Halkett Bay, Gambier Island
Ports Condition Assessment

DRAFT FOR CLIENT REVIEW
2023.01.19

February 28, 2023

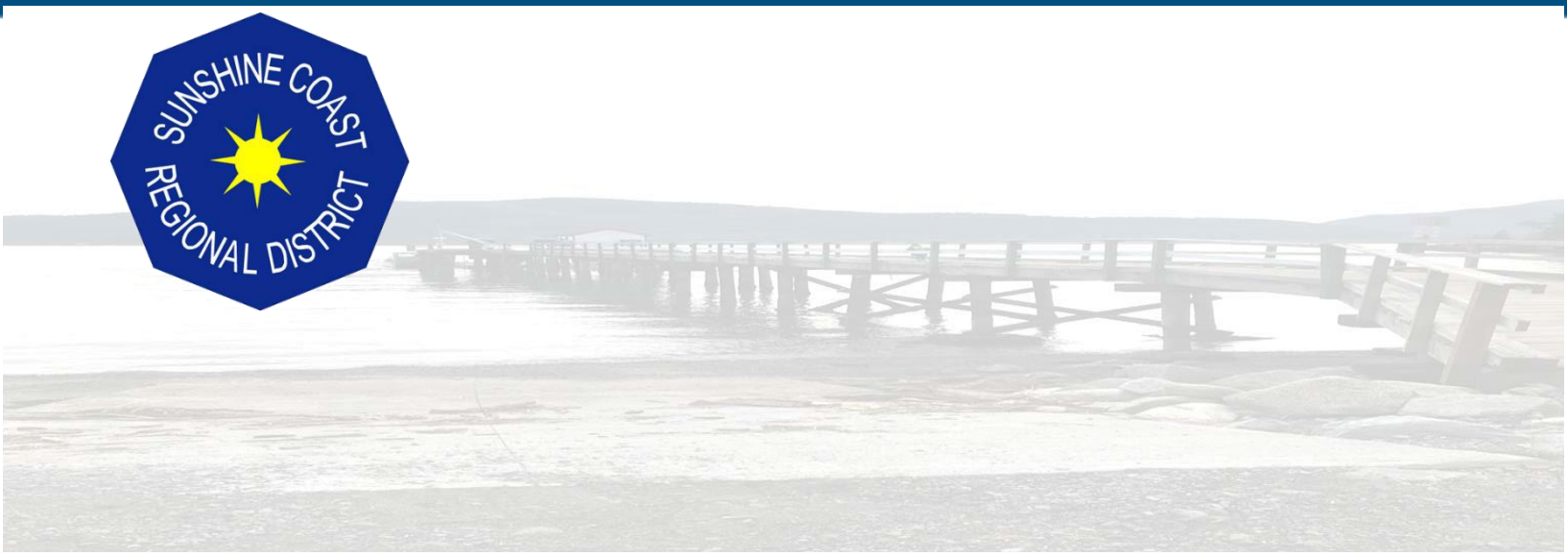
Prepared for:

Sunshine Coast Regional District
1975 Field Road
Sechelt, BC
V0N 3A1

Attention: Kelly Koper, Capital Projects Coordinator
[Ports]

Prepared by:

Herold Engineering Limited
Unit 7, 1920 Lyche Road
Ucluelet, BC
V0R 3A0



HEROLD ENGINEERING

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Attn: Kelly Koper, Capital Projects Coordinator, [Ports]

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Herold Engineering Limited
Unit 7, 1920 Lyche Road
Ucluelet, BC
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Submittal Date: February 28, 2023

Herold Project No.: 4551-012

Prepared by:

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Shannon Summersides, P. Eng.
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Reviewed by:

_____
Craig Work, P. Eng., FEC
Principal

Executive Summary

The scope of the assignment includes above and below water assessment of the Halkett Bay port facility followed by preparation of a site specific condition assessment report. The report includes health and safety considerations and load rated capacities for the overall structure, as well as residual life estimates for individual members. A brief gap analysis between the existing structure and locally accepted Best Management Practices for marine facilities was completed using cited reference material (see Section 1.3). The Best Management Practices utilized for the analysis were generated and apply to Howe Sound, Pender Island and the Sunshine Coast region.

The assessment was conducted on November 28, 2023. The purpose of the assessment was to document the overall physical condition of the facility through review of provided reference material (previous inspection reports/drawings) and visual and tactile assessment of accessible elements from above and below water. The above water assessment was conducted by Herold Engineering and the underwater portion of the work was completed by Westcoast Diving Contractors Limited under direct audio and visual communication with Herold Engineering.

The port facility is in overall serviceable condition. Assessment results indicate that minor remedial work is recommended throughout the facility.

There are some items identified as recommended to be repaired/replaced within the next year as follows:

- Minor repairs/replacement of topside items on all structures
- Recoat handrails in their entirety
- Remove/remediate service shed
- Four bearing piles require metal strapping and replacement within three (3) years
- Coating touch-ups to the gangway and float bull rails
- Replacement of all flange splice block connections on the float

The gap analysis identified minor items which could be completed at the facility to bring it closer to adherence with BMPs. The following could be considered during the next maintenance cycle/upgrade:

- Construct all buildings on the structure to the most current edition of the British Columbia Building Code.
- Retrofit gangway with decking that allows 43% or greater light penetration.
- Consideration should be given to prohibiting vessel moorage in the winter season.

The following recommendations pertain to Health and Safety at the facility:

- Safety ladder spacing and signage does not conform to WorkSafe BC regulations.
- Handrails do not conform to OH&S standards.

The load rating was established using The Canadian Highway Bridge Code (CAN/CSA S16-19), and assumes that all repairs identified to qualify the rating have been completed. The fixed structure(s) has been rated for single unit and two unit vehicle use to a maximum gross vehicle weight (GVW) of 13,750kg and 16,250kg respectively. The signage required to be posted at the facility has been included in the report. The gangway and float appear to be of typical Canadian Department of Public Works construction and have been historically rated to a maximum area load of 1.2kPa.

HALKETT BAY, GAMBIER ISLAND
PORTS CONDITION ASSESSMENT
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1.0 INTRODUCTION

Facility: Halkett Bay, Gambier Island

Assessment by: Shannon Summersides, P. Eng. (Herold Engineering Ltd.)
Westcoast Diving Contractors Ltd. (3 man crew)

Date: November 28, 2023

1.1 Purpose of Assignment

The assessment was conducted to identify members either requiring repairs or showing signs of deterioration. The following report will provide information regarding maintenance, repair, replacement and health and safety on a 10 year forecasted time period, allowing for a prioritized repair and maintenance program to be implemented. Other items noticed during the inspection will be reported only in terms of general overall condition.

The assessment included detailed above water visual / tactile inspection of the following facility components:

- Abutment
- Handrails
- Vehicle Guard
- Cleats
- Safety Ladders
- Deck Planks
- Stringers
- Pile Caps
- Cross Bracing
- Piles

Items assessed specific to floats:

- Gangways and connections
- Bull rails
- Rub boards
- Floatation
- Mooring system (piles, anchor chains)

The facility was reviewed from above water by Herold Engineering Limited (Herold Engineering) and below water by Westcoast Diving Contractors Ltd (WDC) under direct audio and visual supervision of Herold Engineering. Although these assessments are able to verify much of the visible and tactile damage, they are somewhat limited in assessing the severity and extent of internal damage, especially damage as a result of marine borer activity.

The facility was previously reviewed from above water by Herold Engineering from above water in December 2018, and below water in 2016 by GreenWave Marine Services (GreenWave). The majority of the items noted for repair/replacement from these assessments have be completed during construction in 2019/2020.

1.2 Scope of Work

The assessment of the facility components was completed to the standards set out below. The work included facility components noted in Section 1.1.

The condition assessment and residual life estimates were based on previous experience, as well as the reference material noted below.

The load rating and capacity calculations were executed following the recommendations in the reference material noted below and good engineering practice.

All recommendations related occupational health and safety were provided based upon current WorkSafe BC regulations, as well as our experience with facilities similar in form and function.

A gap analysis was conducted for the facility to evaluate compliance with several best management practices documents prepared by municipalities and First Nations groups along the coast of Vancouver Island and the Mainland for the maintenance and construction of marine infrastructure. All documents were provided by The Sunshine Coast Regional District and are reference in Section 1.3 below.

1.3 Reference Material

- Procedures for Inspection and Assessment of Fixed Timber Docks – 1994 September – 4th Edition by R.G. Sexsmith Ltd.
- Standard Practice Manual for Underwater Investigations by the American Society of Civil Engineers, Ports and Harbors Committee, May 2000.
- Canadian Highway Bridge Design Code CAN/CSA S6-19.
- WorkSafeBC Occupation Health and Safety Regulations for Wharves, Docks and Mooring Floats
- Pender Harbour Dock Management Plan. Ministry of Forests, Lands, Natural Resource Operations and Rural Development. March 2021.
- Shisha'lh Nation Best Management Practices for Marine Docks. Version 20180605.
- Atl'ka7tsem/Howe Sound Biosphere Region Best Management Practices for Marine Docks. Draft 10. June 13, 2021.
- Canadian Navigable Waters Act. R.S.C, 1985, c.N-22. Canadian Minister of Justice. December 12, 2022.

2.0 DESCRIPTION

2.1 Location

Halkett Bay Port Facility is located on Gambier Island, immediately southwest of Halkett Bay Marine Provincial Park, approximately 25 kilometers northwest of Vancouver, B.C. Refer to the following aerial figure (Figure 2.1) for port location.

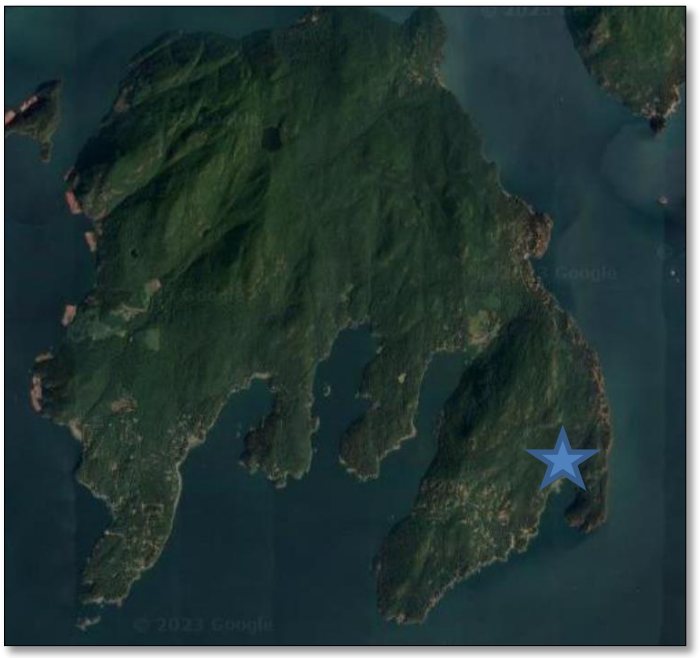


Figure 2.1: Halkett Bay Site Location

2.2 Geometry

The overall geometry of the facility's main components is as follows:

Approach	-	3.05m x 62.4m
Wharfhead	-	9.15m x 9.15m
Gangway	-	1.22m x 10.89m
Float	-	4.6m x 16.0m

The general layout of the facility is as per the Herold Engineering Drawings 4551-012 S01 and S02 located in Appendix C.

2.3 Reference System

The reference system used for this report is as per the drawings found in Appendix C. For the purpose of this report, the approach, wharfhead, gangway, and float all generally run north to south

Along the approach and wharfhead the pile bents are numbered from the abutment (Bent 0) to the wharf face (Bent 16). The pile rows are lettered from east to west as Gridlines A through to D.

There is one float at the facility, accessed via a steel truss gangway with timber deck typical of Transport Canada marine facilities of this nature. The float is moored by three compact mooring dolphins comprised of four timber piles each.

The general arrangement of the facility is shown in Photograph 1 & 2, located in Appendix A.

2.4 Approach & Wharfhead

The facility is a typical legacy Transport Canada facility. The approach and wharfhead are primarily treated timber construction. Topside elements include handrails and vehicle guards along either side of the approach (Gridlines B and C), as well as at a small bump out in the wharfhead footprint where the derrick crane is located. There is a vehicle guard around the wharfhead perimeter, no handrails are present on the wharfhead as is typical of a structure designed to have vessels berthing. Timber decking provides a walking surface along the approach and wharfhead. There is a service shed at the seaward end of the wharfhead with a life ring mounted to the northwest corner of the shed. There is a single safety ladder and two mooring cleats mounted along the seaward edges of the wharfhead.

The substructure is comprised of treated timber stringers, pile caps and bearing piles. Some pile replacement has occurred during the service life of the structure, and there are select wood piles that have been replaced with concrete bearing piles of the same approximate diameter. The approach and wharfhead have been retrofitted with cross bracing during the 2019/2020 construction. The bracing is shown in the reference drawings (Appendix C). There is a fendering system along the seaward face of the structure comprised of fender piles and fender chocks. The wharfhead has no batter piles, and it is understood that vessel berthing is no longer a service requirement of the structure(s).

The abutment (Bent 0) is comprised of a timber sleeper beam supported on concrete lock blocks.
Typical member sizes and spans are as follows:

Handrails	-	38mm x 140mm handrail
	-	38mm x 89mm top-rail
	-	38mm x 140mm mid-rail
	-	89mm x 89mm x 1.5m post
Decking	-	75mm x 305mm treated, spanning approx. 610mm
Vehicle guard	-	140mm x 191mm (approach)
	-	203mm x 254mm (wharfhead)
Risers	-	51mm x 203mm and 305mm or 610mm long
Stringers	-	140mm x 292mm creosote treated, spanning 4.6m
Pile caps	-	305mm x 305mm creosote treated
Cross Bracing	-	165mm x 203mm
All Piles	-	Size 36 (305Ø) creosoted treated/concrete
Fender Chocks	-	140mm x 292mm

2.5 Gangway

A steel truss gangway is located on the seaward edge of the wharfhead between 16B and 16C. The gangway provides access to a timber float. Truss member sizes are as follows:

Top Chord	-	L89x64x6
Bottom Chord	-	L51x51x6
Posts	-	C75x6
Braces	-	C75x6

Decking	-	38mm x 292mm timber with wire mesh gripping surface
Ladder Treads	-	38mm x 38mm (one side of deck)

2.6 Float

Topsides of the float include painted timber bull rails and risers and treated timber decking. There are pile well guard timbers around the compact mooring dolphin, and timber rubboards along the float perimeter. There is a timber landing pad with guide angles secured to the float deck.

The float is moored using three sets of mooring pile dolphins: two at the north and one at the south end of the float. The mooring dolphins consists of four timber mooring piles lashed together with steel cable. Timber blocking is oriented north/south and east/west at the top of the dolphin(s) and adds stiffness to the arrangement. The piles have been outfitted with UHMWPE sleeves in the tidal zone to mitigate cross section loss from abrasion. There is no safety ladder located on the float.

Typical component sizes and spans are as follows:

Decking	-	51mmx305mm
Bull Rails	-	89mmx140mm
Risers	-	140mm x 140mm
Pile Well Guards	-	89mmx140mm
Rubboards	-	75mmx305mm
Mooring Piles	-	Size 36 (305Ø) creosoted treated
Edge Stringer	-	140mm x 235mm
Joists	-	140mm x 140mm and 140mm x 191mm (mixed)
Cross-Tie	-	140mm x 191mm
Flange	-	140mm x 191mm
Flange Splice Block	-	140mm x 140mm
Floatation	-	610mm x 1220mm x 2440mm (Fiberglass)
Floatation	-	610mm x 1220mm x 2440mm (Polystyrene)

3.0 Health & Safety Background

Legacy Transport Canada marine facilities of this kind have a similar construction and arrangement which is somewhat typical within the Pacific region. The majority of marine facilities are not able to meet areas of governing regulations for health and safety. It is at the discretion of the owners of the facility as to the stringency with which the following requirements are followed.

3.1 OH&S Requirements

3.1.1 Ladders

Fixed ladders must be provided at every dock for access to and egress from the water and should:

- Be spaced at intervals not exceeding 30 meters.

- Extend from the top of the float or fixed wharf structure deck to at least 1 meter below the lowest water level.
- Be maintained free of barnacles and marine growth, and
- Have their location identified by high visibility paint on the curb or bull rail.

3.1.2 Lifesaving Equipment

Appropriate lifesaving equipment must:

- Be provided and maintained for the rescue of any worker/users in danger of drowning, and
- Be positioned at intervals not exceeding 50 meters in conspicuous locations as near as practicable to the danger area.
- Throwing lines fitted to lifebuoys or similar equipment must be of suitable size and length and made of buoyant material.
- Lifesaving equipment includes lifebuoys, throwing bags, grapples, boat hooks or other equipment appropriate to the circumstances.

3.1.3 Curbs, Bull Rails, Guardrails, and Barriers

A curb or bull rail must be installed along the open sides of each float, dock, wharf, pier and similar other area where mobile equipment might be used.

Each curb and bull rail must be of substantial construction and be at least 250mm high.
Where practicable, guardrails meeting the requirements of Part 4 (General Conditions)
must be installed at:

- Dangerous breaks in the continuity of the wharf, dock or pier and
- Dangerous corners, edges and other parts of a wharf, dock, or pier.
- See section 3.1.5 for Part 4 (General Conditions) requirements (below).

Moveable warning barriers may be used where the use of standard guardrails is impracticable.

3.1.4 Markings

Where circumstances require, curbs, bull rails, guardrails, and barriers must be painted solid yellow, yellow and black stripes or checkers, or yellow against a suitable contrasting background.

Retroreflective paint or patches must be applied to curbs, bull rails, guardrails, and barriers where mobile equipment is operated at night

3.1.5 Fall Protection (OH&S Part 4 – General Conditions)

An area accessible to workers must have guards or guardrails installed in any of the following circumstances:

- If a raised floor, open-sided floor, mezzanine, gallery, balcony, work platform, ramp, walkway, or runway is 1.22 meters or more above the adjacent floor or grade level;
- On both sides of any walkway over or adjacent to any substance which is a

hazard if a worker fell in, or on it, or which is over machinery or work areas;

- Around the perimeter of any open container or containment area such as an open vat, bin, tank or pit which is 1.22 meters or more in depth and which has sides that do not extend at least as high as required for a guardrail above the adjacent grade or work surface;

It is to be noted that these requirements pertain to workers and may not be relevant for the use of the port facility.

3.2 Fire Protection

The placement of fire-extinguishing equipment shall be planned in cooperation with the authority having jurisdiction and the local responding fire departments at least annually in order to accommodate changing conditions and personnel responsible for fire control in the facility.

The placement of portable fire extinguishers on piers and along bulkheads where vessels are moored or are permitted to be moored shall meet the following criteria:

- Extinguishers listed for Class A, B, and C fires shall be installed at the pier/land intersection on a pier that exceeds 7.62m in length.
- Additional fire extinguishers shall be placed such that the maximum travel distance to an extinguisher does not exceed 22.86 meters.
- All portable fire extinguishers shall be maintained in accordance with Chapter 6 of NFPA 10, Standard for Portable Fire Extinguishers, and shall be clearly visible and marked.

4.0 Best Management Practices Gap Analysis

Pacific coastal municipalities and First Nations groups are beginning to provide regulations and guidelines for marine dock construction, management and remediation in attempts to ensure infrastructure is adhering as best as is practicable to Fisheries and Oceans Canada guidelines and best management practices.

A gap analysis has been conducted for the facility to identify items which may fall short of new regulations/guidelines and to identify items which the SCRD may want to use in the future to develop their own permitting requirements, regulations and best management practices for floating docks within their jurisdiction.

The following Best Management Practices (BMP) documents have been used in the gap analysis as provided by the SCRD:

- Pender Harbour Dock Management Plan. Ministry of Forests, Lands, Natural Resource Operations and Rural Development. March 2021.
- Shisha'lh Nation Best Management Practices for Marine Docks. Version 20180605.
- Atl'ka7tsem/Howe Sound Biosphere Region Best Management Practices for Marine Docks. Draft 10. June 13, 2021.

All three documents have very similar requirements/recommendations. Some items are specific to new construction; however, several items can be incorporated into existing facilities during regular service, repair, renovation and/or decommission activities to improve

environmental and societal impacts.

It is to be understood that the water body surrounding Gambier Island and the Sunshine Coast Mainland is deemed by DFO and the Canadian Species at Risk Act to be a habitat for extirpated, endangered of threatened marine species. For this reason new construction and any major maintenance activities involving in water works are required to be reviewed, at minimum, by DFO to ensure that all habitat and species are kept safe during the associated activities. For this reason, the best management practices noted above heavily emphasize DFO regulations and mitigation measures for marine facilities and construction. Some of the items do not apply to this port facility.

Halkett Bay is a legacy port facility that was constructed as appropriate for its time. Since the facility is existing, and no reports of negative interactions with marine life have been reported during its current service life (ie: as a public facility), we can say that the infrastructure has now likely become part of the marine habitat and there is no known reason to believe the facility poses any threat to marine life.

The following checklist details the gap analysis between the Halkett Bay Port Facility as found during the condition assessment and the BMP's outlined in the above documents.

Table 4.1 Gap Analysis Checklist

BEST MANAGEMENT PRACTICE	2022	REMARKS
Dock Facility that facilitate numerous upland owners	✓	*Facilities service large(r) communities with several people utilizing the facility*
No critical habitats are impacted per Canadian Species at Risk Act (SC 2022, c.29)	✓	*Not directly applicable to the structure in service, but it is considered during upgrades and maintenance activities.*
Do not block the free movement of water along the shoreline	✓	*Piled structures allow for this requirement to be met*
All building codes and bylaws administered by all levels of government must be adhered to for all structures	✗	*Service shed on wharfhead is not designed to the appropriate building code (BCBC2020)*
Clearance to underside of float is minimum 1.5 meters	✗	*Clearance at Lower Low Water Large Tide is less than 1.5 meters*
Aligned in a North to South direction	✗	*Existing facility, this requirement is not possible to meet*
Access ramps/walkways are minimum 1.0 meters above HHWLT	✓	*At high tide this facility is very close to this minimum. Consideration should be given to sea level rise during any changes to the walkway structures*
Access ramps/walkways 1.2 meters wide maximum	✗	*Approach and wharfhead are both wider than this. Serviceability for large (public) populations using the facility to bring in supplies makes achieving this BMP impractical*
Decking material allows (43%) light penetration	✗	*Timber decking does not allow through the minimum 43% light penetration. This is typical along the fixed structures, as well as the gangway and float.*
Use of encased, wrapped or uncovered polystyrene products	✗	*Encased and uncovered polystyrene comprise the floatation system for the float*
Using preferred materials	✓	*Structure(s) are constructed from preferred materials, but are not the BMP specified*

		"best" material, which is steel.
Upland dock elements (including anchor points) do not disturb the riparian area	✓	*N/A*
Maintenance and construction activities take place in appropriate DFO timing windows	✓	*N/A*
Consultation with appropriate First Nations stakeholders prior to construction, with specific sensitivity to archeological significance of site	✗	*Unsure if this is part of the SCRD process during upgrades/maintenance activities.*
Allow access to shoreline for First Nations harvesting of marine resources FN	✓	*N/A*
Seasonal floats	✗	*N/A*
No vessel moorage during winter	✗	*N/A*
Construction does not include native materials	✓	*N/A*
Adhere to Canadian Navigable Waters Protection Act	✓	*No navigation hazards identified within site boundary at time of assessment*
Ongoing maintenance is in accordance with appropriate BMPs	✓	*N/A*

The facility adheres to several of the BMPs set out in the reference material. The majority of nonconformance is a result of the facility being repurposed and existing at the time of BMP implementation.

There are items which currently do not adhere to the BMPs, but could be remediated during major upgrades/maintenance or changes to the service requirements as follows:

- Construct all buildings on the structure to the most current edition of The British Columbia Building Code.
- Retrofit gangway with decking that allows 43% or greater light penetration.
- Consideration should be given to prohibiting vessel moorage in the winter season.

5.0 Assessment Results

The results of the on-site assessment are based mainly on visual review, probing and sounding timber with a hammer. While all the piles were reviewed, these assessments are somewhat limited in detection of the severity and extent of the damage particularly damage due to marine borers.

The general condition of the various elements is as indicated below. For information on specific components, see Appendix B.

The following is an explanation of the rating scale used in Section 4 as it relates to the estimated time before the next required repair to a specific item.

Critical: Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur, and load

restrictions should be implemented, as necessary. Repairs may need to be carried out on a very high priority basis with strong urgency.

Serious: Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high priority basis with urgency

Poor: Advanced deterioration or overstressing is observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.

Fair: All primary structural elements are sound, but minor to moderate defects or deterioration is observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.

Satisfactory: Limited minor to moderate defects or deterioration are observed, but no overstressing is observed. No repairs are required.

Good: No visible damage, or only minor damage is noted. Structural elements may show very minor deterioration, but no overstressing is observed. No repairs are required.

5.1 Approach and Wharfhead

General views of the approach, wharfhead, and floats are shown in Photograph 1 & 2 (Appendix A).

5.1.1 Topsides

Generally the topside elements (handrails, guard timber, and decking) are in overall satisfactory serviceable condition, with moderate amounts of mechanical and biological damage due to weathering, abrasion, biological growth, and moisture ingress.

The handrails are in fair condition and there is one top rail and one mid rail recommended for replacement due to mechanical damage (splitting). There is one post which requires monitoring. The handrails have several coating failures and are not treated. It is recommended that the handrail system be re-coated to extend the service life.

The vehicle guard is in overall good to fair condition. There is evidence of mechanical damage and weathering throughout. One section of guard recommended for replacement due to mechanical damage, likely due to vehicle impact.

The deck boards are generally in satisfactory serviceable condition, with minor deterioration due to weathering. Ongoing monitoring is recommended.

The derrick crane and mooring cleats are in good serviceable condition with only

moderate surface corrosion. The thru-bolt connection for the derrick crane appears to have some surface corrosion to the backer plate and hardware. Ongoing monitoring is recommended.

The service shed is in overall poor condition. The bottom of the shed walls and door are visibly decayed and have areas of localized failure. The coating on the exterior walls and door has several localized areas of failure, allowing additional water ingress and weathering. The area below the shed is double decked. Several deck sections are compromised, and the lower decking is visible. The shed is recommended to be replaced/remediated or removed.

5.1.2 Abutment

The abutment is in overall satisfactory condition. There are minor spalls along the edges of the concrete lock blocks. Ongoing monitoring is recommended.

5.1.3 Stringers

The stringers appear to be in overall good to satisfactory condition, with minor biological growth along the exterior surfaces.

5.1.4 Pile Caps

Generally, the pile caps are in overall satisfactory condition, with minor to moderate biological growth along the exterior surfaces of the members. Two pile caps were noted to have minor checking along the underside of the members at mid-span. Ongoing monitoring is recommended.

5.1.5 Bearing Piles

The bearing piles are in overall fair condition. As noted in the 2018 report, prepared by Herold Engineering, several bearing piles have moderate splitting within the top 1-3m due to weathering and/or conditions during pile driving. During the current assessment we were able to more closely assess the splitting. Four bearing piles have significant splitting with areas of moderate softness when probed. These piles are recommended to be banded with stainless steel banding with replacement of the piles considered within the next three years.

5.1.6 Cross-Bracing

The cross bracing at the facility has been installed within the last three years. The bracing appears to be in good condition.

5.1.7 Fender System

The fendering system on the wharfhead is in overall poor condition.

The fender piles are in overall poor condition. One fender pile has significant cross section loss within the splash zone.

It is understood that the wharf structure is no longer utilized to berth vessels. Provided the service requirements of the facility do not change (ie: no large vessel berthing against the fender system) it is acceptable to leave the piles in place and allow deterioration to continue, or remove them above the mudline to prevent unsafe conditions in the future. Ongoing monitoring of the system is recommended, and if any components become a navigational hazard they are to be removed immediately. Navigation hazards would include elements which break within the intertidal zone or within 3.0 meters below the lowest low water mark, or are dislodged from the structure entirely.

5.2 Soundings

Sounding were taken around the wharfhead and approach perimeter. The soundings may be used to identify any scouring, undermining, and/or sediment transport that may be happening at the facility. It is recommended that sounding measurements be taken during scheduled maintenance and periodic condition assessments to monitor variations in the seabed and/or listing of the structure(s).

Table 5.2.1 Wharf and Approach Sounding (m)
**All measurements were taken from top of deck to mudline.*

Location	2018	2022
7C	5.3m	5.3m
14A	8.0m	8.0m
14D	7.3m	7.3m
16A	8.0m	8.0m
16D	7.7m	7.7m

5.3 Gangway

The gangway is in overall good condition. There are minor coating failures along the steel truss elements. There is no shoreward transition plate, however this does not appear to be a tripping hazard. Ongoing monitoring is recommended with field touch up of the coating to be completed as part of ongoing facility maintenance.

5.4 Main Float

The float is in overall serviceable condition. The topsides are in fair condition. The bull rails have moderate amounts of cross sectional loss (CSL) due to mechanical damage and abrasion. There is no guarding at the seaward end of the float, as well as no safety ladder on the float. Guarding (bull rails) on the east edge of the float and fixed aluminum or galvanized steel ladder are recommended to be installed on the float.

The transition plate from the gangway extends past the existing landing pad footprint at high tides and is beginning to abrade the float decking. Ongoing monitoring is recommended.

The substructure of the float is in overall poor condition. The north edge of the float has loose flange hardware. Corrosion is significant and evident from both topside and underneath the structure. There is significant movement through the connection during wave loading. The flange hardware and slice blocks are recommended to be replaced. Due to the nature of the repair, it is economical and preventative to replace all flange hardware throughout the float at the same time.

There is moderate amounts of damage within the mooring pile wells due to abrasion and impact. There is one UHMWPE rub strip which has failed at one connection point and is hanging within the pile well.

The mooring piles are in good condition. The intertidal zone of the piles has been protected with HDPE sleeves to prevent abrasion. Assessment was somewhat limited due to accessibility at the sleeve locations.

The floatation is in overall fair to poor condition. There are raw Styrofoam billets at the east end of the float, which are not considered to adhere to currently accepted environmental best practices. Removal of the raw Styrofoam floatation and replacement with encased billet floatation is recommended.

Table 5.4.1 Main Float Freeboard Measurements (mm)
**All measurement from waterline to top of float deck*

Location	2018	2022
Northwest	330	381
Northeast	280	330
Southwest	178	431
Southeast	102	406

As noted above, the south end of the float is listing significantly. The freeboard around the float perimeter is, on average, below the recommended freeboard of 430mm, typical for floats of this nature. It is understood that the float was repaired in 2019/2020, which is evident in the much improved freeboard measurements relative to the 2018 measurements noted. It is likely that the loose flange connection and raw Styrofoam billet are contributing to the variability in the new freeboards. Once recommended repairs are completed to the substructure, it is likely the float list will improve, and the freeboards will come within a generally accepted tolerance of (±) 50mm.

5.5 Boat Launch

The boat launch is in overall fair-poor condition. No remediation appears to have taken place since 2018. There is evidence of minor settlement of the concrete panels. The panels do not extend far enough to launch a vessel at low tide, and the slope appears to be slightly steeper than the recommended maximum of 15%.

It is recommended that additional panels be installed such that the end of the boat launch is at minimum 305mm below the water surface at lower low water large tide. It is also recommended that a survey be conducted to verify the slope of the ramp prior to installation of the additional panels.

5.6 Health and Safety

The following health and safety items were noted during the assessment.

5.6.1 Ladders

- There is no safety ladder mounted on the float.
- Ladders along the float and the approach and wharfhead are spaced at intervals exceeding 30 meters.
- The ladder location is not identified with signage and/or high visibility paint on either side of the guard on the wharfhead.

5.6.2 Lifesaving Equipment

- The life ring is mounted to the service shed, and is clearly identifiable when at the facility.

5.6.3 Curbs, Bull Rails, Guardrails, and Barriers

- The guard timber along the approach, as well as the float bull rail/riser arrangements do not meet minimum height requirements of 250mm consistently at the facility. This requirements is typically not met at facilities of this nature.

5.6.4 Fall Protection

The existing handrails are climbable, and have openings larger than 102mm at a deck elevation that exceeds 610mm.

5.6.5 Lighting

There are no lights installed at the facility.

5.6.6 Fire Protection

No observed portable fire extinguishers and/or fire protocols at the facility.

5.6.7 Navigation

No navigation hazards were identified.

6.0 Load Rating & Residual Life Estimates

6.1 Load Rating

There is a posted load rating for the approach and wharf head which was generated by Herold Engineering in 2019.

6.1.1 Approach and Wharfhead

For the approach and wharfhead the load rating calculations were completed in accordance with the prescribed method in CAN/CSA S6-19 for calculating maximum gross vehicle weight (GVW) for different analysis vehicle model configurations as required (Section 14). The vehicle loading models applied to the structure are in accordance with CAN/CSA S6-19 and are defined as follows:

CL2-W (**Two Unit Vehicle)**

Axle 1	-	.08 W	=	50 kN (5,097 kg)
Axle 2	-	.20 W	=	125 kN (12,742 kg)
Axle 3	-	.20 W	=	125 kN (12,742 kg)
Axle 4	-	.28 W	=	175 kN (17,839 kg)
TOTAL	**-**	**0.76W**	**=**	**475 kN (48,420 kg)**

CAN/CSA defines the following as Two Unit Vehicles:

- Tractor – Semitrailer
- Car - Trailer
- Truck – Trailer
- Other vehicles consisting of two units

CL3-W (Single Unit Vehicle)

Axle 1	-	.08 W	=	50 kN (5,097 kg)
Axle 2	-	.20 W	=	125 kN (12,742 kg)
Axle 3	-	.20 W	=	125 kN (12,742 kg)
TOTAL	**-**	**0.48W**	**=**	**300 kN (30,581 kg)**

CAN/CSA defines the following as Single Unit Vehicles:

- Trucks
- Buses
- Cars
- Other vehicles consisting of a single unit

Bending, shear and compressive capacities were determined using methods prescribed in Section 14 of CAN/CSA S6-19. Member sizes and spacing were taken from Herold Engineering drawing set(s) 4551-002 and 4551-006 and confirmed (as required) by field measurements. The analysis was done based on designed member capacities. Structural capacities assume that the recommended repairs, relevant to the load rating, have been completed. See Appendix B where remedial action required to qualification the load rating are identified.

A maximum GVW for individual elements was determined using the prescribed method in Section 14 of CAN/CSA S6-19. This method is used for standardized posting of commercial vehicle weight limits on structures. The analysis involves determining a Live Load Capacity Factor, (F), based on the elements dead load effect (self-weight), live load effect (vehicle loading), and the evaluated member capacity. This Live Load Capacity Factor corresponds to a posting limit for a specified vehicle model.

Table 6.1.2 Approach & Wharfhead Load Rating Governing Condition

Load Type	Element	Failure Mode	Posting Factor	Maximum GVW (kg)
CL2-W	Pile cap	Shear	0.027	16,250
CL3-W	Pile cap	Shear	0.022	13,750

By analyzing each element, an overall governing condition is determined. In the case of this structure, shear in the pile cap on the approach was determined to be the overall governing structural condition. The load rating was achieved by applying a maximum speed of 10 km/hour to the design vehicles. As such, speed limit signage stating this maximum is also required at the facility. The following signage is recommended to be placed at the entry to the approach once the required repairs are completed:

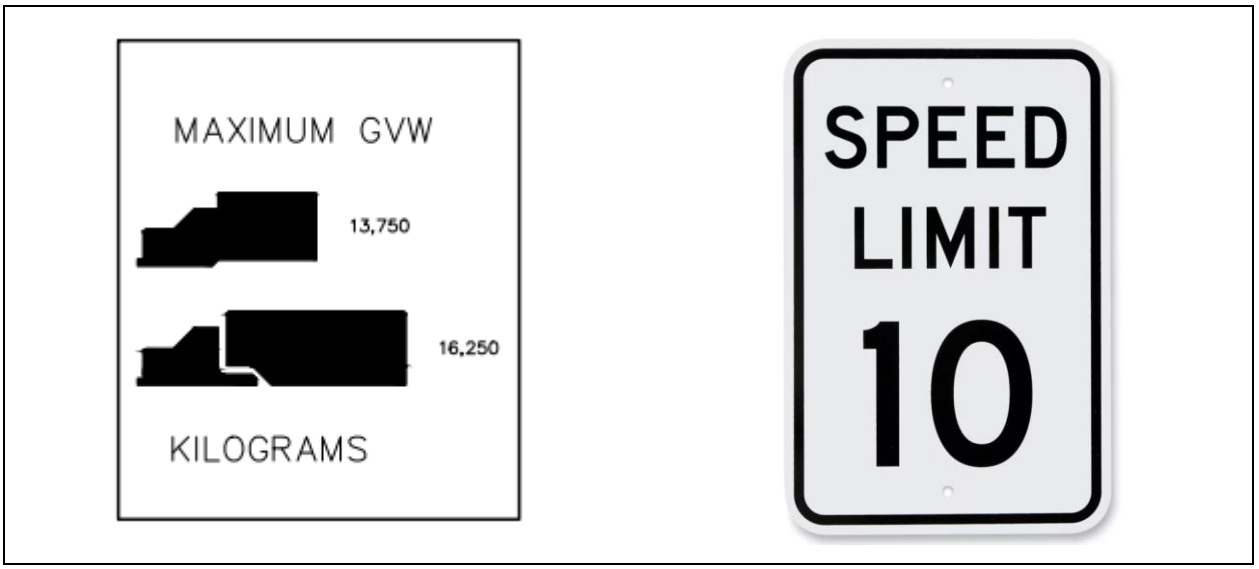


Figure 6.2.1 Load Limit Signage

6.1.2 Gangway

The gangway is a typical Transport Canada style steel truss gangway. The associated load limit, as specified by Transport Canada is 1.2kPa.

6.1.3 Float

Typical Transport Canada timber floats have been historically rated to a maximum uniform load of 122 kg/m^2 or 1.2 kPa. The float is in fair condition with some damage to the splice connections, as well as deteriorated floatation in localized areas. Loads exceeding this maximum are not recommended to access the float.

6.2 Residual Life Estimates

The residual life estimates are based on Section 2.5 of “Procedures for Inspection and Assessment of Fixed Timber Docks, 4th Edition” by R.G. Sexsmith Ltd. These estimates represent the worst case members inspected in any member group. For this reason, the overall condition of the member group is not necessarily reflected by the following residual life estimates. As noted in the above referenced material, the following applies:

- Where treated wood has been examined for presence of decay, and found sound, a life of 8-10 years is appropriate.
- Where evidence of some decay, but very limited extent was found present, a life of 3-6 years is appropriate.
- Where an element has weakened cross-section due to decay, the life can be presumed to be negligible (i.e. 0 years).

Residual life estimates for sacrificial items, intentionally designed for a shortened life span, have been approximated based on our previous experience with elements of this form and function and are as follow:

- Where element retains greater than 50% of its cross section and is secured to structure as designed, a life of 1-2 years is appropriate.
- Where the element retains less than 50% of its cross section and/or shows signs of

fatigue/overstress at the connection points to structure, a life of less than one year is appropriate,

- Where the element retains 0% of its cross section (ie: failed) and/or has failed at any of the connection points it is considered to be "missing" and it is appropriate to presume the life of the element is negligible (0 years)

See Appendix B to determine which members the residual life estimate applies to.

6.2.1 Approach and Wharfhead

Topsides*	0 years (based on minor items to be replaced); 8-10 years otherwise
Stringers	8-10 years (based on overall condition of elements)
Pile Caps	8-10 years (based on overall condition of elements)
Piles	0 years (based on four piles requiring remediation), 3-6 years otherwise

**Note: topside items include handrails, vehicle guards, decking and any accessories which exist on the topside of the fixed structure(s).*

6.2.2 Gangway

Steel Truss	8-10 years with ongoing maintenance (coating touch-ups)
Timber Decking	1-3 years (based on overall condition of element)
Shoreward Transition	0 years (missing)
Seaward Transition	8-10 years with ongoing maintenance

6.2.3 Float

Bull Rails	3-6 years (based on overall condition of elements)
Timber Decking	8-10 years (based on overall condition of members)
Pile Wells	0 years (based on failed wear strip in one location)
Rub Boards	1-2 years (sacrificial)
Flanges	0 years (based on corroded and loose splice connection)
Cross Ties	8-10 years (based on overall condition of the elements)
Floatation	8-10 years (based on the condition of the encased billet floatation)
Mooring Piles	8-10 years (based on overall condition of the elements)

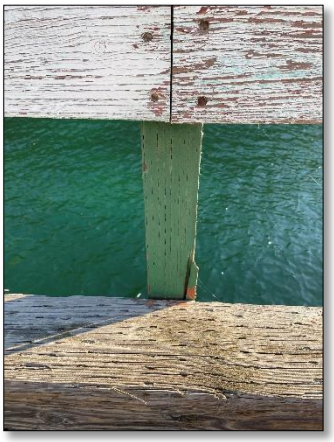
Appendix A
Site Photographs

Photograph 1: Halkett Bay, note: general arrangement from shore looking west

Photograph 2: Halkett Bay, note: general arrangement from seaward end looking east

Photograph 3: Top rail at 0m, note: splitting through rail

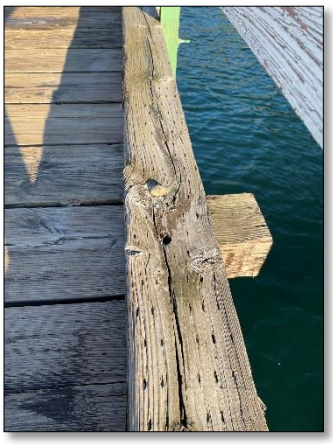
Photograph 4: Top rail at 14.9m, note: nails are raised



Photograph 5: Post at 29.8m, note: splitting

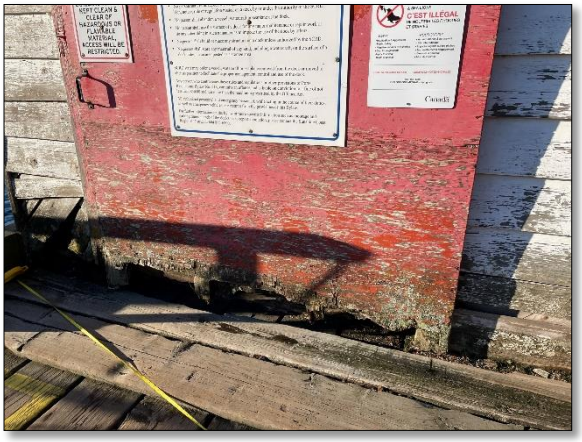
Photograph 6: Mid rail at 55.4m, note: loss of cross section

Photograph 7: Vehicle guard at 0m, note: loss of cross section at end of guard

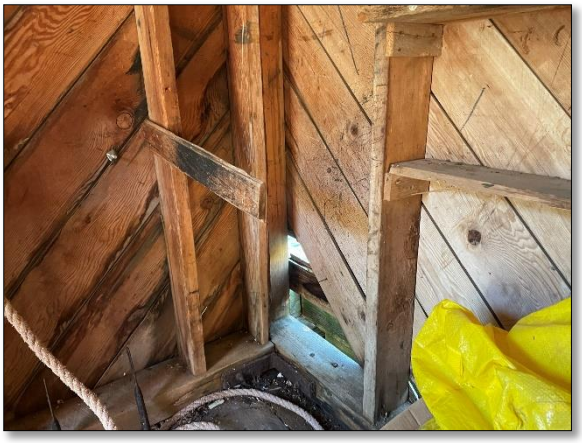


Photograph 8: Vehicle guard at 57.6m, note: splitting and internal cross section loss

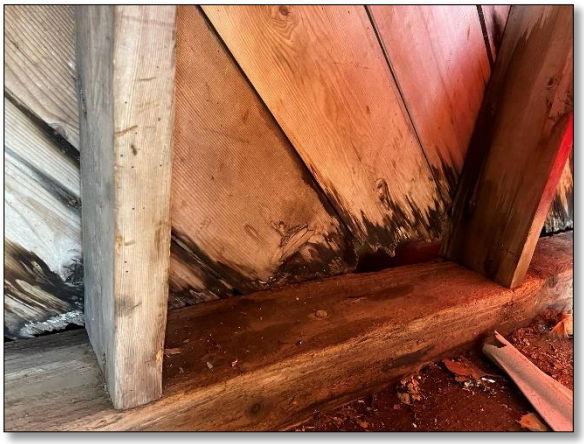
Photograph 9: Service shed, general arrangement



Photograph 10: Access door to shed, note: significant CSL and decay at base



Photograph 11: Interior of service shed, note: failed wall panels

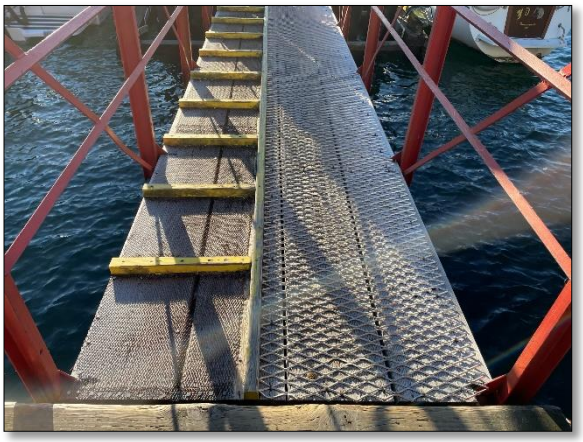


Photograph 12: Interior of service shed, note: base of wall is decayed and failing

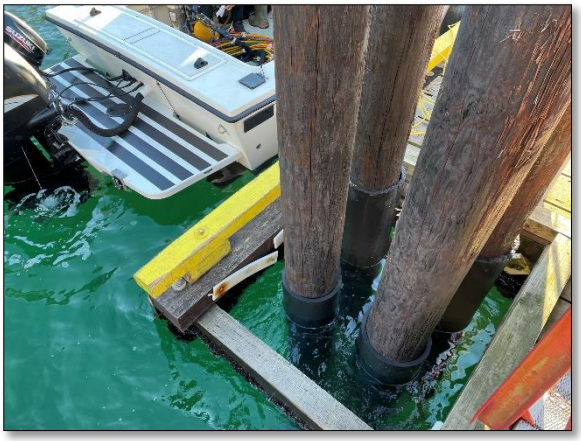
Photograph 13: Pile cap at Bent 5, note: check on underside at mid-span

Photograph 14: Bearing pile 3C, note: splitting throughout pile length

Photograph 15: Bearing pile 4B, note: cracking at cross brace connection



Photograph 16: Shoreward transition, note: missing



Photograph 17: Pile well, note: failed UHMWPE wear strip

Photograph 18: Flange splice block hardware, note: significant corrosion

Photograph 19: East edge of float, note: no guarding

Photograph 20: Seaward transition, note: plate extends past landing pad

Appendix B
Damage Table

Table B1 Facility Damage Table
Note: items required to certify the load rating in Section 5 are identified in **BOLD*

ITEM	LOCATION	DAMAGE	CONDITION	COMMENTS	RECOMMENDATION	REMEDIAL YEAR
Approach & Wharfhead						
Handrail	0m @ C	Mechanical	Fair	Top rail is split	Replace top rail section	2023
Handrail	14.9m @ C	Mechanical	Fair	Nails at the connection are proud of the top rail	Hammer nails back into the top rail to prevent injury	2023
Handrail	29.6m @ B	Mechanical	Fair	Post is split	Ongoing monitoring	-
Handrail	55.5m @ B	Mechanical	Fair	Moderate cross section loss to mid rail	Replace mid rail	2023
Vehicle Guard	0m @ C	Mechanical	Fair	Loss of cross section at end the end of the guard	Replace section of vehicle guard	2023
Vehicle Guard	28.0m @ C	Mechanical	Fair	Minor notch taken out of guard	Ongoing monitoring	-
Vehicle Guard	46.6m @ C	Mechanical	Fair	Moderate cross section loss to riser	Ongoing monitoring	-
Vehicle Guard	57.6m @ A	Mechanical/ Biological	Poor	Splitting through guard with internal cross section loss	Replace section of vehicle guard	2023
Service Shed	Wharf	Mechanical/ Biological	Very Poor	The base of the walls and access door are deteriorated and beginning to decay	Remove or replace service shed in its entirety	2023
Pile Cap	Bent 2	Mechanical	Fair	Splitting on underside	Ongoing monitoring	-
Pile Cap	Bent 5	Mechanical	Fair	Check on underside of cap	Ongoing monitoring	-
Bearing Pile	**3C**	**Mechanical**	**Fair - Poor**	**600 – 900 mm split along pile length**	**Ongoing monitoring. Provide stainless steel strapping and consider replacement within 3 years**	**2023**
Bearing Pile	**4B**	**Mechanical/ Biological**	**Fair**	**Small crack at brace location. Soft when probed**	**Ongoing monitoring. Provide stainless steel strapping and consider replacement within 3 years**	**2023**
Bearing Pile	5B	Mechanical	Fair - Good	Minor splitting in pile	Ongoing monitoring	-
Bearing Pile	5C	Mechanical	Fair	Checking in pile	Ongoing monitoring	-
Bearing Pile	**6C**	**Mechanical/ Biological**	**Fair**	**Splitting with moderate softness when probed**	**Ongoing monitoring. Provide stainless steel strapping and consider replacement within 3 years**	**2023**
Bearing Pile	8B	Mechanical	Fair	Minor cracking in pile length. No softness when probed	Ongoing monitoring.	-
Bearing Pile	8C	-	-	Concrete pile	-	-
Bearing Pile	**9C**	**Mechanical**	**Fair**	**Split extending from the top of the pile, solid when probed**	**Ongoing monitoring. Provide stainless steel strapping and consider replacement within 3 years**	**2023**
Bearing Pile	10B	-	-	Concrete Pile	-	-
Bearing Pile	11C	-	-	Concrete Pile	-	-
Bearing Pile	15D	-	-	Concrete Pile	-	-
Bearing Pile	16B	-	-	Concrete Pile	-	-
Fender Pile	16C	Mechanical	Very Poor	Approximately 50% cross section loss in splash zone	Fender system is no longer required at the facility. Remove pile during next major upgrade	-

ITEM	LOCATION	DAMAGE	CONDITION	COMMENTS	RECOMMENDATION	REMEDIAL YEAR
Safety Ladder	Bent 16	Missing	Very Poor	Chain has failed due to corrosion and the concrete anchor is missing.	Replace anchor block and affected chain on safety ladder	2023
Gangway						
Coating	General	Mechanical/ Corrosive	Satisfactory	Minor localized areas of coating failure	Provide touch ups to coating at next major maintenance cycle or upgrade within the next two years	2023/2024
Shoreward Transition	West end of gangway	Missing	-	Transition plate is missing. It does not appear to be a significant tripping hazard.	Ongoing monitoring	-
Float						
Pile Well	Northwest pile group	Mechanical	Poor	UHMWPE wear strip has failed at the connection and is no longer in place	Re-secure wear strip	2023
Flange Hardware	North edge of float	Mechanical/ Corrosive	Poor to Fair	The upper flange splice bolts are corroded and there is significant movement in the connection resulting in a list in the float.	Replace all flange splice hardware within the next year.	2023
Guarding	East edge of float	Missing	Critical	Bull rail guarding is missing. This does not adhere to safety regulations outlined in Section 3	Install typical guarding (bull rail)	2023
Decking	At gangway landing pad	Mechanical	Fair to Good	Transition plate extends past landing pad at higher tides. Plate is abrading decking.	Ongoing monitoring. Consider replacement if damage increases in severity and/or a major upgrade occurs.	-
Floatation	East end of float	-	-	Exposed polystyrene floatation with moderate damage	Replaced with floatation in accordance with generally accepted BMPs	2023

Appendix C
Reference Drawings

ARCHITECTURAL D 24" x 36"

GENERAL:

1. READ STRUCTURAL DRAWINGS IN CONJUNCTION WITH ALL OTHER CONTRACT DRAWINGS AND DOCUMENTS. REPORT ANY CONFLICTS TO THE ENGINEER BEFORE COMMENCING WORK
2. VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
3. NOTIFY THE ENGINEER 48 HOURS IN ADVANCE FOR INSPECTION OF STRUCTURAL CONNECTIONS BEFORE COVERING UP.
4. CONTRACTOR'S RESPONSIBILITY: THESE DRAWINGS SHOW COMPLETED STRUCTURAL COMPONENTS OF THE DOCKS. THE REQUIRED TEMPORARY BRACING AND SHORING TO PERFORM THE WORK SAFELY IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. ENVIRONMENTAL WORK PROCEDURES, TIMING AND SPECIAL PRECAUTIONS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND LIMITATIONS OF THE FEDERAL DEPARTMENT OF FISHERIES AND OCEANS, AND THE PROVINCIAL MINISTRY OF WATER, LAND AND AIR PROTECTION.
6. DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES, UNLESS OTHERWISE NOTED.
7. HORIZONTAL DATUM U.T.M NAD 83.
8. VERTICAL DATUM (ELEVATIONS AND CONTOURS) TO CHART DATUM (C.D.).
9. TIDE ELEVATIONS AT THE SITE ARE BASED ON VALUES PUBLISHED BY THE CANADIAN HYDROGRAPHIC SERVICE (CHS) FOR THE SITE AS FOLLOWS:

HIGHER HIGH WATER, LARGE TIDE (H.H.W.L.T.)	5.1 METRES
HIGHER HIGH WATER, MEAN TIDE (H.H.W.M.T.)	4.6 METRES
MEAN WATER LEVEL (M.W.L.)	3.2 METRES
LOWER LOW WATER, MEAN TIDE (L.L.W.M.T.)	1.3 METRES
LOWER LOW WATER, LARGE TIDE (L.L.W.L.T.)	0.1 METRES

10. SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR FABRICATION.

ABBREVIATIONS:

CL.	–	CLEAR
C	–	CENTRELINE
CP.	–	COMPLETE PENETRATION
C/W	–	COMPLETE WITH
DWG.	–	DRAWING
EL.	–	ELEVATION
I.D.	–	INSIDE DIAMETER
LLH	–	LONG LEG HORIZONTAL
LLV	–	LONG LEG VERTICAL
MAX.	–	MAXIMUM
MIN.	–	MINIMUM
N.T.S.	–	NOT TO SCALE
OPP.	–	OPPOSITE
PL	–	PLATE
R	–	RADIUS
SIM.	–	SIMILAR
S.S.	–	STAINLESS STEEL
T.O.	–	TOP OF
TYP.	–	TYPICAL
U/S	–	UNDERSIDE
U.N.O.	–	UNLESS NOTED OTHERWISE
WP	–	WORK POINT

DRAWING LIST

DRAWING NUMBER	DESCRIPTION
4551–012 S01	HALKETT BAY: GENERAL NOTES AND KEY PLAN
4551–012 S02	HALKETT BAY: GENERAL ARRANGEMENT SHEET 2
4551–012 S03	HALKETT BAY: GENERAL ARRANGEMENT SHEET 2
4551–012 S04	HALKETT BAY: DETAILS

KEY PLAN
1:500

ISSUED FOR REPORT

NOT FOR CONSTRUCTION

ISSUES								
No.	DATE YYY.MM.DD	ISSUED FOR	No.	DATE YYY.MM.DD	ISSUED FOR	No.	DATE YYY.MM.DD	ISSUED FOR
A	2023.01.13	CLIENT REVIEW						

SUB CONSULTANT

DRAFTED PHU

DRAFTING REVIEW

DESIGNED

DESIGN REVIEW

HEROLD ENGINEERING
3701 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250–751–8558 Fax: 250–751–8559
Email: mail@heroldengineering.com

ENGINEERS SEAL

HALKETT BAY: GENERAL NOTES AND KEY PLAN

PORTS CONDITION ASSESSMENT
HALKET BAY, GAMBIER
1975 FIELD ROAD SECHELT BC V0N 3A1
SUNSHINE COAST REGIONAL DISTRICT

HEL PROJECT No. 4551–012	CLIENT DWG. No. N/A
SCALE AS SHOWN	PERMIT No. N/A
HEL DRAWING No. S01	REVISION A

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

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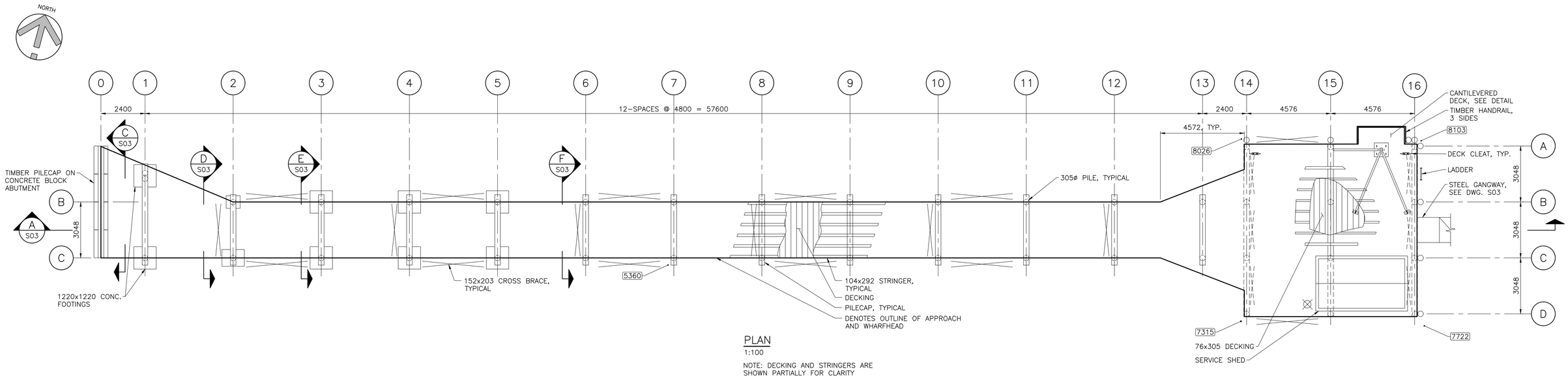
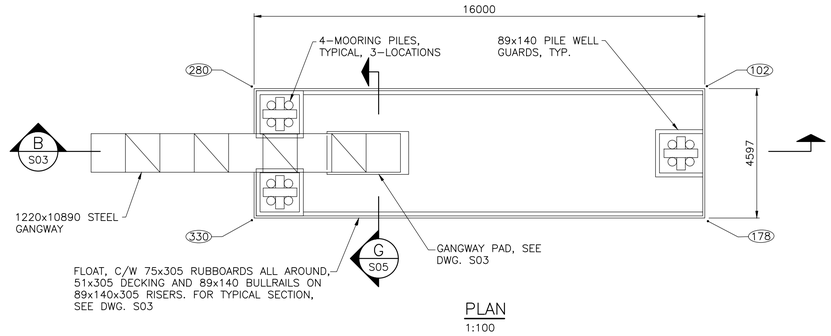


PLAN
1:100

NOTE: DECKING AND STRINGERS ARE SHOWN PARTIALLY FOR CLARITY



PLAN
1:100

LEGEND:

- 7445 — SOUNDING: TOP OF DECK TO SEABED IN MILLIMETRES.
- 229 — FLOAT FREEBOARD: TOP OF DECK TO WATERLINE IN MILLIMETRES.
- LIFE RING
- SAFETY LADDER
- DECK CLEAT

ISSUED FOR REPORT

NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01.
2. ALL ITEMS ARE TIMBER, UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS ARE APPROXIMATE AND ARE TO BE VERIFIED PRIOR TO REMEDIATION/CONSTRUCTION ACTIVITIES

ISSUES								
No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR
A	2023.01.13	CLIENT REVIEW						

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DRAFTED: PHU
DRAFTING REVIEW:
DESIGNED:
DESIGN REVIEW:

HEROLD ENGINEERING
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ENGINEERS SEAL

HALKETT BAY: GENERAL ARRANGEMENT - SHEET 1

PORTS CONDITION ASSESSMENT
HALKET BAY, GAMBIER

1975 FIELD ROAD SECHELT BC V0N 3A1

SUNSHINE COAST REGIONAL DISTRICT

HEL PROJECT No.	CLIENT DWG. No.
4551–012	N/A
SCALE: AS SHOWN	PERMIT No.: N/A
HEL DRAWING No.: S02	REVISION: A

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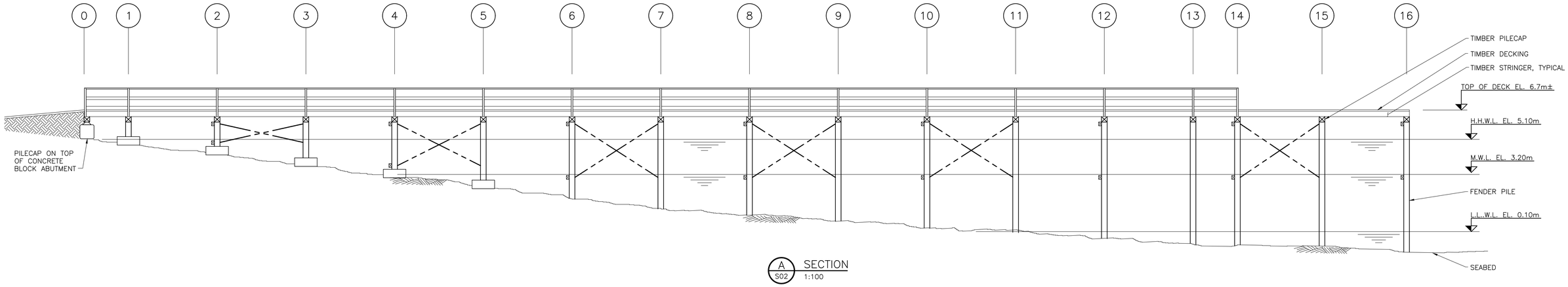

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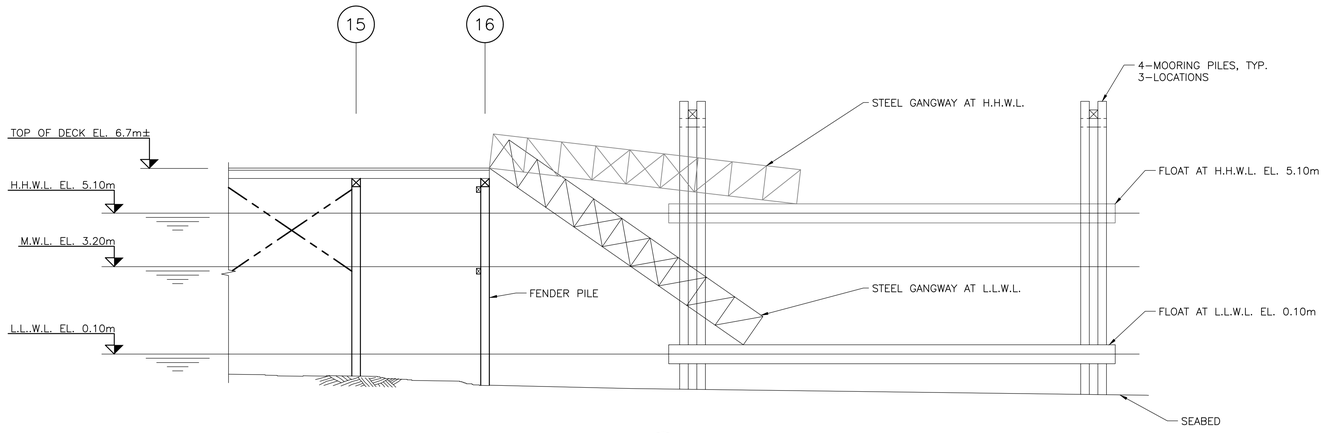

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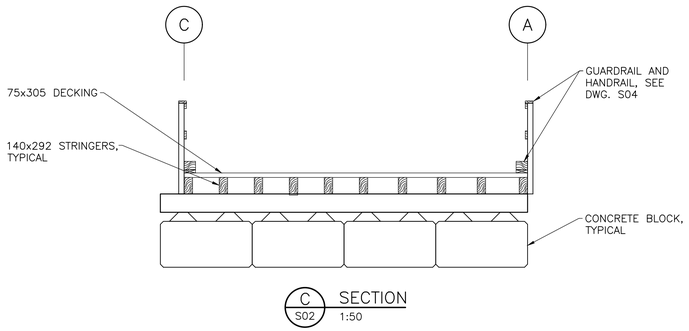

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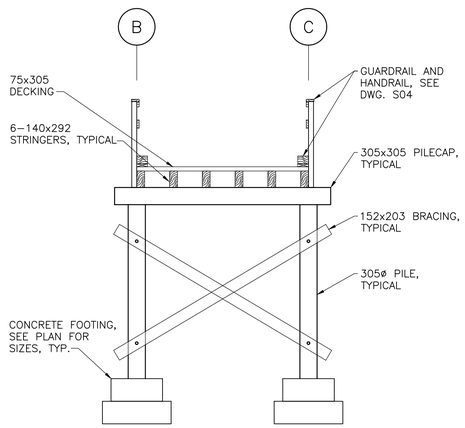

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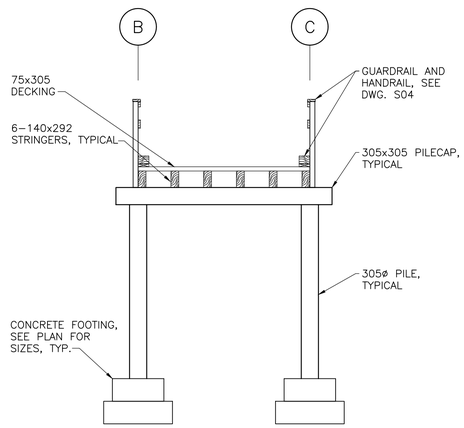

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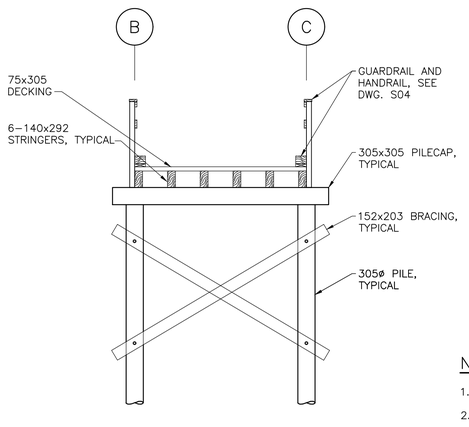

F S02 SECTION 1:50

ISSUED FOR REPORT

NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01.
2. ALL ITEMS ARE TIMBER, UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS ARE APPROXIMATE AND ARE TO BE VERIFIED PRIOR TO REMEDIATION/CONSTRUCTION ACTIVITIES

ISSUES

No.	DATE YYY.MM.DD	ISSUED FOR	No.	DATE YYY.MM.DD	ISSUED FOR	No.	DATE YYY.MM.DD	ISSUED FOR
A	2023.01.13	CLIENT REVIEW						

SUB CONSULTANT

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DRAFTING REVIEW

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DESIGN REVIEW

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Email: mail@heroldengineering.com

ENGINEERS SEAL

HALKETT BAY: GENERAL ARRANGEMENT - SHEET 2

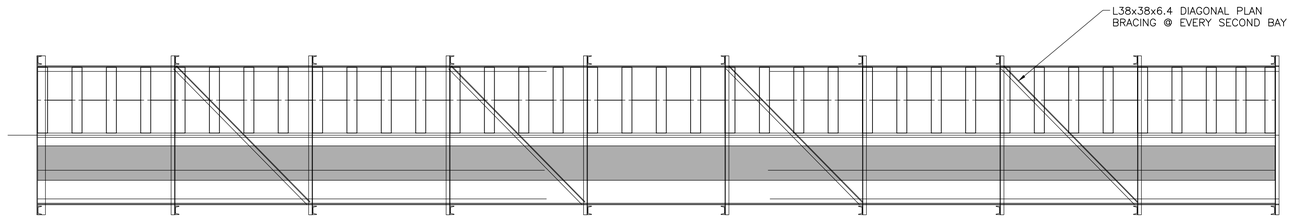
PORTS CONDITION ASSESSMENT HALKET BAY, GAMBIER

1975 FIELD ROAD SECHELT BC V0N 3A1

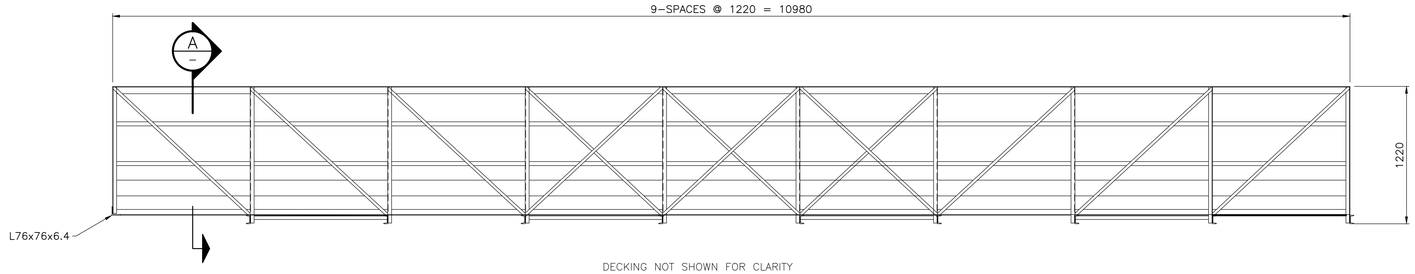
SUNSHINE COAST REGIONAL DISTRICT

HEL PROJECT No.	CLIENT DWG. No.
4551–012	N/A
SCALE: AS SHOWN	PERMIT No.: N/A
HEL DRAWING No.: S03	REVISION: A

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

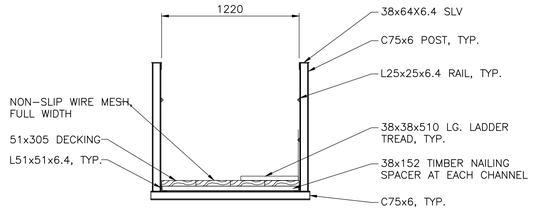


PLAN – STEEL GANGWAY
1:25

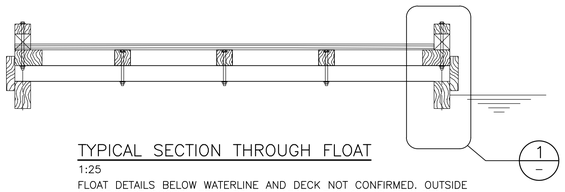


DECKING NOT SHOWN FOR CLARITY

ELEVATION – STEEL GANGWAY
1:25

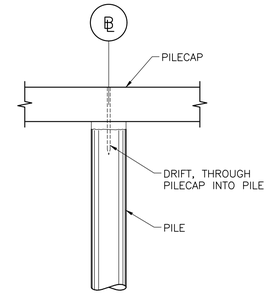


A – SECTION
1:25

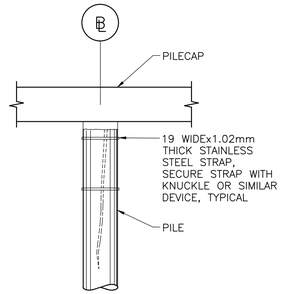


TYPICAL SECTION THROUGH FLOAT
1:25

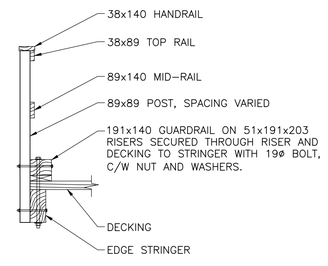
FLOAT DETAILS BELOW WATERLINE AND DECK NOT CONFIRMED. OUTSIDE OF PROJECT SCOPE. ITEMS BELOW WATERLINE SUCH AS STRINGERS, FLANGES, ETC. ARE SHOWN MERELY FOR CONVENIENCE.



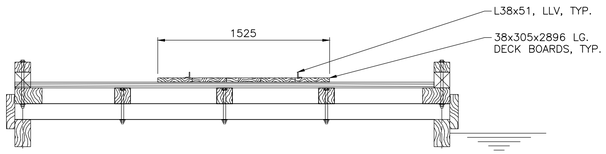
PILE TO PILECAP CONNECTION
1:25



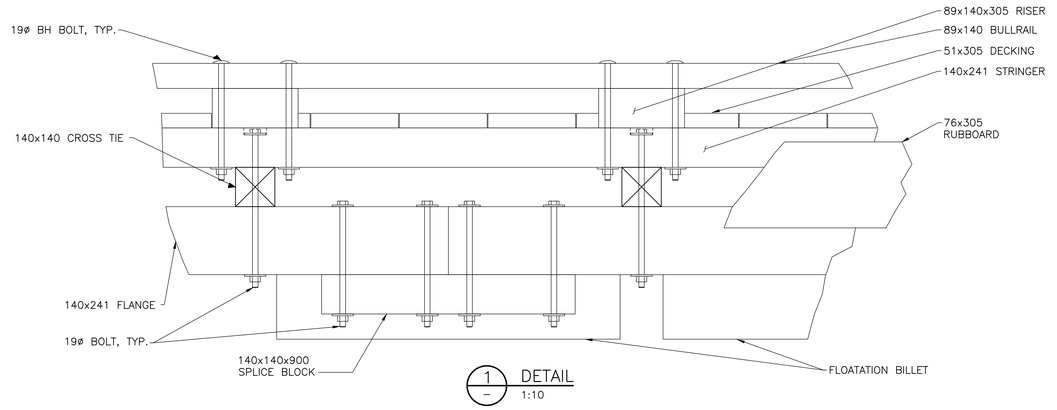
PILE STRAPPING DETAIL
1:25



HANDRAIL AND GUARDRAIL DETAILS
1:25



SECTION THROUGH GANGWAY LANDING PAD
1:25



1 – DETAIL
1:10

ISSUED FOR REPORT

NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01.
2. ALL ITEMS ARE TIMBER, UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS ARE APPROXIMATE AND ARE TO BE VERIFIED PRIOR TO REMEDIATION/CONSTRUCTION ACTIVITIES

ISSUES								
No.	DATE YYY.MM.DD	ISSUED FOR	No.	DATE YYY.MM.DD	ISSUED FOR	No.	DATE YYY.MM.DD	ISSUED FOR
A	2023.01.13	CLIENT REVIEW						

SUB CONSULTANT

DRAFTED: PHU
DRAFTING REVIEW:
DESIGNED:
DESIGN REVIEW:

HEROLD ENGINEERING
3701 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250–751–8558 Fax: 250–751–8559
Email: mail@heroldengineering.com

ENGINEERS SEAL

HALKETT BAY:
DETAILS

PORTS CONDITION ASSESSMENT
HALKET BAY, GAMBIER
1975 FIELD ROAD SECHELT BC V0N 3A1
SUNSHINE COAST REGIONAL DISTRICT

HEL PROJECT No.	CLIENT DWG. No.
4551–012	N/A
SCALE: AS SHOWN	PERMIT No.: N/A
HEL DRAWING No.: S04	REVISION: A

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

Appendix D
Load Rating Calculations

TO BE INCLUDED IN FINAL ISSUE

Routine Thrice-yearly Inspection Report #8

Halkett Bay Port (AKA Fircom)
Gambier Island, BC

Date on Site: June 6th, 2022
Report Submitted: December 6, 2021

SUBMITTED TO:

Sunshine Coast Regional District
1975 Field Road
Sechelt, BC, V0N 3A1
Attention: Sam Adams
sam.adams@scrd.ca

SUBMITTED BY:

Summerhill Fine Homes Inc.
#102 – 675 Industrial Way
Gibsons, BC, V0N 1V7

Kyle Paisley – Project Manager
kyle@summerhillfinehomes.com
778-288-1696

1. INTRODUCTION

On May 30th, 2022 Summerhill Fine Homes (SFH) attended the Marine Facility located at Halkett Bay, B.C. to complete a thrice-yearly inspection and maintenance visit under General Service Contract #18 354 with the Sunshine Coast Regional District (SCRD). The inspectors were Jake Stanley and Charlie Durrant. The site was visually inspected for any signs of deficiency or apparent public safety risk. The observations, actions and recommendations documented in this report are intended for the use of SCRD staff to prioritize and plan future maintenance activities and capital upgrades.

1.1. Description of Structure

The Halkett Bay Marine Facility is located on Gambier Island, in Howe Sound, B.C.

The facility consists of a timber approach and Wharfhead with timber decking extending in a southerly direction from shore. A wood frame shed is located on the southwest corner of the Wharfhead. There is a gangway accessing a float that is moored with float anchor piles. A derrick lift is located on the southeast corner of the Wharfhead.

1.2. Scope of Work

The scope of the inspection included conducting a visual assessment of all the structural and non-structural components of the port above the waterline at the time of inspection.

1.3. Limitations

Summerhill strives to ensure the completeness and accuracy of this report within the limitations of a visual inspection. This report is not however intended to provide assessment of the structural integrity or assurance of the public safety of the port location. Refer to engineering reports for further information regarding structural condition assessment.

2. REPORT

2.1. Approach & Wharf Head

2.1.1. Railings

The railings are comprised of dimensional painted wood railings and mid-level guards supported by painted 89x89 wood posts which are bolted through the outside stringers and curb rails.

Observations: Generally in good but declining condition.

- (From Previous Inspection May 2021) 1 handrail post close to Bent 0 is significantly cracked. Recommended to monitor and expect to replace within the next year.
- Railings require pressure washing to ensure longevity (approved, deferred)
- Several handrails were tightened during inspection round 8

2.1.2. Deck

The decking is comprised of treated wood decking and large 140x242 stringers supported by pile caps, and timber bearing piles.

Observations: Generally in good condition.

2.1.3. Bullrails/Curb Rails

The bullrails/curb rails are treated timber bolted through the concrete decking on riser blocks.

Observations:

- Loose bullrail at bent 7 and bent 13, adding extra drift pins recommended

2.1.4. Bents (Piles, Pile Caps, Stringers, Cross Braces

Timber bearing piles and one (1) concrete pile at Bent 2 Row C;
Timber piles caps 356x394 bearing above timber piles and one (1) concrete pile;
Timber cross braces 165x203 generally bolted through the piles at the top and bottom. **Only located on Bents 3,4,5.**

Observations: Generally, in good condition, although the following is to be monitored

- **Bent 2** Footings appear to be undersized and warn out. Recommend that Herold Engineering review for possible upgrades

- Redundant stringer pins under pile caps at Bents 2 & 4, grinding off recommended.

- **Bent 3** (From Previous Inspection January 2021) Loose bolt on cross brace attachment to pile 3b

- **Bent 4** (From Previous Inspection May 2021) Pile 4b slanted to the North 10 degrees (Monitor)
    - Cap Not fully bearing on 4B (Monitor)

- **Bent 5** (From Previous Inspection January 2021) Pile 5C showing cracking. Recommend adding strap at the top of the pile (deferred due to weather, attempt again on next round)

- **Bent 7** (From Previous Inspection January 2021) Slight Damage to Cap above 7b (monitor)

- **Bent 10** (From Previous Inspections) No cross brace on concrete Pile, and generally far fewer than other docks)

- **Bent 14** (From Previous Inspection May 2021) Pile 14a bolt too short, nut may come loose over time (monitor)
    - (From Previous Inspection) Pile 14A out of place – Possible Contact from barge? (Close inspection at low tide recommended)

- **Bent 15** (From Previous Inspections) Aluminum Pile Cap Needs Replacing.

- **Bent 16** (From Previous Inspection May 2021) Pile 16d slight crack in lower pile (monitor)

2.1.5. Lighting

N/A, no permanent lighting noted at this location

Observations: (From previous report January 2021) Makeshift solar panel and LED lighting system noted in the wood shed, does not appear to be functional.

2.1.6. Shed

Wooden service shed located on southwest corner of the Wharfhead

Observations: Deficiencies noted below:

- (From Previous Report January 2021) Shed is deteriorating and needs structural upgrade, overhaul or removal. (Locals do not want removal, they reiterate it's importance to them)
- Renovation recommended, new siding boards, door rebuild.

2.1.7. Ladder

Metal ladder appears to be secured at the top and bottom

Observations: Generally in good condition, no deficiencies noted

- (As noted from Previous Report January 2021) There are 2 ladders located on the Wharfhead. The one closest to the derrick crane is quite short and only extends ~6' below the Wharfhead. The one on the south side extends below low-low tide.

- Ladders were cleaned during this inspection round. (No ladder on float)

2.1.8. Signage

Adequate signage appears to be installed on the approach and wharfhead

Observations: Deficiencies noted below:

- A list of signage that should be present for each location from SCRD
- Halket Bay is the only location we've seen this sign. Should this be present at all locations?

2.1.9. Derrick

Derrick located in southeast corner of the wharfhead

Observations: Generally in good condition.

2.2. Gangways

(The gangway accessing float is located at the south end of the wharfhead is made of welded steel and appears to have been recently renovated.

2.2.1. Railings

The steel gangway railings are trusses comprised of various angle sections and flat stock

Observations: Generally in good condition

- Algae Build up, pressure washing recommended

2.2.2. Deck

The decking is comprised of treated wood decking covered in wire mesh. Anti-slip blocks are installed along the east side of the ramp and are painted yellow for high visibility.

Observations: Deficiencies noted below:

- Generally in good condition.

2.2.3. Hinge and Roller

Steel hinge connection at top, steel roller on landing pad and retained by steel angle

Observations: Generally in good condition.

- Hinge at the top of gangway is 1 ¼" thick. Perhaps this should be the standard at all locations?

- Roller comes close to end of gangway landing pad at extreme low tides. Pictured at ~1' tide. It should be monitored at a 0' or a minus tide and if extension added only if necessary.

2.2.4 Transition Plate

- (From Previous Inspection May 2021) No transition plate currently installed at the bottom of the gangway.

- Transition plate installed during this round.

2.3. Floats

There is a float positioned in a north to south alignment with a combination of foam and fiberglass flotation billets, timber framing and 4 pile wells. The floatation was recently updated by Island Flotation. One became damaged and requires replacing.

Observations: In good condition.

2.3.1. Deck Condition

Deck boards are 51x305 and fastened to the float structure with galvanized nails.

Observations: Generally, in good condition. Continue to monitor for future cracks on south side of float.

2.3.2. Bullrail and Cleats

Bullrails comprised of 89x140 wooden bullrails on riser blocks, no cleats.

Observations:

- (From Previous Inspections) Bullrails in good condition, new coat of paint recommended next round.

2.3.3. Pile Wells, Mooring Piles and Wear Strips

4 pile wells located on Float, each containing mooring pile groups tied together by steel wire and cross beams at the top. Mooring piles appear to have been recently replaced.

Observations: Deficiencies noted below:

- (From previous inspection April 2019) Pile well plastic wear strips missing or loose in 2 of 4 pile wells. (Recommend replacing pile well wear strips at next inspection round)

2.3.4. Anti-skid

Observations: In good condition, no deficiencies noted.

2.3.5. Signage

Observations: Generally in good condition, no deficiencies noted

- (As mentioned in previous report January 2021) Recommend adding "Slippery when wet" sign to float.
- SCRD to provide permanent moorage signage for installation during next maintenance visit (typ.)
- SCRD to create list of signs that should be present at each location

3. CONCLUSION

Based on our visual inspection, the approach and wharfhead are showing some signs of deterioration. Substructure assessment should be undertaken by structural engineer to determine expected lifespan and/or necessary repairs. The gangway, float and piles are in good condition. Some wear strips to be replaced/installed in the spring.

Locals expressed the importance of the storage shed, especially over the winter months.

3.1 Work Update per Approved Change Orders:

Work Item	*Description*	*SCRD Contract Category*	*Status*
HB4	Transition plate at bottom of the gangway ramp	*Upgrades*	*Completed June 2022*

3.2 Additional work completed on site to be billed T&M:

Work Item	*Description*	*SCRD Contract Category*	*Status*
	Multiple handrail posts were tightened during round 8.	Minor Repairs	*Completed May 2022*

3.3 Recommended work for future visits:

Work Item	*Description*	*SCRD Contract Category*	*Status*
HB7	Redundant stringer pins under pile caps at Bents 2 & 4, grinding off recommended.	Safety	
HB8	Loose bullrail at bent 7 and bent 13, adding extra drift pins recommended		

ARCHITECTURAL D 24" x 36"

GENERAL:

1. READ STRUCTURAL DRAWINGS IN CONJUNCTION WITH ALL OTHER CONTRACT DRAWINGS AND DOCUMENTS. REPORT ANY CONFLICTS TO THE ENGINEER BEFORE COMMENCING WORK.
2. VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
3. NOTIFY THE ENGINEER 48 HOURS IN ADVANCE FOR INSPECTION OF STRUCTURAL CONNECTIONS BEFORE COVERING UP.
4. CONTRACTOR'S RESPONSIBILITY: THESE DRAWINGS SHOW COMPLETED STRUCTURAL COMPONENTS OF THE DOCKS. THE REQUIRED TEMPORARY BRACING AND SHORING TO PERFORM THE WORK SAFELY IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. ENVIRONMENTAL WORK PROCEDURES, TIMING AND SPECIAL PRECAUTIONS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND LIMITATIONS OF THE FEDERAL DEPARTMENT OF FISHERIES AND OCEANS, AND THE PROVINCIAL MINISTRY OF WATER, LAND AND AIR PROTECTION.
6. DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES, UNLESS OTHERWISE NOTED.
7. HORIZONTAL DATUM U.T.M. NAD 83.
8. VERTICAL DATUM (ELEVATIONS AND CONTOURS) TO CHART DATUM (C.D.).
9. TIDE ELEVATIONS AT THE SITE ARE BASED ON VALUES PUBLISHED BY THE CANADIAN HYDROGRAPHIC SERVICE (CHS) FOR BEDWELL HARBOUR, PENDER ISLAND AND ARE AS FOLLOWS:

HIGHER HIGH WATER, LARGE TIDE (H.H.W.L.T.)	5.1 METRES
HIGHER HIGH WATER, MEAN TIDE (H.H.W.M.T.)	4.6 METRES
MEAN WATER LEVEL (M.W.L.)	3.2 METRES
LOWER LOW WATER, MEAN TIDE (L.L.W.M.T.)	1.3 METRES
LOWER LOW WATER, LARGE TIDE (L.L.W.L.T.)	0.1 METRES

10. SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION.

DEMOLITION:

1. ALL UNSALVAGEABLE MATERIAL FROM SITE TO BE DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, PROVINCIAL AND FEDERAL REGULATIONS AT THE CONTRACTOR'S EXPENSE.
2. USED TIMBER PILES REMOVED FROM SITE ARE TO BE DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, PROVINCIAL AND FEDERAL REGULATIONS AT THE CONTRACTOR'S EXPENSE.

TIMBER:

1. ALL TIMBER SHALL BE PRESSURE TREATED NLGA NO. 1 COAST DOUGLAS FIR OR BETTER. LUMBER TO BE GRADED TO NLGA STANDARD GRADING RULES FOR CANADIAN LUMBER, 2003.
2. TIMBER PILES TO BE SUPPLIED SIZE 36
3. ALL TIMBERS SHALL BE CUT TO THE REQUIRED LENGTH PRIOR TO TREATMENT. FIELD CUT TIMBERS WILL BE REJECTED AND REPLACED AT THE CONTRACTOR'S EXPENSE, EXCLUDING CROSS BRACE DRILLING AT THE TOP CONNECTIONS.
4. TREATMENT TO BE IN ACCORDANCE WITH CSA O80:

4.1. CATEGORY 3.2 EXPOSED TO WEATHER, NOT IN GROUND CONTACT. INCLUDING BULLRAILS AND RISERS.

4.1.1. ACZA, 4.0kg/m³
4.1.2. CCA, 4.0kg/m³

4.2. CATEGORY UC 4.1 CONTACT WITH SPLASH ZONE. INCLUDING WHARF JOISTS. STRINGERS, FISH PLATES, PLYWOOD NOT COVERED UNDER UC5A, PILECAPS & BLOCKING.

4.2.1. ACZA, 6.4kg/m³
4.2.2. CCA, 6.4kg/m³
4.2.3. CREOSOTE:
4.2.3.1. 160kg/m³ IF THICKNESS LESS THAN 115MM
4.2.3.2. 120kg/m³ IF THICKNESS GREATER THAN OR EQUAL TO 115MM

4.3. USE CATEGORY UC5A, MARINE. INCLUDING WOOD PILES, PLYWOOD, CROSS BRACES, WALES.
4.3.1. ACZA, 30kg/m³ OR
4.3.2. CCA, 24kg/m³ OR
4.3.3. CREOSOTE 290kg/m³
4.3.3.1. PENETRATION IN ACCORDANCE WITH O80

4.4. AFTER CUTOFF, TREAT PILE TOPS WITH TWO COATS OF HOT CREOSOTE OIL AND ONE COAT OF APPROVED MASTIC AT LEAST 6mm THICK.

4.5. ALL FENDER PILES TO BE COVERED A SHEET OF 24 GUAGE ANNEALED CORROSION RESISTANT ALUMINUM, CUT 300mm LARGER THAN THE PILE TOP.

4.6. ALL DRILLED BOLT HOLES COMPLETED AFTER TREATMENT MUST BE FIELD TREATED WITH TWO COATS OF HOT CREOSOTE AND BOLTS/PLUGS MUST BE DIPPED IN CREOSOTE PRIOR TO INSTALLATION.

4.7. PLUG ALL UNUSED BOLT HOLES WITH TIGHT FITTING CREOSOTE TREATED BOLTS, AND NEOPRENE GASKET AND WASHER EACH END.

4.8. TIMBER HANDLING
4.8.1. ALL TREATED TIMBER AS TO NOT PUNCTURE THE TREATED LAYER. ANY MEMBERS IDENTIFIED AS BEING DAMAGED THROUGH THE TREATED LAYER EITHER PRIOR TO OR DURING INSTALLATION WILL BE REJECTED AT THE EXPENSE OF THE CONTRACTOR.

4.9. ALL SHIMS MUST BE CREOSOTE TREATED PLYWOOD AND MUST BE SECURED IN PLACE BY AT LEAST TWO (2) NAILS AT OPPOSITE CORNERS OF THE SHIM OR APPROVED EQUIVALENT

5. PROPOSED ALTERNATIVES TO THE SUPPLIED DESIGN TO BE APPROVED BY ENGINEER.

6. PILE DRIVING
6.1. PILES ARE TO BE DRIVEN TIP DOWN UNTIL A DRIVING ENERGY OF 25–30 kJ IS ACHIEVED OR TO REFUSAL (5 BLOWS / 25mm).
6.2. DRIVE TO THE FOLLOWING TOLERANCES
6.2.1. LOCATION OF PILES: 25mm ±
6.2.2. VERTICAL TOLERANCE: 2% OR 1:50

7. PILE REPLACEMENT

7.1. EXISTING PILES TO BE REPLACED SHALL BE FULLY EXTRACTED
7.2. REPLACEMENT PILES TO ACHIEVE A MINIMUM PENETRATION EQUAL TO THAT OF THE REMOVED PILE AND TO SATISFY THE PILE DRIVING CRITERIA NOTED ABOVE.

METAL FABRICATIONS:

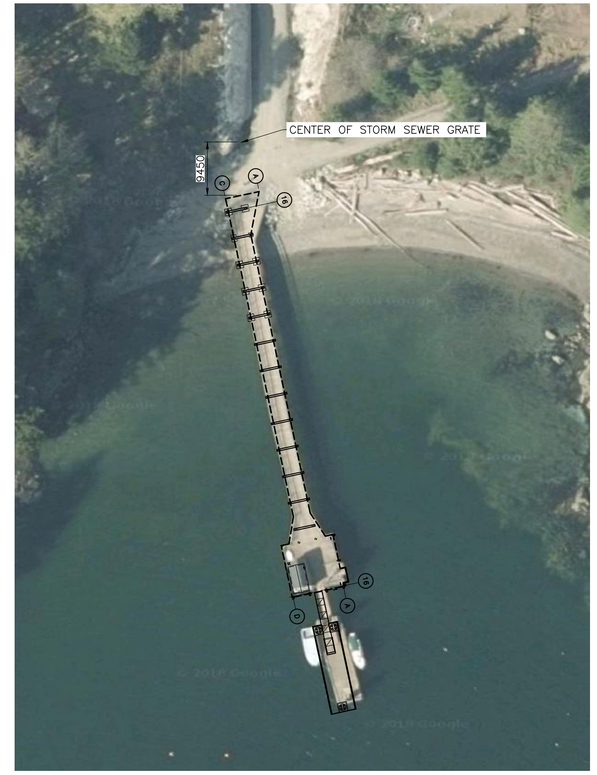
1. UNLESS NOTED OTHERWISE BY THE ENGINEER IN WRITING THE STEEL AND/OR ALUMINUM FABRICATOR SHALL SUPPLY THE ENGINEER WITH SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION. SHOP DRAWINGS SHALL INDICATE ALL DETAILS, MATERIAL SPECIFICATIONS AND DESIGN LOADS.
2. A COPY OF THE FABRICATOR'S CANADIAN WELDING BUREAU CERTIFICATES SHALL BE INCLUDED WITH THE SHOP DRAWING SUBMISSION.
3. ALL WELDING SHALL BE IN ACCORDANCE WITH CSA W59–03 (R2008) AND SHALL BE PERFORMED BY FABRICATORS "FULLY APPROVED" BY THE CANADIAN WELDING BUREAU UNDER CSA W55.3–08. FABRICATING SHOP TO HAVE A MINIMUM DIVISION 2.1 CERTIFICATION BY THE CANADIAN WELDING BUREAU TO THE REQUIREMENTS OF CSA W47.1 (STEEL). THE FABRICATOR SHALL SUBMIT PROOF OF CERTIFICATION PRIOR TO START OF WORK.
4. DESIGN FABRICATIONS TO CSA–S16–09, LIMIT STATES DESIGN OF STEEL STRUCTURES.
5. EXCEPT PARTS OF MEMBERS TO BE EMBEDDED IN CONCRETE, GALVANIZED OR UNLESS NOTED OTHERWISE ON THE DRAWINGS, ALL STEEL WORK SHALL BE SHOP PRIMED. PRIMING SHALL BE IN ACCORDANCE WITH CISC/CPMA–1–73A "QUICK DRYING PRIMER" WHEN NO TOP COAT IS REQUIRED AND IN ACCORDANCE WITH CISC/CPMA–2–75 WHEN A TOP COAT IS SPECIFIED. IF A TOP COAT IS SPECIFIED THE PRIMER SHALL BE SELECTED ENSURING COMPATIBILITY WITH THE SPECIFIED SYSTEM. ITEMS SPECIFIED TO BE GALVANIZED SHALL BE HOT DIPPED GALVANIZED TO ASTM A–123–08, MINIMUM ZINC COATING OF 600G/SQ.M. FIELD TOUCH–UP ALL ABRASIONS, SCRATCHES, WELDS OR BOLTS
6. ISOLATE ALUMINUM FROM DISSIMILAR METALS EXCEPT STAINLESS STEEL, ZINC OR WHITE BRONZE WITH BITUMINOUS PAINT. ALL FASTENERS TO BE COMPATIBLE WITH THE MATERIALS THROUGH WHICH THEY PASS.
7. DELIVER, STORE, HANDLE AND PROTECT MATERIALS FROM DAMAGE. INSTALL PLUMB AND TRUE IN EXACT LOCATIONS, SECURELY FASTENED TO THE BUILDING STRUCTURE AS DETAILED.
8. THE CONTRACTOR SHALL PROVIDE TEMPORARY BRACING DURING CONSTRUCTION. THE BRACING SHALL BE DESIGNED, INSTALLED AND MAINTAINED BY THE CONTRACTOR. THE BRACING SHALL BE REMOVED ONLY AFTER THE INSTALLATION IS COMPLETE.
9. ALL WELDS TO CONTINUOUS SEAL WELDS.
10. ALL STEELWORK SHALL BE COATED PRIOR TO DELIVERY TO THE SITE WHERE POSSIBLE. ONLY FIELD TOUCH–UP SHOULD BE REQUIRED. IF IT IS NECESSARY TO FIELD PAINT, CONTAINMENT MEASURES SATISFACTORY TO THE ENGINEER SHALL BE IN PLACE BEFORE PREPARATION AND PAINTING COMMENCE

ENVIRONMENTAL CONSTRUCTION REQUIREMENTS:

1. ENVIRONMENTAL WORK PROCEDURES, TIMING AND SPECIAL PRECAUTIONS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF FISHERIES AND OCEANS CANADA AND THE PROVINCIAL MINISTRY OF ENVIRONMENT.
2. CONTRACTOR TO FOLLOW THE REQUIREMENTS OF THE "BEST MANAGEMENT PRACTICES FOR CONSTRUCTING DOCKS AND FLOAT IN THE SOUTH COAST AREA (SUNSHINE COAST – VANCOUVER ISLAND), FISHERIES AND OCEANS CANADA", AND "BEST MANAGEMENT PRACTICES FOR PILE DRIVING AND RELATED OPERATIONS – BC MARINE PILE DRIVING CONTRACTOR'S ASSOCIATION, NOVEMBER 2003", FOR ALL WORK ON THIS PROJECT.
3. SECTION 9 NOTIFICATION AND DFO APPROVAL REQUIRED.
4. CONDITIONS OF MELP AND DFO APPROVALS TO BE FOLLOWED.
5. CONTRACTOR MUST EMPLOY METHODS TO MITIGATE HARM TO FISH AND USE DEBRIS CONTROL DEVICES WHEN DRILLING OR WORKING OVER WATER.
6. ALL DEBRIS, SAWDUST AND SHAVINGS FALLING INTO THE WATER CAUSED BY THE WORK SHALL BE CONTAINED AND PROMPTLY CLEANED UP AND PROPERLY DISPOSED OF.
7. CONTRACTOR MUST HAVE EMERGENCY SPILL EQUIPMENT AVAILABLE WHENEVER WORKING ON OR NEAR THE WATER.
8. WHEN GRINDING OR CORING CURED CONCRETE, THE DUST AND FINES ENTERING THE WATER MUST NOT EXCEED THE ALLOWABLE LIMIT FOR SUSPENDED SOLIDS. WHEN GRINDING GREEN OR INCOMPLETELY CURED CONCRETE AND THE DUST OR FINES ARE ENTERING THE WATER, pH MONITORING SHALL BE CONDUCTED TO ENSURE ALLOWABLE RANGES ARE MAINTAINED. IN THE EVENT THAT THE LEVELS ARE OUTSIDE THE ACCEPTABLE RANGES, PREVENTATIVE MEASURES SHALL BE INTRODUCED. THIS MAY INCLUDE INTRODUCING SILT CURTAINS TO CONTAIN THE SOLIDS AND PREVENT FISH FROM ENTERING A CONTAMINATED AREA OR CONSTRUCTING CATCH BASINS TO COVER THE RUN OFF AND NEUTRALIZING IT PRIOR TO DISPOSAL.
9. SPILLS: WHEN PATCHING CONCRETE, ALL SPILLS MUST BE CONTAINED AND PREVENTED FROM ENTERING THE WATER.
10. WHENEVER THERE IS THE POSSIBILITY OF CONTAMINANTS ENTERING THE WATER, THE CONTRACTOR WILL MONITOR pH LEVELS TO ENSURE ACCEPTABLE LEVELS.
11.

ABBREVIATIONS

CL.	–	CLEAR
C	–	CENTRELINE
CP.	–	COMPLETE PENETRATION
C/W	–	COMPLETE WITH
DWG.	–	DRAWING
EL.	–	ELEVATION
I.D.	–	INSIDE DIAMETER
LLH	–	LONG LEG HORIZONTAL
LLV	–	LONG LEG VERTICAL
MAX.	–	MAXIMUM
MIN.	–	MINIMUM
N.T.S.	–	NOT TO SCALE
OPP.	–	OPPOSITE
PL	–	PLATE
R	–	RADIUS
SIM.	–	SIMILAR
S.S.	–	STAINLESS STEEL
T.O.	–	TOP OF
TYP.	–	TYPICAL
U/S	–	UNDERSIDE
U.N.O.	–	UNLESS NOTED OTHERWISE
WP	–	WORK POINT



KEY PLAN
1:500

ISSUED FOR REPORT

NOT FOR CONSTRUCTION

ISSUES

No.	DATE YYYY.MM.DD	ISSUED FOR
A	2018.12.17	CLIENT REVIEW
B	2019.02.15	REPORT

SUB CONSULTANT

DRAFTED GMW
DRAFTING REVIEW
DESIGNED SPS
DESIGN REVIEW

HEROLD ENGINEERING
3701 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250–751–8558 Fax: 250–751–8559
Email: mail@heroldengineering.com

ENGINEERS SEAL

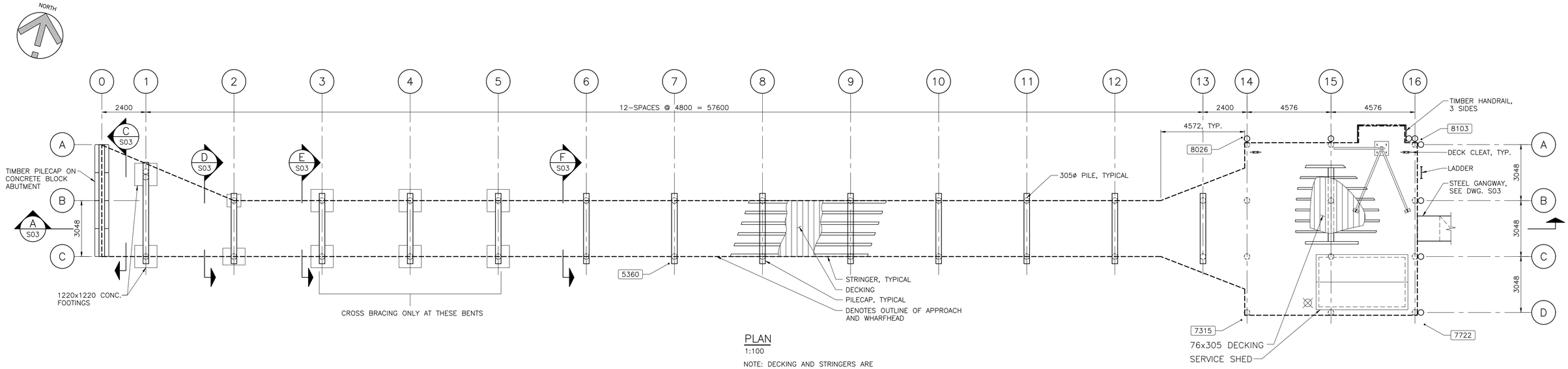
HALKETT BAY:
GENERAL NOTES
AND KEY PLAN

SCRD PORT FACILITIES
- LOAD LIMIT SAFETY
1975 FIELD ROAD SECHELT BC V0N 3A1
SUNSHINE COAST REGIONAL DISTRICT

HEL PROJECT No.	CLIENT DWG. No.
4551–002	N/A
SCALE: AS SHOWN	PERMIT No.: N/A
HEL DRAWING No.: S01	REVISION: B

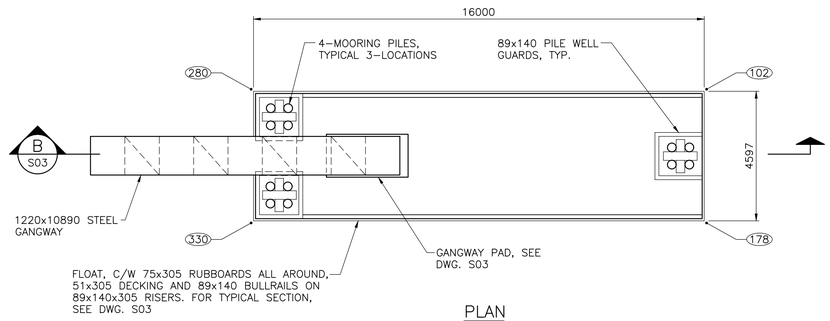
DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

File: X:\Projects\4551-002 SCRD Port Facilities – Load Limit Safety Assessment\4545 Drawings\Admin\4551-002-Halkett Bay.dwg Plot Time: Feb. 15, 19 2:42 PM User: Greg Wake



PLAN
1:100

NOTE: DECKING AND STRINGERS ARE SHOWN PARTIALLY FOR CLARITY.



PLAN
1:100

LEGEND:

- 7445 — SOUNDING: TOP OF DECK TO SEABED IN MILLIMETRES.
- 229 — FLOAT FREEBOARD: TOP OF DECK TO WATERLINE IN MILLIMETRES.
- LIFE RING
- SAFETY LADDER
- DECK CLEAT

ISSUED FOR REPORT

NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01.
2. ALL ITEMS ARE TIMBER, UNLESS NOTED OTHERWISE.
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Email: mail@heroldengineering.com

ENGINEERS SEAL

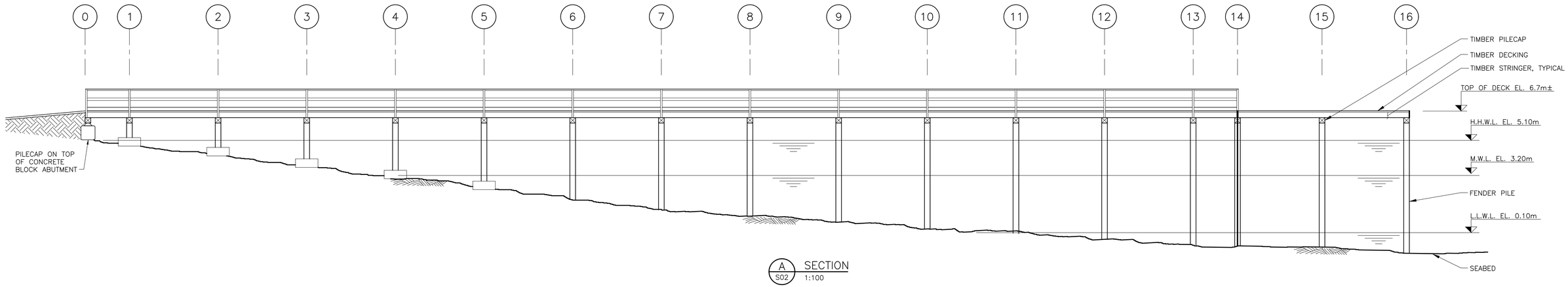
HALKETT BAY: GENERAL ARRANGEMENT

SCRD PORT FACILITIES - LOAD LIMIT SAFETY

1975 FIELD ROAD SECHELT BC V0N 3A1
SUNSHINE COAST REGIONAL DISTRICT

HEL PROJECT No.	CLIENT DWG. No.
4551–002	N/A
SCALE	PERMIT No.
AS SHOWN	N/A
HEL DRAWING No.	REVISION
S02	B

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION



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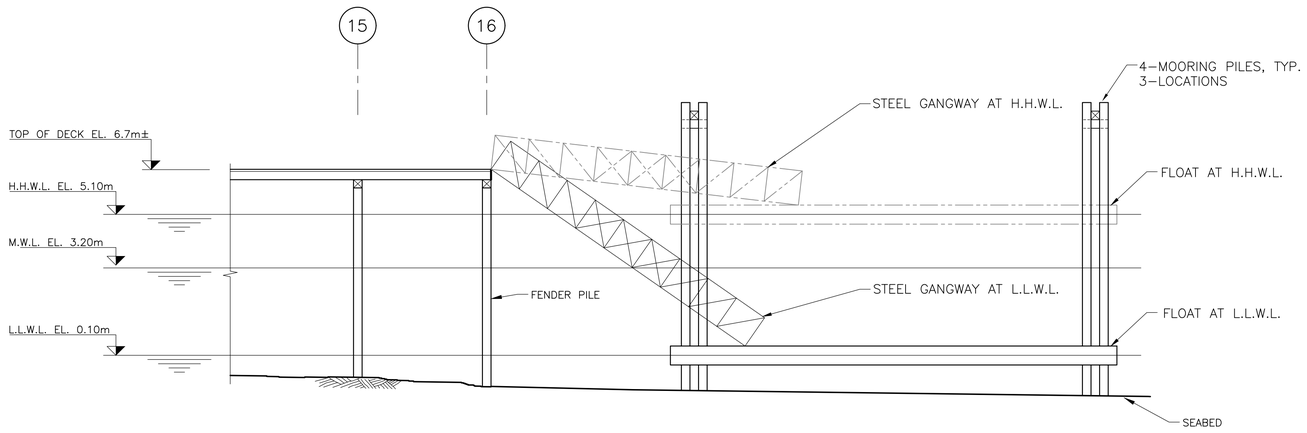

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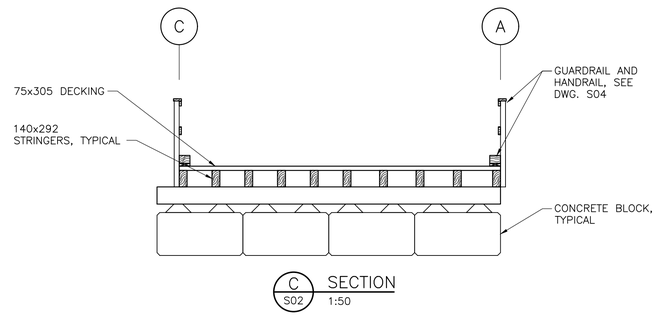

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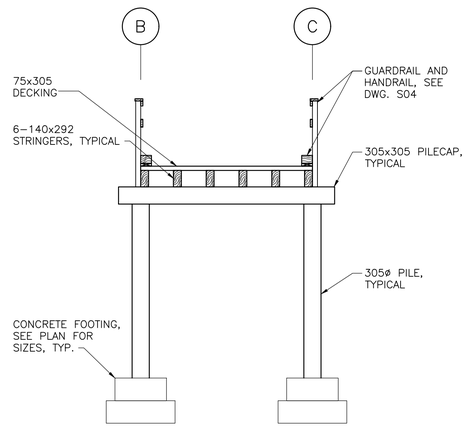

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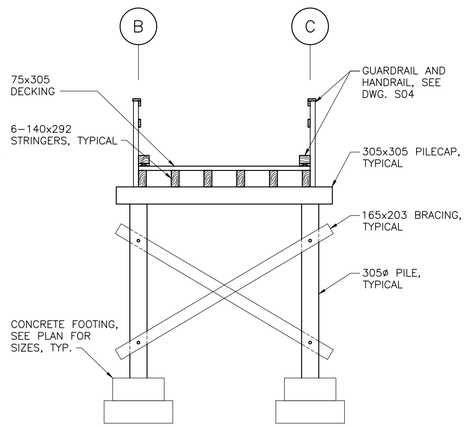

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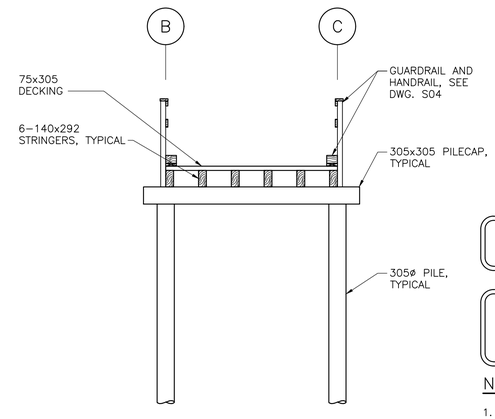

E S02 SECTION 1:50

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B	2019.02.15	REPORT

SUB CONSULTANT

DRAFTED GMW

DRAFTING REVIEW

DESIGNED SPS

DESIGN REVIEW

HEROLD ENGINEERING
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ENGINEERS SEAL

HALKETT BAY: GENERAL ARRANGEMENT - SHEET 2

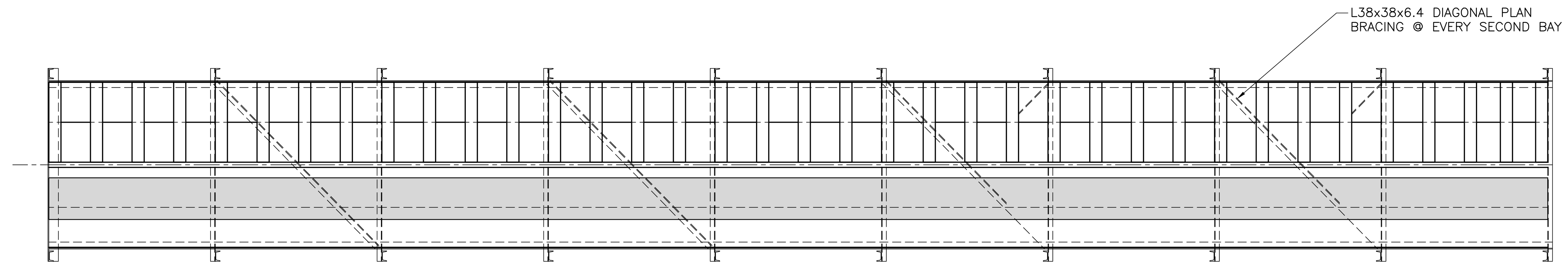
SCRD PORT FACILITIES - LOAD LIMIT SAFETY

1975 FIELD ROAD SECHELT BC V0N 3A1

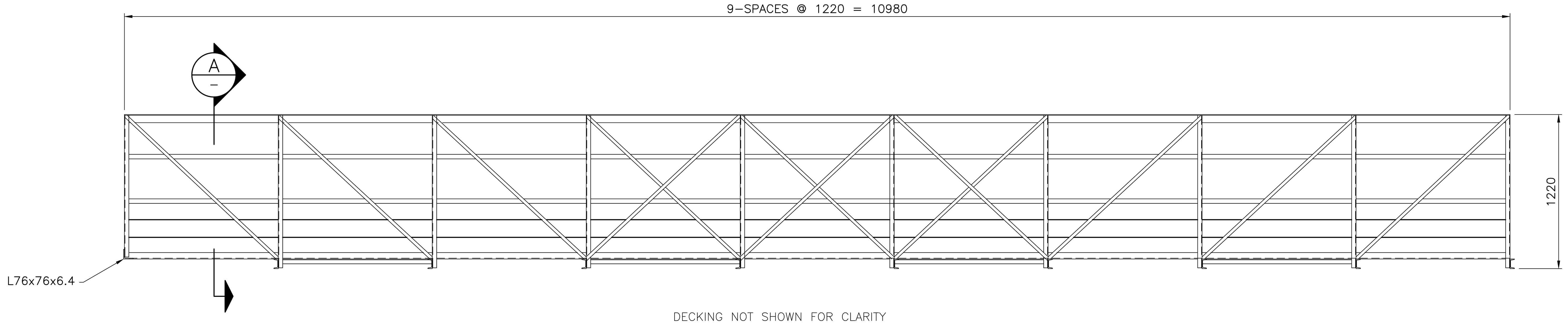
SUNSHINE COAST REGIONAL DISTRICT

HEL PROJECT No.	CLIENT DWG. No.
4551-002	N/A
SCALE: AS SHOWN	PERMIT No.: N/A
HEL DRAWING No.: S03	REVISION: B

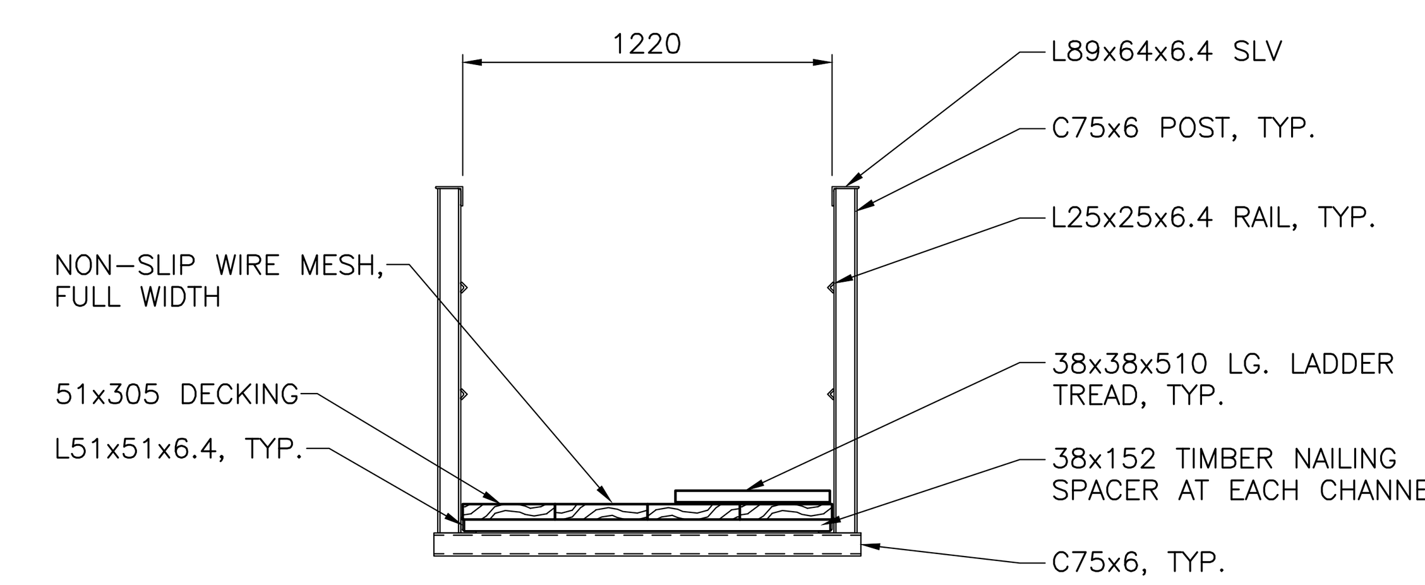
DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION



PLAN – STEEL GANGWAY
1:25



DECKING NOT SHOWN FOR CLARITY
ELEVATION – STEEL GANGWAY
1:25



A S02 SECTION
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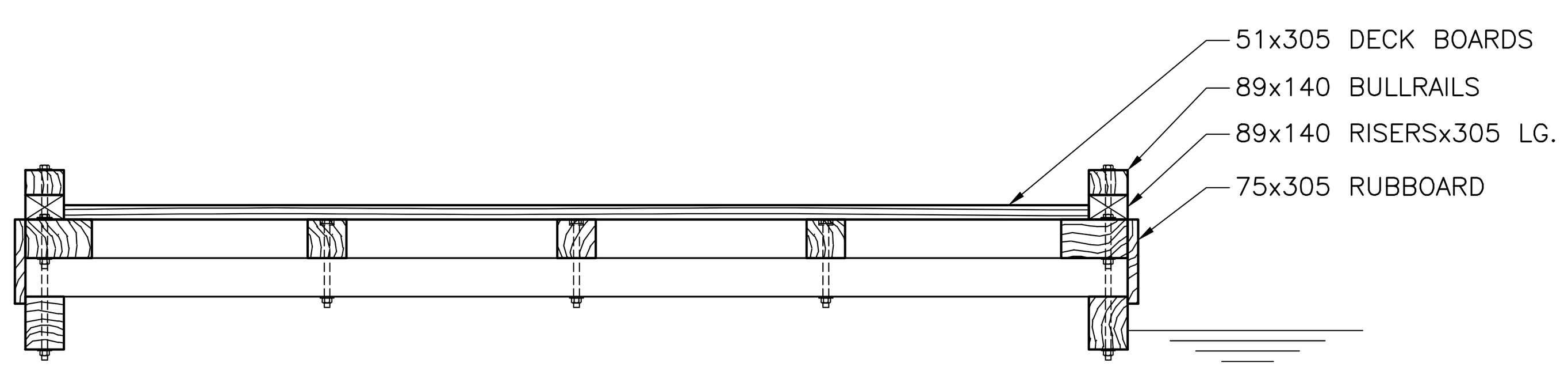
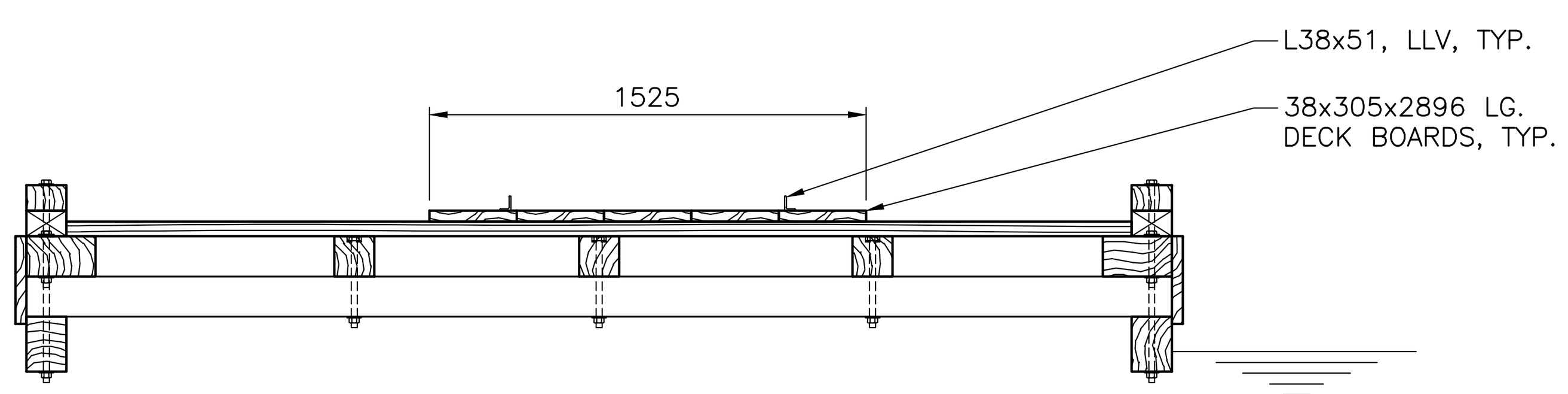
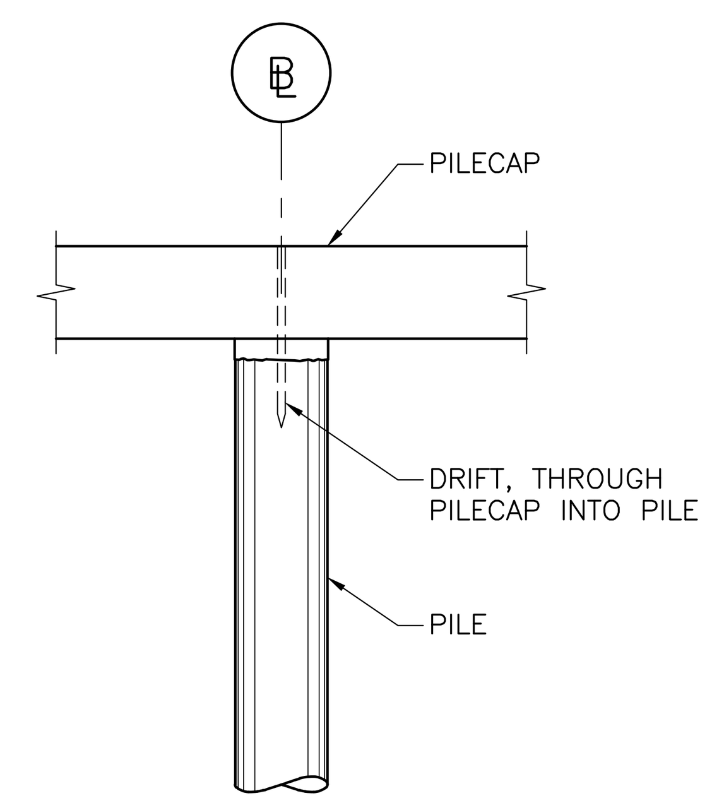


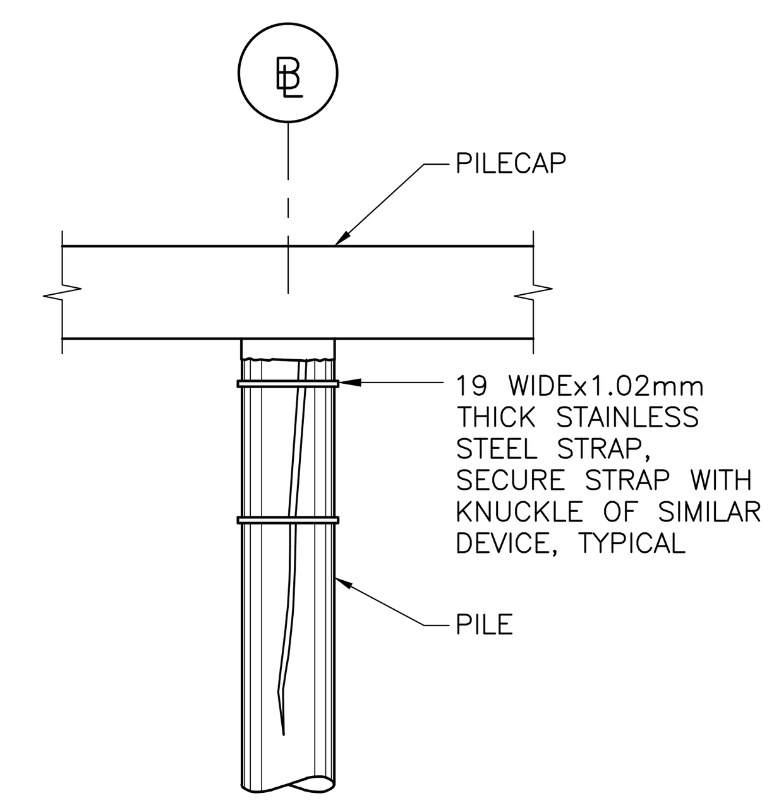
TYPICAL SECTION THROUGH FLOAT
1:25
FLOAT DETAILS BELOW WATERLINE AND DECK NOT CONFIRMED. OUTSIDE OF PROJECT SCOPE. ITEMS BELOW WATERLINE SUCH AS STRINGERS, FLANGES, ETC. ARE SHOWN MERELY FOR CONVENIENCE.



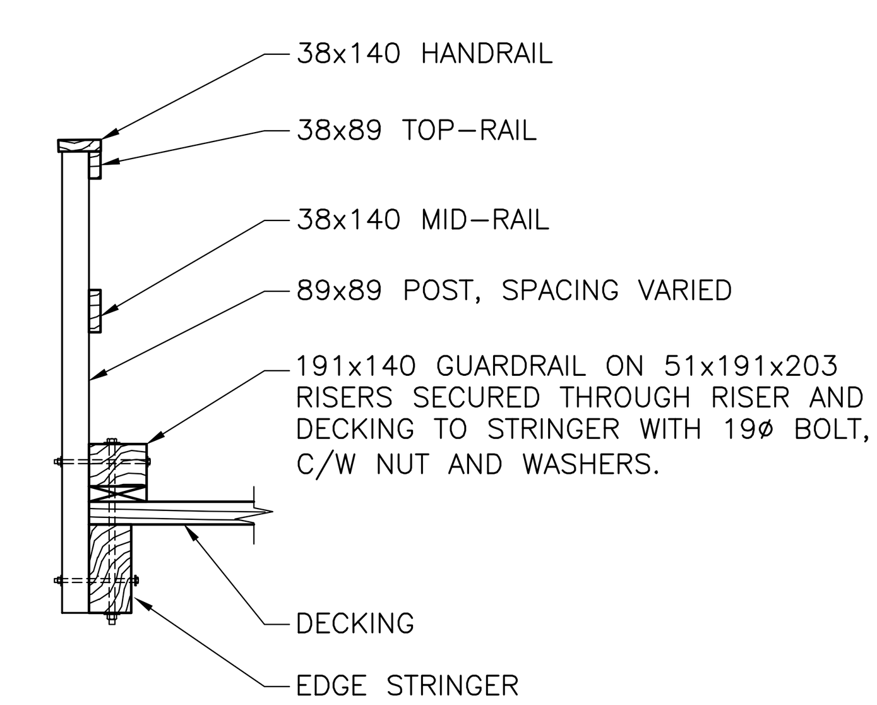
SECTION THROUGH GANGWAY LANDING PAD
1:25



PILE TO PILECAP CONNECTION
1:25



PILE STRAPPING DETAIL
1:25



HANDRAIL AND GUARDRAIL DETAILS
1:25

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ENGINEERS SEAL

HALKETT BAY: DETAILS

SCRD PORT FACILITIES
- LOAD LIMIT SAFETY
1975 FIELD ROAD SECHELT BC V0N 3A1
SUNSHINE COAST REGIONAL DISTRICT

HEL PROJECT No. 4551–002	CLIENT DWG. No. N/A
SCALE AS SHOWN	PERMIT No. N/A
HEL DRAWING No. S04	REVISION B

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION