### **GENERAL NOTES:**

- 1. ALL DIMENSIONS SHOWN IN MILLIMETERS (mm) AND ALL ELEVATIONS SHOWN IN METERS (m) UNLESS NOTED OTHERWISE.
- 2. DO NOT SCALE FROM THE DRAWINGS.
- 3. ALL STANDARDS AND SPECIFICATIONS NOTES REFLECT THE "LATEST EDITION".
- 4. DIMENSIONS/GEOMETRY AND INFORMATION FOR EXISTING STRUCTURES WERE OBTAINED FROM PREVIOUS CONTRACT DRAWINGS.
  - A. "KINGS WHARF REHABILITATION BERMUDA 61-53-79-04", CONSTRUCTION DRAWINGS BY RAMBOLL.
  - "KINGS WHARF REHABILITATION BERMUDA", PRECAST
  - "KINGS WHARF BERMUDA BERTHING DOLPHIN REMEDIAL WORKS". CONSTRUCTION DRAWING BY MOTT MACDONALD.
- 5. ALL DETAILS, DIMENSIONS AND ELEVATIONS SHOWN RELATING 7. TO THE EXISTING STRUCTURES ARE APPROXIMATE. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING ALL MEASUREMENTS AND GEOMETRY ON SITE, REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO STARTING
- ALL FLEVATIONS REFERENCED ARE TO CHART DATUM. CHART DATUM IS. BY INTERNATIONAL AGREEMENT, A PLANE BELOW WHICH THE TIDE WILL SELDOM FALL. TIDE AND CURRENT TABLES, AS ISSUED BY LOCAL AUTHORITY, SHOULD BE CONSULTED FOR TIDAL PREDICTIONS AND OTHER TIDAL INFORMATION RELATING TO THE WORK.

## **REMOVALS NOTES:**

- EXISTING FOAM FENDERS (BEING REPLACED) SHALL BE REMOVED, ALONG WITH ALL OF THEIR ASSOCIATED CHAINS AND HARDWARE.
- 2. IF, DURING REMOVAL OF THE FENDERS OR INSTALLATION OF THE NEW FENDERS/FENDER PANELS, UNSOUND CONCRETE AND/OR EXPOSED REINFORCING IS DISCOVERED, THE ENGINEER/OWNER SHALL BE NOTIFIED TO DETERMINE IF IT WARRANTS REPAIR. IF REPAIRS ARE WARRANTED, THE FOLLOWING PROCEDURE SHALL BE FOLLOWED:
  - AREAS OF EXPOSED REINFORCEMENT, LOOSE, DELAMINATED, CRACKED OR HOLLOW CONCRETE ARE TO BE BROKEN BACK TO SOUND SUBSTRATE OR TO A MINIMUM DEPTH BEHIND THE REINFORCEMENT BAR OF 15 mm (WHICHEVER IS DEEPER). EQUIPMENT, NO LARGER THAN A CP-9 CHIPPING HAMMER, SHALL BE USED FOR ALL DEMOLITION OF EXISTING STRUCTURES. CARE SHALL BE TAKEN TO ENSURE NO DAMAGE IS CAUSED TO STRUCTURAL ELEMENTS.
  - EXISTING AND NEWLY EXPOSED REINFORCEMENT SHALL BE BLAST CLEANED. WHERE SECTION LOSS OF REINFORCEMENT IS ENCOUNTERED, AN ADDITIONAL LENGTH OF STEEL REINFORCEMENT, LAPPED WITH THE DAMAGED BAR A LENGTH OF 35 TIMES THE BAR DIAMETER IS TO BE PROVIDED. WHERE NECESSARY CONCRETE SHALL ALSO BE BROKEN BACK UNTIL A CONTINUOUS LENGTH OF ACCEPTABLE REINFORCEMENT BAR IS EXPOSED. ALTERNATIVELY, THE REBAR SHALL BE DRILLED AND EPOXIED INTO SOUND CONCRETE.
  - THE SOUND CONCRETE SUBSTRATE IS TO BE SCABBLED TO AN EXPOSED AGGREGATE SURFACE AND TREATED WITH A BONDING AGENT PRIOR TO THE APPLICATION OF THE CEMENTITIOUS REPAIR MATERIAL. THE BONDING AGENT SHALL BE "NITROBOND EP STANDARD" OR "NITROBOND EP SLOW SET", MANUFACTURED BY FOSROC EXPANDITE LTD. OR AN EQUIVALENT PRODUCT APPROVED BY THE ENGINEER.
  - D. THE CEMENTITIOUS REPAIR MATERIAL SHALL BE "RENDEROC GP", MANUFACTURED BY FORSOC, AND IS TO BE APPLIED TO AN APPROPRIATE THICKNESS TO REINSTATE THE ORIGINAL COVER TO THE OUTER SURFACE OF THE REINFORCEMENT BAR. WHERE THE APPLICATION THICKNESS EXCEEDS THE STATED MANUFACTURER RECOMMENDATIONS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE PRODUCT FOR THE ENGINEER'S APPROVAL.

## INSTALLATION OF ANCHORS:

- THREADED ANCHOR RODS TO BE ASTM A193, GRADE B7, GALVANIZED. COAT ALL BOLTED CONNECTIONS WITH A SUITABLE THREADLOCKER, SUCH AS LOCTITE, O.A.E.
- 2. ANCHORS SHALL BE FIXED INTO THE EXISTING CONCRETE USING HILTI HIT-RE 500 EPOXY OR AN APPROVED EQUIVALENT, INSTALLED AS PER MANUFACTURER'S INSTRUCTIONS.
- THE LOCATION OF THE REBAR IN THE EXISTING CONCRETE SHALL BE DETERMINED IN ADVANCE OF DRILLING THROUGH A COVER METER SURVEY AND WITH REFERENCE TO THE AS-BUILT DRAWINGS. DRILLED HOLES SHALL BE LOCATED TO AVOID ALL EXISTING REBAR.
- DRILLED HOLES TO BE PREPARED AND CLEANED PRIOR TO FITTING THE ANCHOR. ALL LOOSE MATERIAL SHALL BE REMOVED AND HOLES BLOWN CLEAR.
- CONCRETE SHOP DRAWINGS BY PRECAST SYSTEMS INC. 5. MINIMUM ANCHOR EMBEDMENT DEPTH IS 610mm, U.N.O.
  - ONCE THE ANCHORS ARE INSTALLED, EPOXY SHALL BE ALLOWED TO CURE FOR A MINIMUM OF 24 HOURS BEFORE UNDERTAKING ANY WORK WHICH MAY INTERFERE WITH THE ANCHORS.
  - SET ANCHOR BOLTS USING TEMPLATES UNDER SUPERVISION OF APPROPRIATE TRADE PRIOR TO INSTALLING EPOXY.
  - WHEN SETTING ANCHOR BOLTS, CARE SHALL BE TAKEN TO NOT ONLY ENSURE THAT THE ANCHOR BOLTS ARE SET IN THE CORRECT POSITION AND ORIENTATION, BUT ALSO THAT SUFFICIENT THREAD EXTENSION IS PROVIDED TO FACILITATE BOLTING THE ASSEMBLY TO THE CONCRETE, COMPLETE WITH COMPATIBLE NUTS AND WASHERS (PLATE WASHER WHERE SPECIFIED), AS PER THE DETAILS ON THE CONTRACT DRAWINGS.

## **EXISTING CONCRETE:**

- 1. THE EXISTING DOLPHIN CONCRETE (EXCEPT FENDER WALLS) IS GRADE C25/30.
- 2. THE EXISTING DOLPHIN FENDER WALL CONCRETE IS GRADE 40/50.
- THE EXISTING MAIN WHARF CONCRETE IS GRADE M40 TO C40/50.

#### <u>OPERATIONAL RESTRICTIONS:</u>

- 1. FENDERS HAVE BEEN SIZED BASED ON THE FOLLOWING BERTHING PARAMETERS:
  - A. MAX. APPROACH VELOCITY: 0.12 m/s.
  - B. MAX. APPROACH ANGLE: 3°.
  - C. VESSEL LOA: 347.7m.
  - D. VESSEL BEAM: 41.4m
  - E. VESSEL DRAUGHT: 8.45m.
  - F. VESSEL DISPLACEMENT: 78,130 TONNES.
- 2. OPERATIONS OUTSIDE OF THE ABOVE-LISTED PARAMETERS SHALL BE AT THE OWNER'S RISK.

### **FENDER NOTES:**

- THE REPLACEMENT FENDER SHALL BE A TRELLEBORG SEAGUARD 2100 X 4900 EHC MARINE FENDER OR SIMILAR, AS APPROVED BY THE ENGINEER. FENDER TO CONFORM WITH THE FOLLOWING PERFORMANCE REQUIREMENTS AFTER MATERIAL PERFORMANCE CORRECTIONS:
  - A. MIN. ABNORMAL BERTHING ENERGY: 1300kN-m.
  - B. MAX. ABNORMAL REACTION: 2885kN.
  - BERTHING PARAMETERS AS INDICATED IN OPERATIONAL RESTRICTION.
- FENDER BOLTS AND FIXINGS ARE TO BE DRILLED AND FIXED USING EPOXY GROUT OF SUITABLE STRENGTH AND TO AN EMBEDMENT DEPTH AS SPECIFIED BY THE FENDER SUPPLIER.
- ALL CHAIN AND SHACKLE SIZES AND CHAIN BRACKETS INDICATED HEREIN TO BE CONFIRMED AND ADJUSTED AS REQUIRED BY FENDER SUPPLIER.
- FENDERS AND FENDER PANELS HAVE BEEN DESIGNED FOLLOWING GUIDANCE IN PIANC MARCOM WG33 "GUIDELINES FOR THE DESIGN OF FENDER SYSTEMS: 2002'.
- ALL EXTERIOR WELDS TO BE SEAL WELDS. PRESSURE TESTING OF THE PANEL SHALL BE DONE ACCORDING TO THE FOLLOWING PROCEDURE:
- A. ALL INTERNAL STIFFENERS TO HAVE AN 8mm VENT HOLE TO ALLOW FOR AIR PASSAGE DURING TESTING.
- B. WELD PIPE NIPPLE ON BACK PLATE OF THE PANEL.
- C. PERFORM PRESSURE TEST OF PANEL WITH 10-15psi OF AIR AND SPRAY ALL EXTERIOR WELDS WITH SOAP AND WATER SOLUTION.
- HOLD TIME AT ABOVE MENTIONED PRESSURE RANGE SHALL BE MINIMUM 15 MINUTES.
- E. ALL LEAKS TO BE REPAIRED.
- FENDER PANELS TO RECEIVE AN APPROVED MARINE GRADE EPOXY PAINT SYSTEM AFTER GALVANIZING (REFER TO STRUCTURAL STEEL NOTE 4):
  - A. BLASTING TO SSPC-SP10 OR SA 2.5
  - B. COATING TO BE IN COMPLIANCE WITH ISO 12944-5, FOR CATEGORY C5 HIGH.
  - C. FINAL NDFT: 450-500 MICRONS.
- D. TOP COAT COLOUR: BLACK.
- SUBMIT PROPOSED PAINT SYSTEM TO ENGINEER/OWNER FOR REVIEW.
- F. TOUCH UP ANY PAINT DAMAGED IN THE FIELD AS PER MANUFACTURER'S RECOMMENDATIONS.
- G. OWNER IS RESPONSIBLE FOR REGULAR INSPECTION OF COATING SYSTEM. RE-COAT FENDER PANELS AT A MINIMUM OF EVERY 10 YEARS. OR AT OWNER'S DISCRETION BASED ON RESULTS OF INSPECTION.
- 8. PERMISSIBLE PANEL FLATNESS TOLERANCE IS ±6mm.
- 9. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF FENDER PANEL TO THE ENGINEER FOR REVIEW PRIOR TO FABRICATION.
- 10. UHMW-PE COLOR TO BE BLACK.
- 11. THREAD LOCKER TO BE APPLIED TO ALL PANEL FASTENERS.
- 12. NEW FENDERS, ASSOCIATED MOUNTING COMPONENTS (CHAINS/BRACKETS/ANCHORS), AND UHMW-PE SHALL BE SUPPLIED BY THE OWNER.

# RUBBER BEARING PAD NOTES:

1. RUBBER BEARING PAD TO BE NEOPRENE WITH A HARDNESS OF SHORE 50A, PER ASTM D2240.

# STRUCTURAL STEEL NOTES:

- STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING STANDARDS, OR AN APPROVED ALTERNATIVE:
- A. ALL STRUCTURAL STEEL/STEEL PLATE TO CONFORM TO CSA G40.20/G40.21, GRADE 350W ( $F_v = 350MPa$ )
- HIGH STRENGTH BOLTS TO ASTM F3125, GRADE A325M. TYPE 1. GALVANIZED. THREADS TO BE EXCLUDED FROM ALL SHEAR PLANES.
- THREADED STUDS FOR UHMW-PE MOUNTING TO AISI GRADE 316 STAINLESS STEEL. ALL STAINLESS STEEL SHALL BE ELECTROPOLISHED OR PASSIVATED TO RESTORE THE PASSIVE STATE OF THE STAINLESS STEEL AFTER FABRICATION.
- 2. ALL WELDING SHALL BE IN ACCORDANCE WITH CSA W59 (O.A.E.).
  - A. WELDING MATERIAL TO CSA W48 (O.A.E.).
- ALL EXTERIOR STEEL TO BE HOT DIPPED GALVANIZED TO ASTM A123/A123M MINIMUM ZINC COATING OF 705g/m<sup>2</sup>, UNLESS NOTED OTHERWISE.
- A. TOUCH UP ANY GALVANIZING DAMAGED IN THE FIELD TO ASTM A780.
- INSTALL WELDED STUDS ON FRONT PLATE AFTER GALVANIZING AND TOUCH UP ANY DAMAGED GALVANIZING.
- ALL INTERIOR STEEL TO BE COATED WITH A ZINC-RICH PRIMER. AFTER INTERIOR WELDING IS COMPLETE.
- HOLES SHALL BE DRILLED, NOT PUNCHED. HOLE SIZE SHALL BE 2mm LARGER THAN THE NOMINAL BOLT DIAMETER, U.N.O.
- 6. STRUCTURAL STEEL BOLTS TO BE BROUGHT TO A "SNUG TIGHT" CONDITION, AS DESCRIBED IN CSA S16.
- 7. ALL BOLTED CONNECTIONS SHALL BE COATED WITH A SUITABLE THREADLOCKER, SUCH AS LOCTITE, O.A.E.
- 8. SCREWS TO BE FLAT HEAD SCREW, #8 GAUGE, GALVANIZED. SCREW HEADS TO BE COATED WITH EPOXY PAINT SYSTEM.
- PANEL FABRICATOR TO SUBMIT SHOP DRAWINGS FOR REVIEW. PRIOR TO STARTING FABRICATION.
- 10. FABRICATE. DELIVER TO SITE AND ERECT STEEL WORK IN ACCORDANCE WITH CSA S6 (O.A.E.).
- 11. DEBURR ALL EXPOSED EDGES.
- 12. WHERE POSSIBLE, FIT AND SHOP ASSEMBLE WORK, READY
- 13. ENSURE EXPOSED WELDS ARE CONTINUOUS FOR THE LENGTH OF EACH JOINT.
- 14. WORKMANSHIP AND FINISH SHALL BE OF THE BEST MODERN GENERAL PRACTICE IN THE BRIDGE FABRICATION AND CONSTRUCTION INDUSTRY, STRESSING, FLAME CUTTING AND PLANNING SHALL BE DONE CAREFULLY AND ACCURATELY. PARTICULAR ATTENTION SHALL BE PAID TO THE NEATNESS AND UNIFORMITY OF FINISH OF ALL PARTS OF THE WORK EXPOSED TO VIEW.
- 15. STRUCTURAL STEEL COMPONENTS SHALL BE TRANSPORTED IN SUCH A MANNER SO AS TO AVOID DEVELOPMENT OF FATIGUE CRACKS AND DEFORMATION. WHEN THE COMPONENTS ARE STORED ON THE JOB SITE, THEY SHALL BE PLACED ON TIMBERS SO THAT THEY DO NOT MAKE CONTACT WITH THE GROUND AND ARE SUPPORTED TO AVOID FATIGUE CRACKING, DEFORMATION OR OVER-STRESSING. THEY SHALL BE STORED IN A LOCATION WHERE THEY WILL NOT BE SUBJECTED TO DAMAGE OR SURFACE CONTAMINATION.
- 16. THE ACCEPTANCE CRITERIA FOR ALL WELDING INSPECTIONS SHALL BE BASED ON CSA W59, SECTION 12, CYCLICALLY LOADED STRUCTURES (O.A.E.).
- 17. PROVIDE SUITABLE FACILITIES AND COOPERATE WITH INSPECTION ORGANIZATION AND ENGINEER IN CARRYING OUT INSPECTION AND TESTS REQUIRED.
- 18. ALL WELDS SHALL BE VISUALLY INSPECTED. ALL FULL PENETRATION WELDS SHALL BE 100% INSPECTED BY RADIOGRAPHIC OR ULTRASONIC METHODS.
- 19. FILLET WELDS FOR ATTACHING PANEL COMPONENTS SHALL HAVE 50% OF THE TOTAL WELD LENGTHS TESTED BY MAGNETIC PARTICLE INSPECTION.
- 20. THE COST OF ADDITIONAL INSPECTION AND TESTING MADE NECESSARY BY THE CONTRACTOR/FABRICATOR'S WORK NOT MEETING THESE SPECIFICATIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR/FABRICATOR.

ISSUED FOR CONSTRUCTION | 06/27/24 AJM Date DESCRIPTION (mm/dd/yy) ISSUE or REVISION



KINGS WHARF BERMUDA

FENDERING SYSTEM MODIFICATIONS

GENERAL NOTES AND SPECIFICATIONS

AS NOTED APRIL 202 Drawn Designed MQR Approved Checked GLM Contract No. 241052 Drawing No.











