Alexander Dock Condition Assessment Report

City of Winnipeg

60727340

June 2024

Delivering a better world

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

AECOM shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. AECOM accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

AECOM agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but AECOM makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

Without in any way limiting the generality of the foregoing, any estimates or opinions regarding probable construction costs or construction schedule provided by AECOM represent AECOM's professional judgement in light of its experience and the knowledge and information available to it at the time of preparation. Since AECOM has no control over market or economic conditions, prices for construction labour, equipment or materials or bidding procedures, AECOM, its directors, officers and employees are not able to, nor do they, make any representations, warranties or guarantees whatsoever, whether express or implied, with respect to such estimates or opinions, or their variance from actual construction costs or schedules, and accept no responsibility for any loss or damage arising therefrom or in any way related thereto. Persons relying on such estimates or opinions do so at their own risk.

Except (1) as agreed to in writing by AECOM and Client; (2) as required by-law; or (3) to the extent used by governmental reviewing agencies for the purpose of obtaining permits or approvals, the Report and the Information may be used and relied upon only by Client.

AECOM accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of AECOM to use and rely upon the Report and the Information. Any injury, loss or damages arising from improper use of the Report shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

AECOM: 2015-04-13

Executive Summary

In 2024, AECOM Canada Ltd. (AECOM) was retained by The City of Winnipeg to perform a condition assessment of the Alexander Dock, located at the end of Alexander Avenue on the Red River in Downtown Winnipeg, Manitoba. The dock was originally constructed in 1929 and is approximately 135.0 m in length and 12.8 m in width. The structure is comprised of timber plank decking and timber stringers supported by 89 rows of pile bents consisting of timber/steel pile caps, timber piles, and timber cross bracing. In addition, the vertical face has timber skirting along the river side of the structure.

Rehabilitation work occurred between 2001 to 2004 which consisted of removal and replacement of timber deck planks and skirting, installation of rockfill columns and trench shear keys for riverbank stabilization, installation of a riprap blanket, installation of two new rows of timber piles and installation of new steel pile cap beams at select locations. The dock has been closed and fenced off to the public since 2015 due to public safety concerns relating to the condition of structure. The condition of the structure has continued to deteriorate since this time.

The scope of work for this project consisted of structural, geotechnical, and environmental site inspections, and preparation of structure demolition options with Class 3 cost estimates, with the future objective of creating a facility suitable for public use and mooring recreational watercraft, launching canoes, kayaks, and paddleboards. This could also include the use of dragon boats.

In general, the visible structural components were observed to be in overall fair to very poor condition, apart from the newer timber piles and steel beams installed in 2004 which were in overall good condition. Most of the timber piles, pile caps, skirting, and deck planks were rotten, severely split, and broken in several areas, and are not feasibly reusable for future use due to the limited remaining life span. Several timber piles had minimal to no bearing on the pile caps, depending on the location within the structure. In addition, the two rows of piles closest to the west end of the structure (furthest from the river) were buried in riverbank material for the full length of the structure. Test pits were excavated with a backhoe to expose and inspect the piles and pile caps at select locations. Where visible, the timber backwall, piles, and pile caps were observed to be in overall poor condition due to rotten members, however, one of the three piles were observed to be in good condition.

The geotechnical inspection was completed in two stages, the first stage was completed in winter 2024 for inspecting the underside of the dock when the ground was still frozen and the area accessible. The second stage of inspection was completed in spring 2024 to inspect the side slopes and geotechnical conditions of the riverbank and document any sign of instability. Erosion protection measures in terms of rip rap layers were not observed in the underside part of the dock. In general, typical erosion of soil was observed around piles and extended to the water edge. The erosion was semi vertical, turning to a very gentle slope, then approximately sloped at 45 degrees or flatter related to the typical seasonal water levels. In addition to the erosion, multiple gaps were noted around the existing timber piles. These gaps may impact the lateral resistance of the piles due to lack of contact between the pile at the point of load application with the soil providing the required lateral resistance to withstand the loads. The riverbank upper slope along the dock was in relatively good condition with no visible signs of bank movement observed upstream and downstream of the dock. Minor erosion was observed downstream of the dock. A local saturated area was observed immediately adjacent to the west edge of the dock, due to the west or inland side of the dock having overall settlement and trapping water.

An environmental site inspection conducted on April 17, 2024, concluded that there has not been substantial change to the shoreline and river within the project site since the previous environmental investigation environmental baseline condition study was completed by North/South Consultants Inc. on February 15, 2017; however, the dock has continued to deteriorate since the previous environmental inspection. During the spring 2024 environmental site inspection the water level was lower than typical in April, causing more of the shoreline to

be visible than usual during April. Although Mapleleaf mussel shells (considered a species at risk) were not observed along the visible shoreline, this does not mean that this mussel species would not exist or be found in the river at this location. Anticipated environmental regulatory requirements are not considered onerous if the final project design and construction schedule can accommodate work outside of the sensitive season timelines for species protected by legislation, and work can be done in accordance with recommended mitigation measures to avoid or minimize harm. AECOM recommends including consideration of required regulatory review and approval timelines and costs in overall project planning. Required environmental protection measures should be included as 'special provisions' within the construction contractor contact for services.

AECOM reviewed three demolition options to be considered for the Alexander Dock which includes one full demolition option, and two partial demolition options.

Option 1 – Full Demolition and Removal of the structure, assumes potential replacement with a new dock consisting of steel sheet piles, backfill, and a concrete deck at a later date. While this would provide the longest lifespan for a replacement structure and the lowest overall maintenance, this would likely be a higher cost option. A steel sheet pile and concrete deck dock would not reflect the historic look of the dock from the previous 95 years, which may or may not be considered desirable from a heritage standpoint. The cost estimate for Option 1 including mobilization and demobilization, environmental procedures, removal and disposal of the timber dock, supply and placement of rip rap erosion protection, and a 25% contingency is approximately **$700,000**. Note that this cost estimate does not include the costs for a new structure.

Option 2 – Partial Demolition with a Combination of Fixed and Floating Docks assumes removal of the entire existing structures, with the exception of reuse of the 20-year-old pressure treated timber piles, and salvage of the pressure treated timber stringers for reuse in the dock. This option makes full use of the good existing piles and obtains the longest lifespan and largest structure for a dock which maximizes salvage of materials. The top area of the dock would be reduced by approximately 65% in this option, which reduces initial construction and long-term maintenance costs from that of the existing. This size of dock would have the capacity to hold a large number of visitors, and still provide the feel of the original and current Alexander Dock. To provide mooring for recreational watercraft, and launching canoes, kayaks, and paddleboards a system of floating docks and finger docks has been proposed. The docks would consist of PVC floats, aluminum frames, and timber decking, consistent with the floating docks utilized at the Forks. This provides durability, minimum maintenance, and still maintains the predominantly timber appearance of the Alexander Dock. The proposed arrangement would allow for the mooring of 10 recreational boats, from small power boats to the larger pontoon boats, and the docks would maintain accessible access through a wide range of water levels. The cost estimate for Option 2 including mobilization and demobilization, environmental procedures, removal and disposal of the timber dock, supply and placement of rip rap erosion protection, and a 25% contingency is approximately **$900,000**. The cost estimate for the new structure including 25% contingency is approximately **$1 Million**, for a total of **$1.9 Million**.

Option 3 – Partial Demolition with a Two-Level Fixed Dock also assumes removal of the entire existing structures, with the exception of reuse of the 20-year-old pressure treated timber piles, and salvage of the pressure treated timber stringers for reuse in the dock. A lower level fixed timber dock would be extended to the north, and avoid the annual installation, removal, storage and maintenance of the floating dock system. The elevation would be selected to allow for the docking of recreational watercraft during normal summer water levels, maximizing use of the lower level dock through a range of water levels. The lower level dock would be approximately 0.5 m higher than the Forks walkway to reduce closures from flooding during higher water levels in summer. The lower level dock would also allow for mooring of kayaks, canoes, and up to five recreational watercraft at one time. A floating kayak launch dock could still be included at the north end of the dock, and thus sheltered from the river flow. Similar to Option 2, the floating launch dock for kayaks could be separate from the main dock to allow direct access to the shoreline without crossing the main dock. If the lower level dock became inundated due to a summer flood condition, the main dock would then be functional for use by all types of watercraft. The cost estimate for Option 3

including mobilization and demobilization, environmental procedures, removal and disposal of the timber dock, supply and placement of rip rap erosion protection, and a 25% contingency, is approximately **$900,000**. The cost estimate for the new structure including 25% contingency is approximately **$1.2 Million**, for a total of **$2.1 Million**.

Based on the results of the structural, geotechnical, and environmental inspections, the Alexander Dock has significant deficiencies which require demolition/replacement. The following is recommended:

- Removal of the entire existing structures, with the exception of the main group of the 20-year-old pressure treated timber piles, and salvage of the pressure treated timber stringers for reuse in the dock. If further discussions with Contractors determine that salvage of the stringers is not practical (due to difficulty removing the deck) the stringers would be demolished as well and require replacement. This applies to Options 2 and 3. Salvage of the 20-year-old piles many also be considered impractical by Contractors.
- Salvage and reconstruction of the timber docks in Options 2 and 3 will have a lifespan of 20 to 30 years, based on the salvaged timbers. Alternatives include completely new timber docks, or a new steel sheet pile and concrete dock. Further cost estimates would be required for comparison if the City decides to consider complete replacement with a more modern structure and a lifespan of 50 or more years.
- Option 2 with a floating dock system for recreational watercraft is recommended if the City wishes to have a large deck for visitors and gatherings, and a larger marina which is functional for the widest range of water levels and a higher number of vessels. However, the annual dock installation, removal, and storage must be considered.
- Option 3 with a two-level fixed dock is recommended if the City wishes to minimize annual maintenance, eliminate the floating docks, and still have a functional dock for a wide range of water levels. (A two-level dock could also be applied to a new steel and concrete design.)
- When selecting an option, environmental and heritage resource should be considered. In general, all options include reducing the footprint of the dock, and increasing both aquatic and terrestrial habitat. This could help offset the impacts of developing the remainder of the site with pathways, ramps, gathering areas, parking or other infrastructure. There is no significant excavation work for the options, other than regrading the area below the current dock, which limits environmental impacts and cultural heritage concerns.
- The large deck area for Options 2 and 3 would facilitate use of the space for healing and reconciliation activities. There is also sufficient green space on the embankment where additional gathering spaces could be developed.
- With the active transportation pathway higher on the embankment, there is ample space to develop an accessible path connecting this path to the dock. This would require several switchbacks to obtain the required grade and rest areas. There is also additional space to develop further parking between the Active Transportation Path and Waterfront Drive if required. With the site currently being very open and unobstructed other than by natural shrubs, Crime Prevention Through Environmental Design (CPTED) can be easily applied as the options are developed further.

:

Table of Contents

Figures

Tables

Appendices

1. Introduction and Background

The Alexander Dock is located on the Red River at the east end of Alexander Avenue in Downtown Winnipeg, Manitoba (see **Figure 1**). The dock was originally constructed in 1929 with additions in 1939 and 1953. It is approximately 135.0 m in length and 12.8 m in width. The structure consists of timber plank decking and timber stringers supported by 89 rows of timber/steel pile caps, timber piles, and timber cross bracing. Timber skirting is present on the vertical face along the river side of the structure.

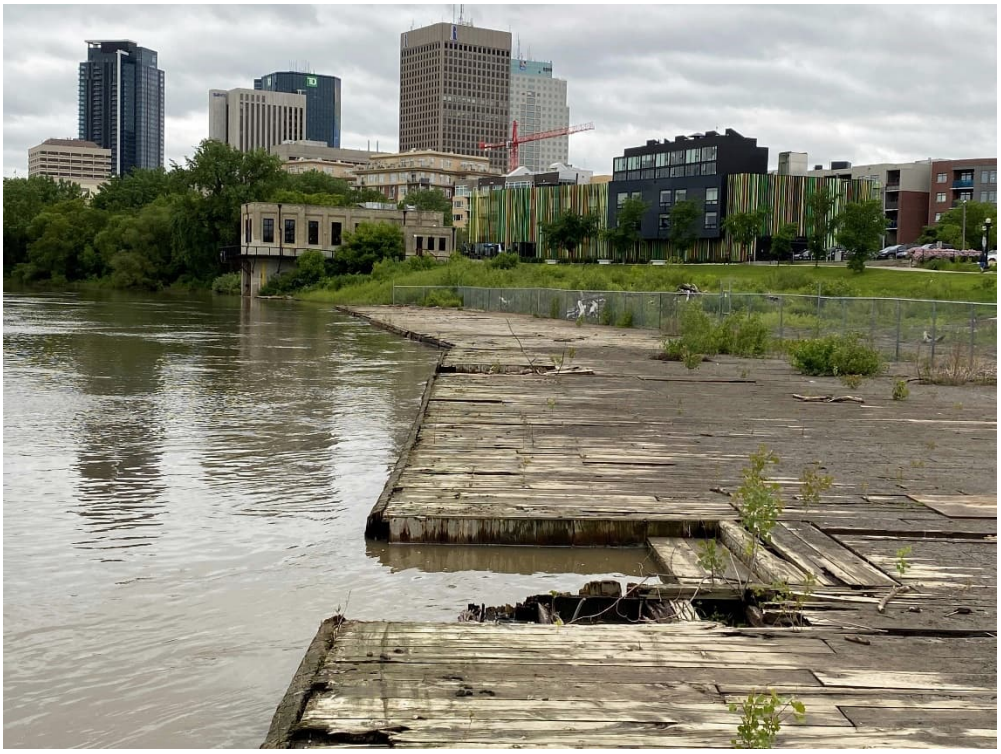


Figure 1: Alexander Dock

The Alexander Dock is now 95-years old and is a profound part of Winnipeg's history with the Red River. In 1929, the dock was the main wharf used by ships moving freight in and out of Winnipeg and Western Canada. Being near the bustling district, the docks were beside the three railway companies operating at the time and being used extensively by the prominent fishing industry. This led to the docks being expanded at least twice over the years. This was the original landing point for many immigrants over the years. The area is also culturally significant to the Indigenous community and holds significance from both historical use and more recent events. Over time, the freight movement changed from water ways to land reducing the use of the dock. In more recent years the River Rouge Paddlewheel Princess and Paddlewheel Queen used the dock from 2009 to 2014.

KGS Group conducted previous engineering assessments of the structure in 2001 and 2014. Following the 2001 condition assessment, a rehabilitation program was recommended and initiated to extend the service life of the structure by repairing severely deteriorated areas. The rehabilitation work is summarized in **Table 1**, which is the most recent rehabilitation work to date.

Table 1: Rehabilitation History

Year	Location	Details
2001	North half of structure	Replaced all timber deck planks with new timber deck planks.
2002	Entire structure	Completed riverbank stabilization works consisting of rockfill columns and trench shear keys on both the upslope and downslope sides of the dock, and a riprap blanket along the lower embankment of the dock and upstream/downstream embankments.
2004	South half of structure	Replaced all timber deck planks with new timber deck planks. Replaced select timber pile caps with steel W200x27 beams. Installed two new rows of pressure-treated timber piles. Replaced timber skirting.

The structure has been fenced off and closed since 2015 following the recommendations made by KGS Group in their 2014 condition assessment report, which determined that the dock was no longer safe for public use. This continues to be the case, and there is significant risk of anyone walking on the deck to fall through a hole or break through a rotted portion of the deck.

In 2016, The Forks conducted a stakeholder and community engagement program to consult the public about the future of the dock, which was requested by the City of Winnipeg. The program consisted of discussions with key stakeholders in the area, a public online survey, and two public open houses. The Forks prepared a report outlining the engagement program, and the recommendation was that the dock should be maintained as a public space for year-round use and as a place for healing and reconciliation.

In 2021, City Council approved the COVID-19 Economic Response and Recovery Plan which supports the Downtown Recovery Strategy, a 3-year investment strategy to support the recovery of downtown from the COVID-19 pandemic. As a result, $600,000 of the existing budget has been assigned to the Alexander Dock Area Project.

In 2024, The City of Winnipeg retained AECOM Canada Ltd. (AECOM) to assess the existing condition of the dock, to determine if the structure has progressed in deterioration since the previous assessment, and to develop concepts and recommendations for the partial or full demolition of the dock with the future objective of creating a facility suitable for public use and mooring recreational watercraft, launching canoes, kayaks, and paddleboards.

2. Inspection

AECOM conducted structural, geotechnical, and environmental site inspections in March, April, May, and June of 2024. The following subsections summarize the inspection findings of the structural, geotechnical, and environmental components.

2.1 Structural

AECOM inspected the underside of the structure in March 2024 when the ground was still frozen, and inspected the deck in April 2024 after the snow had melted. The inspections focused on the visual condition of the timber deck planks, stringers, pile caps, piles, bracing, skirting, steel pile cap beams, and riverbank conditions. In addition, to assess for rot/decay, non-destructive testing (hammer sounding) was conducted on timber members, and destructive testing (drilling and core sampling) was conducted on select timber piles and pile caps.

The north area which is enclosed by fire separations was accessed by cutting and removing the existing large holes in the deck (caused by rotten deck planks) with a chainsaw. During AECOM's site visit for the deck inspection, it was observed that these locations had been covered with plywood sheets and anchored to the stringers, which was

requested by AECOM as these areas presented a safety hazard. Note however that the entire deck is still considered hazardous and unsafe, especially for any untrained workers.

The underside of the structure is buried in riverbank material along the west end which varies from 6 to 7 m in width along the full length of the structure, and therefore the condition of the underside members could not be confirmed in this area. In May 2024, three test pits were excavated at select locations along the west end of the structure to expose and inspect the buried timber backwall, pile caps, piles (backhoe and operator provided by JC Maintenance Ltd. with AECOM supervision).

The general arrangement and deficiency drawings are included in **Appendix A: Drawings**. The General Arrangement and Deficiency drawings, **Sketches SK-01 to SK-03**, include considerable detail in order to properly evaluate which components could realistically be salvaged. The inspection team was able to access most of the structure that was not buried and gather significant information on all components of the structure. Photographs from the visual inspection are included in **Appendix B: Inspection Photographs**.

2.1.1 Timber Deck Planks

The timber deck planks consist of 70 mm x 290 mm members. The planks were in overall fair to very poor condition depending on the location within the structure. In several locations there were broken and missing planks with large holes in the deck, and many planks severely decayed and split (see **Figure 2**). Puddles, debris, and vegetation obscured the deck along the west end. At the south end of the structure, there was a larger area of missing and damaged planks with exposed stringers and substructure members. A follow-up inspection after spring thaw indicates that many planks that may look solid actually feel soft when walking on them.

Figure 2: Typical deteriorated timber deck planks

Two manhole covers were present on the deck between Rows 51 and 52, and near Slip No. 4.

2.1.2 Timber Stringers

The timber stringers consist of 100 mm x 250 mm members which generally span across 3 rows of pile caps for approximately 4.5 m in length. The visible stringers (between Piles C to E) were in overall good to poor condition depending on the location within the structure. Between Rows 8 to 51 of the structure, the stringers were in overall good condition, except for some fire damaged members between Rows 52 to 60. Three 50 mm x 250 mm built-up members were paired with the fire damaged stringers. Between Rows 61 to 87, within the enclosed area to the north, the visible stringers were in overall poor condition due to the majority of stringers being decayed and split. Note also that the stringers in the west half may be buried into the embankment and are likely to be in worse condition due to moist conditions, lack of air flow, and with potentially more rot.

2.1.3 Timber Pile Caps

The timber pile caps consist of 300 mm x 300 mm members and span between Piles A to C (West Cap), and Piles C to E (East Cap). In general, the East Caps were in overall good to poor condition. Approximately 80% of the East Caps along the structure were in overall poor condition due to decay, severe splitting, section loss, and several protruding anchor bolts. All of the East Caps within the enclosed area to the north were in overall poor condition. In some locations the East Cap has been replaced with steel pile cap beams as part of the 2004 rehabilitation work on the South half of the structure.

In general, the West Caps were in overall good to poor condition due to splitting and section loss. The West Cap is timber throughout the entire structure and in most areas was visible for approximately 1 to 2 m in length, and not visible in other locations due to the riverbank material.

Both the East and West Caps rest on a steel bearing seat on Pile C. In some locations there was reduced bearing length between the East Cap and the bearing seat, and in some cases the West Cap had less than 50 mm of bearing length on the bearing seat. The steel bearing seats were in overall poor condition throughout the structure due to typical severe corrosion and flaking.

The West Caps were exposed at three locations within the test pits and were observed to be saturated and in poor condition due to rot. This further emphasizes that much of the buried portion of the structure is likely to have severe rot of both the pile caps and stringers.

Figure 3: Deteriorated timber pile with minimal bearing (Pile E shown)

Select timber pile caps were drilled and cored to assess for rot. In general, rot was not detected on pile caps which were accessible from the underside of the structure (No. 1 to 4). However, rot was detected on a pile cap sample obtained from one of the test pits (No. 5). A summary of the sample condition and location of the timber pile caps is shown in **Table 2** below.

Table 2: Timber Pile Cap Testing/Sampling

No.	Row Number/Location	Cap Location (East/West)	Test Type (Drill/Core)	Condition Description
1	28	East	Drill & Core	No rot detected. Saturated.
2	30	East	Drill	No rot detected.
3	30	West	Drill	No rot detected.
4	32	East	Drill	No rot detected.
5[(a)]	49	West	Core	**Rot detected.**

[(a)] Pile cap sampled within test pit excavation on west side of structure.

2.1.4 Timber Piles

There are 89 rows of approximately 300 mm diameter timber piles (with some piles up to 450 mm diameter) oriented east to west throughout the structure, which varies from a total of 3 to 7 total piles per row, depending on the location within the structure. The timber piles were overall in good to very poor condition depending on the pile location (see **Figure 3**). All timber piles are creosote treated apart from two newer rows of pressure-treated piles

which were installed as part of the 2004 rehabilitation work. Note that Rows 1 to 6 have an irregular pile layout due to the tapered upstream vertical face. Abandoned timber piles were observed between each row of existing C and D Piles from Rows 6 to 60. There were no abandoned piles observed within the enclosed north area.

The overall pile arrangement plan and deficiencies can be found in **Appendix A: Drawings**. A cross section of the structure showing the typical pile layout is shown in **Figure 4**. A significant level of detail was obtained and recorded during the inspection and identified on the drawings so that the potential for reuse of piles could be better understood.

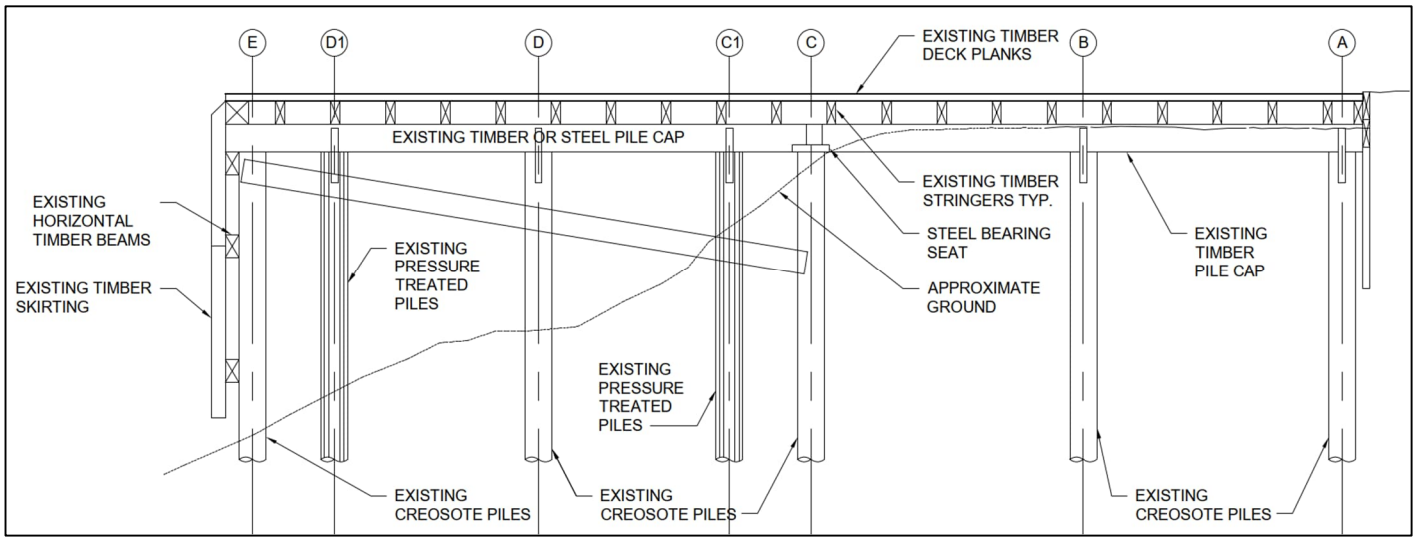


Figure 4: Typical cross section

A summary of the overall condition of the timber piles is described in **Table 3** below.

Table 3: Summary of Timber Pile Location and Condition

Pile Name	Location and Condition Description
Pile A	Not visible throughout entire structure due to riverbank material. Top 200 mm of piles exposed and inspected at three locations during test pit excavation. One pile in good condition and two piles in poor condition due to rot, severe shake/shell separation, and minimal bearing/misaligned pile cap.
Pile B	Top 200 mm of piles visible between Rows 28 to 36 only. Piles in overall poor condition due to segmentation and splitting throughout.
Pile C	Piles between Rows 1 to 60 in overall poor condition due to severe splitting and tilting throughout. Approximately 75% of piles not visible between Rows 61 to 89 due to riverbank material, with visible piles in overall fair condition.
Pile C1[(a)]	Piles present at Row 3, and between Rows 5 to 46. Piles in overall good condition with isolated poor condition piles due to significant cross-section removed for steel pile clamp connection. Piles generally vertical and appear stable.
Pile D	Piles present between Rows 4 to 89. Piles in overall poor condition due to typical severe splitting and several piles with minimal to no bearing.
Pile D1[(a)]	Piles present between Rows 4 to 46. Note that piles between Rows 4 to 6 are not parallel with other piles and are irregularly placed due to the tapered vertical face on the upstream end for ice protection. Piles in overall good condition with isolated poor condition piles due to splitting. Piles generally vertical and appear stable.

Pile Name	Location and Condition Description
Pile E	Piles visible throughout entire structure except for Rows 8 to 10, and 37 to 46 where non-typical diaphragm/beam construction exists. Piles in overall poor condition due to typical severe splitting throughout, segmentation, minimal to no bearing, and decay. Several piles not functional.

[(a)] Pressure-treated timber piles installed in 2004.

Select timber piles were drilled and cored to assess for rot. In general, rot was not detected on piles which were accessible from the underside of the structure (No. 1 to 18). However, rot was detected on two of the three piles (Pile A) exposed within the test pits. Note that most piles tested were the pressure treated piles installed in 2004, as these were in overall better condition than the older creosote piles and more likely to be reused in repair or rehabilitation options. A summary of the sample condition and location of the timber piles is shown in **Table 4** below.

Table 4: Timber Pile Testing/Sampling

No.	Row Number/Location	Pile Name	Pile Type	Test Type (Drill/Core)	Condition Description
1	14	D1	Pressure treated	Drill	No rot detected.
2	18	D1	Pressure treated	Core	No rot detected. Saturated.
3	21	D1	Pressure treated	Drill	No rot detected.
4	22	D1	Pressure treated	Drill	No rot detected.
5	23	D1	Pressure treated	Drill & Core	No rot detected.
6	24	D1	Pressure treated	Drill	No rot detected.
7	31	C1	Pressure treated	Drill & Core	No rot detected.
8	32	C1	Pressure treated	Drill	No rot detected.
9	34	D1	Pressure treated	Drill	No rot detected.
10	36	C1	Pressure treated	Drill	No rot detected.
11	38	D1	Pressure treated	Drill	No rot detected.
12	40	C1	Pressure treated	Drill	No rot detected.
13	42	D1	Pressure treated	Drill	No rot detected.
14	44	C1	Pressure treated	Drill	No rot detected.
15	46	D1	Pressure treated	Drill	No rot detected.
16	65	D	Creosote	Drill	No rot detected.
17	84	D	Creosote	Drill	No rot detected.
18	86	C	Creosote	Drill	No rot detected.
19[(a)]	46	A	Creosote	Core	**Rot detected.**
20[(a)]	49	A	Creosote	N/A	**Rot detected by probing/sounding with hammer. Severe shake with shell separation.**
21[(a)]	67	A	Creosote	Core	No rot detected.

[(a)] Piles sampled/observed within test pit excavation on west side of structure.

2.1.5 Timber Bracing

The timber cross bracing consists of two 100 mm x 250 mm members along each row of piles (north and south sides) which span from Piles C to E. The majority of bracing was in overall good to fair condition however at some locations the bracing was missing, broken, severely split, or rotten. In some locations the bracing was partially buried due to the riverbank material.

2.1.6 Timber Skirting

The timber skirting consists of 150 mm x 150 mm vertically oriented members on the river side of the structure which are connected to horizontal beams. The skirting and horizontal beams were in overall fair to poor condition due to typical weathered, broken, split, and missing members throughout, with the majority of skirting completely missing between Rows 50 to 60 (see **Figure 5**)

Figure 5: Typical broken and missing timber skirting

2.1.7 Steel Pile Cap Beams

The steel pile cap beams consist of W200x27 beams which span between Piles C and E. A steel angle is welded to the west end of the beams, which acts as a bearing seat for the West Timber Caps. These steel beams replaced the timber pile caps at 18 locations as part of the 2004 rehabilitation work on the south half of the structure. The beams were in overall good condition except for the two beams at Rows 6 and 7, which were severely deformed due to ice impact damage at the upstream end of the structure.

2.1.8 Upstream End

The upstream end of the structure had severe deterioration in the timber deck, stringers, caps, piles, skirting, and steel pile cap beams between Rows 1 to 7. Several deck planks and stringers were broken and missing, timber caps were broken, piles and skirting were weathered and split, and the steel pile cap beams were severely deformed (see **Figure 6**).

Figure 6: Damaged upstream area

2.1.9 Timber Firewalls

There are timber firewalls present within the enclosed north area of the structure, between Rows 60/61, 74/75, and 87/88. The planks were in overall good condition with some members misaligned at the fire wall near Row 60. Timber firewalls were noted on previous drawings by others in the south area of the structure. However, these were actually the partial vertical walls at the slip locations, so these are not shown on the AECOM drawings.

2.1.10 Timber Header Beams

Timber header beams are present below the two stair areas which support the stair stringers at Rows 66 to 68 and 81 to 83. The beams rest along Piles D and E across three piles. The header beams were in overall good to fair condition.

2.1.11 Timber Backwall

The timber backwall on the west end of the structure was exposed during the test pit excavation. The backwall consists of a 100 mm x 330 mm top stringer with several built-up 55 mm x 100 mm horizontal planks for a total height of approximately 1.1 m. Between the top stringer and the top horizontal plank was a 70 mm gap with exposed clay fill and cobblestones. The backwall was in overall poor condition with rot and splitting throughout where exposed/visible (see **Figure 7**).

Figure 7: Rotten/split timber backwall

2.1.12 Steel Drainpipes

Three 300 mm diameter corrugated steel drainpipes are located between Rows 7/8, 49/50, and 57/58. The pipes extend from the riverbank and terminate near Pile D. The drainpipes were in overall good condition with light corrosion and some sediment buildup. It is unknown how well these are functioning, but as noted earlier the embankment on the west side of the dock is quite saturated and retains water, so it is assumed that the drainage from behind the dock is generally inadequate.

2.2 Geotechnical

It was understood that the south half substructure condition was significantly impacted by historical riverbank movement and in 2002 the City of Winnipeg proceeded with the riverbank stabilization program as part of the Waterfront Drive project.

Background information related to geotechnical investigation and riverbank assessment reports, construction drawings of riverbank remediation works for this site and its adjacent properties were not available for AECOM review. However, the as-built drawings for the completed (May 2003) riverbank remediation works at the Alexander Dock and both the upstream and downstream properties were attached to KGS report "Alexander Dock: Class 3 Estimate for Demolition and Riverbank Protection" dated May 8th, 2018.

Based on the drawings, rockfill columns and shear keys were installed on the riverbank upper slope and lower slope of the dock in the direction perpendicular to the dock and extended down into dense competent till. Along the other direction, parallel to the dock, the rock columns and rip rap was extended along the full length of the dock and beyond the upstream and downstream extents of the dock. As per KGS's report the riverbank remediation works were designed and constructed consistent with City of Winnipeg criteria for long-term riverbank development works.

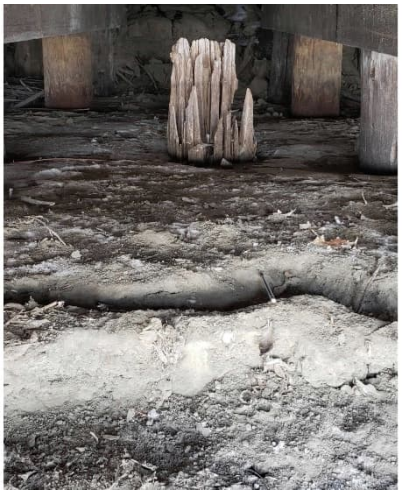


Figure 8: Erosion underside the dock

The geotechnical visual inspection of the riverbank along the structure was performed by Saba Ibrahim, P.Eng. The inspection was planned in two stages.

The stage one inspection was completed in March 2024 to inspect the accessible areas of the underside of the timber deck and substructure during the time window where the river levels dropped to seasonal lows. Overall, erosion protection measures in terms of rip rap layers were not observed in the underside part of the dock. Erosion of soil was observed around Pile C (see **Figure 4**) and extended to the water edge. The erosion was semi vertical around Pile C, turning to very gentle slope for about 2.5 to 5 m, then approximately sloped at 45 degrees or flatter

around the water edges (see **Figure 8 and 9**). In addition to the erosion, multiple gaps were noted around the existing timber piles (see **Figure 10**). These gaps may impact the lateral resistance of the piles due to lack of contact between the pile at the point of load application with the soil providing the required lateral resistance to withstand the loads.

The stage two inspection of the riverbank along the top surface of the timber deck was performed in April 2024 after snow melting. The riverbank upper slope along the dock was in relatively good condition with no visible signs of bank movement observed upstream and downstream of the dock. Minor erosion was observed downstream of the dock. A local saturated area was observed immediately adjacent to the west edge of the dock where the embankment meets the dock (see **Figure 11**).

Figure 9: Erosion between Pile D1 and E

2.3 Environmental

To provide the City of Winnipeg with an update on the current environmental conditions of the project site, and to inform the regulatory requirements needed for the project options, AECOM conducted an environmental site condition inspection on April 17, 2024. The results of the environmental site inspection, including environmental mitigation recommendations, are provided as Attachment A within a Regulatory Roadmap Memorandum to the City of Winnipeg in **Appendix C: Regulatory Roadmap Memorandum**. In summary, there has not been substantial change to the shoreline and river within the project site since the previous environmental investigation (North/South Consultants Inc. 2017). During the spring 2024 environmental site inspection the water level was lower than typical in April, causing more of the shoreline to be visible than usual at that time of the year. The dock has continued to deteriorate since the previous environmental inspection (North/South Consultants Inc. 2017).

Figure 10: Gap around the piles

Environmental regulatory requirements are anticipated to be the same for either a partial or full demolition of the dock with the objective of creating a facility suitable for public use and mooring recreational watercraft, launching canoes, kayaks, and paddleboards. This is under the assumption that work will occur in water below the ordinary high water mark, and there will be some modification of the riverbank to provide erosion control. Additionally, AECOM assumes that some minor natural vegetation clearing may be needed to accommodate construction/demolition equipment and materials laydown areas. At minimum, the Project will require a Request for Review to Fisheries and Oceans Canada (DFO) for DFO to make a determination if an Authorization under the federal *Fisheries Act* would be required, noting that a 'Self Assessment' by proponents for projects that may potentially affect fish and fish habitat is no longer an option under the current *Fisheries Act*. Additional details including project cost and timeline implications regarding the anticipated regulatory review requirements required for the project, once a design and timing of works is determined, are provided in a Regulatory Roadmap for the Project in **Appendix C: Regulatory Roadmap Memorandum**.

Figure 11: Local saturated area

3. Dock Demolition Options and Class 3 Cost Estimates

AECOM reviewed three demolition options to be considered for the Alexander Dock which includes one full demolition option, and two partial demolition options.

3.1 Full Demolition and Removal – Option 1

Option 1 includes full demolition and removal of the structure. This assumes potential replacement with a new dock consisting of steel sheet piles, backfill, and a concrete deck. While this would provide the longest lifespan for a replacement structure and low maintenance, this would likely be a higher cost option, and would not reflect the historic look of the dock from the previous 95 years.

The oldest creosote piles on the dock are up to 95 years old, with the newer pressure treated piles being 20 years old. The estimated lifespan is 50-60 years for creosote timber piles, and 40-50 years for newer pressure treated piles, depending on conditions such as: wetting and drying; whether piles are exposed, submerged or buried (oxygen levels and moisture varies); impact damage from ice or debris; water temperature, and other environmental factors. As a result, the creosote treated piles, which are understood to be from 1929, 1939 and 1953 construction, are well beyond their lifespan with the newest creosote piles being approximately 65 years old. Reusing any of these piles, even if some are still in fair condition, would not make economic sense and likely require major repair or replacement work in the near future. Note that the previous condition assessment reports with retrofit options include banding, jacketing and grouting for various pile repairs. This would have been a reasonable way to extend the life of the piles under the current wharf configuration, however the structure is now an additional 9 years older, and this would not be practical as part of a major rehabilitation.

It should be noted that though most of the older creosote timber piles are in poor condition, permanently buried portions with little exposure to oxygen can be in “as new” condition well beyond their service life. The test pits indicated that 1 of 3 of the buried piles in Row A (west embankment side of the dock) was in good condition, at the top of the pile. It is likely that further below the surface these (and other piles) are still solid. As a result, reuse of some of these piles in a lowered structure could be possible, however their condition would be unknown without exposing a large number of these piles to a significant depth. In general typical water levels on the Red River suggest that lowering the overall structure is also not a desired option. Water levels are discussed further in Option 2.

The cost estimate for the full demolition and removal includes mobilization and demobilization, environmental procedures, removal and disposal of the timber dock, and supply and placement of rip rap erosion protection. This would include regrading of the embankment under the dock to approximately a 3:1 slope with the geotextile and rip rap slope protection placed on top. The previous embankment stabilization works with rock columns and drain trenches appear to be functioning as intended, and as a result this rip rap is primarily for erosion protection along the waters edge, which is particularly important due to the dock being on the outside of a curve in the river, which is more prone to erosion, and currently void of vegetation. The 3:1 slope will also provide a slighter flatter slope than the existing grade under the dock, and remove the muddy “steps” in the embankment under the dock created from erosion at the typical water levels. This slope will also allow for mowing of grass if required on the higher portion, and would be suitable for the rip rap slope/erosion protection on the lower portion.

The cost estimate provided in **Appendix D - Cost Estimates** does not include the cost of a new replacement structure for Option 1. The cost estimate is based on feedback from Contractors, and pricing from other current projects, however a wide range of costs have been received, indicating further discussion and feedback is required to define the costs better, and so that the project scope is fully understood. The cost estimate including mobilization

and demobilization, environmental procedures, removal and disposal of the timber dock, supply and placement of rip rap erosion protection, and a 25% contingency is approximately **$700,000**. This is more than the budget of $600,000 stated in the Request for Proposal, but is consistent with the cost estimate from the 2015 report, increased for inflation. Note that it is also important for potential Contractors to understand the requirement for selective demolition and salvage, which could increase costs further.

3.2 Partial Demolition – Option 2: Fixed Timber Dock with Floating Docks

The partial demolition option with a combination of fixed and floating docks assumes that all of the creosote timber piles would be abandoned and cut off at or just below grade. The 20-year-old pressure treated timber piles from Row 8 to Row 46 would be used for the new dock configuration. See **Sketch SK-01 to SK-03** summarizing the condition assessment, and **SK-04 Option 2 in Appendix A**. Locating the dock from Row 8 to 46 shifts the remaining dock after demolition further south than the rehabilitation option in the 2015 report, however this shift makes the best use of the existing piles considering the current condition, and obtains the longest lifespan and largest structure while maximizing salvage of materials. The top area of the dock is reduced by approximately 65% in this option, which reduces initial construction and long-term maintenance costs, while still having the capacity to hold a large gathering of people for visitors, recreation, or formal events. This will also still provide the feel of a large dock structure similar to the original historic and current Alexander Dock.

A new back row of pressure treated piles is required for this option, new timber skirting, new timber (or new/salvaged steel) pile caps, and new timber decking. It is currently assumed that enough of the timber stringers are in good condition that they can be reused after selective demolition. The timber deck planks, curb and skirting will recreate the appearance of the original and existing timber dock, thus adding aesthetic value and appeal in combination with any historical interpretive plaques regarding the Alexander Docks. Timber deck planks, which have a slight gap between planks, will also allow for some air circulation under the dock similar to the existing, which may help increase longevity. (The alternative is a timber laminated deck, which is a solid timber deck nailed together.) The new back row of piles will also allow for correction of the settlement of the back half, or west portion of the dock.

A new timber ice breaker would be constructed at the leading edge of the dock. Several options exist, including using rock filled timber cribs such as the older ice breakers on the Elm Park (BDI) Bridge. It would be recommended to add steel plating to the exterior of the timber cribbing, similar to the Elm Park Bridge, to prevent the significant issues with ice damage reoccurring on the new structure at Alexander Dock. Additional options include timber piles, however these have not performed well as an icebreaker at this site, and horizontal timbers with steel plating would still be recommended if piles are used. Additional alternatives for the ice breaker would include a concrete wall on steel piles, or drilled and cast concrete caissons (large diameter concrete piles), or a steel sheetpile structure with backfill and a concrete edge beam.

Figure 12: Typical floating dock at the Forks

To provide suitable public use and mooring for recreational watercraft, launching canoes, kayaks, paddleboards and possibly dragon boats, a system of floating docks is proposed as shown on **Drawing SK-04 in Appendix A**. The docks would consist of PVC floats, aluminum frames, and timber decking, consistent with the floating docks utilized at the Forks. This provides durability, minimum maintenance, and still maintains the predominantly timber appearance of the Alexander Docks (composite deck panels are also available). It would also provide the ability to change out sections of floating docks or share parts with those at the Forks, as similar widths and lengths to the existing floating docks at the Forks have been utilized in the layout on Drawing SK-04. The groove for sliding mooring cleats in the docks at the Forks also allows for mooring locations to be adjusted based on the type of use. Five floating finger docks are shown in the drawing, which allows for the mooring of 10 recreational boats, from small power boats to the largest recreational pontoon boats on the market today. A floating PVC kayak launch dock would be located at the north end of the floating docks. The kayak launch dock could also be located as a separate structure to provide direct access from the shoreline without moving kayaks across the main dock. The locations for mooring canoes and kayaks, or for entering the water with paddleboards, would be on the backside of the floating docks, which would provide a calm area for these small recreational watercraft. A temporary docking location for public water taxis could also be reserved on the floating dock or fixed timber dock, depending on water elevations.

Figure 13: Typical floating dock at the Forks

Figure 14: June 11, 2024 water level at the dock

The existing/proposed section on Drawing SK-04 shows that the top of deck on the main timber dock is to match the existing. This dock elevation is suitable for larger vessels, should riverboats or other large vessels return to use on the Red River. It was noted on June 11, 2024, that the existing river level was approximately 300 mm below the top of the deck. At this time/day the Forks riverwalk was flooded by about 760 mm, which means the Alexander Dock deck is approximately 1.0 to 1.1 m higher than the Forks riverwalk relative to the river level. A formal hydrotechnical review should still be performed to determine the optimum deck elevation and confirm the normal summer water elevation, but it would appear that the existing deck elevation, combined with floating docks for small watercraft is suitable for this site, and will be functional for a much greater range of water levels than the docks at the Forks or the existing Alexander Dock.

Figure 15: June 11, 2024 water level at the Forks

An accessibility review would also be required for preliminary design of the floating docks, so that the ramp slopes remain accessible for the largest range of river levels possible. Additional details such as curbs and railings need to be considered where appropriate to permit accessibility and improve safety where possible, while still meeting the functionality of the dock system. It should also be noted that at the current deck top elevation, the dock will still be regularly submerged during the spring flooding. This impacts ancillary items such as lighting, benches, signage and fencing.

Regrading the slopes within the old and proposed dock footprint is recommended with the placement of rip rap, similar to Option 1.

The cost estimate provided in **Appendix D - Cost Estimates** for Option 2 for demolition only, including mobilization and demobilization, environmental procedures, removal and disposal of the timber dock, supply and placement of rip rap erosion protection, and a 25% contingency is approximately **$900,000**. The cost estimate for the new structure including 25% contingency is approximately **$1 Million**, for a total of **$1.9 Million**. Similar to Option 1, the cost estimate requires further discussion and feedback from potential Contractors, as well as discussion with the City of Winnipeg. Annual costs would also be incurred for this option due to the annual installation, removal, storage and maintenance of the floating dock system. Temporary removal may also be required for more extreme summer flood events.

3.3 Partial Demolition – Option 3: Fixed Timber Dock with Two Levels

The partial demolition option with a two-level fixed dock assumes that all of the creosote timber piles would be abandoned and cut off at or just below grade, similar to Option 2. All of the existing 20-year-old pressure treated timber piles from Row 8 to Row 46 would be used for this dock configuration, also with the addition of the new third row of pressure treated piles at the back. See **Drawing SK-05 Option 3 in Appendix A**. In order to avoid the annual installation, removal, storage and maintenance of the floating dock system, the timber dock would be extended north with three rows of new pressure treated piles from Row 47 to 58, in alignment with existing pile rows. The existing pressure treated piles from Row 39 to 46 would be cut shorter to create a lower level for the dock. The elevation would be selected to allow for the docking of recreational watercraft during normal summer water levels, maximizing use of the lower level dock through a range of water levels. The dock level would be approximately 0.5 m higher than the Forks walkway to reduce closure from flooding of the lower level dock during higher water levels in summer. The lower level dock would also allow for mooring of kayaks, canoes, and up to five recreational watercraft at one time. A floating kayak launch dock could still be included at the north end of the dock, and thus sheltered from the river flow. The kayak launching dock should also be situated to avoid currents and back eddies. (Note that for safety reasons, kayak launching and docking on the upstream side of a dock should be avoided, as strong currents can pull kayaks and their occupants under a dock.) Similar to Option 2, the floating launch dock for kayaks could be separate from the main dock to allow direct access to the shoreline without crossing the main dock.

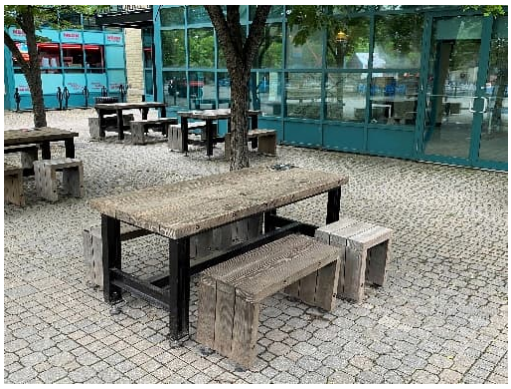


Figure 16: Typical table and seats at the Forks

During higher water events in the summer the lower level dock would be submerged and closed to the public. At this time the main dock at the existing deck elevation would be suitable for use by both smaller and larger watercraft. One set of access stairs and one ramp to the water could be included similar to those on the existing Alexander Dock. The stairs would allow for use of the main dock for loading and unloading passengers for a greater range of water levels and sizes of watercraft, and ramp would allow for launching kayaks or canoes without the floating launch dock. The stairs and ramp would also maintain the historical look of Alexander Dock. In general, the intent of the two-level fixed timber dock is to allow for the use of the docks for the greatest range of water levels for all users, combined with the lowest level of annual maintenance. Similar to Option 1, the total area of dock is greatly reduced from the existing dock to reduce initial construction cost and reduce long-term maintenance.

For both Option 2 and 3 project aesthetics could be selected to maintain to style of Waterfront drive, in particular with lighting for the dock. Currently there is significant vandalism and breakage of the glass globes on the nearby lighting, however this vandalism is likely to reduce as the Alexander Dock area is redeveloped and pedestrian traffic

increases. Due to regular spring flooding it would be advantageous to refrain from putting lighting directly on the new dock, however lamp posts could be put on separate pedestals on the embankment above the dock, and at an elevation that will not be impacted by flooding, ice and floating debris.

Additional items to consider could include outdoor furniture and appurtenances. Tables and chairs similar to those at the Forks would suit the rugged character of the historic Alexander Dock. However, based on the current activity with encampments in the area loose timber elements should be avoided.

Figure 17: Typical lighting near dock

With the upper parking area and extensive open space between Waterfront Drive and Alexander Dock there is also significant opportunity for redeveloping the area, pathways, and access to the dock.

The above options do not include significant excavation of the dock and surrounding area. The test pits for the three back row piles completed during the condition assessment would have been within the depth of the original excavation from the dock construction, and no cultural artifacts were observed during excavation of these test pits. However, heritage resources and cultural impacts should be considered further as the options are developed further, refined, and selected.

The cost estimate provided in **Appendix D - Cost Estimates** for Option 3 for mobilization and demobilization, environmental procedures, removal and disposal of the timber dock, supply and placement of rip rap erosion protection, and a 25% contingency, is approximately **$900,000**. The cost estimate for the new structure including 25% contingency is approximately **$1.2 Million**, for a total of **$2.1 Million**. Similar to Options 1 and 2, the cost estimate requires further discussion and feedback from potential Contractors, as well as discussion with the City of Winnipeg.

3.4 Environmental Class 3 Cost Estimate

Environmental considerations include regulatory permitting required and associated environmental mitigation measures recommended to expedite the regulatory review and approval processes. The anticipated regulatory requirements, including associated ballpark cost estimates which maybe further refined based on a final Project design, are provided within a Regulatory Roadmap memorandum for the Project in **Appendix C**.

3.5 Heritage Resources Class 3 Cost Estimate

If the final Project design will disturb land areas above the ordinary high water mark of the Red River, Manitoba Historic Resources Branch (HRB) may require a Heritage Resources Impact Assessment (HRIA) conducted by a qualified archaeologist permitted under The Heritage Resources Act. At this time, it is assumed that the Project works would take place below the ordinary high water mark of the Red River. However, if additional land area is required to be disturbed for future Project construction, a screening request would be submitted to HRB for HRB to determine if a HRIA by a qualified archaeologist would be needed. Preparation of a screening request to HRB and associated communications is a nominal cost (approximately $500). Additional land area that would be disturbed adjacent to the Red River to accommodate future Project construction would very likely require a HRIA. The scope of a HRIA is determined by the HRB based on the screening request, which would outline the spatial extent of the land areas that would be disturbed. The land area that maybe disturbed, based on an approximate 60% detailed design, is expected to be minimal. Therefore, the cost of a HRIA is anticipated to be approximately $5,000 as a high-level ballpark cost estimate. A Heritage Resources Protection Plan (HRPP) would also be required for the

Project works if heritage resources maybe potentially disturbed. AECOM assumes that the City's heritage resources protection policies for other City works that have been conducted adjacent to the Red River would be applied for this Project. Therefore, a cost estimate to develop a HRPP, the content of which is primarily based on the HRB guideline or template for HRPPs, is not included because AECOM assumes that a HRPP would be prepared by the City or a HRPP that can be applied for this Project currently exists, with minimal modification needed to make the HRPP site-specific (e.g., include a map of the Project works area).

4. Conclusions

The Alexander Dock was observed to be in overall poor condition. General conclusions from the structural, geotechnical, and environmental inspections are as follows:

- The timber deck planks were overall in fair to poor condition due to typical checking, splitting, severe rot, and broken/missing planks in several locations depending on the location within the structure. The north half of the structure appeared to be in worse condition. It is assumed that these cannot be salvaged.
- The timber stringers were overall in good condition between Rows 8 to 51 within the structure. The remaining stringers were overall in poor condition due to fire damage, splitting, and severe rot. The stringers may be rotted where they are buried in the embankment, which could impact whether they can be salvaged for the proposed dock structure. Careful demolition of the deck and salvage of the stringers may be difficult to complete.
- The east timber pile caps were overall in fair to poor condition due to rot, splitting, section loss, and large anchor bolts protruding from the members. In addition, the caps had reduced bearing length on the steel bearing seat on Pile C in some locations. It is assumed that these cannot be salvaged.
- The West timber pile caps were overall in fair to poor condition due to splitting and section loss. In some locations, the caps had less than 50 mm of bearing length on the steel bearing seat at Pile C. In addition, the ends of select pile caps were exposed during the test pit excavation along the west side of the structure. These pile caps were observed to have rot. It is assumed that these cannot be salvaged.
- The steel bearing seats at Pile C were overall in poor condition due to typical severe corrosion and flaking/pitting throughout.
- The timber piles were overall in good to very poor condition depending on the pile location, type, and age:
    - **Piles Row A -** Not visible throughout entire structure due to riverbank material. Top 200 mm of piles exposed and inspected at three locations during test pit excavation. One pile in good condition and two piles in poor condition due to rot, severe shake/shell separation, and minimal bearing/misaligned pile cap.
    - **Piles Row B -** Piles visible between Rows 28 to 36 only. Visible areas (top 200 mm) in overall poor condition due to segmentation and splitting throughout.
    - **Piles Row C -** Piles between Rows 1 to 60 in overall poor condition due to severe splitting and tilting throughout. Approximately 75% of piles not visible between Rows 61 to 89 due to riverbank material, with visible piles in overall fair condition.
    - **Piles Row C1 -** Piles present at Row 3, and between Rows 5 to 46. Piles in overall good condition with isolated poor condition piles due to significant cross-section removed for steel pile clamp connection. These piles could be remain in place and be used as part of a new structure.
    - **Piles Row D -** Piles present between Rows 4 to 89. Piles in overall poor condition due to typical severe splitting and several piles with minimal to no bearing.

  - **Piles Row D1 -** Piles present between Rows 4 to 46. Piles between Rows 4 to 6 are not parallel with other piles and are irregularly placed due to the tapered vertical face on the upstream end for the ice protection. Piles in overall good condition with isolated poor condition piles due to splitting. These piles could remain in place and be used as part of a new structure.
  - **Piles Row E -** Piles present throughout entire structure except for Rows 8 to 10, and 37 to 46 where non-typical diaphragm/beam construction exists. Piles in overall very poor condition due to typical severe splitting throughout, segmentation, minimal to no bearing, and decay. Several piles not functional.

- The timber cross bracing was overall in good to poor condition. At isolated locations the bracing was missing, broken, severely split, or rotten. In addition, the bracing was partially buried in some locations due to the riverbank material. Salvage of some bracing may be possible.
- The timber skirting and horizontal beams were overall in fair to poor condition due to typical weathered, broken, split, and missing members throughout, with the majority of skirting completely missing between Rows 50 to 60. It is assumed that these cannot be effectively salvaged or reused.
- The steel pile cap beams were in overall good condition except for the two beams at Rows 6 and 7, which were severely deformed due to ice impact damage at the upstream end of the structure. Most of these beams could be salvaged for reuse.
- The upstream end of the structure had severe deterioration in the timber deck, stringers, caps, piles, skirting, and steel pile cap beams between Rows 1 to 7. Several deck planks and stringers were broken and missing, timber caps were broken, piles and skirting were weathered and split, and the steel pile cap beams were severely deformed. The ice breaker area will required complete reconstruction.
- The timber fire wall planks were in overall good condition with some members showing signs of minor movement/displacement at the fire wall near Row 60.
- The timber backwall was exposed during the test pit excavation and was in overall poor condition due to rot throughout where exposed/visible. Between the top stringer and the top horizontal plank was a gap with exposed clay fill and cobblestones. The lower portion of these piles may still be functional if the tops were removed for the lower level of the two-level fixed dock in Option 3.
- The corrugated steel drainpipes between Rows 7/8, 49/50, and 57/58 were in overall good condition with light corrosion and minor sediment buildup. It is unknown of they are providing adequate drainage from behind the dock.
- Erosion protections were not provided along the underside part of the dock and it's impacting the lateral resistance of the existing piles. The riverbank upper slope is generally in good condition with no sign of slope movement or slope instability. Prior slope stabilization works appear to be functioning as intended.

General conclusions for the three options are as follows:

- **Option 1 – Full Demolition and Removal** of the structure, assumes potential replacement with a new dock consisting of steel sheet piles, backfill, and a concrete deck at a later date. While this would provide the longest lifespan for a replacement structure and the lowest overall maintenance, this would likely be a higher cost option. A steel sheet pile and concrete deck dock would not reflect the historic look of the dock from the previous 95 years, which may or may not be considered desirable from a heritage standpoint.
- **Option 2 – Partial Demolition with a Combination of Fixed and Floating Docks** assumes removal of the entire existing structures, with the exception of reuse of the 20-year-old pressure treated timber piles, and salvage of the pressure treated timber stringers for reuse in the dock. This option makes full use of the good existing piles and obtains the longest lifespan and largest structure for a dock which maximizes salvage of materials. The top area of the dock would be reduced by approximately 65% in this option, which reduces initial construction and long-term maintenance costs from that of the existing. This size of

dock would have the capacity to hold a large number of visitors, and still provide the feel of the original and current Alexander Dock. To provide mooring for recreational watercraft, and launching canoes, kayaks, and paddleboards a system of floating docks and finger docks has been proposed. The docks would consist of PVC floats, aluminum frames, and timber decking, consistent with the floating docks utilized at the Forks. This provides durability, minimum maintenance, and still maintains the predominantly timber appearance of the Alexander Dock. The proposed arrangement would allow for the mooring of 10 recreational boats, from small power boats to the larger pontoon boats, and the docks would maintain accessible access through a wide range of water levels. A floating PVC kayak launch dock would be located at the north end of the floating docks, and the location for mooring canoes and kayaks, or for entering the water with paddleboards, would be in a calm area on the backside of the floating docks. A temporary docking location for public water taxis could also be reserved on the floating dock or fixed timber dock, depending on water elevations, and by maintaining a large portion of the existing dock configuration it could still accommodate much larger private or commercial vessels. This option would require annual installation, removal, storage and maintenance of the floating dock system. Due to potential vandalism removal from site or a secure storage compound may be required.

- **Option 3 – Partial Demolition with a Two-Level Fixed Dock** also assumes removal of the entire existing structures, with the exception of reuse of the 20-year-old pressure treated timber piles, and salvage of the pressure treated timber stringers for reuse in the dock. A lower level fixed timber dock would be extended to the north, and avoid the annual installation, removal, storage and maintenance of the floating dock system. The elevation would be selected to allow for the docking of recreational watercraft during normal summer water levels, maximizing use of the lower level dock through a range of water levels. The lower level dock would be approximately 0.5 m higher than the Forks walkway to reduce closures from flooding during higher water levels in summer. The lower level dock would also allow for mooring of kayaks, canoes, and up to five recreational watercraft at one time. A floating kayak launch dock could still be included at the north end of the dock, and thus sheltered from the river flow. Similar to Option 2, the floating launch dock for kayaks could be separate from the main dock to allow direct access to the shoreline without crossing the main dock. If the lower level dock became inundated due to a summer flood condition, the main dock would then be functional for use be all types of watercraft.

- The cost estimate for Option 1 including mobilization and demobilization, environmental procedures, removal and disposal of the timber dock, supply and placement of rip rap erosion protection, and a 25% contingency is approximately **$700,000**. This is more than the budget of $600,000 stated in the Request for Proposal, but is consistent with the cost estimate from the 2015 report, increased for inflation. The cost estimate is based on feedback from Contractors, and pricing from other current projects, however a wide range of costs have been received, indicating further discussion and feedback is required to define the costs better, and so that the project scope is fully understood.

- The cost estimate for Option 2 including mobilization and demobilization, environmental procedures, removal and disposal of the timber dock, supply and placement of rip rap erosion protection, and a 25% contingency is approximately **$900,000**. The cost estimate for the new structure including 25% contingency is approximately **$1 Million**, for a total of **$1.9 Million**. Similar to Option 1, the cost estimate requires further discussion and feedback from potential Contractors, as well as discussion with the City of Winnipeg. Annual costs would also be incurred for this option due to the annual installation, removal, storage and maintenance of the floating dock system. Temporary removal may also be required for more extreme summer flood events.

  The cost estimate for Option 3 including mobilization and demobilization, environmental procedures, removal and disposal of the timber dock, supply and placement of rip rap erosion protection, and a 25% contingency, is approximately **$900,000**. The cost estimate for the new structure including 25% contingency is approximately **$1.2 Million**, for a total of **$2.1 Million**. Similar to Options 1 and 2, the cost estimate requires further discussion and feedback from potential Contractors, as well as discussion with the City of Winnipeg.

5. Recommendations

Based on the results of the structural, geotechnical, and environmental inspections, the Alexander Dock has significant deficiencies which require demolition/replacement. The following is recommended:

- Removal of the entire existing structures, with the exception of the main group of the 20-year-old pressure treated timber piles, and salvage of the pressure treated timber stringers for reuse in the dock. If further discussions with Contractors determine that salvage of the stringers is not practical (due to difficulty removing the deck) the stringers would be demolished as well. This applies to Options 2 and 3. Salvage of the 20-year-old piles many also be considered impractical by Contractors.
- Salvage and reconstruction of the timber docks in Options 2 and 3 will have a lifespan of 20 to 30 years, based on the salvaged timbers. Alternatives include completely new timber docks, or a new steel sheet pile and concrete dock. Further cost estimates would be required for comparison if the City decides to consider complete replacement with a more modern structure and a lifespan of 50 or more years.
- Option 2 with a floating dock system for recreational watercraft is recommended if the City wishes to have a large deck for visitors and gatherings, and a larger marina which is functional for the widest range of water levels and a higher number of vessels. However, the annual dock installation, removal, and storage must be considered.
- Option 3 with a two-level fixed dock is recommended if the City wishes to minimize annual maintenance, eliminate the floating docks, and still have a functional dock for a wide range of water levels. (A two-level dock could also be applied to a new steel and concrete design.)
- When selecting an option, environmental and heritage resource should be considered. In general, all options include reducing the footprint of the dock, and increasing both aquatic and terrestrial habitat. This could help offset the impacts of developing the remainder of the site with pathways, ramps, parking or other infrastructure. There is no significant excavation work for the options, other than regrading the area below the current dock, which limits environmental impacts and cultural heritage concerns.
- The large deck area for Options 2 and 3 would facilitate use of the space for healing and reconciliation activities. There is also sufficient green space on the embankment where additional gathering spaces could be developed.
- With the active transportation pathway higher on the embankment, there is ample space to develop an accessible path connecting this path to the dock. This would require several switchbacks to obtain the required grade and rest areas. There is also additional space to develop further parking between the Active Transportation Path and Waterfront Drive if required. With the site currently being very open and unobstructed other than by natural shrubs, Crime Prevention Through Environmental Design (CPTED) can be easily applied as the options are developed further.

6. References

KGS Group, 2015. Alexander Dock Inspection and Condition Assessment Report. Prepared for the City of Winnipeg, May 2015.

KGS Group, 2015. Alexander Dock Inspection and Condition Assessment, Budget Estimates for the Retrofit Concept and the Dock Demolition and Riverbank Stabilization Concept. Prepared for the City of Winnipeg, June 2015.

North/South Consultants, 2017. City of Winnipeg, Alexander Docks Demolition Environmental Site Characterization Report. Prepared for the City of Winnipeg, May 2017.

Appendix A. Drawings

DAMAGED UPSTREAM AREA

TYPICAL SLIP WITH RAMP

TYPICAL NOTCHED PILE WITH SECTION LOSS (SL), COULD BE REPAIRED

TYPICAL PILE NOT BEARING (NB)

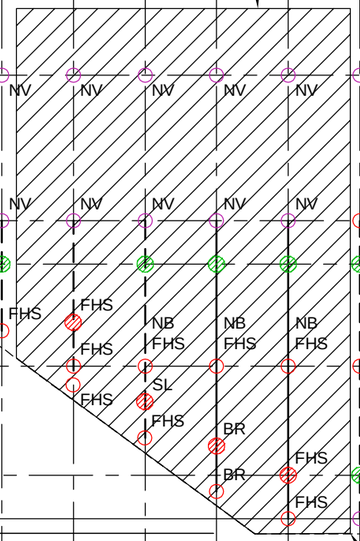
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

1500± TYP.

A
B
C
C1
D
D1
E

2896
3048
6401
12731
3048
6330
3201

914± TYP.



SLIP NO.1

SLIP NO.2

AREA EXPOSED AND DAMAGED WITH VEGETATION GROWTH

85800±

FLOW
RED RIVER

PLAN

Scale 1:125

NOTES:
1. ABANDONED TIMBER PILES EXIST BETWEEN EACH ROW OF EXISTING "C" AND "D" PILES FROM ROWS 6 TO 60 (NOT SHOWN FOR CLARITY)
2. MOST NEWER PRESSURE TREATED PILES ARE VERTICAL AND OVERALL IN GOOD CONDITION

LEGEND

———	STEEL W200x27 PILE CAP (BEAM)
– – – –	12x12 TIMBER PILE CAP (BEAM)
B(%)	- PERCENTAGE OF BEARING SURFACE
NB	- NO BEARING BETWEEN PILE AND BEAM
FHS	- FULL HEIGHT SPLIT
ES	- END SPLIT
SH	- SHIMMED PILE
C	- PILE CORED OR DRILLED
NV	- PILE NOT VISIBLE DURING INSPECTION
SL	- SECTION LOSS (DAMAGED OR NOTCHED)
CR	- CENTRE ROT
BR	- BROKEN

- NEWER PRESSURE TREATED PILE
- OLD CREOSOTE PILE
- NOT SALVAGEABLE
- SALVAGEABLE
- NOT VISIBLE

Issue Status: DRAFT

GENERAL ARRANGEMENT AND DEFICIENCIES

AECOM

SK-01

ALEXANDER DOCK
Project No.: 60727340

TYPICAL STEEL PILE CAP BEAM

TYPICAL BROKEN "B" PILE

TYPICAL "C1/D1" PILE CORE SAMPLE

TYPICAL ROTTEN "A" PILE

TYPICAL BROKEN/NOT BEARING "E" PILE

30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58

APPROX. LOCATION OF TEST PIT NO. 3

APPROX. LOCATION OF TEST PIT NO. 2

A — 2896 — B — 3048 — C — 3048 — C1 — 3048 — D — 3201 — D1 — E

	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
A	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	CR B(10)	NV	NV	CR C B(10)	NV	NV	NV	NV	NV	NV	NV	NV	NV
B	BR	BR	BR	BR	BR	BR	BR	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
C	FHS	FHS	FHS	FHS	FHS	FHS	FHS	FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	FHS	FHS	FHS	FHS	FHS	FHS	FHS	FHS	FHS	FHS	FHS	FHS	FHS
C1	C NB	C NB				FHS SL	B(50) C	FHS C	ES	ES	C	ES			C	ES													
D	NB FHS	B(10) FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	NB FHS	SL FHS	FHS	FHS	B(50) FHS	B(25) FHS	B(25) FHS	FHS	B(25) FHS	B(25) FHS	B(25) FHS	B(25) FHS	B(25) FHS
D1		B(25) FHS	B(50)	C FHS		FHS	ES	C B(75)				ES	C				C												
E	NB FHS	NB FHS	BR NB	BR NB	BR NB	FHS	FHS	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	FHS	FHS	FHS NB	BR NB	BR NB	BR NB	BR NB	BR NB	BR NB	BR NB	BR NB	BR NB

FLOW
RED RIVER

85800±

PLAN

Scale 1:125

LEGEND

- STEEL W200x27 PILE CAP (BEAM)
- – – – 12x12 TIMBER PILE CAP (BEAM)
- B(%) - PERCENTAGE OF BEARING SURFACE
- NB - NO BEARING BETWEEN PILE AND BEAM
- FHS - FULL HEIGHT SPLIT
- ES - END SPLIT
- SH - SHIMMED PILE
- C - PILE CORED OR DRILLED
- NV - PILE NOT VISIBLE DURING INSPECTION
- SL - SECTION LOSS (DAMAGED OR NOTCHED)
- CR - CENTRE ROT
- BR - BROKEN

- ▨ - NEWER PRESSURE TREATED PILE
- ○ - OLD CREOSOTE PILE
- ○ - NOT SALVAGEABLE
- ○ - SALVAGEABLE
- ○ - NOT VISIBLE

NOTES:

1. ABANDONED TIMBER PILES EXIST BETWEEN EACH ROW OF EXISTING "C" AND "D" PILES FROM ROWS 6 TO 60 (NOT SHOWN FOR CLARITY)
2. MOST NEWER PRESSURE TREATED PILES ARE VERTICAL AND OVERALL IN GOOD CONDITION ▨

TYPICAL DAMAGED SKIRTING

Issue Status: DRAFT

GENERAL ARRANGEMENT AND DEFICIENCIES

AECOM

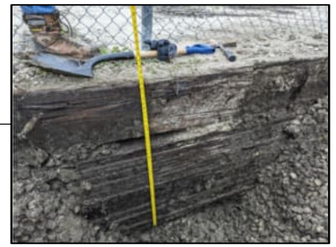
SK-02

ALEXANDER DOCK
Project No.: 60727340

Project Management Initials: ____ Designer: ____ Checked: ____ Approved: ____ ANSI B 279.4mm x 431.8mm

Last saved by: CAMERONKJ (2024-06-12) Last Plotted: 2024-06-12
Filename: C:\USERS\CAMERONKJ\ONEDRIVE - AECOM\DESKTOP\WORK\60727340\60727340.DWG

ROTTEN TIMBER BACKWALL



TYPICAL SPLIT "C" PILE

TYPICAL SLIP WITH STAIRS

APPROX. LOCATION OF TEST PIT NO. 1

SLIP NO.3

SLIP NO.4

FIRE SEPARATION

46500±

FLOW
RED RIVER

PLAN

Scale 1:125

LEGEND

———	STEEL W200x27 PILE CAP (BEAM)
– – – –	12x12 TIMBER PILE CAP (BEAM)
B(%)	- PERCENTAGE OF BEARING SURFACE
NB	- NO BEARING BETWEEN PILE AND BEAM
FHS	- FULL HEIGHT SPLIT
ES	- END SPLIT
SH	- SHIMMED PILE
C	- PILE CORED OR DRILLED
NV	- PILE NOT VISIBLE DURING INSPECTION
SL	- SECTION LOSS (DAMAGED OR NOTCHED)
CR	- CENTRE ROT
BR	- BROKEN

- NEWER PRESSURE TREATED PILE
- OLD CREOSOTE PILE
- NOT SALVAGEABLE
- SALVAGEABLE
- NOT VISIBLE

NOTES:
1. ABANDONED TIMBER PILES EXIST BETWEEN EACH ROW OF EXISTING "C" AND "D" PILES FROM ROWS 6 TO 60 (NOT SHOWN FOR CLARITY)
2. MOST NEWER PRESSURE TREATED PILES ARE VERTICAL AND OVERALL IN GOOD CONDITION

Issue Status: DRAFT

GENERAL ARRANGEMENT AND DEFICIENCIES

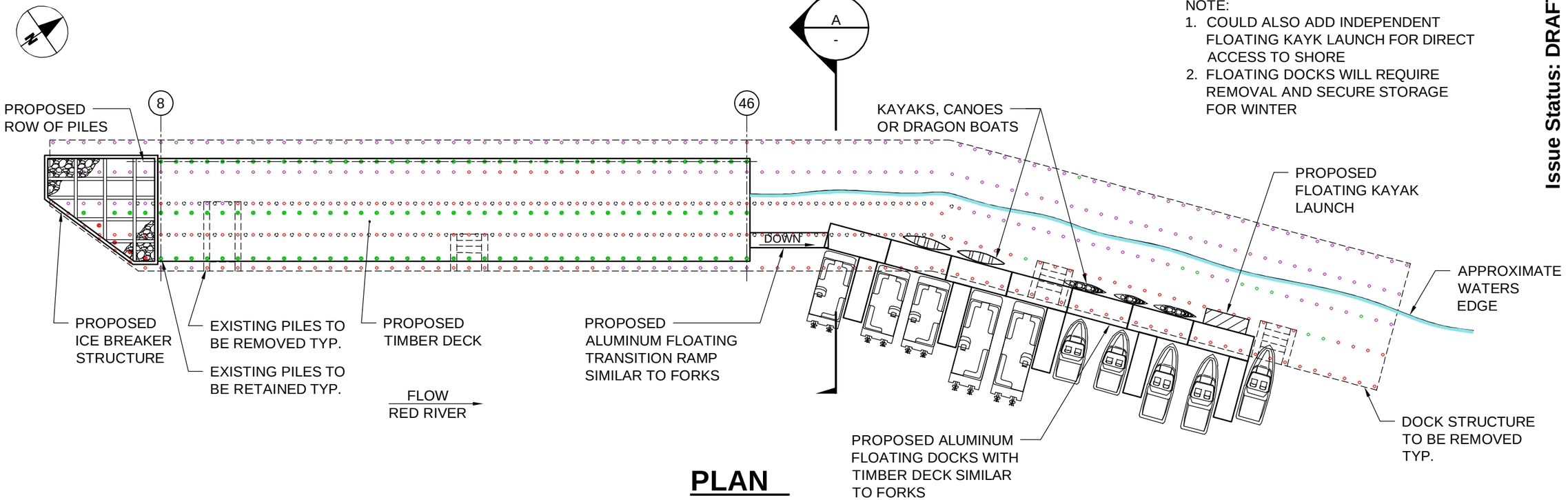
AECOM

SK-03

ALEXANDER DOCK
Project No.: 60727340

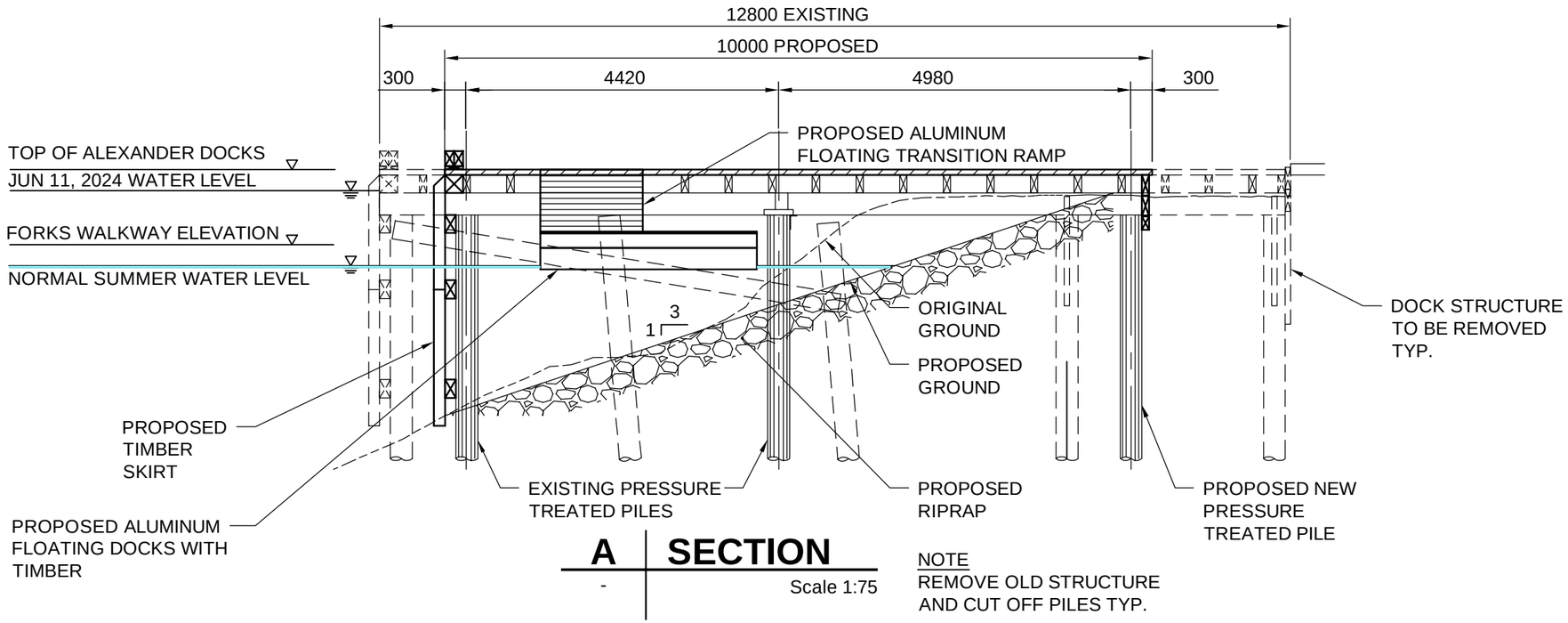
Project Management Initials: ____ Designer: ____ Checked: ____ Approved: ____ ANSI B 279.4mm x 431.8mm

Last saved by: CAMERONKJ (2024-06-12) Last Plotted: 2024-06-12
Filename: C:\USERS\CAMERONKJ\ONEDRIVE - AECOM\DESKTOP\WORK\60727340\60727340.DWG



PLAN
Scale 1:400

NOTE:
1. COULD ALSO ADD INDEPENDENT FLOATING KAYK LAUNCH FOR DIRECT ACCESS TO SHORE
2. FLOATING DOCKS WILL REQUIRE REMOVAL AND SECURE STORAGE FOR WINTER



A - SECTION
Scale 1:75

NOTE
REMOVE OLD STRUCTURE AND CUT OFF PILES TYP.

Issue Status: DRAFT

AECOM

SK-04

NEW DOCK OPTION 2 - FIXED TIMBER DOCK WITH FLOATING DOCKS

ALEXANDER DOCK
Project No.: 60727340

PROPOSED TIMBER DECK TO MATCH EXISTING ELEVATION

PROPOSED RAMP

PROPOSED PRESSURE TREATED ACCESSIBLE RAMP

PROPOSED STEPS

PROPOSED NEW PILES ROW 8 TO 58

PROPOSED NEW PILES ROW 47 TO 58

A
-

8 38 47 58

DOWN DOWN

NOTE:
1. COULD ALSO ADD INDEPENDENT FLOATING KAYK LAUNCH FOR DIRECT ACCESS TO SHORE

APPROXIMATE WATERS EDGE

PROPOSED ICE BREAKER STRUCTURE

EXISTING PILES TO BE REMOVED TYP.

EXISTING PILES TO BE RETAINED ROW 8 TO 46 TYP.

PROPOSED TIMBER DECK LOWER THAN EXISTING BY 600±

PROPOSED FLOATING KAYAK LAUNCH

DOCK STRUCTURE TO BE REMOVED TYP.

FLOW
RED RIVER

PLAN
Scale 1:400

12800 EXISTING
10000 PROPOSED
4420
4980
300
STEPS
RAMP

TOP OF ALEXANDER DOCKS
JUN 11, 2024 WATER LEVEL
FORKS WALKWAY ELEVATION
NORMAL SUMMER WATER LEVEL

3
1

ORIGINAL GROUND

PROPOSED GROUND

DOCK STRUCTURE TO BE REMOVED TYP.

PROPOSED TIMBER SKIRT

EXISTING PRESSURE TREATED PILES

PROPOSED RIPRAP

PROPOSED NEW PRESSURE TREATED PILE

A - SECTION
Scale 1:75

NOTE
REMOVE OLD STRUCTURE AND CUT OFF PILES TYP.

Issue Status: DRAFT

AECOM

SK-05

NEW DOCK OPTION 3 - FIXED TIMBER DOCK WITH TWO LEVELS

ALEXANDER DOCK
Project No.: 60727340

Appendix B. Inspection Photographs

AECOM Alexander Dock Inspection
City of Winnipeg
March 2024 to June 2024

Photograph 1
South end of structure.

Photograph 2
Looking North along structure.

Photograph 3
North end of structure.

Photograph 4
Firewall at North end of structure.

Photograph 5
Looking along deck top.

Photograph 6
Typical deck top.

Photograph 7
Slip No. 1 with ramp.

Photograph 8
Slip No. 2 with stairs.

Photograph 9
Slip No. 3 with stairs.

Photograph 10
Slip No. 4 with stairs.

Photograph 11
Deck top. Note: Deck planks removed.

Photograph 12
Deck top. Note: Manhole cover for access.

Photograph 13
Deck top. Note: Typical deteriorated planks with holes in deck.

Photograph 14
Deck top. Note: Typical deteriorated planks and stringers with holes in deck.

Photograph 15
South end. Note: Severe timber deterioration and steel deformations caused by ice flows.

Photograph 16
South end. Note: Removed/damaged deck planks. Damaged stringers and caps. Cap rot.

Photograph 17
Vertical face. Note: Severely deteriorated timber skirting and beams.

Photograph 18
Slip No. 1. Note: Severely deteriorated timbers.

Photograph 19
Firewall separating North and centre section of structure.

Photograph 20
South of firewall at North section. Note: Missing and deteriorated skirting throughout. Exterior piles deteriorated and not functional.

Photograph 21
Typical soffit and stringers.

Photograph 22
Typical bay between pile rows. Note: Typical abandoned piles between Piles C and D.

Photograph 23
Typical beam construction at Rows 35 to 46.

Photograph 24
Typical severely split and not functional pile.

Photograph 25
Typical drain pipe.

Photograph 26
Typical abandoned pile between existing piles.

Photograph 27
Typical partailly bearing pile.

Photograph 28
Typical not bearing/not functional pile.

Photograph 29
Typical pile with section removed for connection.

Photograph 30
Typical steel shoe at Pile C. Note: Severe corrosion throughout.

Photograph 31
Showing stringers with fire damage paired with newer built-up stringers.

Photograph 32
Typical steel pile cap beam.

Photograph 33
Typical steel angle bearing at steel pile cap beam and timber pile cap.

Photograph 34
Typical timber header construction below Slip No. 4.

Photograph 35
Typical timber header construction below Slip No. 4.

Photograph 36
Looking into enclosed North area.

Photograph 37
Looking into enclosed North area. Note: Typical split piles.

Photograph 38
Typical bay at enclosed North area. Note: Pile C buried due to riverbank height.

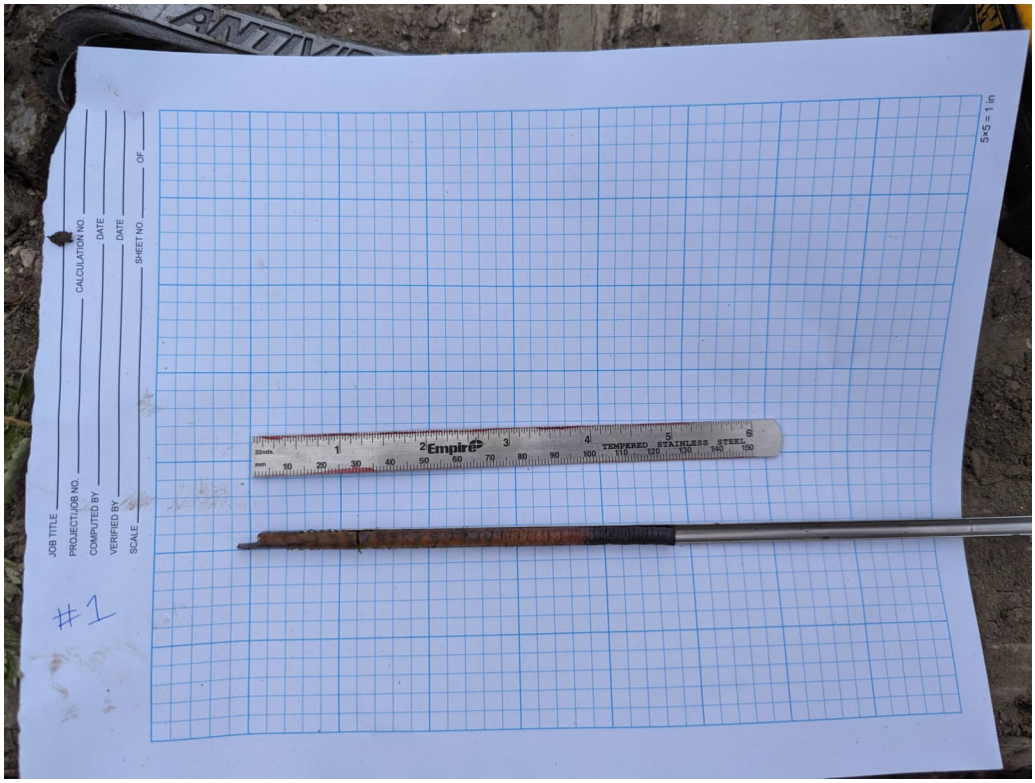
Photograph 39
Typical core sample obtained from Piles C1/D1. Note: No rot detected.

Photograph 40
Timber backwall at test pit excavation. Note: Typical rotten/split members.

Photograph 41
Exposed pile and pile cap at Test Pit No. 1. Note: Rotten pile cap. No rot detected in pile where visible.

Photograph 42
Exposed pile and pile cap at Test Pit No. 2. Note: Rotten pile and pile cap. Minimal bearing on pile.

Photograph 43
Exposed pile and pile cap at Test Pit No. 3. Note: Rotten pile and pile cap. Severe shell separation in pile. Minimal bearing on pile.



Photograph 44
Core sample obtained from pile at Test Pit No. 1. Note: No rot detected.

Photograph 45
Core sample obtained from pile at Test Pit No. 2. Note: Rotten.

Photograph 46
June 11, 2024 water level at the Forks.

Photograph 47
Typical float dock at the Forks.

Photograph 48
Typical float dock at the Forks.

Photograph 49
June 11, 2024 water level at the dock.

Photograph 50
June 11, 2024 water level at the dock.

Photograph 51
Parking lot located west of the dock.

Photograph 52
Looking east towards dock approach.

Appendix C. Regulatory Roadmap Memorandum

AECOM Canada Ltd.
99 Commerce Drive
Winnipeg, MB R3P 0Y7
Canada

T: 204.477.5381
F: 431.800.1210
aecom.com

To:
Marsha Christiuk
Consulting Contract Administrator
City of Winnipeg and Urban Design Division

CC:
Chad Kingerski, Sr. Project Manager (AECOM)
Eric Loewen, Sr. Marine/Structural Engineer (AECOM)

Project Number:
60727340

From:
Marlene Gifford, M.Sc., P.Biol., R.P.Bio.
Biologist, Environmental Assessor

Date:
May 7, 2024

Memo

Subject: Alexander Dock – Regulatory Roadmap

1. Introduction

The purpose of this 'Regulatory Roadmap' is to provide the City of Winnipeg with an understanding of the regulatory review and approvals processes that would apply to the proposed options for the Alexander Dock refurbishment project (AECOM 2024[1]), and potential Project schedule and cost implications. Environmental baseline information regarding the existing Alexander Dock and surrounding area (Project site), as described in **Attachment A**, has been used to inform the anticipated regulatory review requirements for the Project options. **Attachment A** also includes recommendations to minimize or avoid adverse environmental impacts of the Project that are expected to be required for applicable environmental legislation compliance.

2. Regulatory Roadmap

The anticipated regulatory review and approval requirements for the Project options for the Alexander Dock as described in the Alexander Dock Condition Assessment Report (AECOM 2024) are provided in **Table 2-1**. Environmental regulatory requirements **are anticipated to be the same for either a partial or full demolition of the dock with the objective of creating a facility suitable for public use and mooring recreational watercraft, launching canoes, kayaks, and paddleboards.** This is under the assumption that work will occur in water below the ordinary high water mark, and there will be some modification of the riverbank to provide erosion control. Additionally, AECOM assumes that some minor natural vegetation clearing may be needed to accommodate construction/demolition equipment and materials laydown areas.

[1] AECOM Canada Ltd. (AECOM). 2024. Alexander Dock Condition Assessment Report for the City of Winnipeg.

Table 2-1: Anticipated Environmental Regulatory Requirements

Approval/ Licence/ Permit	Submission/ Application	Agency/Authority	Project Trigger	Lead Time[a]	Ballpark Cost[b]
FEDERAL					
Department of Fisheries and Oceans Canada (DFO) determination regarding if a DFO Authorization under the *Fisheries Act* is required.	Request for Review form submission to DFO	DFO regional Fish and Fish Habitat Protection Program office: 867 Lakeshore Road, Burlington ON L7S 1A1 (FisheriesProtection@dfo-mpo.gc.ca)	In-water work in waters where a DFO review is required that may have the potential for 'harmful alteration, disruption or destruction of fish habitat' (or 'HADD') where DFO 'Measures to Protect Fish and Fish Habitat' cannot all be applied and the existing DFO Codes of Practice are not applicable to all project works. The Interim Code of Practice: Repair and Maintenance of In-Water Structures and/or The Interim Code of Practice: Repair, Maintenance and Construction of Docks, Moorings and Boathouses may apply, depending on the final Project design. However, a DFO Request for Review will be required if the Project works may potentially affect the mapleleaf mussel (aquatic Species at Risk) and/or if erosion protection works are required below the ordinary high water mark. If mapleleaf mussels may be potentially affected, DFO recommends submitting a Request for Review rather than a *Species at Risk Act* (SARA) permit to the regional DFO office. There currently is no Code of Practice for bank erosion protection works; therefore, submission of a Request for Review to DFO is advised.	**3 to 5 months** (estimated)	**$3,000 to $5,000**

Approval/ Licence/ Permit	Submission/ Application	Agency/Authority	Project Trigger	Lead Time[a]	Ballpark Cost[b]
Fisheries Act Authorization	*Fisheries Act* Authorization application form, including required habitat offsetting plan.	DFO regional Fish and Fish Habitat Protection Program office (as above).	If DFO determines, after the Request for Review is submitted (see above), that a *Fisheries Act* Authorization is required. **Not anticipated if:** there is no net loss if fish habitat, disturbance of mapleleaf mussel habitat can be avoided, and DFO measures to protect fish and fish habitat can be applied. When regulatory approvals are required under both the federal *Species at Risk Act* (i.e., a SARA Permit) and the *Fisheries Act*, DFO may issue a *Fisheries Act* authorization that also acts as a SARA Permit.	**5 to 12 months** (estimated)	**$20,000 to $40,000**
Transport Canada Approval under the *Canadian Navigable Waters Act* (CNWA)	Application to Navigation Protection Program (NPP); or Publish a public notice on the NPP External Submission Site	Transport Canada: The NPP is responsible for administering and processing applications for approval.	The Red River is a scheduled waterway under CNWA. For work in navigable water listed in the CNWA schedule, an owner who proposes to construct, place, alter, rebuild, remove or decommission a work, other than a major work or a minor work, in a navigable water listed in the schedule **and that may interfere with navigation[c]**, must submit an application for an approval to the Minister and deposit information about the work in locations specified by the Minister. In addition, the owner must publish a notice about the work to advise interested parties that information has been posted for review. Any comments must be received within 30 days (or as specified) after the publication of the notice to the NPP. After the respective time period for the review, the Minister makes a decision for approval.	**4 to 6 months** (estimated)	**$2,000 to $4,000**

Approval/ Licence/ Permit	Submission/ Application	Agency/Authority	Project Trigger	Lead Time[a]	Ballpark Cost[b]
PROVINICAL					
None anticipated. **Note:** The mapleleaf mussel is listed as an Endangered species under *The Endangered Species and Ecosystems Act* of Manitoba, and is also listed as Endangered under the federal *Species at Risk Act*. Section 12(1) of *The Endangered Species and Ecosystems Act* provides the potential for an exemption to the Act for an existing or proposed development, if the minister is stratified that *a) protection and preservation of the species and its habitat is assured; or b) appropriate measure are established, or will be established, to reduce to a minimum the impact of the development upon the species and its habitat*. While the Project is not a 'development' under the Classes of Development Regulation under *The Endangered Species and Ecosystems Act*, AECOM assumes that the Manitoba minister of Environment and Climate Change would defer to the DFO species at risk protection and permitting process under the federal *Fisheries Act*, and therefore a separate permit under *The Endangered Species and Ecosystems Act* would not be required for Project activities potentially affecting the mapleleaf mussel.					
CITY OF WINNIPEG					
Waterway Permit pursuant to City of Winnipeg Waterway By-law No. 5888/92	Submission of a Waterway Permit application form and fee as per the Schedule of Fees as applicable, and as determined by the City of Winnipeg Planning, Property and Development Department	City of Winnipeg Planning, Property and Development Department	Work within 106.7 m (350 ft) of the regulated summer water level of the Red River. A Waterway Permit is required for: • the deposit, removal, alteration or disturbance of any material • the construction or demolition of a building or other structure • the alteration of surface or subsurface drainage • the diversion of a waterway or alteration of a channel of a waterway.	**4 to 6 weeks** (estimated)	**$1,000 to $2,000**

[a]Estimated time required once complete application is submitted to regulatory authority until regulatory decision/determination is provided.

[b]Ballpark Cost is a general cost estimate that includes preparation of applications, excluding any required application fees or habitat offsetting cost assurances to be provided by the proponent and based on regulatory review of the application(s). The Ballpark Cost does not include any additional studies or fieldwork that maybe required by regulatory authorities. The Ballpark Cost maybe further refined based on a final Project design.

[b]Transport Canada (NPP) will determine if the Project may potentially interfere with navigation based on the final Project design information. AECOM assumes that not all criteria can be met for Project works to be categorized as a 'Minor Work' under the Minor Works Order. The Minor Works Order allows for specific works to be built, without review or approval, if they meet the criteria for the applicable class of works as well as specific terms and conditions. However, for some types of Minor Works (e.g., erosion-protection works), the owner is required to deposit information and publish a public notice, pursuant to the Minor Works Order.

In addition to the above-listed anticipated regulatory approvals anticipated to be required for the Project, it is expected that the Project would conform with the latest City of Winnipeg environmental protection plans, procedures and policies that may be applicable to the Project (e.g., City of Winnipeg Best Management Practices Handbook for Activities In and Around the City's Waterways and Watercourses[2]).

3. Conclusion and Recommendations

Anticipated environmental regulatory requirements are not considered onerous if the final Project design and construction schedule can accommodate work outside of the sensitive season timelines for species protected by legislation, and work can be done in accordance with recommended mitigation measures to avoid or minimize harm (**Attachment A**). In particular, AECOM recommends that in-water construction activities be done in accordance with DFO's 'measures to protect fish and fish habitat' (e.g. using proper erosion and sediment control; respecting DFO recommended timing windows for in-water work) and in accordance with the City of Winnipeg's Best Management Practices Handbook for Activities In and Around the City's Waterways and Watercourses (Nov. 2005). This handbook indicates that "…*natural areas in the City are managed with a 'no net loss' policy approach and approvals to affect or remove natural vegetation must be obtained*." Prior to clearing natural areas within the City of Winnipeg, the Public Works Department Naturalist Services Branch should be consulted.

Given the regulatory review timelines and ballpark cost estimates provided in **Table 2-1**, AECOM recommends including consideration of required regulatory review and approval timelines and costs in overall Project planning. Required environmental protection measures should be included as 'special provisions' within the construction contractor contact for services.

[2] City of Winnipeg Best Management Practices Handbook for Activities In and Around the City's Waterways and Watercourses. November 2005. Accessed at: https://legacy.winnipeg.ca/ppd/Documents/CityPlanning/Riverbank/Best-Management-Practices-Handbook-for-Activities-In-and-Around-the-Citys-Waterways-and-Watercourses.pdf

Attachment A

MEMORANDUM: Alexander Dock Environmental Site Condition Inspection Spring 2024

AECOM Canada Ltd.
99 Commerce Drive
Winnipeg, MB R3P 0Y7
Canada

T: 204.477.5381
F: 431.800.1210
aecom.com

To:
Marsha Christiuk
Consulting Contract Administrator
City of Winnipeg and Urban Design Division

CC:
Chad Kingerski, Sr. Project Manager (AECOM)
Eric Loewen, Sr. Marine/Structural Engineer (AECOM)

Project Number:
60727340

From:
Adam Egan, Ecologist

Date:
April 22 2024

Memo

Subject: Alexander Dock Environmental Site Condition Inspection Spring 2024

1 Introduction

This memorandum summarizes the results of the environmental site condition inspection of the Alexander Dock and surrounding area (Project site) that took place on April 17, 2024. Representaitve photographs taken at the Project site are provided in **Attachment 1**. The purpose of the environmental site condition inspection was to determine if any substantial changes to the existing environment at the Alexander Dock site had occurred since the environmental baseline condition study was completed by North/South Consultants Inc. (2017).

2 Vegetation

The area located northwest of the dock approximately 40m from Waterfront Drive is Fort Douglas Park that is maintained by the City of Winnipeg (**Attachment 1**, Photos 14 and19). The area located directly adjacent and surrounding the dock contains shrub species and tree saplings including Field wormwood (*Artemisia campestris*), Cocklebur (*Xanthium strumarium* L.), and willow species (*Salix* sp.) (**Attachment 1**, Photos 3,4,14,16, and 19). There is a group of Siberian Elms (*Ulmus pumila*) located at the access to the dock at the end of Alexander Avenue (**Attachment 1**, Photo 15). The low-lying vegetation that surrounds the dock will likely need to be cleared prior to construction. The mature trees located next to Alexander Ave may need to be cleared depending on access requirements and land needed for an equipment and materials laydown area.

3. Bird and Nest Observations

The bird species that were observed or heard during the site visit included Song Sparrow, Canada Goose, Mallard, Ring-billed Gull, Dark-eyed Junco, American Crow, White-breasted Nuthatch, Bald Eagle and Hairy Woodpecker. There were a large number of Song Sparrows and Dark-eyed Junco throughout the vegetation surrounding the dock. No new or previous breeding season bird nests or signs of nesting behavior was observed at the Project site. No nests were observed under the dock when inspecting from the shoreline on the north and south ends of the dock, and no nests were observed under the dock during the structural inspections on March 8 and 12, 2024. However, the environmental and structural inspection site visits took place outside of the breeding bird season for most bird species.

4. Aquatic Assessment

The substrate observed around the dock and the shoreline, in order of dominance, consisted of boulders, cobble, silt, fines, and sand. Banks on both sides of the river showed signs of erosion and instability (**Attachment 1**, Photos 5,6,8,11, and 13). A search for mapleleaf mussel (Species at Risk) shells was conducted around the dock and shoreline surrounding the dock; however, no mussels or mussel shells of any mussel species were observed. Historic satellite imagery of the dock and surrounding area shows that the Project site commonly floods in the spring causing the dock to be submerged. As a result, large amounts of woody debris have washed up on the land behind the dock and the area around the dock (**Attachment 1**, Photos 3,4,11, and 15). This debris will need to be removed prior to construction. The aquatic environment (e.g., substrate characteristics) are not expected to have changed since the detailed environmental site characterization was done at the Project site in 2017 (North/South Consultants Inc. 2017).

5. Conclusion and Recommendations

Based on the findings of the environmental site inspection, some limited vegetation clearing will likely be required before construction for an equipment and materials laydown area as well as access to the dock. Any vegetation clearing required for future work at the Project site should be completed outside the breeding bird season (late April through to mid-August) to avoid contravening the federal *Migratory Birds Convention Act*, 1994. Birds that could potentially nest under the dock, if access is available due to low water levels, during the breeding bird season include Barn Swallow and Eastern Phoebe, both of which are migratory bird species protected under the federal *Migratory Birds Convention Act, 1994*. If active bird nests are found under or on the dock, work on the dock should not occur until the nests are no longer active and the young birds have left the Project site area. Bird access under the dock can be prevented prior to the start of the dock construction work by installing fine-mesh netting over all access openings to the underside of the dock. However, this mitigation measure may be impractical on this site due to the size of the dock and large number and sizes of openings.

Fisheries and Oceans Canada's (DFO) Online Aquatic Species at Risk Map tool (DFO, 2023) indicates that Mapleleaf mussels may potentially occur within the Project site. Although the report from North/South Consultants Inc. found that the substrate within the footprint of the dock is not conductive to supporting Mapleleaf mussels, the area surrounding the dock does have the potential to support Mapleleaf mussels (North/South Consultants Inc. 2017). Once the scope of the project has been decided and detailed designs have been finalized, an assessment can be done to determine if the project requires a request for review to DFO. There has not been substantial change to the shoreline and river within the Project site since the previous environmental investigation; however, the dock has continued to deteriorate since the previous environmental inspection (North/South Consultants Inc. 2017). During the spring 2024 environmental site inspection the water level was lower than typical in April, causing more of the shoreline to be visible than usual during April. Although Mapleleaf mussel shells were not observed along the visible shoreline, this does not mean that this mussel species would not exist or be found in the river at this location.

During the site visit there was evidence of an active homeless encampment located in the wooded area approximately 100m north of the dock. Engagement efforts should be undertaken by the City of Winnipeg

appropriate authorities and the encampment occupants if the encampment is still present prior to future work at the Project site to mitigate the potential for conflict and to address potential safety issues.

6. References

Fisheries and Oceans Canada (DFO), 2023: Aquatic Species at Risk Map. Available online at https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html Accessed April 2024.

North/South Consultants Inc. 2017. City of Winnipeg, Alexander Docks Demolition Environmental Site Characterization Report. Prepared for the City of Winnipeg, May 2017.

Attachment 1

Photo Log

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
City of Winnipeg Planning and Urban Design Division	Alexander Docks	60727340

Photo No.	Date
1	4/18/2024

Direction Photo Taken

Southwest

Description

Facing southwest along the dock and north bank

Photo No.	Date
2	4/18/2024

Direction Photo Taken

Northeast

Description

Facing northeast along the dock

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
City of Winnipeg Planning and Urban Design Division	Alexander Docks	60727340

Photo No.	Date
3	4/18/2024

Direction Photo Taken

West

Description

Facing west from the dock at woody debris pile next to dock

Photo No.	Date
4	4/18/2024

Direction Photo Taken

North

Description

Facing north at debris and vegetation next to dock

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
City of Winnipeg Planning and Urban Design Division	Alexander Docks	60727340

Photo No.	Date
5	4/18/2024

Direction Photo Taken

Northeast

Description

Facing northeast looking at north bank from the north end of the dock

Photo No.	Date
6	4/18/2024

Direction Photo Taken

Northeast

Description

Facing northeast looking at north bank from the north end of the dock

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
City of Winnipeg Planning and Urban Design Division	Alexander Docks	60727340

Photo No.	Date
7	4/18/2024

Direction Photo Taken

North

Description

Facing north at vegetation and wooded area north of the dock

Photo No.	Date
8	4/18/2024

Direction Photo Taken

Southeast

Description

Facing southeast at the opposite side of the river from the north end of the dock

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
City of Winnipeg Planning and Urban Design Division	Alexander Docks	60727340

Photo No.	Date
9	4/18/2024

Direction Photo Taken

South

Description

Facing southwest along the north bank from the south end of the dock

Photo No.	Date
10	4/18/2024

Direction Photo Taken

West

Description

Raccoon tracks found on the dock

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
City of Winnipeg Planning and Urban Design Division	Alexander Docks	60727340

Photo No.	Date
11	4/18/2024

Direction Photo Taken

South

Description

Facing the north bank next to the south end of the dock

Photo No.	Date
12	4/18/2024

Direction Photo Taken

Southeast

Description

Facing southeast at the opposite side of the river from the south end of the dock

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
City of Winnipeg Planning and Urban Design Division	Alexander Docks	60727340

Photo No.	Date
13	4/18/2024

Direction Photo Taken

Northeast

Description

Facing northeast at the south end of the dock

Photo No.	Date
14	4/18/2024

Direction Photo Taken

Northeast

Description

Facing northeast at the vegetation and debris west of the dock

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
City of Winnipeg Planning and Urban Design Division	Alexander Docks	60727340

Photo No.	Date
15	4/18/2024

Direction Photo Taken

Northeast

Description

Facing the trees located off of Alexander Ave west of the dock

Photo No.	Date
16	4/18/2024

Direction Photo Taken

Southwest

Description

Facing southwest at the site from the north end of the site

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
City of Winnipeg Planning and Urban Design Division	Alexander Docks	60727340

Photo No.	Date
17	4/18/2024

Direction Photo Taken: Southwest

Description: Facing southwest at the north end of the dock

Photo No.	Date
18	4/18/2024

Direction Photo Taken: Northeast

Description: Facing northeast at the north bank on the north end of the site

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
City of Winnipeg Planning and Urban Design Division	Alexander Docks	60727340

Photo No.	Date
19	4/18/2024

Direction Photo Taken

Southwest

Description

Facing southwest at the vegetation found west of the dock

Appendix D. Cost Estimates

Alexander Docks
Cost Estimate

Option 1 - Full Demolition

Description	Unit of measure	Quantity		Unit Price		Total quantity
Mobilization and Demobilization	LS	1	$	50,000.00	$	50,000.00
Environmental Procedures	LS	1	$	20,000.00	$	20,000.00
Removal and disposal of dock	m2	1660	$	210.00	$	348,600.00
Supply and place geotextile	m2	1660	$	5.00	$	8,300.00
Supply and place of rip rap	m3	670	$	200.00	$	134,000.00
				Demolition and removal subtotal	$	560,900.00
				Contingency (25%)	$	140,225.00
				Subtotal Section 1	**$**	**701,125.00**

Alexander Docks
Cost Estimate

Option 2 - Partial Demolition (Floating Docks)

Description	Unit of measure	Quantity	Unit Price	Total quantity
Mobilization and Demobilization	LS	1	$ 50,000.00	$ 50,000.00
Environmental Procedures	LS	1	$ 20,000.00	$ 20,000.00
Partial removal and disposal of dock	m2	1660	$ 300.00	$ 498,000.00
Supply and place geotextile	m2	1660	$ 5.00	$ 8,300.00
Supply and place of rip rap	m3	670	$ 200.00	$ 134,000.00
			Demolition and removal subtotal	$ 710,300.00
			Contingency (25%)	$ 177,575.00
			Subtotal Section 1	**$ 887,875.00**
New Ice Breaker Structure	LS	1	$ 100,000.00	$ 100,000.00
New Piles	each	39	$ 5,000.00	$ 195,000.00
New Pile Caps (per row of replacement)	each	23	$ 1,000.00	$ 23,000.00
New Skirting	m	67	$ 650.00	$ 43,550.00
New Deck	m2	576	$ 200.00	$ 115,200.00
Remove and Install Salvaged Stringers	LS	1	$ 200,000.00	$ 200,000.00
New Floating Ramp	each	1	$ 7,000.00	$ 7,000.00
New Floating Docks	each	7	$ 12,500.00	$ 87,500.00
New Finger Docks	each	5	$ 10,000.00	$ 50,000.00
Kayak Launch System	each	1	$ 15,000.00	$ 15,000.00
			New Work Subtotal	$ 836,250.00
			Contingency (25%)	$ 209,062.50
			Subtotal Section 2	**$ 1,045,312.50**
			Total (Section 1 + 2)	**$ 1,933,187.50**

Alexander Docks
Cost Estimate

Option 3 - Partial Demolition

Description	Unit of measure	Quantity	Unit Price	Total quantity
Mobilization and Demobilization	LS	1	$ 50,000.00	$ 50,000.00
Environmental Procedures	LS	1	$ 20,000.00	$ 20,000.00
Partial removal and disposal of dock	m2	1660	$ 300.00	$ 498,000.00
Supply and place geotextile	m2	1660	$ 5.00	$ 8,300.00
Supply and place of rip rap	m3	670	$ 200.00	$ 134,000.00
			Demolition and removal subtotal	$ 710,300.00
			Contingency (25%)	$ 177,575.00
			Subtotal Section 1	**$ 887,875.00**
New Ice Breaker Structure	LS	1	$ 100,000.00	$ 100,000.00
New Piles	each	75	$ 5,000.00	$ 375,000.00
New Pile Caps (per row of replacement)	each	35	$ 1,000.00	$ 35,000.00
New Skirting	m	86	$ 650.00	$ 55,900.00
New Deck	m2	756	$ 200.00	$ 151,200.00
Remove and Install Salvaged Stringers	LS	1	$ 262,000.00	$ 262,000.00
Kayak Launch System	each	1	$ 15,000.00	$ 15,000.00
			New Work Subtotal	$ 994,100.00
			Contingency (25%)	$ 248,525.00
			Subtotal Section 2	**$ 1,242,625.00**
			Total (Section 1 + 2)	**$ 2,130,500.00**

AECOM Canada Ltd.
99 Commerce Drive
Winnipeg, MB R3P 0Y7
Canada

T: 204.477.5381
F: 431.800.1210
www.aecom.com