) SEVERE CONCRETE SPALLING AND EXPOSED REINFORCEMENT UP TO 20% OF SURFACE AREA. SEVERE DELAMINATION UP TO 50% SURFACE AREA. UP TO 10% SECTION LOSS OF REINFORCEMENT.	0
	MAJOR CRACKS (>2MM), SEVERE CONCRETE SPALLING AND EXPOSED REINFORCEMENT UP TO 50% OF SURFACE AREA. SEVERE DELAMINATION >50% SURFACE AREA. UP TO 20% SECTION LOSS OF REINFORCEMENT.	0
	VERY SEVERE CONCRETE SPALLING WITH EXPOSED REINFORCEMENT AND REINFORCEMENT SECTION LOSS OF > 20% COMPONENT HAS FAILED.	0
	TOTAL	1147

LEGEND

STR - xx : STRINGERS (TIMBER)
CH - xx : CROSS HEADS (TIMBER)
SCH - xx : CROSS HEADS (STEEL)
Ps - xx : PILE (TIMBER)
Pt - xx : PILE (STEEL)
xx : WSCAM TIMBER PILE CONDITION STATE (REFER TABLE)
Y/N : ACCELERATED LOW WATER CORROSION (ALWC) PRESENT (YES/NO) FOR STEEL PILE ONLY.

NOTES:

1. CONDITION RATINGS ARE BASED ON ABOVE AND BELOW WATER VISUAL SURVEY UNDERTAKEN OCTOBER 2021. CONDITION OF TIMBERS BEFORE BENT 39 INDICATIVE ONLY AND MAY ONLY BE VALIDATED THROUGH TIMBER INTEGRITY TESTING
2. STRUCTURAL LAYOUT IS INDICATIVE ONLY.
3. AREIAL IMAGE RETRIEVED FROM NEARMAP PHOTO DATED 11 NOVEMBER 2021.

REV.	DATE	DESCRIPTION	DES.	VER.	APPD.
2	2022-03-24	ISSUED FOR INFORMATION	MP	AD	NB
1	2021-11-12	ISSUED FOR CLIENT REVIEW	MP	AD	NB

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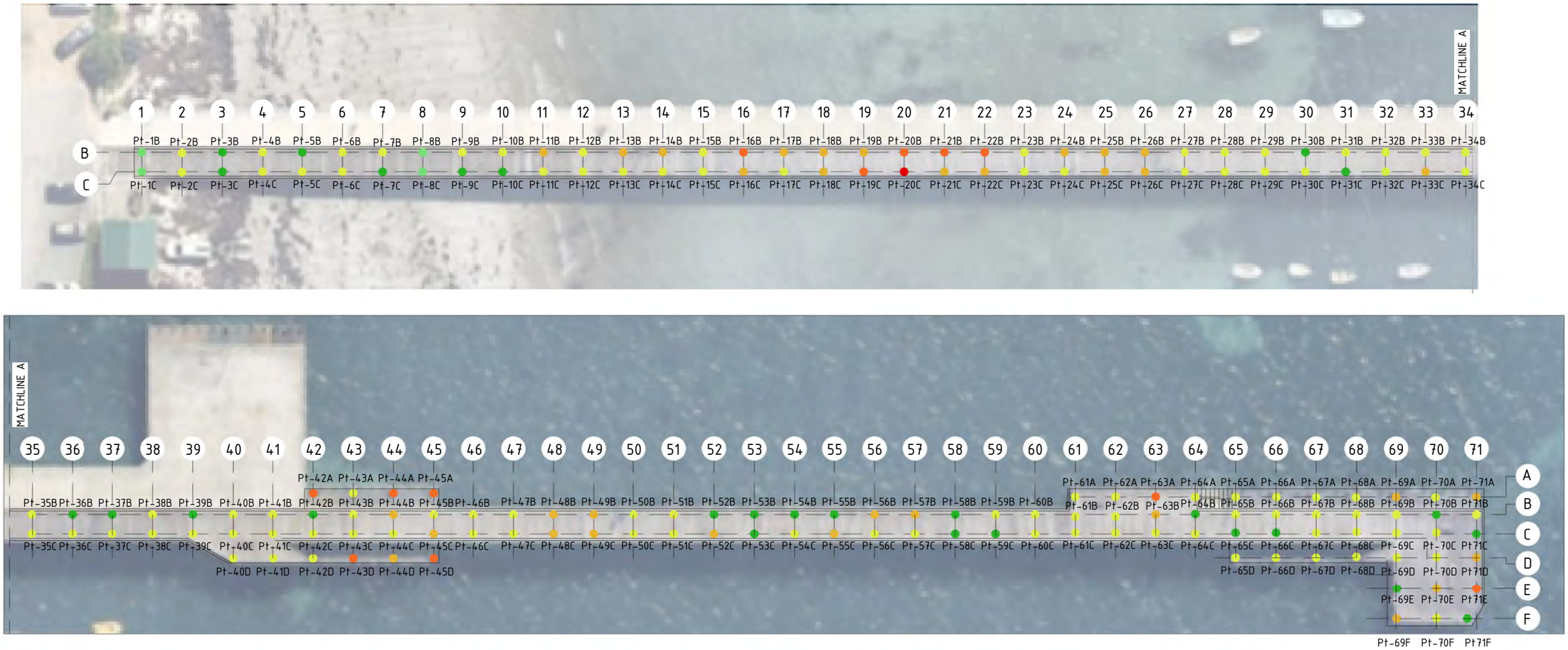
DRAWN	IM	2022-03-24
CHECKED	BB	2022-03-24
DESIGNED	MP	2022-03-24
VERIFIED	AD	2022-03-24
APPROVED	NB	2022-03-24

CLIENT: PARKS VICTORIA
PROJECT: FLINDERS PIER CONDITION ASSESSMENT
TITLE: CONCRETE PIER SHEET 02 OF 02
STATUS: ISSUED FOR INFORMATION
SCALE:
SIZE: A3
DRAWING NUMBER: S003
REV: 2

BIM 360://FSC Range/FSC Range - Flinders Pier Heat Map Drawings.rvt



TIMBER PILE PLAN

1:500

LEGEND - TIMBER PILE CONDITION RATING SCALE		QUANTITY
SYMBOL	DESCRIPTION	PILES (No.)
1	NEW WITH NO VISIBLE DEFECTS/DAMAGE.	0
2	AS NEW. MINOR SPLITS AND CHECKS, NO MEASURABLE SECTION LOSS.	4
3	MINOR MARINE ORGANISM ATTACK AND PIPE ROT OR DECAY RESULTING IN UP TO 5% OF SECTION AREA LOSS. THERE MAY BE MINOR SPLITS OR CHECKS EVIDENT.	27
4	MODERATE PIPE ROT, MARINE ORGANISM ATTACK OR DECAY RESULTING IN UP TO 5-20% OF SECTION AREA LOSS. THERE MAY BE MODERATE SPLITS OR CHECKS EVIDENT.	99
5	HEAVY MARINE ORGANISM ATTACK, EVIDENCE OF TERMITE ACTIVITY, PIPE ROT OR DECAY RESULTING IN UP TO 20-35% SECTION LOSS. MAJOR SPLITS OR CHECKS EVIDENT.	33
6	SEVERE MARINE ORGANISM OR TERMITE ATTACK, PIPE/SURFACE ROT OR DECAY RESULTING IN UP TO 35-50% SECTION LOSS. MAJOR SPLITS OR CHECKS EVIDENT IN CRITICAL ZONES	12
7	SEVERE MARINE ORGANISM OR TERMITE ATTACK, PIPE/SURFACE ROT OR DECAY RESULTING IN GREATER THAN 50% SECTION LOSS. COMPONENT HAS FAILED	1
	TOTAL	176

LEGEND

STR - xx : STRINGERS (TIMBER)
CH - xx : CROSS HEADS (TIMBER)
SCH - xx : CROSS HEADS (STEEL)
Ps - xx : PILE (TIMBER)
Pt - xx : PILE (STEEL)
xx : WSCAM TIMBER PILE CONDITION STATE (REFER TABLE)
Y/N : ACCELERATED LOW WATER CORROSION (ALWC) PRESENT (YES/NO) FOR STEEL PILE ONLY.

NOTES:

1. CONDITION RATINGS ARE BASED ON ABOVE AND BELOW WATER VISUAL SURVEY UNDERTAKEN OCTOBER 2021. CONDITION OF TIMBERS BEFORE BENT 39 INDICATIVE ONLY AND MAY ONLY BE VALIDATED THROUGH TIMBER INTEGRITY TESTING
2. STRUCTURAL LAYOUT IS INDICATIVE ONLY.
3. AREIAL IMAGE RETRIEVED FROM NEARMAP PHOTO DATED 11 NOVEMBER 2021.

REV.	DATE	DESCRIPTION	DES.	VER.	APPD.
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1	2021-11-12	ISSUED FOR CLIENT REVIEW	MP	AD	NB

Parks VICTORIA

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DESIGNED	MP	2022-03-24
VERIFIED	AD	2022-03-24
APPROVED	NB	2022-03-24

CLIENT: PARKS VICTORIA
PROJECT: FLINDERS PIER CONDITION ASSESSMENT
TITLE: TIMBER PIER SHEET 01 OF 03
STATUS: ISSUED FOR INFORMATION
SCALE:
SIZE: A3
DRAWING NUMBER: S004
REV: 2

BIM 360://FSC Range/FSC Range - Flinders Pier Heat Map Drawings.rvt
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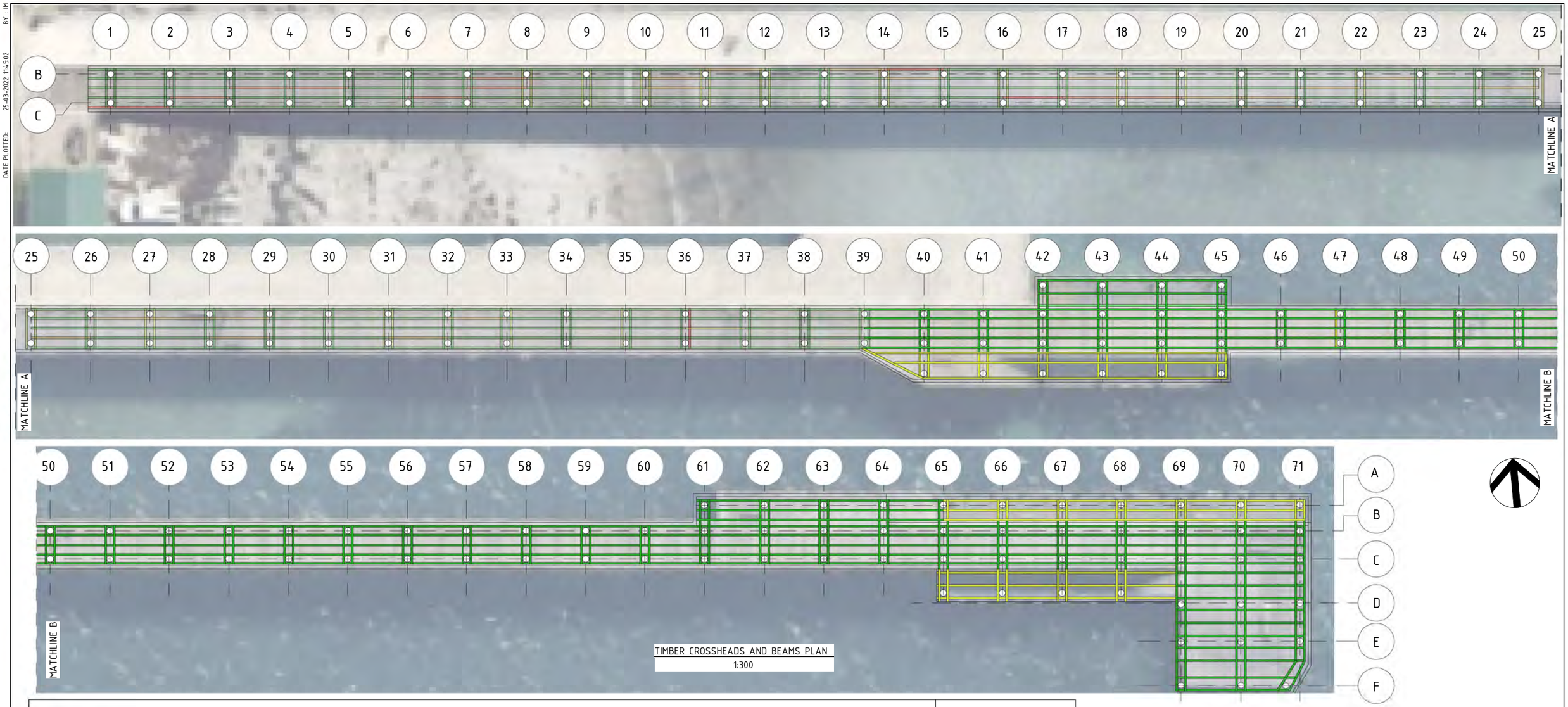
DATE PLOTTED: 25-03-2022 11:45:02 BY : IM



TIMBER CROSSHEADS AND BEAMS PLAN
1:300

LEGEND -TIMBER BEAMS/CROSS HEADS & TIMBER DECK CONDITION RATING SCALE			QUANTITY	
SYMBOL	DECK	DESCRIPTION	STRINGERS (No.)	CROSS HEADS (No.)
1		NEW WITH NO VISIBLE DEFECTS/DAMAGE.	0	0
2		AS NEW. MINOR SPLITS AND CHECKS, NO MEASURABLE SECTION LOSS.	12	8
3		MINOR MARINE ORGANISM ATTACK AND PIPE ROT OR DECAY RESULTING IN UP TO 5% OF SECTION AREA LOSS. THERE MAY BE MINOR SPLITS OR CHECKS EVIDENT.	342	110
4		MODERATE PIPE ROT, MARINE ORGANISM ATTACK OR DECAY RESULTING IN UP TO 5-20% OF SECTION AREA LOSS. THERE MAY BE MODERATE SPLITS OR CHECKS EVIDENT.	46	74
5		HEAVY MARINE ORGANISM ATTACK, EVIDENCE OF TERMITE ACTIVITY, PIPE ROT OR DECAY RESULTING IN UP TO 20-35% SECTION LOSS. MAJOR SPLITS OR CHECKS EVIDENT.	19	1
6		SEVERE MARINE ORGANISM OR TERMITE ATTACK, PIPE/SURFACE ROT OR DECAY RESULTING IN UP TO 35-50% SECTION LOSS. MAJOR SPLITS OR CHECKS EVIDENT IN CRITICAL ZONES	8	0
7		SEVERE MARINE ORGANISM OR TERMITE ATTACK, PIPE/SURFACE ROT OR DECAY RESULTING IN GREATER THAN 50% SECTION LOSS. COMPONENT HAS FAILED	3	1
		TOTAL	430	194

LEGEND

STR - xx : STRINGERS (TIMBER)
CH - xx : CROSS HEADS (TIMBER)
SCH - xx : CROSS HEADS (STEEL)
Ps - xx : PILE (TIMBER)
Pt - xx : PILE (STEEL)
xx : WSCAM TIMBER PILE CONDITION STATE (REFER TABLE)
Y/N : ACCELERATED LOW WATER CORROSION (ALWC) PRESENT (YES/NO) FOR STEEL PILE ONLY.

NOTES:

1. CONDITION RATINGS ARE BASED ON ABOVE AND BELOW WATER VISUAL SURVEY UNDERTAKEN OCTOBER 2021. CONDITION OF TIMBERS BEFORE BENT 39 INDICATIVE ONLY AND MAY ONLY BE VALIDATED THROUGH TIMBER INTEGRITY TESTING
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DESIGNED	MP	2022-03-24
VERIFIED	AD	2022-03-24
APPROVED	NB	2022-03-24

CLIENT: PARKS VICTORIA
PROJECT: FLINDERS PIER CONDITION ASSESSMENT
TITLE: TIMBER PIER SHEET 02 OF 03
STATUS: ISSUED FOR INFORMATION
SCALE:
SIZE: A3
DRAWING NUMBER: S005
REV: 2

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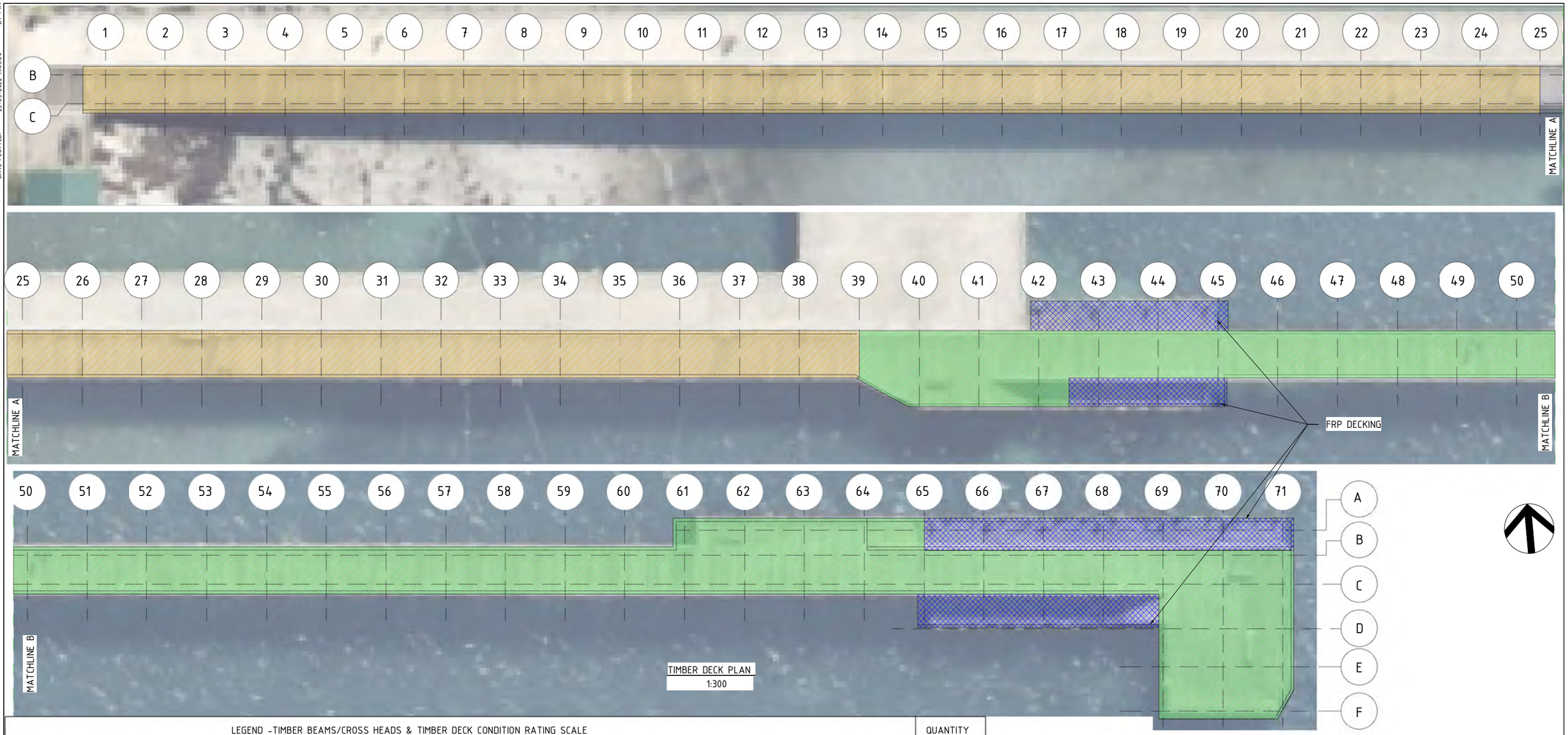
DATE PLOTTED: 25-03-2022 11:45:04 BY : IM



TIMBER DECK PLAN
1:300

LEGEND -TIMBER BEAMS/CROSS HEADS & TIMBER DECK CONDITION RATING SCALE			QUANTITY
SYMBOL	DECK	DESCRIPTION	DECKING (m^2)
1		NEW WITH NO VISIBLE DEFECTS/DAMAGE.	0
2		AS NEW. MINOR SPLITS AND CHECKS, NO MEASURABLE SECTION LOSS.	630
3		MINOR MARINE ORGANISM ATTACK AND PIPE ROT OR DECAY RESULTING IN UP TO 5% OF SECTION AREA LOSS. THERE MAY BE MINOR SPLITS OR CHECKS EVIDENT.	0
4		MODERATE PIPE ROT, MARINE ORGANISM ATTACK OR DECAY RESULTING IN UP TO 5-20% OF SECTION AREA LOSS. THERE MAY BE MODERATE SPLITS OR CHECKS EVIDENT.	0
5		HEAVY MARINE ORGANISM ATTACK, EVIDENCE OF TERMITE ACTIVITY, PIPE ROT OR DECAY RESULTING IN UP TO 20-35% SECTION LOSS. MAJOR SPLITS OR CHECKS EVIDENT.	600
6		SEVERE MARINE ORGANISM OR TERMITE ATTACK, PIPE/SURFACE ROT OR DECAY RESULTING IN UP TO 35-50% SECTION LOSS. MAJOR SPLITS OR CHECKS EVIDENT IN CRITICAL ZONES	0
7		SEVERE MARINE ORGANISM OR TERMITE ATTACK, PIPE/SURFACE ROT OR DECAY RESULTING IN GREATER THAN 50% SECTION LOSS. COMPONENT HAS FAILED	0
		TOTAL	1230

LEGEND

STR - xx : STRINGERS (TIMBER)
CH - xx : CROSS HEADS (TIMBER)
SCH - xx : CROSS HEADS (STEEL)
Ps - xx : PILE (TIMBER)
Pt - xx : PILE (STEEL)
xx : WSCAM TIMBER PILE CONDITION STATE (REFER TABLE)
Y/N : ACCELERATED LOW WATER CORROSION (ALWC) PRESENT (YES/NO) FOR STEEL PILE ONLY.

NOTES:

1. CONDITION RATINGS ARE BASED ON ABOVE AND BELOW WATER VISUAL SURVEY UNDERTAKEN OCTOBER 2021. CONDITION OF TIMBERS BEFORE BENT 39 INDICATIVE ONLY AND MAY ONLY BE VALIDATED THROUGH TIMBER INTEGRITY TESTING
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Parks VICTORIA

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CHECKED	BB	2022-03-24
DESIGNED	MP	2022-03-24
VERIFIED	AD	2022-03-24
APPROVED	NB	2022-03-24

CLIENT: PARKS VICTORIA
PROJECT: FLINDERS PIER CONDITION ASSESSMENT
STATUS: ISSUED FOR INFORMATION
TITLE: TIMBER PIER SHEET 03 OF 03
SCALE:
SIZE: A3
DRAWING NUMBER: S006
REV: 2

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Appendix C – Pile Inspection Methodology

Technical Memo

1 Document Control Record

Project	Flinders Pier Condition Inspection		
Project number	210178	**Date**	11/10/2021
Subject	Pile Inspection Methodology	**Advice Reference**	MEMO-001
Client	Parks Victoria		
Client Contact	David Habib	**Range Contact**	Maverick Penman
Client Email	david.habib@parks.vic.gov.au	**Range email/phone**	maverick.penman@fsc-range.com
Attachments			

FSC-Range (Range) have been engaged by Parks Victoria to undertake a condition assessment and structural integrity check of Flinders Pier on the western shore of Western Port adjacent to the town of Flinders, Victoria. The pier is comprised of two sections – a timber pier structure 325m long constructed circa 1970, and a concrete pier structure 150m long constructed in 2013.

There are 144 timber piles supporting the timber pier superstructure, and approximately 60 steel tubular piles supporting the concrete pier superstructure. Flinders Pier is renowned as a natural habitat for seagrass beds that provide favourable conditions for the weedy seadragon species. As such, Parks Victoria have requested a detailed pile inspection methodology to ensure that a balance is struck such that the cleaning of piles for the purpose of inspection and structural assessment does not cause harm or disturbance to the local flora and fauna.

Range have engaged Southern Divers to undertake the below-water inspection of the piles. During the inspection, divers will complete partial cleaning of the timber piles using hand tools, taking a strip not exceeding 200mm in width along the length of the pile from high water to seabed level. Only one strip is to be cleaned per pile. No pressure cleaning of piles is to be undertaken. Following cleaning, divers will use pile calipers to take pile diameter measurements at high water, low water, mid water and seabed. The minimum pile diameter will also be taken. Any defects including splitting, cracks and hollows will be mapped out. Information of marine borer activity and marine growth will also be recorded.

The above inspection methodology is a natural ‘first pass’ in terms of gaining a degree of confidence in the condition of piles for the purpose of structural assessment. However, the inspection is visual in nature and Range engineers are limited to what they can see. Range will allocate time aboard the dive vessel to monitor the below-water inspection in real time to ensure that quality assurance in the data output is undertaken. If marine borer activity is identified, particularly the teredo worm, further investigation will be undertaken (ie. integrity testing from timber cores) to assess the distribution of borer and severity of impact on the integrity of the timber piles. This is a preferred solution to undertaking a full clean of the timber piles which would involve removing marine growth from the full length and depth of the piles and pose a significantly more adverse affect on the marine life in the area.

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Appendix D – Southern Divers Dive Report

Underwater survey, construction
environmental solutions

3 November 2021

Job Reference: 2021090987

FSC Range
Level 1
366 Bridge Road
Richmond, 3121
VIC Australia

Attention: Maverick Penman

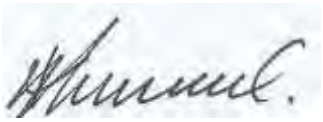
Dear Maverick,

RE: Flinders Pier Pile Inspections

Please find attached the report following the pile inspections on Flinders Pier.

Should you require any further clarification please do not hesitate to connect the undersigned on 0418 538 276.

Yours Sincerely,



Kate Pritchard
Southern Divers Pty Ltd
Managing Director
kate@southerndivers.com.au
www.southerndivers.com.au
1300 053 708
0418 538 276

"Working Safely Under Pressure"

Underwater survey, construction

environmental solutions

FSC RANGE

REPORT

IN RELATION TO

FLINDERS PIER PILE INSPECTIONS

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

Southern Divers was commissioned by Maverick Penman of FSC Range to complete an inspection of the piles at Flinders Pier, a Parks Victoria Asset. Southern Divers completed the inspection over 3 days and adopted the following scope of work.

1. Detailed Inspection of all timber piles,
2. Swim through inspection of all steel piles, and
3. Detailed inspection of 6 steel piles

The original scope of works detailed that 144 timber piles and 50 steel piles were to be inspected at Flinders Pier. The scope of work was amended to include all piles located at Flinders Pier (176 timber and 56 steel).

Discrepancies were discovered between the piles laid out in the original pile plan and the piles present at Flinders Pier. Three piles that were included in the original pile plan were not found at Flinders Pier, these were piles 40A, 41A and 46D.

The scope of work was set out in the FSC Range tender to inspect piles at Flinders Pier and record the findings on data sheets. For the detailed timber inspection this information included pile diameters at highwater, low water, mid water and seabed. It also included overall condition ratings (WSCAM and Parks Victoria), notes on marine growth and mapping out any defects including splits, cracks, hollows, borer activity as well as existing repairs. For the swim through steel this included noting the presence or absence of any defects without cleaning or measuring them. The detailed inspection of six steel piles added steel thickness readings as well as pitting and corrosion measurements to the existing swim though data for those piles.

All data and findings recorded can be found on the provided data sheets which can be viewed in conjunction with this report. All areas inspected were provided with a correlating WSCAM rating and Parks Victoria Rating. Defects as well as any other notable features were also recorded. Each facet of inspection had its own data record sheet relating directly to the information required by FSC Range.

2. METHODOLOGY

All diving was completed in accordance with Southern Divers' Operations Manual and Australian and New Zealand Occupational Diving Standard AS/NZS2299.1:(2015). These standards are followed to ensure all works are completed safely and copies of these documents can be provided upon request. All work was completed under the Dive Project Plan for the work. This document is an all-encompassing safety document for the work outlining the hazards and addressing risk management as well as emergency planning.

Operations were carried out under the Southern Divers current COVID19 Procedures, these were followed onsite in line with government advice.

The data collected for all piles at Flinders Pier was entered into the data sheets that are attached to this report. The data sheets captured all prerequisite information requested by FSC Range including information such as the pile identification, tide during time of inspection, water level, pile diameters at high water, low water, mid water and seabed, previous repairs (including location and type), defects (including location and type) and WSCAM and Parks Victoria condition ratings. The data was recorded in 3 separate data sheets with varying types of information recorded on each sheet.

The WSCAM rating system is a rating system generated to provide a standard numerical rating system across the board for timber pile inspections. The ratings range from 1 to 7, 1 being a pile in good condition to 7 being a pile likely to have an extreme impact on the integrity/failure of an element. This rating system is a standard evaluation system for piles that allows for a consistent set of descriptions for each pile, and thereby assists with the future planning of any rectification. Further it allows for consistent evaluation of the deterioration status of piles over time. The ratings are presented in Table 1 below. Condition ratings were also provided under the Parks Victoria Ratings System, a description of these ratings and how they compare to the WSCAM rating system can be seen in Table 2 below.

All fifty-six steel piles were inspected via a swim through survey. No cleaning was completed on these piles, divers noted any obvious defects found during the inspection but did not measure them. Divers noted the presence or absence of ALWC, corrosion, pitting and section loss for steel piles. In addition, the condition of any repairs present was also noted and condition ratings were given for each pile in accordance with Table 1 Below.

The detailed inspection of 176 timber piles required that the piles were to be cleaned using hand tools. By this methodology, the piles were prepared in accordance with the scope outlining that a 200mm strip clean be obtained for detailed inspection nominated piles only. In addition, any outlying defects were also cleaned. During detailed inspection, pile measurements were taken at highwater, midwater, low-water and seabed zones. The pile was assigned a WSCAM and rating and all defects were measured and recorded in the datasheet which should be viewed in conjunction with this report.

During the detailed inspection of the six steel piles divers cleaned a section the piles at sampling locations. Detailed inspection of steel piles included ultrasonic thickness testing using a Cygnus Underwater Ultrasonic Thickness Tester to determine the thickness of the steel. The unit was calibrated prior to each dive and thicknesses were monitored throughout the dive in case recalibration was required. Thickness testing was conducted at various levels on the pile and each reading was taken on four sides of the pile.

The results presented in the attached spreadsheet represent the state of the structure during the inspections in only. The in-water visibility throughout the survey was approximately one metre (1m).

Table 1. WASCAM ratings system.

Table A2.1: Timber Condition Rating Scale

CONDITION STATE	DESCRIPTION	EXPECTED REM. LIFE (% of original design life)	RECOMMENDED ACTIONS
1	New with no visible defects/damage.	100	No repairs required. Re-inspection at next scheduled inspection may be considered.
2	As new. Minor splits and checks, no measurable section loss.	55-100	No repairs required. Re-inspection at next scheduled inspection may be considered.
3	Minor marine organism attack and pipe rot, decay or necking resulting in up to 5% of section area loss. There may be minor splits or checks evident.	40-55	Planned and preventative maintenance works may be considered.
4	Moderate pipe rot, decay, marine organism attack or necking resulting in up to 5-20% of cross section loss. There may be moderate splits or checks evident.	25-40	Further testing; reactive maintenance and some minor upgrades may be considered.
5	Heavy marine organism attack, evidence of termite activity, pipe rot, decay or necking resulting in up to 20-35% section loss. Major splits or checks evident.	15-25	Structural assessment is recommended. Further investigation may be required to inform the structural assessment. Maintenance, upgrade or rehabilitation works may be considered.
6	Severe marine organism or termite attack, pipe/surface rot, decay or necking resulting in up to 35-50% section loss. Major splits or checks evident in critical zones mid and end spans.	0-15	Structural assessment is recommended. Further investigation may be required to inform the structural assessment. Rehabilitation or renewal works may be considered.
7	Severe marine organism or termite attack, pipe/surface rot, decay or necking resulting in greater than 50% section loss. Component has failed.	0	Rehabilitation required immediately or replace component/asset. Structural assessment is recommended where rehabilitation works are to be undertaken. Further investigation may be required to inform the structural assessment.

Table 2. Parks Victoria Rating System.

Condition Rating	Condition	Action Required	Description	WSCAM Rating
1	Excellent	Preventative Maintenance	The asset is essentially in as new condition. Exhibits no significant signs of deterioration. Only preventative maintenance is required	1 and 2
2	Good	Condition–based Maintenance: Minor repairs	The asset is in good physical condition. Exhibits only superficial wear and tear, minor defects or signs of surface deterioration. Requires minor maintenance	3
3	Average	Repairs Required	The asset is in fair condition. Deterioration is evident but the asset it still serviceable. Failure is unlikely in the near future but deferred maintenance work exists.	4
4	Poor	Major Repairs/ Renewal/ Replacement or Decommissioning	The asset is reaching the end of its serviceable life. It has deteriorated badly or suffered structural damage and serviceability is likely affected.	5
		Increased Monitoring	Major repairs, renewal, replacement or decommissioning required	
5	Very Poor	Closure	The asset has reached the end of its serviceable life. It has failed or is in a condition that provides an unacceptable safety risk. The asset is closed to public access if unsafe.	6 and 7
		Decommissioning		
		Replacement		

3. WORKS COMPLETED

Full details of each pile are contained in the data records provided and are to be viewed in conjunction with this report. The data records are set out in three separate datasheets which include the information and measurements recorded during the three types of inspections. The data presented is representative of the conditions at the time of inspection only.

3.1. Detailed Inspection of Timber Piles

Of the 176 piles inspected one (1) pile (0.57%) had been rated 7 in accordance with the WSCAM rating system meaning that this pile has failed and is not operational. This was pile 20C which had broken off below the seabed, divers had to excavate sand at the seabed to observe the defect. Major concrete and reinforcement repairs, or a complete replacement of the pile may be necessary.

Thirty-three (33) (18.8%) and twelve (12) (6.8%) piles were given WSCAM ratings of 5 and 6 respectively. These piles are in poor condition although have not yet failed.

Of the remaining piles, ninety-nine (99) (56.3%) had been rated as a 4, twenty-seven (27) (15.3%) had been rated as a 3 and four (4) (2.3%) had been rated 2 on the WSCAM scale. No piles were given a WSCAM rating of 1.

It was observed that sand erosion was affecting the timber piles at the seabed. Sand movement at the seabed could be a limitation in finding defects which are covered by sand such as the break found in pile 20C.

3.2. Swim Through Steel

Fifty-six steel piles were to be inspected via swim through survey. These piles were given a WSCAM rating based on the diver's visual inspection including the types of defects found on an individual pile. These defects were not inspected with detail or measured.

Of the fifty-six piles inspected seventeen (17) piles (30.4%) were rated as WSCAM 2 and thirty-nine (39) piles (69.6%) were rated as WSCAM 3 indicating the steel piles are in generally good condition. Corrosion was present on the piles rated 3 however no other defects or ALWC was observed.

3.3. Detailed Steel

Steel thickness readings were taken for piles 11B, 14A, 17B, 20B, 21C and 22E. Each pile was spot cleaned at high water, low water and seabed on the north, south, east and west sides resulting in 12 readings per pile and 96 in total. No pitting was observed on the exposed areas after cleaning, there was no coating loss below the water level on the patches cleaned by the divers and therefore no CP readings were taken at the time of the inspection. The table below summarises the UTT readings recorded in the attached datasheet.

Pile	Minimum (mm)	Maximum (mm)	Average (mm)
11B	9.0	9.3	9.12
14A	9.0	9.3	9.13
17B	9.3	9.5	9.36
20B	9.3	9.4	9.37
21C	9.2	9.4	9.29
22E	9.2	9.4	9.30
All	9.0	9.5	9.26

3.4. Still Photography

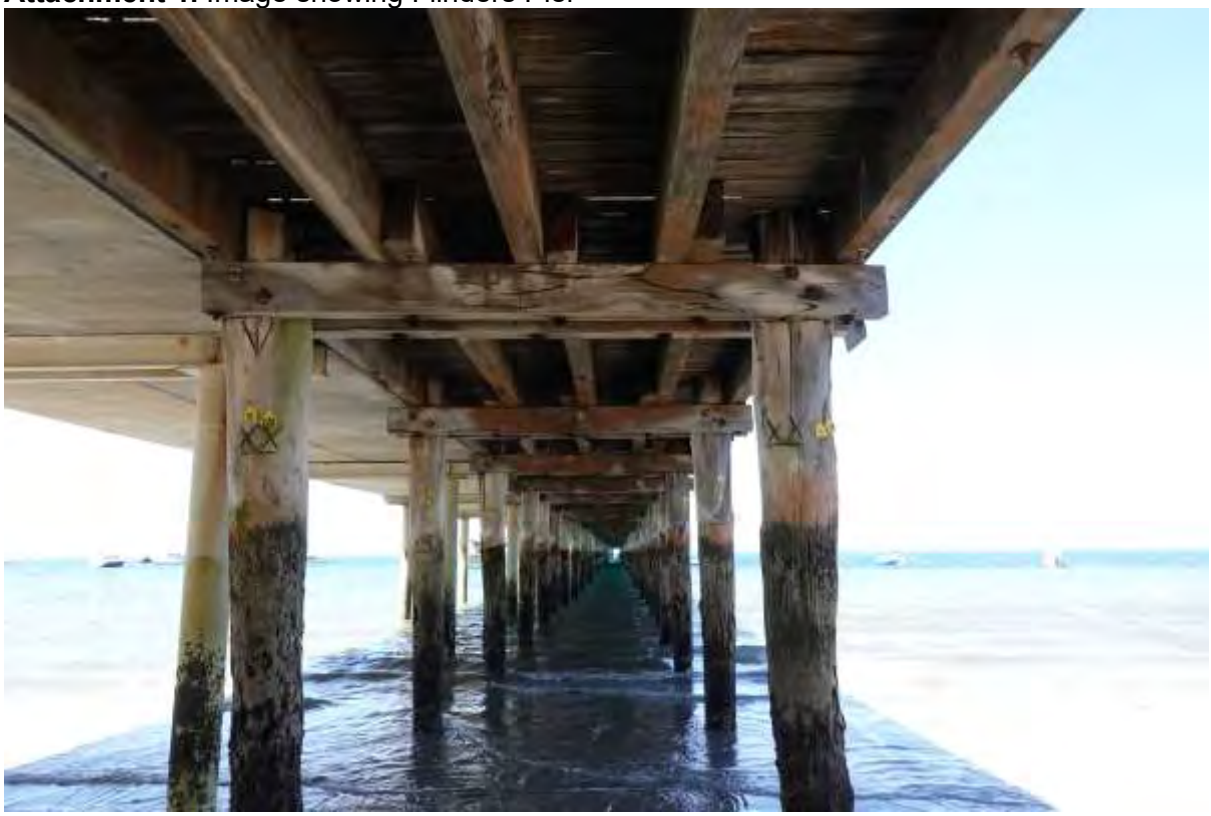
Southern Divers captured still images above water and below water with our state-of-the-art Nauticam underwater camera system. After cleaning divers captured photos to show pile conditions at highwater, low-water, midwater as well as seabed. Additional photos of piles included in the swim-through inspection were taken as reference to the different ratings captured in the survey. Images captured can be seen in the Attachments in section 4 below, these are also listed as file names in the datasheet for further reference.

4. ATTACHMENTS

Table 1. Photo log.

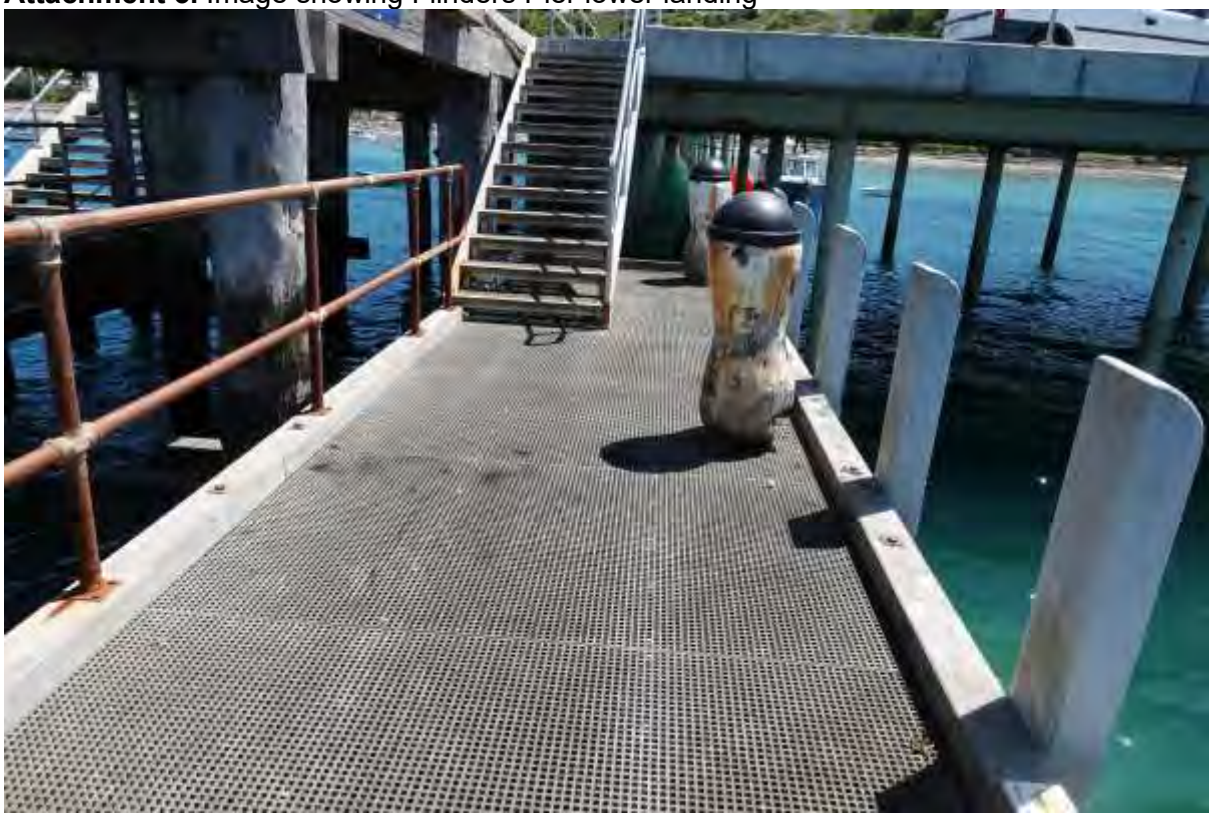
Description	Attachments
Representative images	Attachments 1 to 30

Attachment 1. Image showing Flinders Pier

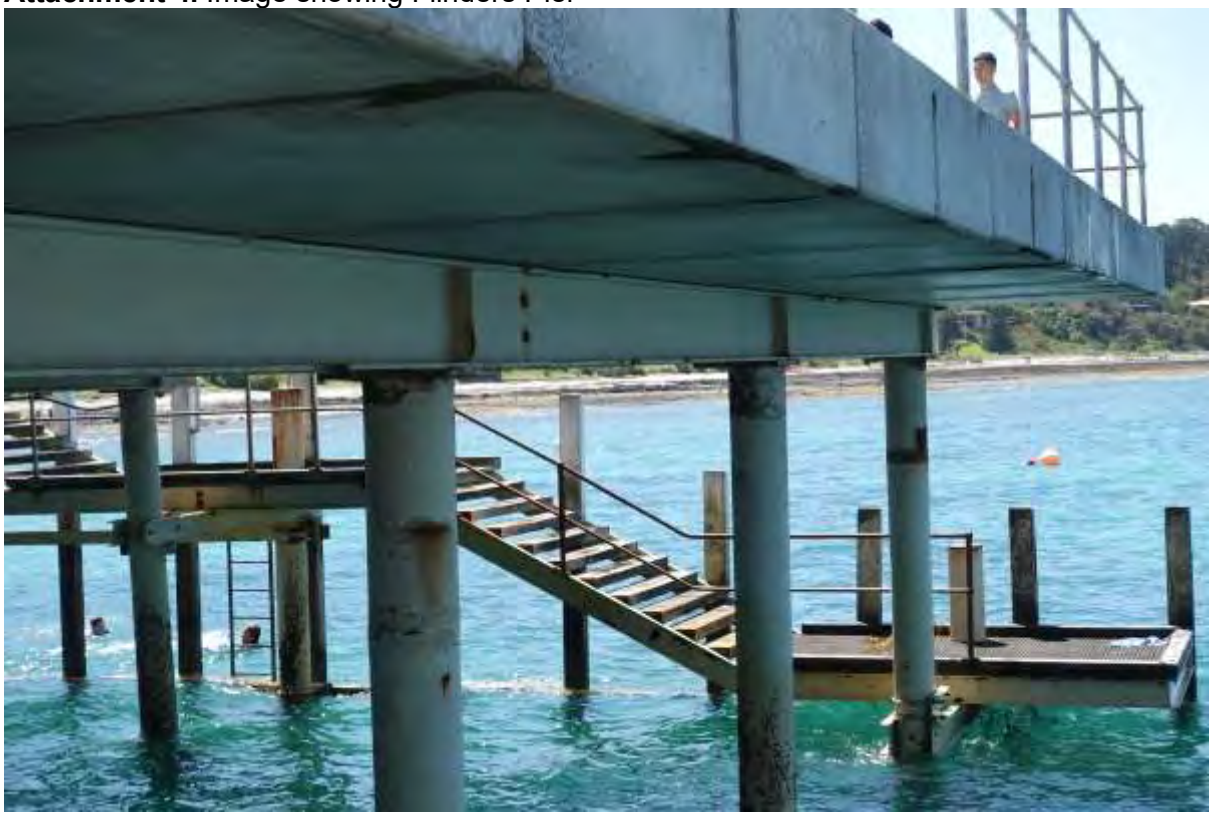


Attachment 2. Image showing Flinders Pier

Attachment 3. Image showing Flinders Pier lower landing



Attachment 4. Image showing Flinders Pier



Attachment 5. Image showing pile 21C

Attachment 6. Image showing pile 22C

Attachment 7. Image showing pile 24B

Attachment 8. Image showing pile 25C

Attachment 9. Image showing pile 26C

Attachment 10. Image showing pile 33C

Attachment 11. Image showing pile 42A

Attachment 12. Image showing pile 43D

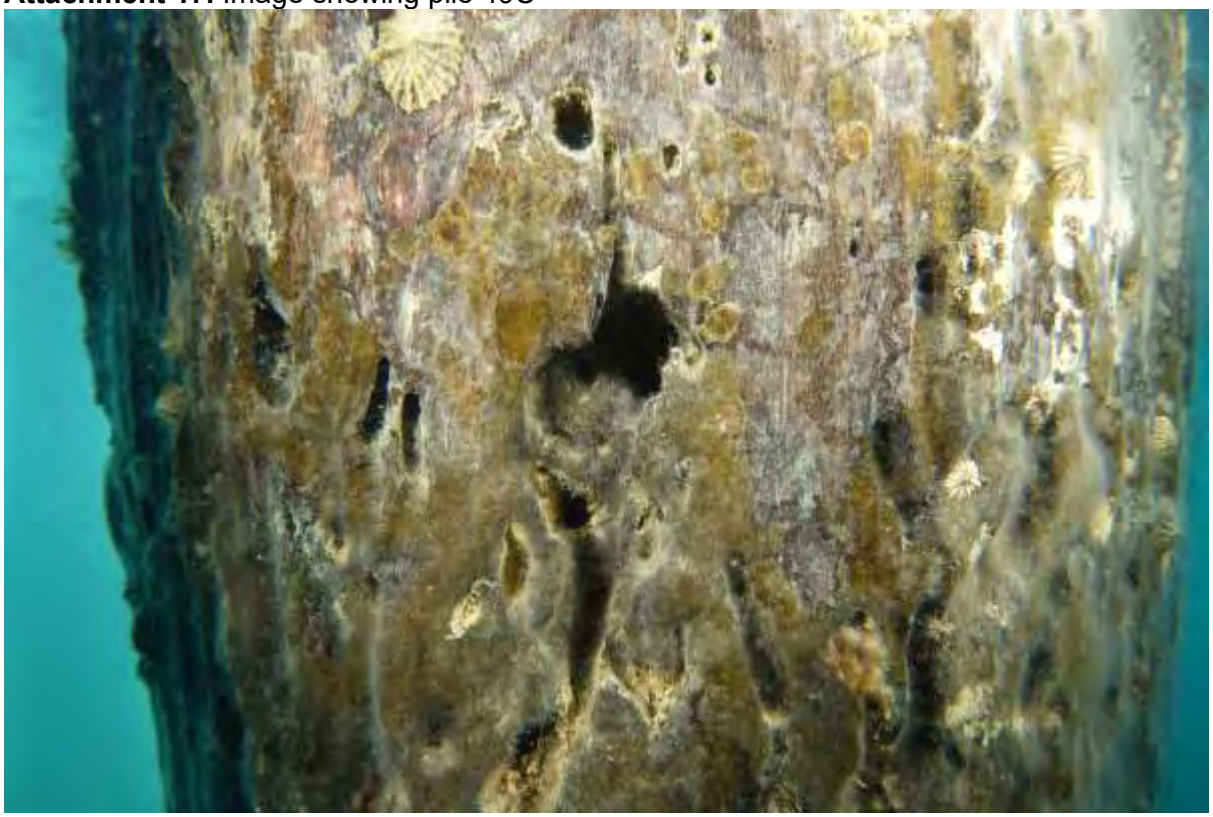
Attachment 13. Image showing pile 44A

Attachment 14. Image showing pile 44B

Attachment 15. Image showing pile 45A

Attachment 16. Image showing pile 45D

Attachment 17. Image showing pile 49C



Attachment 18. Image showing pile 57A

Attachment 19. Image showing pile 63A

Attachment 20. Image showing pile 63B

Attachment 21. Image showing pile 71B

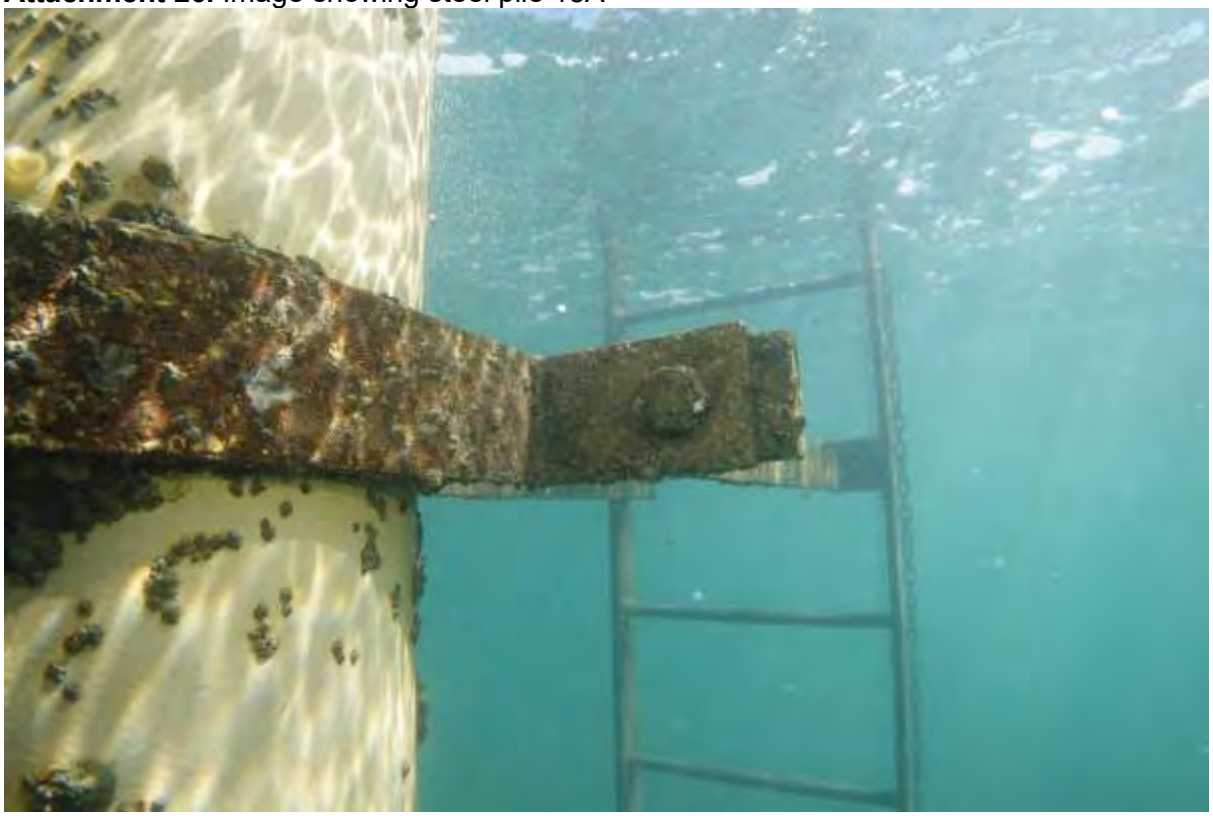
Attachment 22. Image showing pile 71D

Attachment 23. Image showing pile 71E

Attachment 24. Image showing steel pile 15A

Attachment 25. Image showing steel pile 16B

Attachment 26. Image showing steel pile 18A



Attachment 27. Image showing steel pile 21B

Attachment 28. Image showing steel pile 21D

Attachment 29. Image showing steel pile 22C

Attachment 30. Image showing steel pile 22F

Appendix E – Design Calculations

Project name	Job No	Sheet No
Flinders Pier Timber Pile Assessment	210178	1
Client	**Prepared By**	**Checked By**
Parks Victoria	MP	AD
Section of Project	**Date**	**Date**
Pile Capacity - Lower Landing	24 Jan 22	24 Jan 22

Ref

CONTENTS

Inputs

Structural Grade	F17				
Timber Species	Turpentine				
Structural Grade No.	SG1				
Strength Group	S3				
Diameter	0.27	(m)	φ =	0.70	(Primary members other than houses)
Area	0.0573	(m^2)	k_1 =	0.97	(5 kPa will not exceed 5 hours)
Z	0.0019	(m^3)	k_4 =	1.0	(Unseasoned Timber assumed)
Length	8	(m)	k_6 =	0.9	(Coastal Region)
			k_9 =	1.0	(No Sharing)
Bending strength	42	(MPa)	k_{12} =	1.0	(Moment -For round timbers)
Shear strength	3.6	(MPa)	S =	34.07	$S = 1.15\ L/d_p$
Bearing strength	40	(MPa)	ρ_c =	1.08	(Table 3.3 AS 1720)
Compressive strength	34	(MPa)	k_{12} =	0.15	(Axial -For round timbers)
Timber Density	11.0	(kN/m^3)	k_{20} =	1.0	(immaturity factor d>250)
Modulus of Elasticity	14000	(MPa)	k_{21} =	0.85	(shaving factor-bending)
			k_{21} =	1.0	(shaving factor-axial)
			k_{22} =	1.0	(processing factor)

Capacity

Flexural Capacity

$\varphi M_x = \varphi k_1 k_4 k_6 k_9 k_{12} k_{20} k_{21} k_{22} [f'_b Z_x]$

φM_x = 42.16 (kNm)

Buckling Capacity

$$P = \frac{2\pi^2 EI}{L^2}$$

φP= 1126.43 (kN)

Axial Capacity

$\varphi Np = \varphi k_1 k_4 k_6 k_9 k_{12} k_{20} k_{21} (f'_p A_p)$

$\varphi N_{d,p}$= 175.69 (kN)

Combined Bending and Axial

$$\left(\frac{M_x^*}{M_{d,x}}\right)^2 + \frac{N_c^*}{N_{d,cy}} \le 1$$

M*x	2.12	kNm	**0.05**
Nc*	170.33	kN	**0.97**

Combined **0.97**

Project name: Flinders Pier Timber Pile Assessment		Job No: 210178	Sheet No: 1
Client: Parks Victoria		Prepared By: MP	Checked By: AD
Section of Project: Pile Capacity - Main Pier		Date: 24 Jan 22	Date: 24 Jan 22

Ref | CONTENTS

Inputs

Structural Grade	F17				
Timber Species	Turpentine				
Structural Grade No.	SG1				
Strength Group	S3				
Diameter	0.23	(m)	φ =	0.70	(Primary members other than houses)
Area	0.0415	(m^2)	k_1 =	0.97	(5 kPa will not exceed 5 hours)
Z	0.0012	(m^3)	k_4 =	1.0	(Unseasoned Timber assumed)
Length	8	(m)	k_6 =	0.9	(Coastal Region)
			k_9 =	1.0	(No Sharing)
Bending strength	42	(MPa)	k_{12} =	1.0	(Moment -For round timbers)
Shear strength	3.6	(MPa)	S =	40.00	$S = 1.15\ L/d_p$
Bearing strength	40	(MPa)	ρ_c =	1.08	(Table 3.3 AS 1720)
Compressive strength	34	(MPa)	k_{12} =	0.11	(Axial -For round timbers)
Timber Density	11.0	(kN/m^3)	k_{20} =	1.0	(immaturity factor d>250)
Modulus of Elasticity	14000	(MPa)	k_{21} =	0.85	(shaving factor-bending)
			k_{21} =	1.0	(shaving factor-axial)
			k_{22} =	1.0	(processing factor)

Capacity

Flexural Capacity

$\varphi M_x = \varphi k_1 k_4 k_6 k_9 k_{12} k_{20} k_{21} k_{22} [f'_b Z_x]$

φM_x = 26.06 (kNm)

Buckling Capacity

$$P = \frac{2\pi^2 EI}{L^2}$$

φP= 593.14 (kN)

Axial Capacity

$\varphi Np = \varphi k_1 k_4 k_6 k_9 k_{12} k_{20} k_{21} (f'_p A_p)$

$\varphi N_{d,p}$= 92.51 (kN)

Combined Bending and Axial

$$\left(\frac{M_x^*}{M_{d,x}}\right)^2 + \frac{N_c^*}{N_{d,cy}} \le 1$$

M*x	2.12	kNm	**0.08**
Nc*	91.3	kN	**0.99**
Combined	**0.99**		

Appendix F – Special Purpose Termite Inspection Report

ALL ABOUT TERMITES
Diamond Creek Vic
Tel: 0438 671 280
dave@allabouttermites.com.au

Special Purpose Termite Inspection Report.

Purpose Of Inspection:
Carry out a specialised non-invasive inspection.

INSPECTOR DETAILS

Name Of Inspection Firm:	ALL ABOUT TERMITES
Contact Phone:	0438 671 280
Technician Name:	David Oates

CONTACT DETAILS

Inspection Requested By:	Maverick Penman FSC RANGE 0419428181 maverick.penman@fsc-range.com L1/366 Bridge Rd Richmond VIC 3121
Inspection Requested For:	Same as Inspection Requested By
Cost Billed To:	Same as Inspection Requested By
Contact For Access:	Same as Inspection Requested By

INSPECTION DETAILS

Property Inspected Details:	Flinders Pier Flinders VIC 3929
Job Instructions:	Termite inspection
Specific Client Inspection Requests:	Please provide report on active termites
Inspection Date/Time:	03/03/2022
Weather Condition(s):	Sunny
Standard Tools Used:	Binoculars, Compass, Knife, Magnifying Glass (x10), Powerful Torch, Sounding Device, Screwdriver, Personal Protection Equipment
Persons Present At Inspection:	Dave Oates- ALL ABOUT TERMITES Justo Montes- SNIFFER DOG TERMITE DETECTION
Were there any physical or other circumstance changes to the property or site compared to the Regular Inspection Report?	No
General comments:	Please note that the structure itself and environment makes for a difficult inspection due to height of pier and water underneath, because of these factors further undetected damage and live activity could exist within structure and a more comprehensive inspection would be required. The purpose of this inspection was to pick up on potential live termite activity in safe places to be able to undertake a termite baiting program.

1: STRUCTURE(S) INSPECTED:

1.1 STRUCTURE NAME: Flinders Pier

STRUCTURAL DETAILS

Structure Type:	Pier
Areas Inspected:	Pier underside to water's edge, topside of Pier
	Areas Not Inspected: No inspection was made, and no report is submitted, of inaccessible areas. These include, but may not be limited to, concealed frame timbers, eaves, areas concealed by concrete floors, wall linings, soil, landscaping, rubbish, floor coverings, furniture, pictures, appliances, stored items, insulation, hollow blocks/posts. Furnishings, furniture & stored items were not inspected.

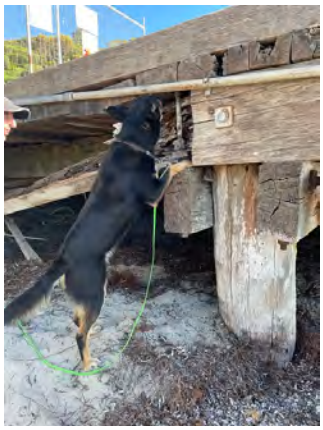
IMPORTANT: If a complete Inspection of the above areas was not possible, timber pest activity and/or damage may exist in these areas. Further Inspections are strongly recommended to the areas where Reasonable Access is Unavailable, Obstructed or Restricted or a High Risk of possible Termite Activity and/or Damage exists.

Moisture:	High WARNING: SEE IMPORTANT WARNING BELOW, ALSO REFER TO SECTION 3: Point 2. High Moisture High moisture levels due to ocean environment
Were specialist non-destructive tools considered necessary?	Yes Termite Detector Animal Sniffer dog located live termite activity Note: If the specialist tools used suggested possible current termite activity, a more invasive inspection is recommended.
Termite:	Yes WARNING: SEE SECTION 3, Point 4. Yes Live Termites Present Coptotermes Spp Yes Termite Nest Identified - Yes Termite Damage Visible Termite Damage Extent - Extensive
Location of Threats Not Limited To:	
Where specialist non-destructive tools were NOT used, is an Invasive Inspection Recommended?:	No WARNING: SEE SECTION 3. Point 4. Invasive Inspection.
Other Comments:	With the aid of a termite sniffer dog termite activity was located around piles 1and 3c with damage to stringers In between. Live activity located in the top pier capping Timbers between 20-23c, termite mudding was located in these timbers and a sagging section of pier is visible in this area, also a lot of termite mudding evident in pile 22c which may suggest possible stand alone termite nest totally detached from land. Live activity also detected to top capping Timbers around 25-26c. Sniffer dog also showed some interest around capping Timbers from 26-31c and possible suspicion around 56c.

IMPORTANT: If high moisture readings are found, and unaccounted for, the use of a termite movement tracker, thermal imaging camera, or a termite detection animal, if practical or determined necessary by the inspector, may provide further supportive evidence. But if high moisture or termite damage or activity was reported, then you must have a building expert investigate the moisture, and its cause, and determine the full extent of damage and the estimated cost of repairs.

Damage to stringers attached to land

Sniffer dog detected activity around 20-23c capping



Detection around 3c

Sagging of pier 20-23c

Active termite mudding

STRUCTURE ACCESS ISSUES

No structure access issues were identified on the day of inspection.

2: SITE IMPROVEMENTS:

CONDUCIVE CONDITIONS PRESENT

Conducive Conditions Present:

Yes.
IMPORTANT: Our firm cannot accept responsibility for termite attack damage resulting from your failure to rectify the conducive conditions outlined in this report. Also refer to SECTION 3 for further information.

Comments:

Pier is located in a high risk environment due to moisture from the sea, surrounding trees areas. Decay, moisture and marine borers create a perfect environment for termites and in some cases can provide the perfect environment for termites to start separate colonies out on the Pier totally detached from land contact

Ground contact of pier

Trees and ocean environment

Decay and marine borers

SITE ACCESS ISSUES

No site access issues were identified on the day of inspection.

No site termite issues were identified on the day of inspection.

TERMS AND CONDITIONS

1. The Inspector inspected all timber structures such as, decking, extensions, patios, dividing fences, retaining walls constructed with timber, tree stumps within 30 metres of the main building and inside the property boundary
2. The inspection and report are provided in accordance with the Australian Standards (as amended from time to time) to provide a report on termite activity.
3. This is a Specific -special Inspection & Report on termite carried in accordance with AS 3660.2-2017
4. This report is an assessment of areas which the Inspector can see and access to determine the existence or evidence of activities of Subterranean termites.
5. Any restricted areas, structures, furniture which prevent or hinder visual inspection was not moved. The inspector did not undertake any invasive digging, cutting, separated, or pulled apart to gain access.
6. The client acknowledges that a building has many concealed areas and there is no access to some roof areas or areas between floors or eaves because they are simply too low. Floor coverings can be restricted by furniture and belongings. The Inspector did not inspect areas which did not have the minimum space required for inspection as follows:
    a. beneath a floor – vertical clearance not less 40 cm;
    b. exterior walls or roof and ceilings will only be inspected if it can be reached safely having regards to work and safety by use of a safe ladder or step ladder which can be extended to a maximum of 3.6 metres from ground level;
    c. roof void minimum access size must not be less than 45 cm by 40 cm with vertical space 60 cm X 60 cm for reasonable movement;
7. The Client acknowledges that some defects may not be visible nor reported because of weather condition existing at the time of inspection.
8. The Inspection did not include the following:
    a. items which are non-structural;
    b. any areas which cannot be seen or where further examination is required;
    c. areas which are obstructed or areas which cannot be assessed readily and safely;
    d. Serviceability damp defects including rising damp and condensation;
    e. Body Corporate common property;
    f. Mould;
    g. Asbestos materials;
    h. Magnesite materials;
    i. Foundations footings

9. The Inspector is not required to provide any estimate of repairs and if such estimates are given then it is given as a guide an on to be relied on in determining the likely costs of repairs. The Client shall engage a Builder, engineer and other trades obtain proper quotations for any repairs.

10. Mediation. In the event of any claim, dispute or other matter arising out of or relating to this Agreement, the parties shall attempt to resolve any dispute amicably at a meeting to be attended by a person nominated by the Australian Mediations Association Limited. The parties shall bear equally the costs of the mediation.

11. Other than inspections conducted in the Australian Capital Territory (ACT) third parties cannot rely on this report; see The Civil Law (Sale of Residential Property) Act 2003 ACT as amended establishes a process for the making and exchange of contracts for the sale of residential property in the ACT. The ACT Act details documents that must be obtained and made available to the buyer for inspection before a residential property is offered for sale. These documents include building inspection reports. The aim is to enhance consumer protection by giving buyers all the relevant information about the property they intend to purchase. Building inspectors are also required to advise when reports on a property have been prepared for an intending seller. This information is then recorded in a public register in the ACT only.

12. WARNING: It is recommended that the client engages the relevant consultants or builders to investigate and rectify all defects raised in this report otherwise the defects may deteriorate and cause further damage or problems.

13. 13. ExclusionsThe Inspection report does not include the following:
    a. the detection of Drywood termites (e.g. Cryptotermes brevis) or any exotic Timber Pests as Drywood termites typically live entirely inside a piece of timber with no visible evidence.
    b. An assessment of the extent or degree of damage caused by Timber Pests as this can only be determined by further invasive investigations by other consultants including plumbers, builders, and Engineers.
    c. the detection non-timber destroying pests on the property such as bedbugs, cockroaches, fleas, rodents etc. Accordingly, these are not defined as Timber Pests and so are not covered within the scope of Inspection.
    d. The inspection does not include any preventative advice or action plans.

14. Glossary - The following definition is to assist you to understand the report:
    a. Subterranean Termites -Subterranean termites also commonly known as "white-ants" are a highly wood destructive timber pest of the Order Isoptera causing major structural timber damage to buildings.
    b. Visible Evidence -There are clear signs or evidence of timber damage by Subterranean termites activity
    c. No Visible Evidence - The Inspector did not detect any visible signs or indication of the presence or activity of Subterranean termites
    d. High Risk - Having regards to the building structure, environment and conditions that there is a high degree of the existence of infestation or Subterranean termites' activity.Serious Safety Hazard is a matter or thing may be regarded as an immediate or imminent risk to life, health or property.

15. Further Notations: The Report is not to be taken as a guarantee but is an opinion of the Inspector of the existence of any infestation. This is not a report on the structure the building works and if the client requires such a report then the client should engage the appropriate consultant to obtain the reports.
16. Access Comments: Reasons areas did not have reasonable accessSub Floor levelExample: No inspections of those parts of sub floor area because insufficient clearanceRoof Void Example: No inspections in those parts of roof cavity due to existence of ducting or insulation materials or insufficient clearanceVisual inspectionsNo inspections of areas because of Visual obstruction -reasonsAreas Obstructed not inspected because of existence of:Example carpet,cupboards & furniture

Advice on reduction of the risk of Timber termites

1. Inspect surroundings of your home –keep vegetation, trees plants or garden beds well away of building weep holes and building lines.
2. Repair leaks or moisture issues like inadequate drainage, leaking taps or pipes or poor ventilation.
3. Do not accumulate materials under the house as they reduce ventilation space.
4. Ensure that there is no timber on the ground in proximity of the dwelling house or structure.
5. When building and renovation be aware that some building materials or methodology can reduce termite risks.
6. Arrange for timber pest inspection at least once a year and adopt their recommendations.

4: FINAL DETAILS:

RECOMMENDATIONS

Date of the Regular Termite Inspection that this SP relates to:	03/03/2022
At this inspection was an invasive inspection carried out?	No
Termite Management Recommendation:	Highly recommend termite baiting program
Frequency of Further Inspections:	A further Special Purpose Inspection is required
Other Inspections Recommended:	Yes Comment: Highly recommend yearly termite inspection to pier due to high risk environment and structure. Refer to Recommendations in the Report.
Comments regarding a Subterranean Termite Treatment Proposal:	Baiting system proposed

GENERAL COMMENTS

No works on pier are to be undertaken whilst baiting system in place.
Termites are of the highest risk to this pier due to the environment and conditions.
Once termites have been eliminated it is recommended that engineering contractors re assess damage.

SIGNED BY INSPECTOR

Inspector Name:	**David Oates**
License Number:	**L004165**
Date:	**03/03/2022**
Signed:	

FSC | RANGE

DELIVERY REIMAGINED

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