

FISHERIES AND OCEANS CANADA
REAL PROPERTY, SAFETY, AND SECURITY
PACIFIC REGION

IOS PATRICIA BAY
NEW TIMBER FLOATS FOR
MSPV VESSEL MOORAGE

MARCH 2014

**PLEASE DIRECT ALL INQUIRIES TO THE
PWGSC CONTRACTING OFFICER**

SPECIFICATIONS

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END OF SECTION

1.1 SITE

- .1 The site of the work is at the Institute of Ocean Sciences located at 9860 West Saanich Road, Sidney, BC.

1.2 DESCRIPTION OF WORK

- .1 Remove and dispose of 69m of existing steel camel pontoons at the south side of the approach pier.
- .2 Supply and install 120 lineal meters of new HD treated timber floats
- .3 Supply and install 14 new 457.2mm diameter steel pipe piles
- .4 Supply and install one new 19.812 m long aluminum gangway
- .5 Supply and install 3.1m x 4.5m concrete approach, with 2 ea 324 dia. piles supporting seaward end, and lockblock abutment on shore end.
- .6 Supply and install two new electrical kiosk on the new floats, including two 600V kiosk feeds, one 120V lighting feed, and 7 LED luminaires and associated lighting controls. The work will include the following:
Substation No. 6

1. Install 2 breakers in 600V distribution panel and 1 breaker in 120V panel.
2. Install cable tray and cable paths as required.
3. Install lighting controls.

Pier and Caisson

1. Use x-ray scanner and core holes for cables.
2. Install cable tray, splice boxes, and power cables.

Shore to Ship Power

1. Install tidal cable transitions.
2. Install new cable tray path and 600V feed to each MSPV Kiosk.
3. Install MSPV kiosk complete with protective enclosure, wire way, receptacle, and electrical control enclosure.

Float Lighting

1. Install piling-to-piling areal cable and associated supports.
2. Install LED luminaires and associated cables/junction boxes on piling structures.

1.3 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each of following:
 - .1 Contract drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change orders.

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- .5 Other modifications to Contract.
 - .6 Copy of approved work schedule.

1.4 WORK SCHEDULE

- .1 Provide a schedule of work within three (3) days of the Award of Contract, and observe the following requirements:
 - .1 The work must be completed by September 30, 2014.
 - .2 Whenever variation from the schedule in excess of three (3) working days occurs or is expected to occur, notify the Engineer of the change and provide an updated schedule.
 - .3 Hours of work will be restricted to 8:00 AM to 4:00 PM, Mondays to Fridays only

1.5 SITE CONDITIONS

- .1 It will be the responsibility of the Contractor to visit the site prior to Submission of Tenders and make themselves thoroughly acquainted with conditions at the site and to make whatever inquiries are necessary to familiarize themselves with all conditions likely to affect the work.

1.6 CONTRACTORS USE OF SITE

- .1 Use of site: limited to immediate area of the work and areas assigned by the Engineer for office storage, equipment, stock piles, sanitary facilities, etc.
- .2 As there will be **NO ACCESS** to any of the buildings, Contractor will provide sanitary facilities for the work force in accordance with governing regulations and ordinances
- .3 Vehicles entering and left in the designated work area must have Contractor's logo/name clearly marked on the vehicle
- .4 Arrange parking in areas directed by Department Representative. Maintain construction parking area clean and free of construction related debris. Make good damage resulting from Contractor use of parking areas, at no cost to the Contract.
- .5 Confine work and operations of employee to areas defined by the Contract Documents unless directed otherwise in writing by the Department Representative. Do not unreasonably encumber premise with products.

1.7 SETTING OUT OF WORK

- .1 The Engineer will provide survey control points and set such stakes as necessary to define general location, alignment and elevations of work. Give the Engineer reasonable notice of requirements for such control points and stakes.
- .2 The Contractor will set grades and lay out work in detail from control points and grades established by the Engineer and those additional points specified on the drawings.

- .3 The Contractor will assume full responsibility for and execute complete layout of work to locations, lines, and elevations indicated.
- .4 Provide devices needed to lay out and construct work.
- .5 Supply such devices as straight edges and templates required to facilitate Engineer's inspection of work.
- .6 Supply stakes and other survey markers required for laying out work.
- .7 Ensure that all stakes and marks placed on the work or its site by or under the authority of the Engineer are protected and are not removed, defaced, altered, or destroyed.
- .8 The Contractor is responsible for maintaining all survey control for the duration of the project.

1.8 MEASUREMENT FOR PAYMENT

- .1 General:
 - .1 Payment for work will be made at the Prices Per Unit as tendered for the various classifications of the work appearing in the "Unit Price Table" of the Form of Tender.
 - .2 Any work called for in the specifications or shown on the plans, or which is necessary for the completion of the work called for in the specifications and is not specifically listed as a separate item in the "Unit Price Table", shall be deemed incidental to the general purpose of the Contract and no separate payment will be made on account of any such work, but the cost of any such incidental work shall be included in the Price Per Unit values as tendered for the various items appearing in the "Unit Price Table".
- .2 Mobilization and Demobilization – Pay Item No. 1:
 - .1 The unit of measure will be a single fixed item. "Mobilization and Demobilization" will include all work required to supply the material, plant, and labour (including temporary sanitary facilities) to the site of the work at the start of the project and to remove all materials, plant and labour from the site at the end of the project. The supply and maintenance of the temporary sanitary facilities for the work force will be included in this pay item. This item will also include all costs associated the General Conditions requirements, instructions of the Contract, and the removal and disposal of the 69 lineal meters of existing steel pontoons, including associated cross-pier chains (4) and weights (4).
- .3 Supply and Installation of Treated Timber Floats - Pay Item No 2:
 - .1 The unit of measure will be each square meters of timber float supplied and installed. This item will include the supply and installation of new connecting chains, transfer plates, mooring wells, and billets. The supply and installation of the following misc. items is to be included in this item: life ring with stand (4),

fire extinguisher and enclosure fixed to electrical boxes (2); safety ladder (4) including all the required hardware will be included in this item.

- .4 Supply of new 457.2mm OD Steel Piles - Pay Item No. 3:
 - .1 The unit of measure will be each meter of 457.2mm OD steel piling supplied in accordance with the "Table of Pile Lengths", drawing 496-003. This item includes handling and supply of pipe material, splicing (shop splice or field splice) to achieve the lengths noted in the table, removal of unused pipe (cutoffs) at the completion of the project.

- .5 Drive/Drill 457.2mm OD Float Mooring Piles - Pay Item No. 4:
 - .1 The unit of measure will be each new 457.2mm OD steel pile driven/drilled, secured, and remaining an integral part of the completed work as specified. This item also includes the supply and installation the pile lids, top header beams, Type 1 anodes (1 per pile) and all required hardware.

- .6 Supply and Install New Aluminum Gangway - Pay Item No. 5:
 - .1 The unit of measure will be each new gangway supplied and placed in, secured, and remaining an integral part of the completed work as specified. The supply and installation of the required hardware, roller, hinges, apron/transfer plate will also be included in this item.

- .7 Supply and Installation of new abutment/landing - Pay Item No. 6:
 - .1 The unit of measure for the supply and installation of the new abutment/landing will be a single fixed item. The supply and installation of the 324mm dia. piles (2), precast pilecap (1), precast panels (2), lock blocks, handrails and required hardware will also be included in this item.

- .8 Supply and install new kiosk for electrical upgrade - Pay Item No. 7:
 - .1 The unit of measure for the supply and installation of new kiosk for electrical upgrade will be a single fixed item. The supply and installation of the two new electrical kiosk on the new floats, including two 600V kiosk feeds, one 120V lighting feeds, and 7 LED luminaires and associated lighting controls will be included in this item. Also included in this pay item: aluminum support structure for enclosure (2), aluminum support frame for G-Cable transition section

1.9 PROJECT MEETINGS

- .1 The Engineer will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

1.10 ADDITIONAL DRAWINGS

- .1 The Engineer may furnish additional drawings for clarification. These additional drawings have the same meaning and intent as if they were included with plans referred to in Contract Documents.

1.11 RECORD DRAWINGS

- .1 As work progresses maintain accurate records to show all deviations from the Contract drawings. Note on as-built drawings as changes occur, and at completion supply one (1) set of all drawings and specifications with all deviations clearly marked.

1.12 CODES AND STANDARDS

- .1 Perform work in accordance with latest edition of the National Building Code of Canada (NBCC) and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
- .2 Meet or exceed requirements of:
 - .1 Contract Documents,
 - .2 Specified standards, codes and referenced documents.
- .3 All work is to be done in accordance with Workers' Compensation Board regulations, Labour Canada regulations, and all applicable municipal statutes and authorities having jurisdiction. In the event of conflict between any provisions of these authorities, the most stringent provision will apply.
- .4 Prior to commencing work, all Contractor's personnel will be required to complete the Fisheries and Oceans Canada site access orientation session
- .5 Ensure that all employees have received appropriate WHMIS training and that all necessary MSDS information is available on site

1.13 ENVIRONMENTAL PROTECTION

- .1 Comply with Federal, Provincial and Municipal laws, orders, and regulations concerning the protection of the environment and the control and abatement of soil, water, and air pollution.
- .2 Do not dispose of waste or volatile materials such as oil, paint thinners, or mineral spirits into waterways, storm or sanitary sewers.
- .3 Fires and burning of rubbish on site not permitted.
- .4 The mitigation measures outlined in the Appendix C will form part of the specification. The Contractor will keep a copy of the report on site.

1.14 PERMITS, CERTIFICATES, FEES, AND NOTIFICATIONS

- .1 Obtain and pay for all permits

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- .1 The Contractor shall give all notices, obtain and pay all fees and permits, and all other services required or requested by the authorities having local jurisdiction.
 - .2 The Contractor shall be responsible for all damages and costs which result from the Contractor's failure to pay the fees and procure the permits referred to herein.

1.15 SITE SECURITY

- .1 The Contractor will assume responsibility for construction personnel, vessels and vehicles requiring access to the site.
- .2 The Contractor will assume responsibility in public safety and protection with regard to setting up warning signs and barricades during the construction period.

1.16 EXISTING SERVICES

- .1 Where unknown services are encountered, immediately advise Engineer and confirm in writing.
- .2 Where work involve breaking into or connecting to existing services, carry out work at all times directed by governing authorities, with minimum of disturbance to pedestrian and vehicular traffic.

1.17 RELICS AND ANTIQUITIES

- .1 Protect relics, antiquities, items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during course of work.
- .2 Give immediate notice to Engineer and await Engineer's written instructions before proceeding with work in this area.
- .3 Relics, antiquities and items of historical or scientific interest remain her Majesty's property.

1.18 TEMPORARY FACILITIES

- .1 Provide temporary facilities in order to execute work expeditiously.
- .2 Water is available for construction use at no cost. Department Representative will determine delivery points. Connect to existing power supply in accordance with Canadian Electrical Code. Provide all equipment and temporary hoses to bring water to work, at no additional cost to the Contract. Exercise conservation whenever using water supply. Do not leave water running unattended.
- .3 Electrical power is available for construction purposes at no cost. Department Representative will determine delivery points. Provide all equipment and temporary lines

to bring power to work, at no additional cost to the Contract. Exercise conservation whenever using temporary electrical power supply.

- .4 Provide and maintain temporary fire protection equipment during performance of work required by governing codes, bylaws, and regulations. Conform to site plan where in effect.
- .5 Provide sanitary facilities for work force in accordance with governing regulations and ordinances. Locate where directed by Department Representative.
- .6 Remove any temporary services or facilities after completion of the work and make good any damage to conditions previously existing or to match new work as acceptable to the Engineer.

1.19 MATERIAL DISPOSAL

- .1 All material designated to be removed will become the property of the Contractor and will be disposed of in an environmentally acceptable manner so that they neither become a menace to marine navigation nor a nuisance to the public on adjacent or any other property.
- .2 Unless otherwise specified, all existing material to be replaced or removed will be disposed of in accordance with .1 above.
- .3 Conduct cleanup and disposal operations to comply with local ordinances and anti-pollution laws.

1.20 NOTIFICATIONS

- .1 The Contractor will also notify the local Fisheries Officer not less than five (5) days prior to commencement and completion of operations.
- .2 Keep Vancouver Vessel Traffic Services, Canadian Coast Guard informed of operations in order that necessary notices to shipping will be issued. For notices to shipping, contact:

Canadian Coast Guard
Regional Marine Information Centre, Pacific
Suite 2380, P.O. Box 12107
555 West Hastings Street
Vancouver, B.C. V6B 4N6
Tel: (604) 666 – 6011
Fax: (604) 666 – 8453

1.21 REQUIREMENTS OF REGULATORY AGENCIES

- .1 Ensure work meets all applicable environmental regulations and standards.

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- .2 The Contractor shall comply with municipal, provincial, and national regulatory agency regulations relating to the project.
 - .3 Claims for extra costs resulting from all regulatory agency requirements including those referenced in Clause 1.21.2 will not be entertained by the Department.
 - .4 The Contractor shall mark floating equipment with lights in accordance with Notice to Mariners CCG regulations.
 - .5 The Contractor will ensure that a fuel/oil spill emergency action plan is in place at all times.
 - .6 The contractor shall comply with the “BC Marine and Pile Driving Contractors Association, Best Management Practices for Pile Driving and Related Operations”

1.22 MATERIAL AND EQUIPMENT

- .1 The following requirements shall apply unless otherwise specified in the Contract Documents.
- .2 Material and Equipment:
 - .1 Use new material unless otherwise specified.
 - .2 Within seven (7) days of written request by the Engineer, submit the following information for any or all materials and products proposed for supply:
 - .1 Name and address of supplier.
 - .2 Use products of one supplier for material of same type or classification unless otherwise specified.
- .3 Construction Equipment and Plant:
 - .1 On request, prove to the satisfaction of the Engineer that the construction equipment and plant are adequate to manufacture, transport, place, and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.
 - .2 Maintain construction equipment and plant in good operating order.

1.23 CUTTING, FITTING, AND WORK FIT PATCHING

- .1 Execution cutting (including excavation), fitting and patching required to make the work properly fit together.
- .2 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.

1.24 REQUIREMENTS OF REGULATORY AGENCIES

- .1 Ensure work meets all applicable environmental regulations and standards.

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- .2 The Contractor shall comply with municipal, provincial, and national regulatory agency regulations relating to the project.
 - .3 Claims for extra costs resulting from all regulatory agency requirements including those referenced in Clauses 1.24.1 and 1.24.2 will not be entertained by the Department.
 - .4 The Contractor will ensure that a fuel/oil spill emergency action plan, applicable to the size of plant and equipment being used to complete work, is in place at all times.

1.25 DELAYS

- .1 Delays, other than those caused by changes requested by the Engineer, which occur will not affect the Tender Prices Per Unit. Claims for such delays will not be entertained by the Department.

1.26 OTHER CONTRACTS

- .1 Other contracts may be in progress or be awarded while this contract is in progress.
- .2 Co-operate with other Contractors in carrying out their respective works and carry out instructions from department Representatives
- .3 Co-ordinate with that of other Contractors. If any part of work under this contract depends for its proper execution or result upon work of another Contractor, report promptly to Department Representative, in writing, any defects or conflicts which may interfere with the proper execution of this work

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 N/A

1.2 ADMINISTRATIVE

- .1 Submittals are required as listed in Part 2 and Part 3 below. Submit to Engineer for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Contract to carefully review all submittals prior to submission to Engineer. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Engineer, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Engineer's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Engineer's review.
- .10 Keep one reviewed copy of each submission on site.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

- .3 Allow 14 days for Engineer's review of each submission.
- .4 Adjustments made on shop drawings by Engineer are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to DFO Departmental Representative prior to proceeding with Work.
- .5 Make changes in shop drawings as Engineer may require, consistent with Contract Documents. When resubmitting, notify Engineer in writing of revisions other than those requested.
- .6 Accompany submissions with transmittal letter, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .7 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .8 After Engineer's review, distribute copies as required by the Contract.
- .9 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Engineer may reasonably request.

- .10 Submit electronic copy of product data sheets, brochures, or other information for requirements requested in specification Sections and as requested by Engineer where shop drawings will not be prepared due to standardized manufacture of product.
- .11 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Engineer.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project (for standard manufacture products), and must be current dated (for project-specific materials).
- .12 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Engineer.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .13 Submit electronic copies of manufacturers' instructions for requirements requested in specification Sections and as requested by Engineer.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .14 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Engineer.
 - .1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .15 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Engineer.
- .16 Delete information not applicable to project.
- .17 Supplement standard information to provide details applicable to project.
- .18 If upon review by Engineer, no errors or omissions are discovered or if only minor corrections are made, marked-up copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.4 SAMPLES

- .1 Submit for review samples as requested in respective specification Sections. Label samples with origin and intended use.

- .2 Deliver samples prepaid to DFO Departmental Representative's site office.
- .3 Notify DFO Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by DFO Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to DFO Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which DFO Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 PROGRESS PHOTOGRAPHS

- .1 Submit progress photographs in accordance with Section 01 32 33 - Construction Photographs.

1.6 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Copy of Contractors' Site Safety Program including all relevant WHMIS documentation.
- .3 Submit transcription of insurance immediately after award of Contract.

Part 2 Products

2.1 SUBMITTALS

- .1 Submit the following to the engineer in a timely manner, allowing a minimum of 14 days for review. In general the submittals noted in item 2.1.2 and 2.1.3 below are required, and the engineer must have responded with a formal review for any particular item, before those materials can be ordered.
- .2 Shop Drawings are required for the following:
 - .1 Precast concrete panels.
 - .2 Rebar cut/bend sheets (for precast, as well as cast-in place concrete).
 - .3 Aluminum fabrication (handrails, gangway and apron, roller assembly and details).
 - .4 DFO timber Float fabrication (including: floatation plan and details, timber framing cut sheets, bolt details, gangway landing plate). Note: The standard DFO drawings will need to be modified to accommodate the pile boxes and other details as per the contract drawings.

- .5 Miscellaneous Steel Fabrications (pile boxes, UHMW spacers, embedded steel plates, header beams, pile top plates, gangway hinge).
- .6 Tree-Saver Boomsticks.
- .7 Refer to Drawing No 1780-E3 for items requiring shop drawings
- .3 Other information (product data sheets, mill certs, manufacturers information etc.) are required for the following:
 - .1 Lumber - structural grading.
 - .2 Lumber - treatment certificates
 - .3 Fabricated Steel Components - mill certs
 - .4 Fabricated Aluminum components - mill certs
 - .5 Pipe Piles - Mill certs
 - .6 Contractors proposed drilling method and equipment.
 - .7 Concrete mix design (for precast, as well as cast-in-place concrete).
 - .8 Rebar Mill certs (for precast, as well as cast-in-place concrete).
 - .9 LED Luminaires and associated lighting controls

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of British Columbia
 - .1 Workers Compensation Act, RSBC 1996 - Updated 2006.
 - .2 Occupational Health and Safety Regulation.
- .4 National Building Code of Canada (NBC)
 - .1 Part 8, Safety Measures at Construction and Demolition Sites.

1.2 WORKERS COMPENSATION BOARD COVERAGE

- .1 Comply fully with Workers' Compensation Act, regulations, and orders made pursuant thereto and any amendments up to the completion of work
- .2 Maintain Workers' Compensation Board coverage during term of Contract, until and including date that Certificate of Final Completion is issued.

1.3 COMPLIANCE WITH REGULATIONS

- .1 DFO may terminate Contract without liability to Canada where Contractor, in the opinion of DFO, refuses to comply with a requirement of Workers' Compensation Act or Occupational Health and Safety Regulations.
- .2 Contractor is responsible to ensure that all workers are qualified, competent and certified to perform work as required by Workers' Compensation Act or Occupational Health and Safety Regulations.

1.4 SUBMITTALS

- .1 Submit to Department Representative submittals listed for review.
- .2 Work effected by submittal will not proceed until review is completed.
- .3 Submit the following:
 - .1 Health and Safety Plan.
 - .2 Copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
 - .3 Copies of incident and accident reports.
 - .4 Copies of Material Safety Data Sheets and all other documents required by Workplace Hazardous Materials Information System (WHMIS) requirements.
 - .5 Emergency procedures

- .4 Submission of Health and Safety Plan and any revised version to the Departmental Representative is for information and reference purpose only. It will not:
 - .1 Be construed to imply as approval by Department Representative
 - .2 Be interpreted as warranty of being complete, accurate, and compliant.
 - .3 Relieve the Contractor of his legal obligations for provision of health and safety for the project.
- .5 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

1.5 WORK PERMITS

- .1 Obtain speciality permit(s) related to the project before start of work

1.6 FILING OF NOTICE

- .1 Complete and submit Notice of Project as required by Provincial authorities.
- .2 Provide copies of all notices to Department Representative.

1.7 SAFETY ASSESSMENT

- .1 Perform site specific safety hazard assessment related to project.

1.8 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.9 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.10 GENERAL CONDITIONS

- .1 Provide safety barricades and lights at work site as required to provide safe working environment for workers
- .2 Ensure that non-authorized persons are not allowed in designated construction areas and work site.
 - .1 Provide appropriate means by use of barricades, fences, and warning signs.

1.11 REGULATORY REQUIREMENTS

- .1 Comply with specified codes, acts, bylaws, standards, and regulations to ensure safe operations at site.
- .2 In the event of conflict between any provision of above authorities, the most stringent provision will apply.

1.12 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.13 UNFORSEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations having jurisdiction and advise Departmental Representative verbally and in writing.

1.14 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have site-related working experience specific to activities associated with the work outlined in the Contract.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of work.

1.15 HAZARDOUS PRODUCTS

- .1 Comply with the requirements of Workplace hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Departmental Representative and in accordance with Canada Labour Code.

1.16 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations having jurisdiction, and in consultation with Departmental Representative.

1.17 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected. The Contractor will be responsible for costs arising from such "stop work order".

1.18 CONFINED SPACES

- .1 Carry out work in confined spaces in compliance with Provincial regulations.

1.19 OVERLOADING

- .1 Ensure no part of the work is subject to a load which will endanger its safety or will cause permanent deformation

1.20 SCAFFOLDING

- .1 Design, construct, and maintain scaffolding in a rigid, secure, and safe manner, in accordance with CSA Z797 and BC Occupational Health and Safety Regulations.

1.21 FIRE SAFETY REQUIREMENTS

- .1 Store oily/paint soaked rags, waste products, and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis
- .2 Handle, store, use and dispose of inflammable and combustible materials in accordance with the National Fire Code of Canada.

1.22 FIRE PROTECTION

- .1 Do not use fire hydrants, standpipes, and hose systems for purposes other than firefighting
- .2 Be responsible/liable for cost incurred from fire department, building owner, and tenants, resulting from false alarms

1.23 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures.

1.2 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-94, Stipulated Price Contract.

1.3 INSPECTION

- .1 Refer to CCDC 2, GC 2.3.
- .2 Allow Departmental Representative and Engineer unrestricted access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Engineer, instructions, or law of Place of Work.
- .4 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .5 The Engineer may order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, the Owner shall pay cost of examination and replacement.

1.4 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Department of Fisheries and Oceans for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the Department.
- .2 Contractor to provide equipment and access required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Engineer at no cost to The Department. Contractor to pay costs for retesting and re-inspection.

1.5 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.6 PROCEDURES

- .1 Notify appropriate agency Engineer in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.7 REJECTED WORK

- .1 Refer to CCDC, GC 2.4.
- .2 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by the Engineer as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .3 Make good other Contractor's work damaged by such removals or replacements promptly.
- .4 If in opinion of the Engineer it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by the Departmental Representative.

1.8 REPORTS

- .1 Submit inspection and test reports to Engineer.
- .2 Provide copies to subcontractor of work being inspected or tested, or to manufacturer or fabricator of material being inspected or tested.

1.9 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

1.10 MILL TESTS

- .1 Submit mill test certificates as required in specification sections.

1.11 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

N/A

1.2 REFERENCES

- .1 Canadian Environmental Protection Act, 1999 (CEPA 1999).
 - .1 Export and Import of Hazardous Waste Regulations (SOR/2002-300).
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 National Fire Code of Canada [2005].
- .4 Transportation of Dangerous Goods Act (TDG Act) [1999], (c. 34).
- .5 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2003-400).

1.3 DEFINITIONS

- .1 Dangerous Goods: product, substance, or organism that is specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 Hazardous Material: product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .3 Hazardous Waste: any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .4 Workplace Hazardous Materials Information System (WHMIS): Canada-wide system designed to give employers and workers information about hazardous materials used in workplace. Under WHMIS, information on hazardous materials is provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by combination of federal and provincial laws.

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit to Departmental Representative current Material Safety Data Sheet (MSDS) for each hazardous material required prior to bringing hazardous material on site.
 - .2 Submit hazardous materials management plan to Departmental Representative that identifies hazardous materials, their use, their

location, personal protective equipment requirements, and disposal arrangements.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
- .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
- .3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.
- .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
 - .1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
 - .2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
- .5 Transfer of flammable and combustible liquids is prohibited within buildings.
- .6 Do not transfer of flammable and combustible liquids in vicinity of open flames or heat-producing devices.
- .7 Do not use flammable liquids having flash point below 38 degrees C, such as naphtha or gasoline as solvents or cleaning agents.
- .8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
- .9 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
- .10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are not mixed.
 - .6 Store hazardous materials and wastes in secure storage area with controlled access.
 - .7 Maintain clear egress from storage area.
 - .8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
 - .9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.

- .10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
- .11 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .12 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.

1.6 TRANSPORTATION

- .1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .2 If exporting hazardous waste to another country, ensure compliance with federal Export and Import of Hazardous Waste Regulations.
- .3 If hazardous waste is generated on site:
 - .1 Co-ordinate transportation and disposal with Departmental Representative.
 - .2 Ensure compliance with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.
 - .3 Use licensed carrier authorized by provincial authorities to accept subject material.
 - .4 Prior to shipping material obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept this material.
 - .5 Label container(s) with legible, visible safety marks as prescribed by federal and provincial regulations.
 - .6 Ensure that trained personnel handle, offer for transport, or transport dangerous goods.
 - .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.
 - .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Departmental Representative.
 - .9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

Part 2 Products

2.1 MATERIALS

- .1 Only bring on site quantity of hazardous materials required to perform work.
- .2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

Part 3 Execution

3.1 DISPOSAL

- .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.
- .3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
- .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
- .6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.
- .7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.
- .8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
 - .1 Hazardous wastes recycled in manner constituting disposal.
 - .2 Hazardous waste burned for energy recovery.
 - .3 Lead-acid battery recycling.
 - .4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 41 00 - Precast Structural Concrete.

1.2 REFERENCES

- .1 American Concrete Institute (ACI)
 - .1 SP-66-04, ACI Detailing Manual 2004.
 - .1 ACI 315-99, Details and Detailing of Concrete Reinforcement.
 - .2 ACI 315R-04, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.
 - .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A143/A143M-03, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .2 ASTM A185/A185M-05a, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - .3 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1-[04]/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-A23.3-04, Design of Concrete Structures.
 - .3 CAN/CSA-G30.18-M92(R2002), Billet-Steel Bars for Concrete Reinforcement, A National Standard of Canada.
 - .4 CSA-G40.20/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles, A National Standard of Canada.
 - .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice and ACI 315.
- .3 Submit shop drawings including placing of reinforcement and indicate:
 - .1 Bar bending details.
 - .2 Lists.

- .3 Quantities of reinforcement.
- .4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Engineer, with identifying code marks to permit correct placement without reference to structural drawings.
- .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
- .4 Detail lap lengths and bar development lengths to CSA-A23.3, unless otherwise indicated.
- .5 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
 - .1 Mill Test Report: provide Engineer with certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.
 - .2 Upon request submit in writing to Engineer proposed source of reinforcement material to be supplied.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for recycling and handle in accordance with local regulations.
 - .2 Place materials defined as hazardous or toxic in designated containers.

Part 2 Products

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Engineer.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
- .3 Cold-drawn annealed steel wire ties: to ASTM A497/A497M.
- .4 Welded steel wire fabric: to ASTM A185/A185M.
 - .1 Provide in flat sheets only.
- .5 All reinforcement for this project is 'black' (no galvanizing, no epoxy-coated bar).
- .6 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .7 Mechanical splices: subject to approval of Engineer.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23, ACI 315 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Engineer's approval for locations of reinforcement splices other than those shown on placing drawings.

Part 3 Execution

3.1 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2.
- .2 Prior to placing concrete, obtain Engineer's approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained during concrete pour.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 20 00 - Concrete Reinforcing.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A185-05, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-2004, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .3 CAN/CSA-G30.18-M92(R2002), Billet-Steel Bars for Concrete Reinforcement.

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit placing drawings prepared in accordance with plans to clearly show size, shape, location and all necessary details of reinforcing.
 - .2 Submit drawings showing formwork and falsework design to: CSA-A23.1/A23.2.
- .3 At least 4 weeks prior to beginning Work, submit concrete mix design to Engineer for review and approval.
- .4 Concrete hauling time: submit for review by Engineer deviations exceeding maximum allowable time of 90 minutes for concrete to be delivered to site of Work and discharged after batching.

1.4 QUALITY ASSURANCE

- .1 Submit to Engineer, minimum 4 weeks prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
- .2 Quality Control Plan: cylinders, slump, and air tests will be arranged onsite by the Engineer, paid for by the Department.
- .3 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Concrete hauling time: maximum allowable time limit for concrete to be delivered to site of Work and discharged not to exceed 90 minutes after batching.
 - .1 Modifications to maximum time limit must be agreed to by the Engineer and concrete producer as described in CSA A23.1/A23.2.
 - .2 Deviations to be submitted for review by the Engineer.
- .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Ensure that concrete waste is disposed of in accordance with local regulations.
- .2 If possible, use any excess concrete for: pile fill.
- .3 Concrete washout to be done offsite, in an approved facility (ie: back at suppliers' yard).
- .4 Unused concrete products must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

- .1 Cement: to CAN/CSA-A3001, Type 1.
- .2 Supplementary cementing materials: with minimum 20% fly ash replacement, by mass of total cementitious materials to CAN/CSA A3001.
- .3 Water: to CSA-A23.1/A23.2.
- .4 Reinforcing bars: to CAN/CSA-G30.18, Grade 400, black bar.
- .5 Welded steel wire fabric: to ASTM A185.
- .6 Sealer: Deck to be sealed with silane based sealer (or other product reviewed and approved by the Engineer).
- .7 Other concrete materials: to CSA-A23.1/A23.2.

2.2 MIXES

- .1 Performance Method for specifying concrete: to meet Engineer] performance criteria in accordance with CAN/CSA-A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in Part 3 - Verification.
 - .2 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-1.

- .2 Minimum compressive strength 30 MPa at 28 days.
- .3 Surface texture: broom non-skid finish on top deck, as-formed or steel trowel finish on all other surfaces.
- .4 Geometrical requirements: 2% slope for drainage.
- .3 Concrete supplier's certification.
- .4 Provide quality management plan to ensure verification of concrete quality to specified performance.

Part 3 Execution

3.1 PREPARATION

- .1 Provide Engineer with 24 hours notice before each concrete pour.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.
- .4 Protect previous Work from staining.
- .5 Clean and remove stains prior to application of concrete finishes.

3.2 CONSTRUCTION

- .1 Perform cast-in-place concrete work in accordance with CSA-A23.1/A23.2.

3.3 INSERTS

3.4 CURING

- .1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and in accordance with CSA-A23.1/A23.2.

3.5 SEALING

- .1 Following curing, apply silane based sealing compound in accordance with manufacturers instructions (or alternate sealer as reviewed and approved by the Engineer).

3.6 SITE TOLERANCES

- .1 Concrete floor slab finishing tolerance in accordance with CSA-A23.1/A23.2.

3.7 FIELD QUALITY CONTROL

- .1 Concrete testing: to CSA-A23.1/A23.2 by testing laboratory arranged by Engineer and designated and paid for by Department of Fisheries and Oceans.

3.8 CLEANING

- .1 Use trigger operated spray nozzles for water hoses.
- .2 Designate cleaning area for tools to limit water use and runoff.
- .3 Cleaning of concrete equipment to be done in accordance with Section 01 35 43: Environmental Procedures.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 20 00 - Concrete Reinforcing.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A185/A185M-05a, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - .2 ASTM A775/A775M-04a, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
 - .3 ASTM C260-01, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .4 ASTM D2240-05, Standard Test Method for Rubber Property - Durometer Hardness.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-2004, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-A23.3-04, Design of Concrete Structures.
 - .3 CSA-A23.4-05, Precast Concrete - Materials and Construction.
 - .4 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .5 CAN/CSA-G30.18-M92(R2002), Billet-Steel Bars for Concrete Reinforcement.
 - .6 CAN/CSA-G40.20/G40.21-2004, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .7 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .8 CAN/CSA-S6-2005, Canadian Highway Bridge Design Code.
 - .9 CSA-W47.1-03, Certification of Companies for Fusion Welding for Steel.
 - .10 CAN/CSA W48-01(R2006), Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .11 CSA-W59-03, Welded Steel Construction (Metal Arc Welding) (Metric version).
 - .12 CSA-W186-M1990(R2002), Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.3 PERFORMANCE REQUIREMENTS

- .1 Tolerance of precast elements to CSA-A23.4.
- .2 Length of precast elements not to vary from design length by more than plus or minus 5 mm.

- .3 Cross sectional dimensions of precast elements not to vary from design dimensions by more than plus or minus 5 mm.
- .4 Deviations from straight lines not to exceed 5 mm in 5 m.
- .5 Precast elements not to vary by more than plus or minus 5 mm from true overall cross sectional shape as measured by difference in diagonal dimensions.

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
- .3 Submit shop drawings in accordance with CSA-A23.3 and CSA-A23.4 and include following items:
 - .1 Design calculations for items designed by manufacturer.
 - .2 Details of prestressed and non-prestressed members, reinforcement and their connections.
 - .3 Camber.
 - .4 Finishing schedules.
 - .5 Methods of handling and erection.
 - .6 Openings, sleeves, inserts and related reinforcement.

1.5 QUALITY ASSURANCE

- .1 Quality Control Plan: submit written report, as described in PART 3 - VERIFICATION, to Engineer verifying compliance that concrete provided meets performance requirements of concrete as established in PART 2 - PRODUCTS.

1.6 QUALIFICATIONS

- .1 Precast concrete manufacturer to be certified in accordance with CSA's certification procedures for precast concrete plants prior to submitting tender and to specifically verify as part of tender that plant is currently certified in appropriate category,
- .2 Only precast elements fabricated in such certified plants to be acceptable to Engineer and plant certification to be maintained for duration of fabrication, erection until warranty expires.
- .3 Welding companies certified to CSA-W47.1.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, handle and store precast/prestressed units according to manufacturer's instructions.

Part 2 Products

2.1 MATERIALS

- .1 Cement to CAN/CSA-A3001, Type 1.
- .2 SPEC NOTE: For full types of supplementary cementing materials refer to CSA A23.1/A23.2: N - Natural pozzolan, F - Fly ash (low calcium content), CI - Intermediate calcium content, CH - High calcium content, S - Ground granulated blast-furnace slag, and SF - Silica fume.
- .3 Supplementary cementing materials: with minimum 20% fly ash replacement, by mass of total cementitious materials to CAN/CSA A3001.
- .4 Water: to CSA-A23.1/A23.2.
- .5 Reinforcing steel: to CAN/CSA-G30.18, grade 400, black bar.
- .6 Prestressing steel tendons and bars: N/A.
- .7 Welded wire fabric: to ASTM A185/A185M.
- .8 Hardware and miscellaneous materials: to CSA-A23.1/A23.2.
- .9 Forms: to CSA-A23.4.
- .10 Anchors and supports: to CAN/CSA-G40.21 Type 300 W galvanized after fabrication.
- .11 Welding materials: to CSA W48.
- .12 Welding electrodes: to CSA W48 certified by Canadian Welding Bureau.
- .13 Galvanizing: hot dipped galvanizing with minimum zinc coating of 610 g/m² to CAN/CSA-G164.
- .14 Epoxy coating: N/A.
- .15 Steel primer: For embedded items which will be field welded, weldable primer on exposed faces, to CAN/CGSB-1.40 MPI #23 (embedded portions to be 'black').
- .16 Post-tensioning ducts: N/A.
- .17 Bearing pads: puddled grout smear over entire bearing surface, with steel shims to achieve matching and level deck surface.
- .18 Air entrainment admixtures: to ASTM C260.
- .19 Chemical admixtures: to CSA-A23.1/A23.2.
- .20 Weephole tubes or bolt sleeves: PVC or PE tube to suit bolt size.
- .21 Sealer: Deck to be sealed with silane based sealer (or other product reviewed and approved by the Engineer).

2.2 MIXES

- .1 Concrete:
 - .1 Performance Method for specifying concrete: performance criteria in accordance with CAN/CSA-A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in Part 3 - Verification.
 - .2 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-1.
 - .2 Minimum compressive strength 35 MPa at 28 days.
 - .3 Surface texture: broom non-skid finish on top deck, as-formed or steel trowel finish on all other surfaces.
 - .4 Geometrical requirements: 2% slope for drainage.
 - .3 Provide quality management plan to ensure verification of concrete quality to specified performance.
 - .4 Concrete supplier's certification.
 - .2 Grout:
 - .1 Cement grout: non-shrink cementitious grout (pre-bagged product). Contractor to provide details and spec sheets to engineer for review minimum 4 weeks prior to installation onsite.
 - .2 Minimum compressive strength: 35 MPa at 28 days.

2.3 MANUFACTURED UNITS

- .1 Manufacture units in accordance with CSA-A23.4.
- .2 Mark each precast unit to correspond to identification mark on shop drawings for location with date cast.
- .3 Provide hardware suitable for handling elements.
- .4 Galvanize anchors after fabrication.

2.4 FINISHES

- .1 Finish units to commercial grade to CSA-A23.4.

2.5 SOURCE QUALITY CONTROL

- .1 Provide engineer with certified copies of quality control tests related to this project as specified in CSA-A23.4, CSA-G279.
- .2 Provide records from in-house quality control programme based upon plant certification requirements to engineer for inspection and review.
- .3 Upon request, provide engineer with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.

- .4 Precast plants should keep complete records of supply source of concrete material, steel reinforcement, prestressing steel and provide to engineer for review upon request.

Part 3 Execution

3.1 ERECTION

- .1 Do precast concrete work in accordance with CSA-A23.4, CSA-A23.3, and CAN/CSA-S6.
- .2 Do welding in accordance with CSA-W59, for welding to steel structures and CSA-W186, for welding of reinforcement. note: no welding of reinforcement is anticipated or required on this project.
- .3 Erect precast elements within allowable tolerances (+/- 10mm).
- .4 Non-cumulative erection tolerances in accordance with CSA-A23.4.
- .5 Set elevations and alignment between units to within allowable tolerances before connecting units.
- .6 Grout underside of unit bearing plates with shrinkage compensating grout.
- .7 Fasten precast units in place as indicated on project drawings.
- .8 Do not weld or secure bearing plates at sliding joints. Note: no sliding joints on this project.
- .9 Clean field welds with wire brush and touch-up with salt-water marine grade epoxy in accordance with manufacturers' instructions (submit field epoxy touch-up paint details to engineer for review).

3.2 VERIFICATION

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established in Part 2 Products and provide verification of compliance as described in Part 1 Quality Assurance.

3.3 REPAIR

- .1 Use repair methods as reviewed by engineer before undertaking repairs to damaged or soiled precast concrete surfaces.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 30 00 - Cast-in-Place Concrete.
- .3 Section 03 41 00 - Precast Structural Concrete.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A53/A53M-02, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Steamless.
 - .2 ASTM A269-02, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .3 ASTM A307-02, Specification for Carbon Steel Bolts and Studs, 414 MPa Tensile Strength.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
 - .2 CAN/CGSB-1.181-92, Ready-Mixed, Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-S16.1-01, Limit States Design of Steel Structures.
 - .4 CSA W48-01, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .5 CSA W59-1989(R2001), Welded Steel Construction (Metal Arc Welding) (Imperial Version).

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheets in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Indicate VOC's for finishes, coatings, primers and paints.
- .2 Shop Drawings

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

1.4 QUALITY ASSURANCE

- .1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with local regulations.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan.
- .4 Wherever possible, divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.
- .2 Steel pipe: to ASTM A53/A53M.
- .3 Welding materials: to CSA W59.
- .4 Welding electrodes: to CSA W48, electrode to match steel grade and metallurgy.
- .5 Bolts and anchor bolts: to ASTM A307 unless noted otherwise.
- .6 Aluminum plate: Alloy 5052 H32 temper (or approved equal).
- .7 Aluminum Tube: Alloy 6061 T6 temper, rounded corners (or approved equal).

2.2 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Where possible, fit and shop assemble work, ready for erection.
- .3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164.
- .2 Shop coat primer: to CAN/CGSB-1.40.
- .3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .4 Aluminum fabrications to self colour (no painting of aluminum).

2.4 ISOLATION COATING

- .1 Isolate aluminum from following components, by means of bituminous paint (or other alternate method reviewed and approved by Engineer):
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

2.5 SHOP PAINTING

- .1 Apply one shop coat of weldable primer to metal items, with exception of galvanized or concrete encased items.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.

Part 3 Execution

3.1 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Make field connections with bolts to CAN/CSA-S16.1, or weld.
- .4 Touch-up galvanized surfaces and welds with zinc rich primer or marine-grade epoxy where burned by field welding.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 06 10 00.01 - Rough Carpentry.

1.2 REFERENCES

- .1 American Wood-Preservers' Association (AWPA)
 - .1 AWPA M2-[01], Standard for Inspection of Treated Wood Products.
 - .2 AWPA M4-[06], Standard for the Care of Preservative-Treated Wood Products.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA O80 Series-97(R2002) - O80S2-05, Wood Preservation.
 - .2 CSA O80.201-M89, This Standard covers hydrocarbon solvents for preparing solutions of preservatives.
 - .3 CSA O322-02, Procedure for Certification of Pressure-Treated Wood Materials for Use in Preserved Wood Foundations.

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Quality assurance submittals:
 - .1 Submit certificates in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 For products treated with preservative by pressure impregnation submit following information certified by authorized signing officer of treatment plant:
 - .1 Information listed in AWPA M2 and revisions specified in CSA O80 Series, Supplementary Requirement to AWPA M2 applicable to specified treatment.
 - .2 Moisture content after drying following treatment with water-borne preservative.
 - .3 Acceptable types of paint, stain, and clear finishes that may be used over treated materials to be finished after treatment.

1.4 QUALITY ASSURANCE

- .1 Plant inspection of products treated with preservative by pressure impregnation will be carried out by designated testing laboratory to AWPA M2, and revisions specified in CSA O80 Series, Supplementary Requirements to AWPA M2.
- .2 Each piece of lumber and plywood for preserved wood foundations to be identified by CSA O322 certified stamp.
- .3 Inspection and testing of timber float materials (bullrails, blocking, stringers, crossies, flanges, splice timbers) will be carried out by a Testing Laboratory acceptable to the Engineer.

- .4 Costs for testing to be included in the bid price for the timber float.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling or disposal in accordance with local regulations.
 - .2 Contractor to make an effort to recycle or reuse as much 'waste' material as possible.

Part 2 Products

2.1 MATERIALS

- .1 All timber materials on this project are to be Coast Douglas Fir, #1 Structural Grade or better.
- .2 All timber materials for this project will be incised and preservative treated as follows: a) Bullrails and risers - ACZA treated; b) All other materials - Creosote treated.
- .3 ACZA treated timber to have minimum 6.4 kg/m³ retention, with a minimum depth of penetration of 10mm as specified in CSA 080.14
- .4 Creosote treated timber to have minimum 224 kg/m³ net retention, with a minimum depth of penetration of 19mm. Treatment in accordance with CSA 080.2.

Part 3 Execution

3.1 APPLICATION: FIELD TREATMENT

- .1 Comply with AWP A M4 and revisions specified in CSA O80 Series, Supplementary Requirements to AWP A M2.
- .2 Remove chemical deposits on treated wood to receive applied finish.
- .3 It is the intention that ALL HOLES and ALL TIMBERS will be pre-framed for this project in order to eliminate field touchup and modification. Shop drawings for the pre-framed float components will be submitted to the engineer for approval before placing the order for these materials.
- .4 Where absolutely necessary, field cut ends and drilled holes to receive 2 coats of copper naphthenate (chemical soaked rag pulled through holes twice, once in each direction).

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 06 05 73 - Wood Treatment

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A123/A123M-[02], Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products..
- .2 Canadian Standards Association (CSA International)
 - .1 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
 - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA O141-05, Softwood Lumber.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2005.

1.3 SUBMITTALS

- .1 Submissions: in accordance with Section 01 33 00 - Submittal Procedures.

1.4 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Waste Management and Disposal: Separate waste materials for disposal in accordance with Clause 1.19 “Material Disposal” of Section “011 11 15 – General Instructions”.

Part 2 Products

2.1 LUMBER MATERIAL

- .1 Lumber: unless specified otherwise, Coast Douglas Fir softwood, #1 Structural Grade or better, dressed to dimensions shown on drawings, moisture content 19% or less in accordance with following standards:

- .1 CAN/CSA-O141.
- .2 NLGA Standard Grading Rules for Canadian Lumber.

2.2 ACCESSORIES

- .1 Nails, spikes and staples: to CSA B111.
- .2 Bolts: 15.9 mm diameter A307 (galvanized) unless indicated otherwise, complete with nuts and washers.
- .3 Use stainless steel screw for securing mini-mesh decking to stringers.

2.3 FINISHES

- .1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for pressure- preservative treated lumber.

2.4 WOOD PRESERVATIVE

- .1 Bullrail and risers incised and ACZA treated.
- .2 Stringers, crossties, flange timbers, blocking, splice blocks incised and closed cell creosote treated to 224 kg/m³ (14 pcf) retention.

Part 3 Execution

3.1 PREPARATION

- .1 All timbers are to be accurately framed and drilled, counterbored in accordance with the shop drawings, prior to preservative treatment. The intention is to keep field drilling and framing to a minimum.
- .2 All components to be identified with a clearly visible tag and identifying mark number. These tags may need to be installed after the treating process.

3.2 INSTALLATION

- .1 Comply with requirements of DFO Best Management Practices for Piledriving and Marine Construction.
- .2 Install components in accordance with the shop drawings, then square up and tighten all bolts, install floatation billets and decking as per the drawings.
- .3 Use appropriate safety procedures and personal protection when working with treated wood, in accordance with WCB safe-work procedures.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 05 50 00 - Metal Fabrications.

1.2 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: submit manufacturer's printed product literature, specifications and datasheet.
- .3 Sub-surface investigation report: when site conditions differ from those indicated, submit written notification to Engineer and await further instructions.
- .4 Spliced piles: submit details of spliced joint complete with either prequalified joint procedure, or signature and stamp of qualified welding engineer registered or licensed in the Province of BC, Canada.
- .5 Submit proof that welders are qualified and ticketed in accordance with the requirements of CSA W59 for the procedure in question.
- .6 Submit proof that the company performing the welding is certified to CSA W47.1 Division 2 or better.
- .7 Equipment:
 - .1 Submit prior to pile installation, for review and approval by Engineer: list and details of equipment for use in installation of piles. Note: due to limited overburden at the site it is expected that these piles will need to be advanced using drilling methods and equipment. This is a drilling job.
 - .2 Impact hammers: submit manufacturer's written data as specified.
 - .3 Non-impact methods; submit characteristics to evaluate performance.
 - .4 Drilling equipment: Descriptions, manufacturers specs, details of installation sufficient for Engineer to evaluate the suitability of the method.

- .8 Quality assurance submittals:
 - .1 Test reports: Welding inspection (splice welds) will be arranged by the Engineer, paid for by the Department of Fisheries and Oceans, with minimum 48 hours notice by Contractor. Rejected welds will be replaced at Contractors' expense, including the cost of re-testing.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.3 EXISTING CONDITIONS

- .1 A Geotechnical subsurface investigation report is included with the specification (Cook Pickering & Doyle, February 1974, Appendix B attached). It is important to note that this report was not done for this project, it was done for the original Pat Bay Ocean Sciences Pier Project. The information contained in this report is believed to be representative and accurate, and the information on the drawings is based to a large part, on the information contained herein. Pipe piles driven on D-dock (north side of the approach pier) in 2010 were advanced using a vibratory hammer, to approximately 4.0m penetration, with typically 1 to 2m in firm material (possible Till) then refusal on bedrock.
- .2 The specific type of bedrock is unknown, but presumed to be: mudstone, siltstone, sandstone, or conglomerate typical for the Southern Gulf Islands area.
- .3 Notify Engineer immediately in writing if subsurface conditions at site differ materially from those indicated on the drawings or in the geotechnical report, and await further instructions. No claim for a change in subsurface conditions will be entertained if the Contractor has not notified the Engineer within 48 hours of discovering the variance.

1.4 SCHEDULING

- .1 Provide schedule of planned sequence and timeline for pile installation to Engineer for review, not less than two weeks prior to commencement of pile driving.

Part 2 Products

2.1 MATERIALS

- .1 Pile material to meet A252 grade 3, minimum 350MPa yield. Alternate material specifications will be considered, submit details to Engineer for review before ordering pile material..
- .2 Piles may be fabricated and installed full length, or they may be installed in 18.3m (60') lengths, with field splices as required at Contractors' option.
- .3 It is assumed that these piles will be spliced, although it may be possible to supply and install full-length piles to meet the advancement and cutoff criteria specified on the drawings. Contractor to make suitable allowances for splicing (if required) or for handling full length piles (if required).

2.2 PILE INSTALLATION EQUIPMENT

- .1 Hammers to be selected by Contractor with details for impact and non-impact methods, as well as overburden-style drilling methods submitted to the Engineer for review.
- .2 The Contractor is fully responsible for ensuring that the equipment he chooses is capable of advancing the piles to the specified tip elevations.

Part 3 Execution

3.1 PREPARATION

- .1 Protection:
 - .1 Protect adjacent structures, services and work of other sections from hazards due to pile driving operations.
 - .2 Arrange sequencing of pile driving operations and methods to avoid damages to adjacent existing structures.
 - .3 When damages occur, remedy damaged items to restore to original or better condition at own expense.
- .2 Ensure that ground conditions at pile locations are adequate to support pile driving operation and that piles are not left in an unstable condition. Temporary staying of piles (if necessary) is a Contractor responsibility.
- .3 At Contractors' option, pre-boring of holes may be acceptable to facilitate pile alignment control.

3.2 INSTALLATION

- .1 The selection of equipment and method is up to the Contractor, but in all cases the Contractor is wholly responsible for advancing the piles to the minimum tip elevations and penetrations into bedrock as indicated on the drawings, and to the tolerances as identified in section 3.4 below.
- .2 Installation of each pile will be subject to the approval of the Engineer. The Engineer will be sole judge as to acceptability of each pile with respect to final driving resistance, depth of penetration, specified tolerances.
- .3 Seat each 457mm diameter pile to practical refusal in the bedrock socket, at the specified (4.0m) penetration into bedrock, or to equivalent advancement in good material as defined by the engineer.
 - .1 Do not overdrive to cause damage to piles in bedrock.
 - .2 The Engineer will determine refusal criteria for piles seated in rock sockets based on type of pile and driving equipment as proposed by the Contractor.
- .4 Seat each 324mm diameter pile to practical refusal on bedrock (ie: no socket required for the 324mm diameter piles), as there is sufficient overburden at this location to provide the required lateral stability. Note: This does not relieve the Contractor from responsibility to ensure that the 324mm diameter piles are advanced without damage through the existing rip-rap slope materials, an operation which is presumed to require the use of overburden drilling techniques and equipment.

- .1 Do not overdrive to cause damage to piles in bedrock.
- .2 The Engineer will determine refusal criteria for piles driven to rock based on type of pile and driving equipment as proposed by the Contractor.

3.3 APPLICATION / DRIVING / DRILLING

- .1 Use driving caps and cushions to protect piles, appropriate to the method and equipment chosen by the Contractor.
 - .1 Piles with damaged heads will have the damaged section removed and (if necessary) a new piece of pipe spliced on top as determined by the Engineer. No claims for additional costs for this work will be entertained unless the completed pile length is more than the lengths specified on the Contract Drawings.
- .2 Hold piles securely and accurately in position while driving.
- .3 Deliver hammer blows along axis of pile.
- .4 Use of water jet: Jetting of piles is not permitted, except as required to facilitate the drilling operation and equipment.
- .5 Cut off piles neatly and squarely at elevations as indicated to tolerance of plus or minus 5 mm.
- .6 Remove cut-off lengths from site on completion of work.

3.4 INSTALLATION TOLERANCES

- .1 Pile heads to be within 75 mm of locations as indicated.
- .2 Piles not to be more than 2% of length out of vertical alignment.
- .3 Piles installed outside of these tolerances may be accepted at Engineers discretion, but if so directed the Contractor shall remove and re-install the pile to meet the Contract tolerances at no cost to the Department.

3.5 OBSTRUCTIONS

- .1 Because the piles are specified to be advanced by drilling methods, any visible surface obstructions are assumed to be the responsibility of the Contractor .
- .2 Contractor to allow for a pre-pile dive survey at all pile locations in order to remove any visible obstructions before pile installation begins. The Engineer is to be advised as to timing for the dive survey so he may attend.
- .3 Sub-surface obstructions may be present in the overburden. These sub-surface obstructions fall into two categories: a) rocks and buried wood debris; and b) buried metal debris or buried reinforced concrete debris.
 - .1 Rocks and wood debris are Contractor responsibility and no claims for such obstructions will be entertained.
 - .2 Buried metal debris including reinforced concrete will be claimable as an extra to the Contract, as long as the Engineer agrees as to the nature of the debris encountered. All instruction in this matter will be through the Engineer and will

require clear direction and written communication on both sides. As part of a claim under this section the Contractor will be required to prove that he has actually incurred additional costs as a result of said obstruction.

3.6 FIELD QUALITY CONTROL

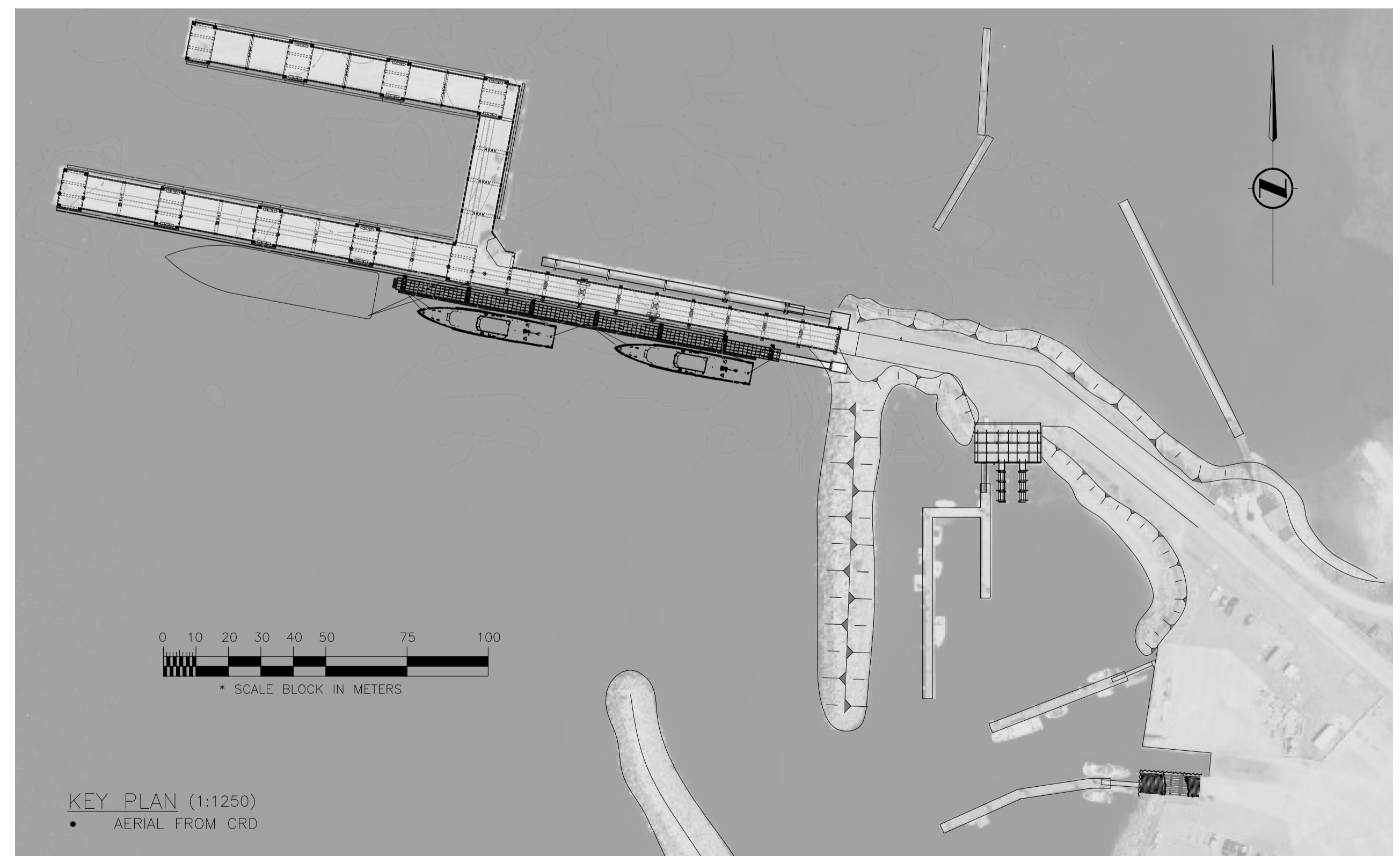
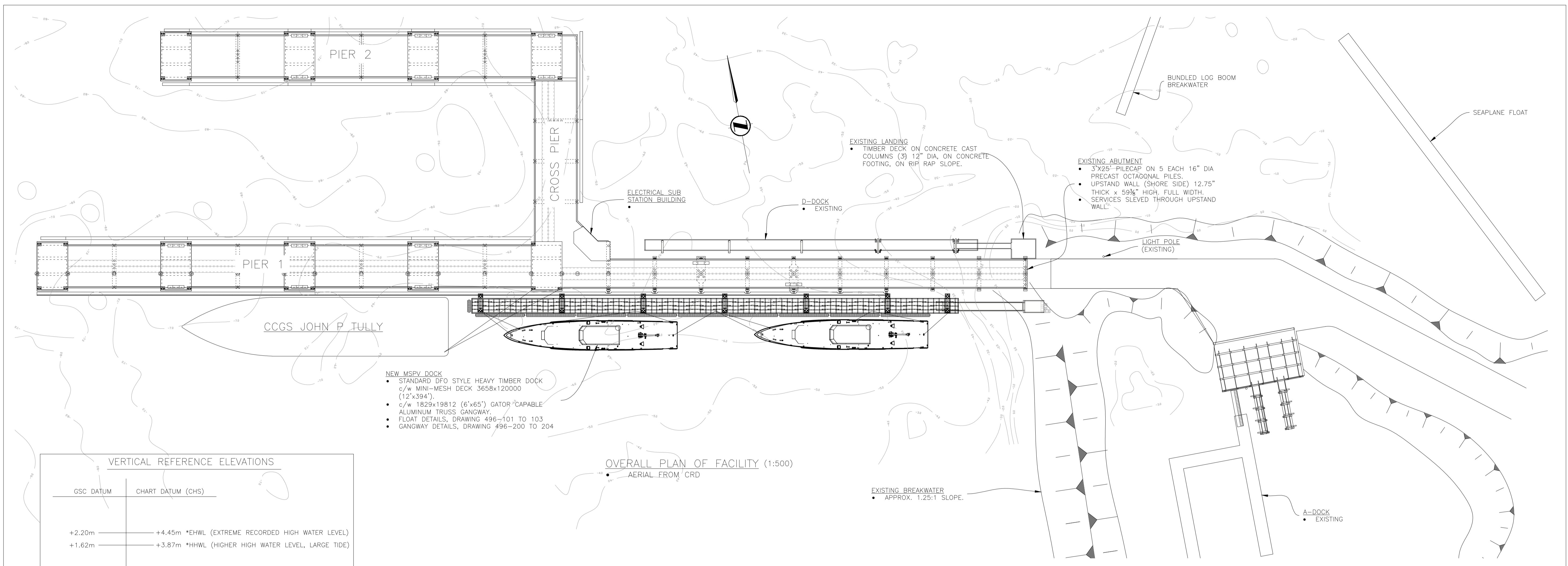
- .1 Contractor to maintain accurate records of driving for each pile, including:
 - .1 Type and make of hammer, stroke or related energy.
 - .2 Other driving equipment including drill details, air/water details, leads.
 - .3 Pile size and length, location of pile in pile group, location or designation of pile group.
 - .4 Start time and finish time for each stage of pile advancement, with pertinent notes describing sequence and steps taken.
 - .5 Seating criteria and result.
 - .6 Final tip and cut-off elevations.
 - .7 Other pertinent information such as interruption of continuous driving, pile damage, obstructions encountered.
- .2 Submit piledriving records to the Engineer for review and signoff at the completion of each week.

3.7 CLEANING

- .1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

APPENDIX A
DRAWINGS



NOTES:

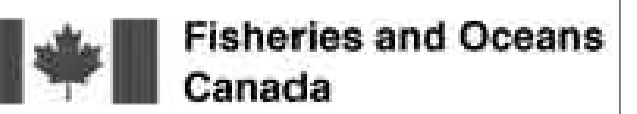
- THE FOLLOWING MINIMUM MATERIAL REQUIREMENTS ARE TO BE FOLLOWED:
 - PLATE AND ROLLED STEEL - GRADE 300W OR BETTER
 - HSS - COLD FORMED G40.20, GRADE 350W OR BETTER.
 - PIPE - A252 GRADE 2, 300MPa OR > YIELD
 - BOLTS - A307, GALVANIZED U.N.O.
 - ALL NUTS FOR A325 BOLTS TO BE HEAVY HEX, GALVANIZED
 - HEAVY TIMBER - D. FIR /1 OR BETTER, 14# CREOSOTE TREATED.
 - GROUT - 35MPa OR >, SANDED
 - CONCRETE - 35MPa (@28 DAYS), 0.45 MAX. W/C RATIO, CLASS C1.
 - REBAR - Fy = 400MPa, DEFORMED BARS TO CSA G30.18M.
- ASSUMED WELD SIZE TO BE 6mm FILLET UNLESS NOTED OTHERWISE
- ALL MISC METAL AND ALL FASTENERS TO BE HOT DIPPED GALVANIZED.
- ALL FABRICATED STEEL WORK TO BE PAINTED FOR MARINE ENVIRONMENT, (2 COATS POLY URETHANE, TOP COAT COLOR TO CLIENT SPEC); PAINT INSTALLED IN ACCORDANCE WITH PAINT MANUFACTURERS RECOMMENDATIONS.
- ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE.
- TIMBER, STEEL, AND FASTENER SIZES IN THESE DRAWINGS ARE REFERRED TO IN "SOFT" METRIC FORM. ACTUAL SIZES TO BE NEAREST IMPERIAL STANDARD.
- MARINE CONTOURS DRAWN FROM CHS 2010 SOUNDING PLAN.
- FOR ELECTRICAL DETAILS REFER TO RB ENGINEERING DRAWINGS FOR THIS PROJECT (1880-E1,E2,E3 MARCH 2014).
- FOR DESIGN LOADS, SEE TABLE ON DRAWING 496-002

FILE: D:\high\OCS\496 - ICS - MSPV Float, Pld Bay\496 - ICS MSPV Float.dwg PLOT DATE: April 9, 2014 11:56:14 AM

REVISIONS	D/M/Y	BY	REVISIONS	D/M/Y	BY
E			J		
D			I		
C			H		
B	1/04/14	KLT	G		
A	11/03/14	KLT	F		

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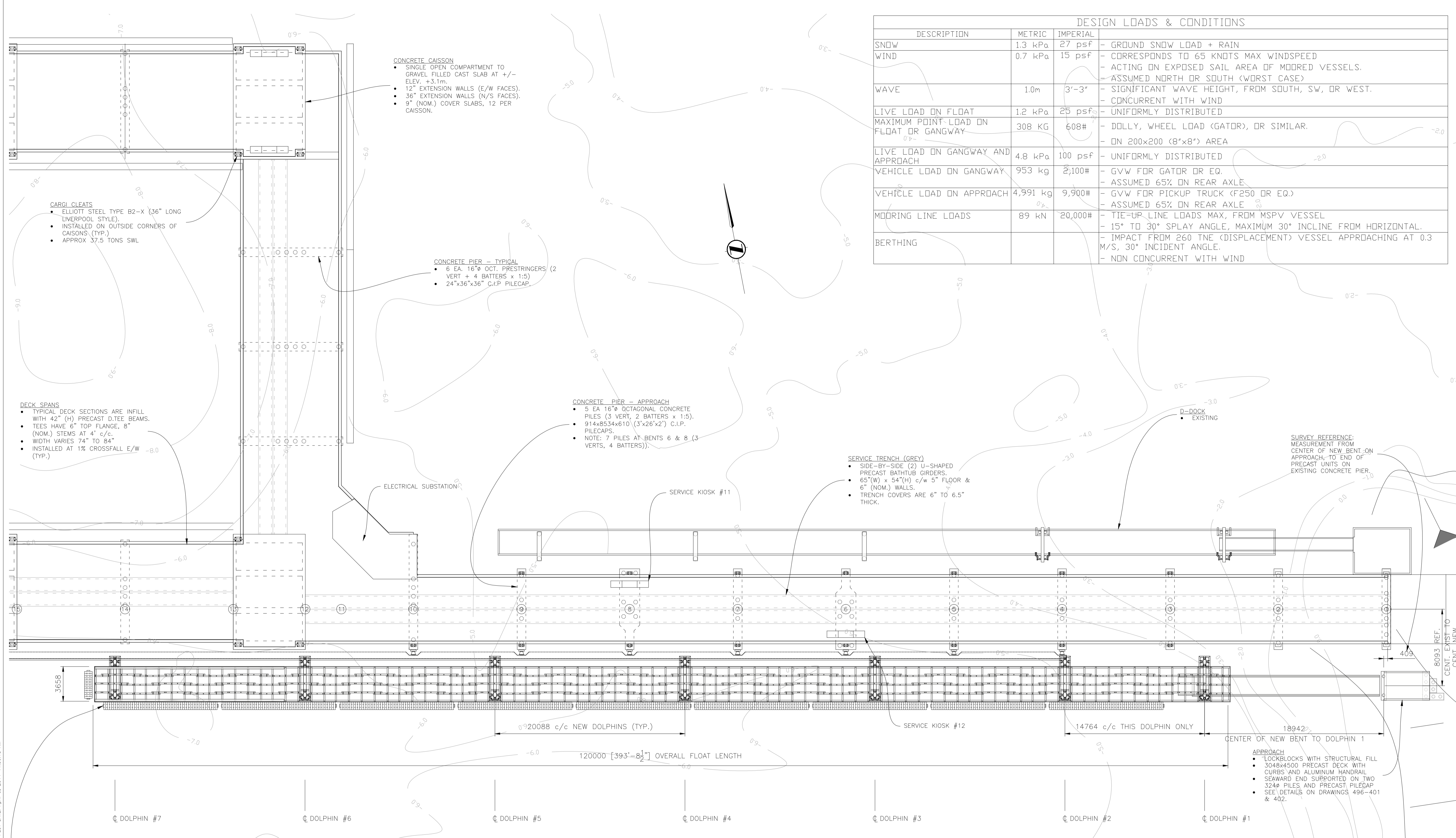
DRAWN BY: KRISTIN TUTTLE
 DESIGN BY: HUGH TUTTLE P.ENG.
 DATE: 8-JANUARY-2014
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INSTITUTE OF OCEAN SCIENCES
NEW FLOAT FOR MSPV MOORAGE

OVERALL PLAN DRAWING No.: **496 - 001** **B**
CANCEL PRINTS BEARING EARLIER REVISION

DESIGN LOADS & CONDITIONS			
DESCRIPTION	METRIC	IMPERIAL	
SNOW	1.3 kPa	27 psf	- GROUND SNOW LOAD + RAIN
WIND	0.7 kPa	15 psf	- CORRESPONDS TO 65 KNOTS MAX WINDSPEED - ACTING ON EXPOSED SAIL AREA OF MOORED VESSELS. - ASSUMED NORTH OR SOUTH (WORST CASE)
WAVE	1.0m	3'-3"	- SIGNIFICANT WAVE HEIGHT, FROM SOUTH, SW, OR WEST. - CONCURRENT WITH WIND
LIVE LOAD ON FLOAT	1.2 kPa	25 psf	- UNIFORMLY DISTRIBUTED
MAXIMUM POINT LOAD ON FLOAT OR GANGWAY	308 KG	608#	- DOLLY, WHEEL LOAD (GATOR), OR SIMILAR. - ON 200x200 (8"x8") AREA
LIVE LOAD ON GANGWAY AND APPROACH	4.8 kPa	100 psf	- UNIFORMLY DISTRIBUTED
VEHICLE LOAD ON GANGWAY	953 kg	2,100#	- GVW FOR GATOR OR EQ. - ASSUMED 65% ON REAR AXLE
VEHICLE LOAD ON APPROACH	4,991 kg	9,900#	- GVW FOR PICKUP TRUCK (F250 OR EQ.) - ASSUMED 65% ON REAR AXLE
MOORING LINE LOADS	89 kN	20,000#	- TIE-UP LINE LOADS MAX, FROM MSPV VESSEL - 15° TO 30° SPLAY ANGLE, MAXIMUM 30° INCLINE FROM HORIZONTAL.
BERTHING			- IMPACT FROM 260 TON (DISPLACEMENT) VESSEL APPROACHING AT 0.3 M/S, 30° INCIDENT ANGLE. - NON CONCURRENT WITH WIND



PLAN VIEW - NEW MSPV FLOAT (1:200)

- THE NEW MSPV FLOAT FACILITY CONSISTS OF:
- NEW HD TIMBER DPW STYLE FLOATING DOCK 3658x120m (12'x394').
 - NEW DRILLED PIPE PILES (14) c/w HEADERS.
 - NEW CONCRETE APPROACH AND ABUTMENT 3048x4500 (10'x 15').
 - NEW GANGWAY (6'x65')
 - NEW TREESAVER BOOMSTICKS
 - 400V ELECTRICAL SERVICE (SHIP-SHORE CONNECTION) AND FACILITY LIGHTING.
 - FIREWATER AND DOMESTIC WATER, PORTABLE CONNECTION.
 - MINIMUM 4.0m WATER (AT ZERO TIDE)

- TREESAVER BOOMSTICKS**
- FOAM-FILLED VEHICLE TIRES ON 324# EPOXY PAINTED STEEL PIPE CORE
 - 19# BOOM CHAINS AND SHACKLES (GALV.) TO SECURE TO DOCK AT EACH END OF EACH BOOMSTICK (SHACKLES TO BE MOLY'D SHUT WITH XXHD ZAP STRAPS).
 - TOTAL 1x3000 AND 9x12192 (1/10' AND 9/40') REQ'D.
 - DETAILS TO BE REVIEWED AND APPROVED BY ENGINEER PRIOR TO ORDER

- TIRES**
- NOMINAL 760#
 - FOAM FILLED
- CORE**
- NOMINAL 324# x 9.53 W.T. (12.75"x0.375")
 - EPOXY COATED AND FOAM FILLED. NOMINAL 760#
 - FOAM FILLED

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REVISIONS	D/M/Y	BY	REVISIONS	D/M/Y	BY
E			J		
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B	ISSUED FOR TENDER	1/04/14	KLT	G	
A	95% - ISSUED FOR REVIEW	11/03/14	KLT	F	

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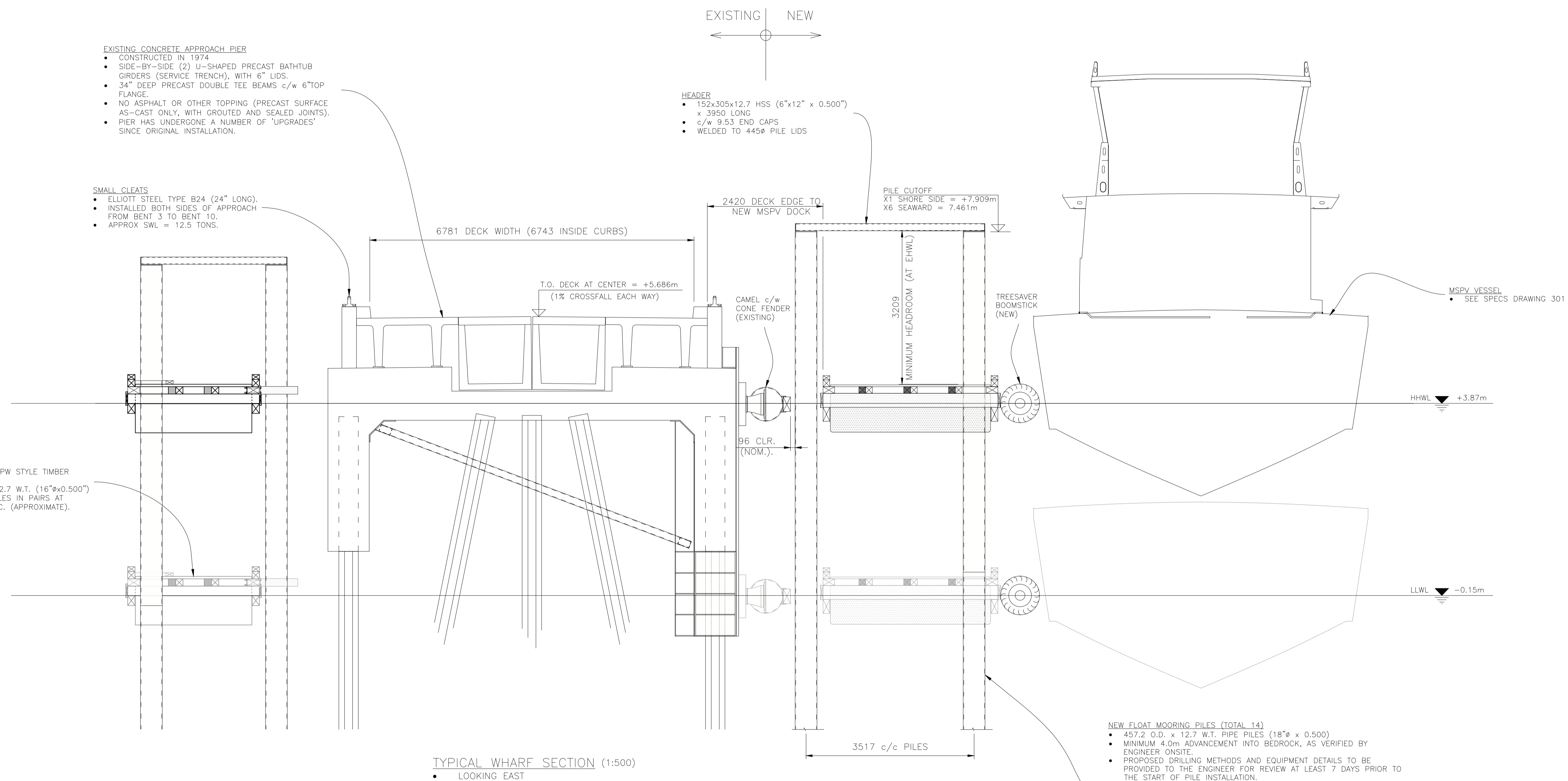
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NEW FLOAT FOR MSPV MOORAGE

NEW DOCK PLAN DRAWING No.: **496 - 002** **B**
CANCEL PRINTS BEARING EARLIER REVISION

TABLE OF PILE LENGTHS								
LOCATION	PILE DETAILS	CUTOFF ELEV.	SEABED ELEVATION	OVERBURDEN	ROCK SOCKET	CUTOFF ALLOWANCE	SUPPLIED PILE LENGTH	
APPROACH	324Øx9.53 W.T.	+5.09m	+2.2m	10.3m		2.0m	13.2m	
DOLPHIN #1	457Øx12.7 W.T.	+7.909m	4.2m	4.0m	4.0m	2.0m	22.4m	
DOLPHIN #2	457Øx12.7 W.T.	+7.461m	4.8m	4.0m	4.0m	2.0m	22.3m	
DOLPHIN #3	457Øx12.7 W.T.	+7.461m	5.5m	4.0m	4.0m	2.0m	23.0m	
DOLPHIN #4	457Øx12.7 W.T.	+7.461m	5.9m	4.0m	4.0m	2.0m	23.4m	
DOLPHIN #5	457Øx12.7 W.T.	+7.461m	5.5m	4.0m	4.0m	2.0m	23.0m	
DOLPHIN #6	457Øx12.7 W.T.	+7.461m	6.4m	4.0m	4.0m	2.0m	23.9m	
DOLPHIN #7	457Øx12.7 W.T.	+7.461m	6.9m	4.0m	4.0m	2.0m	24.4m	



TYPICAL WHARF SECTION (1:500)
• LOOKING EAST

- NOTES:**
- MSPV FLOAT INSTALLATION IS SIMILAR TO EXISTING D-DOCK INSTALLATION.
 - EXCEPT AS NOTED (REFER TO "REMOVE CAMELS" NOTE, THIS PAGE), THE INTENTION IS TO LEAVE THE EXISTING CAMELS IN PLACE. THE NEW FLOAT WILL BE ENTIRELY SEPARATE FROM THE EXISTING CONCRETE PIER.
 - PRIMARY VESSEL TIE WILL BE FROM VESSEL TO PILE. THE INTENTION IS FOR THE VESSEL ROPES TO BE SECURED AROUND THE PILES (ROLLER/CHAIN ASSEMBLY FIXED TO FLOAT, ALLOWING THE MOORING ROPE LOADS TO FOLLOW THE TIDE).

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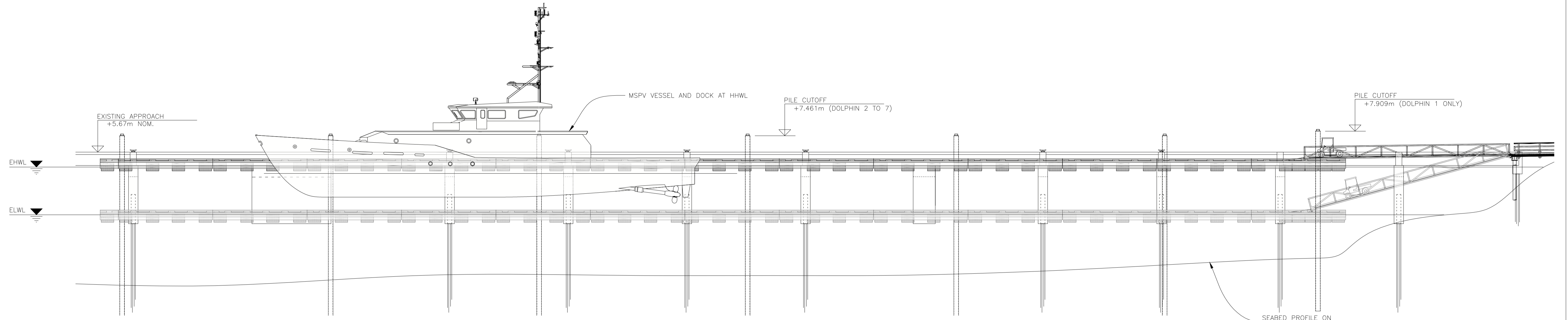
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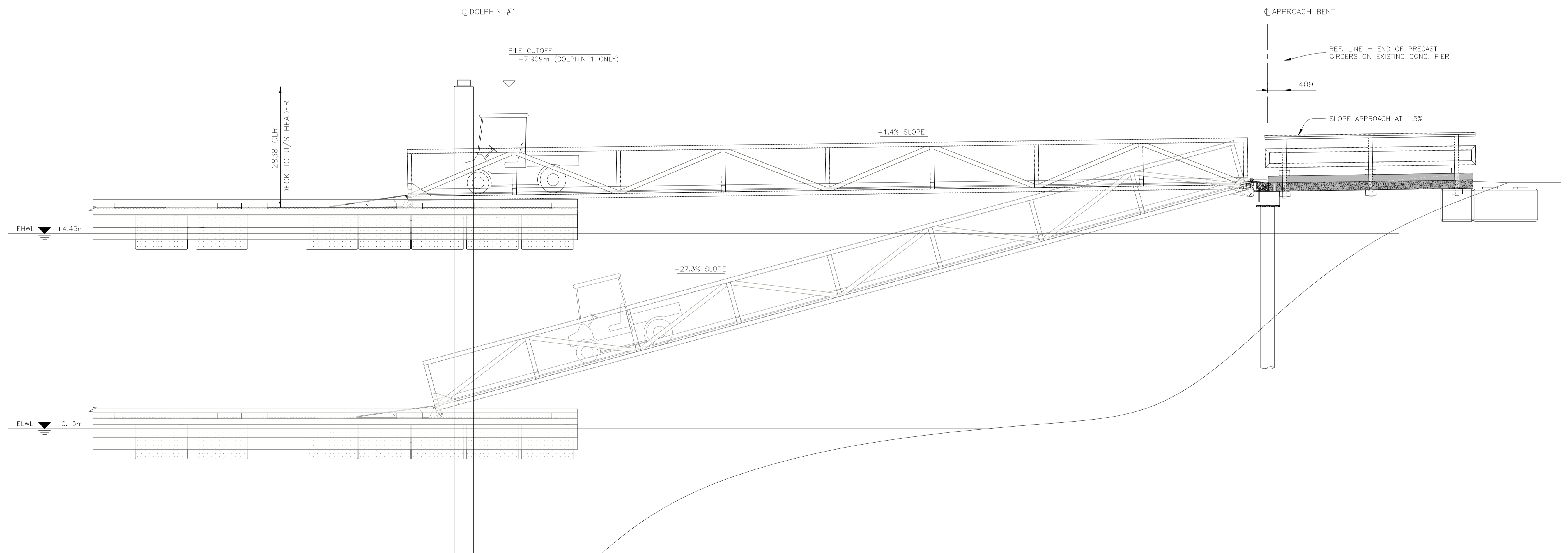
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WHARF SECTION DRAWING No.: **496 - 003** **B**

CANCEL PRINTS BEARING EARLIER REVISION



LONGITUDINAL SECTION (1:200)
 • LOOKING NORTH



GANGWAY SECTION (1:50)
 • LOOKING NORTH

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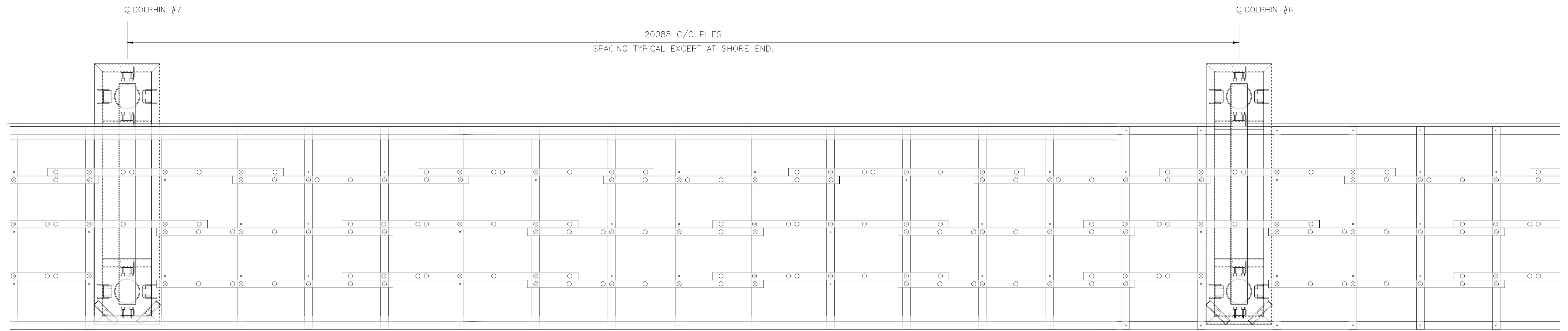
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NEW FLOAT FOR MSPV MOORAGE

SIDE ELEVATIONS

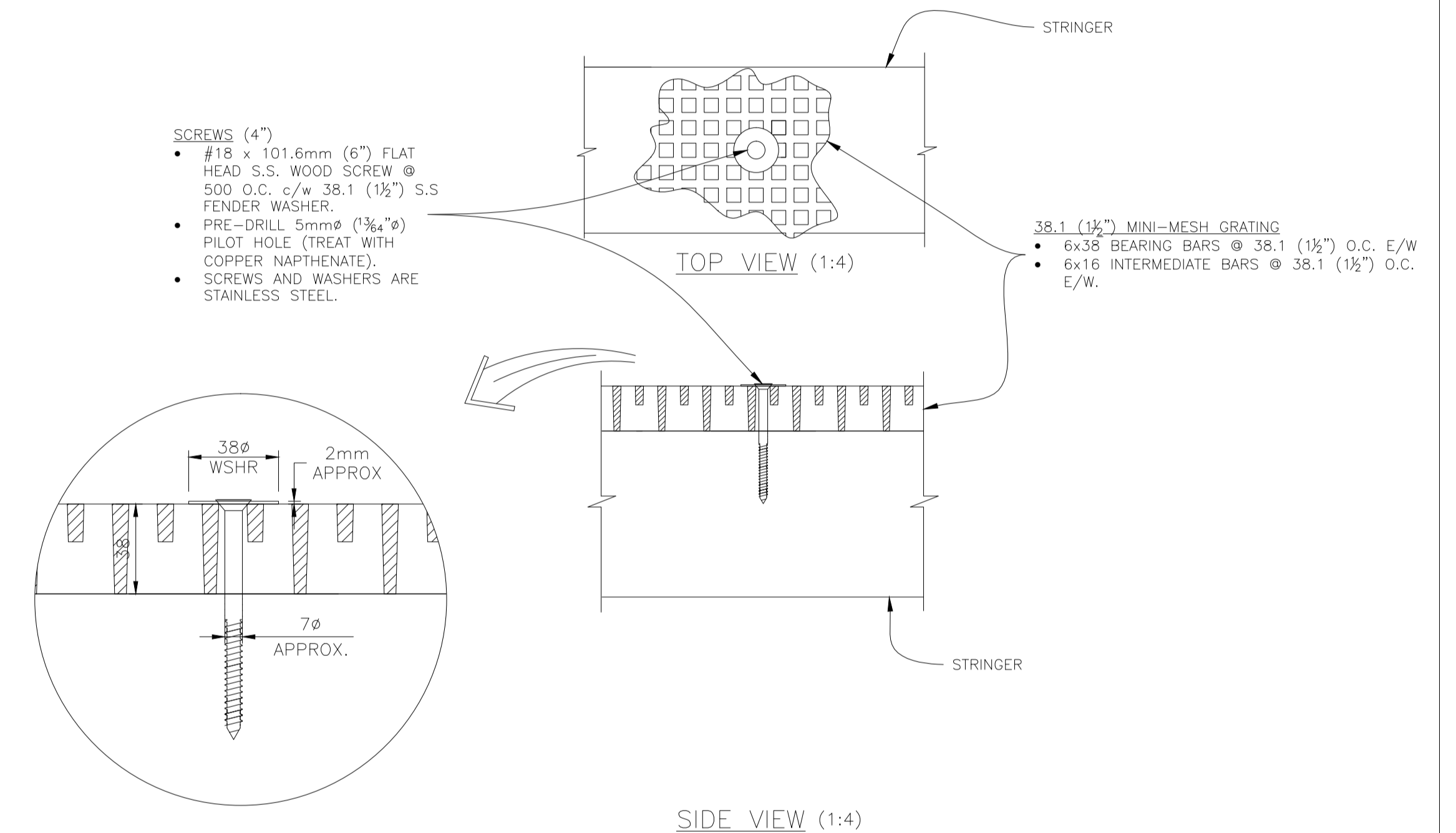
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A

CANCEL PRINTS BEARING EARLIER REVISION



PLAN VIEW OF FLOAT (1:40)
 • DECKING NOT SHOWN FOR CLARITY

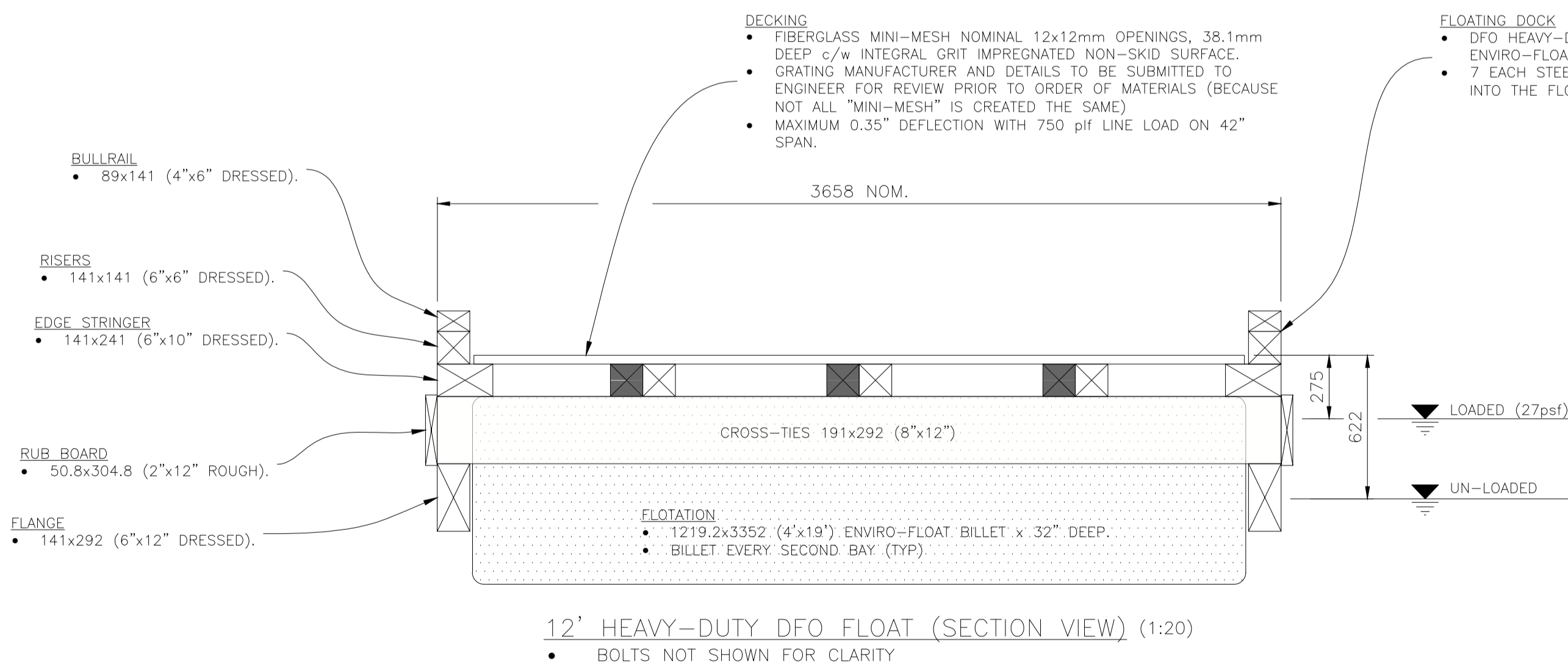


SCREWS (4")
 • #18 x 101.6mm (6") FLAT HEAD S.S. WOOD SCREW @ 500 O.C. c/w 38.1 (1 1/2") S.S. FENDER WASHER.
 • PRE-DRILL 5mm (3/16") PILOT HOLE (TREAT WITH COPPER NAPHTHENATE).
 • SCREWS AND WASHERS ARE STAINLESS STEEL.

38.1 (1 1/2") MINI-MESH GRATING
 • 6x38 BEARING BARS @ 38.1 (1 1/2") O.C. E/W
 • 6x16 INTERMEDIATE BARS @ 38.1 (1 1/2") O.C. E/W.

SIDE VIEW (1:4)

DECK FIXING DETAILS (1:5)



DECKING
 • FIBERGLASS MINI-MESH NOMINAL 12x12mm OPENINGS, 38.1mm DEEP c/w INTEGRAL GRIT IMPREGNATED NON-SKID SURFACE.
 • GRATING MANUFACTURER AND DETAILS TO BE SUBMITTED TO ENGINEER FOR REVIEW PRIOR TO ORDER OF MATERIALS (BECAUSE NOT ALL "MINI-MESH" IS CREATED THE SAME)
 • MAXIMUM 0.35" DEFLECTION WITH 750 pif LINE LOAD ON 42" SPAN.

FLOATING DOCK
 • DFO HEAVY-DUTY 3658mm (12' WIDE) TIMBER DOCK c/w ENVIRO-FLOAT STYLE BILLETS.
 • 7 EACH STEEL PILE BOXES (FOR 2 PILE SPREAD DOLPHIN BUILT INTO THE FLOAT STRUCTURE).

12' HEAVY-DUTY DFO FLOAT (SECTION VIEW) (1:20)
 • BOLTS NOT SHOWN FOR CLARITY

NOTES:

- FRAMING AND DETAILS IN ACCORDANCE WITH "FISHERIES AND OCEANS CANADA SMALL CRAFT HARBORS BRANCH 3.657m WIDE HEAVY FLOAT MODULE", DRAWINGS FM12-HV-009 (E), FM12-HV-001 (E), FM12-HV-END-000 (G), FM12-HV-END-001 (G).
- LUMBER GRADING. ALL TIMBER MATERIAL TO BE COAST D.FIR. #1 OR > PRE-FRAMED PRIOR TO PRESSURE TREATMENT.
- PRESSURE TREATMENT: BULLRAIL AND RISERS = ACZA TREATED; STRINGERS, CROSSTIES, JOISTS, FLANGES, SPLICE BLOCKS TO BE 14# CRO TREATED.
- ALL HARDWARE TO BE HOT-DIPPED GALVANIZED, BOLTS TO ASTM A307.
- THIS FLOAT CAN SUPPORT MAXIMUM 2100# CVW 'GATOR' STYLE VEHICLE (WIDTH = 60" LENGTH = 120" 4 WHEELS).
- ALL DRILLED HOLES AND FIELD CUT ENDS TO BE PRESSURE TREATED WITH CREOSOTE (COPPER NAPHTHENATE FOR ACZA TIMBERS).
- DESIGN FREEBOARDS AS FOLLOWS:
 • UNLOADED = 622 (24 1/2")
 • LOADED (27psf) = 275 (10.8")
- ADDITIONAL BILLETS REQUIRED IN THE CROSS-TIE CAVITY, UNDER THE GANGWAY LANDING, AND ALSO AT THE PILE WELL LOCATIONS.
- 1200 (LONG) x 3048 (WIDE) x 12.7 (1/2") ALUMINUM LANDING PLATE TO BE PROVIDED FOR GANGWAY ROLLERS TO RUN ON. FIX TO DECKING WITH COUNTERSUNK SCREWS.
- FLOAT TO BE EQUIPPED WITH THE FOLLOWING ADDITIONAL MISCELLANEOUS ITEMS (LOCATED AS DIRECTED IN FIELD):
 • LIFERINGS (4) WITH STAND
 • FIRE EXTINGUISHERS (2), 20-BC RATED, MOUNTED ONE PER ELECTRICAL KIOSK
 • SAFETY LADDERS (4), FLIP-UP PLASTIC 5 STEP DOCK LADDER (BARR MODEL DL-50R ORR EQ.)

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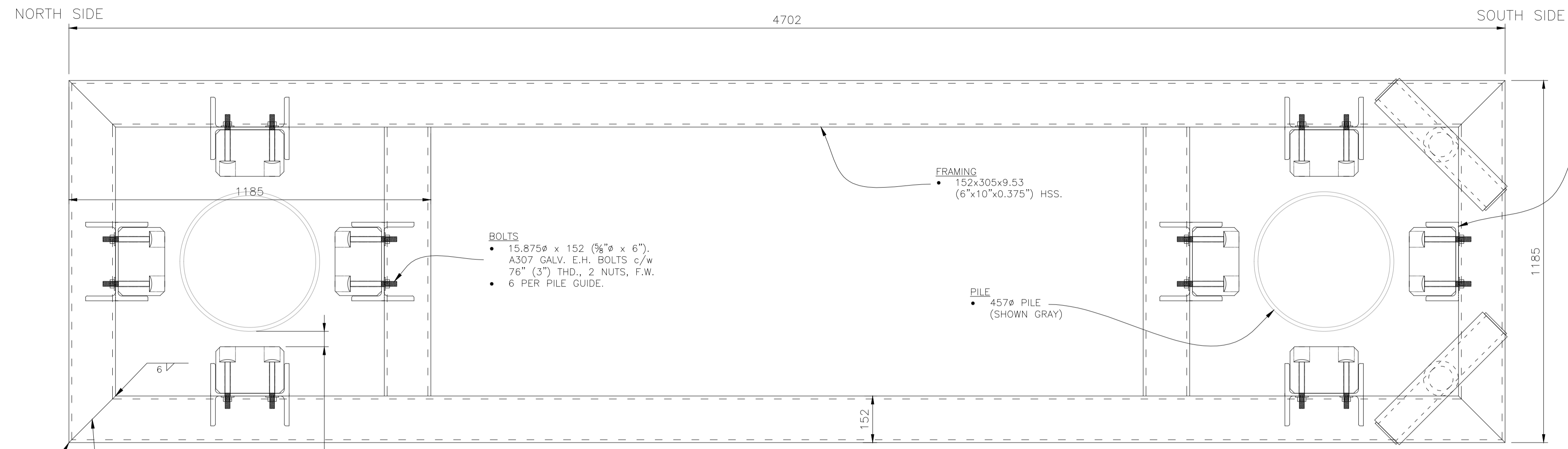


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NEW FLOAT FOR MSPV MOORAGE

FLOAT DETAILS - 1 OF 2

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 CANCEL PRINTS BEARING EARLIER REVISION

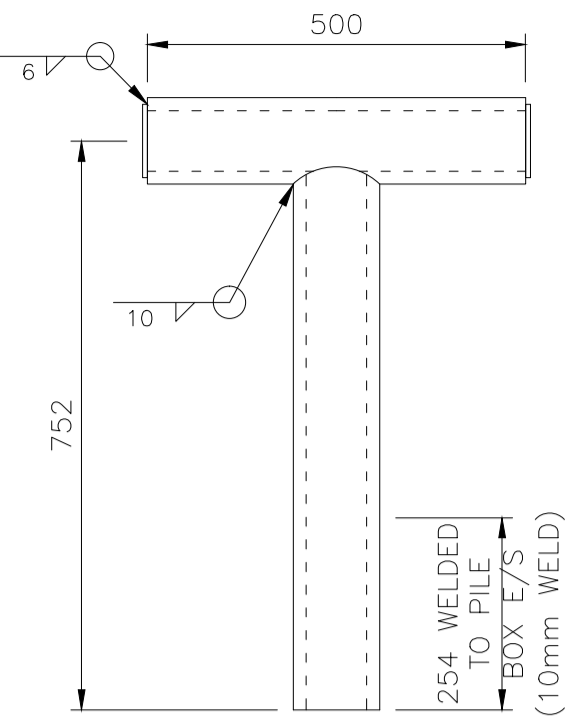
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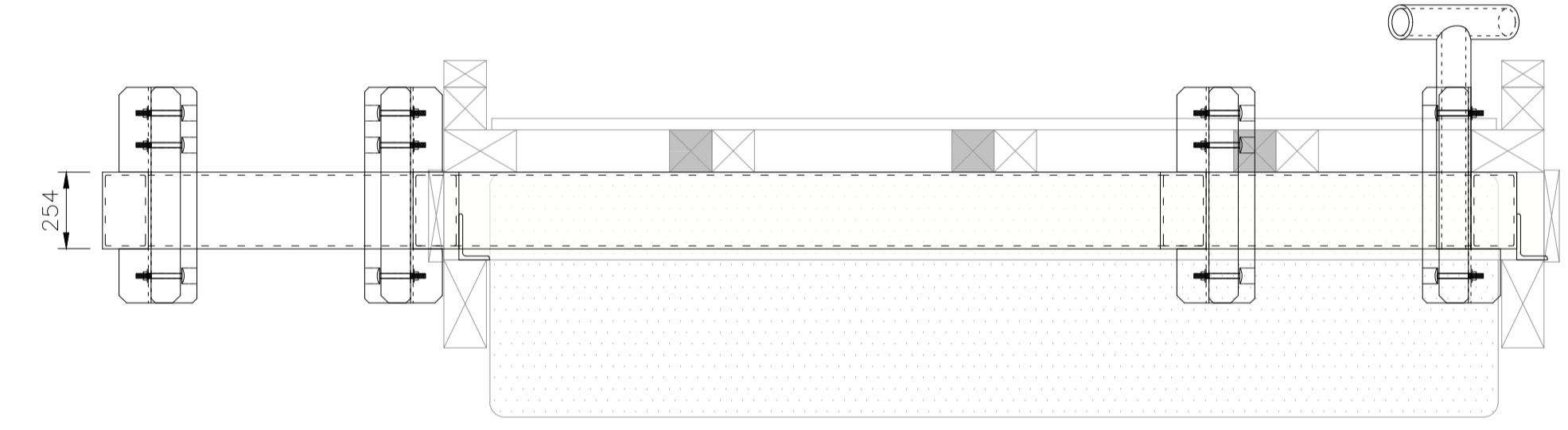
INSTALL BLOCKING AGAINST FRAMING, TO ENSURE PILE BOX CANNOT MOVE LATERALLY OR LONGITUDINALLY (BLOCKING TO BE SECURED TO JOISTS (STRAPPED OR LAG-BOLTED)

PILE BOX - PLAN VIEW (1:20)

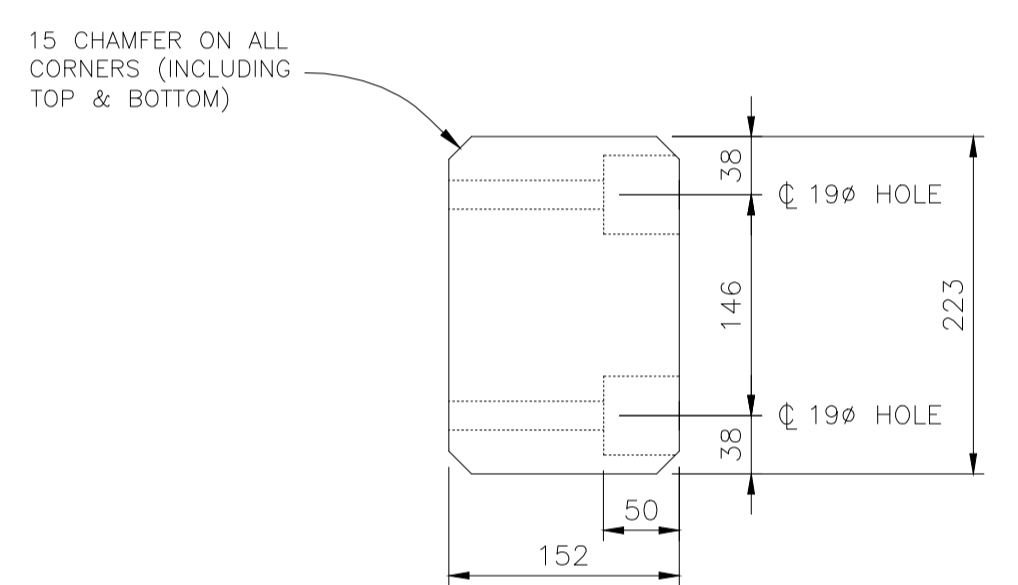
SOUTH SIDE PILE GUIDES
 CROP FLANGES FLUSH WITH WEB, TOP 536mm



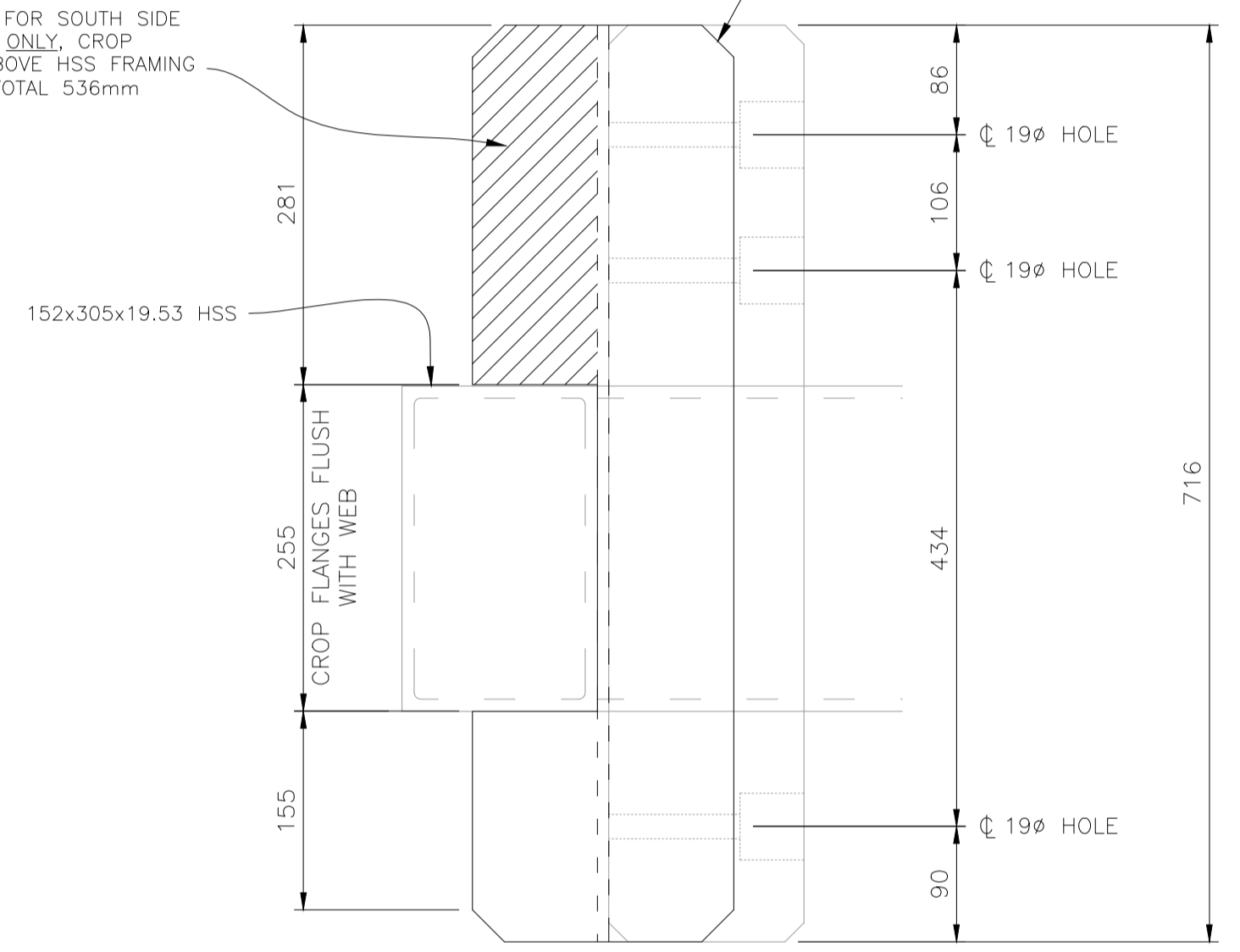
BOLLARD DETAIL (1:10)
 • 114.3ø O.D. x 17.12 W.T. (4\"/>



PILE BOX - SIDE ELEVATION (1:20)

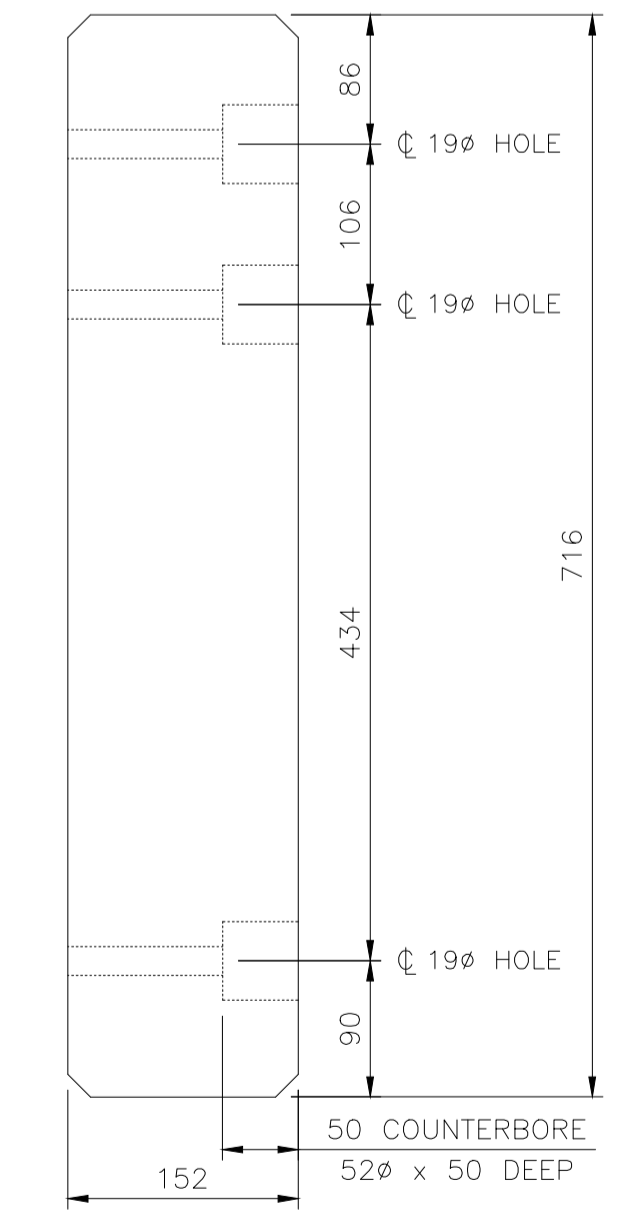
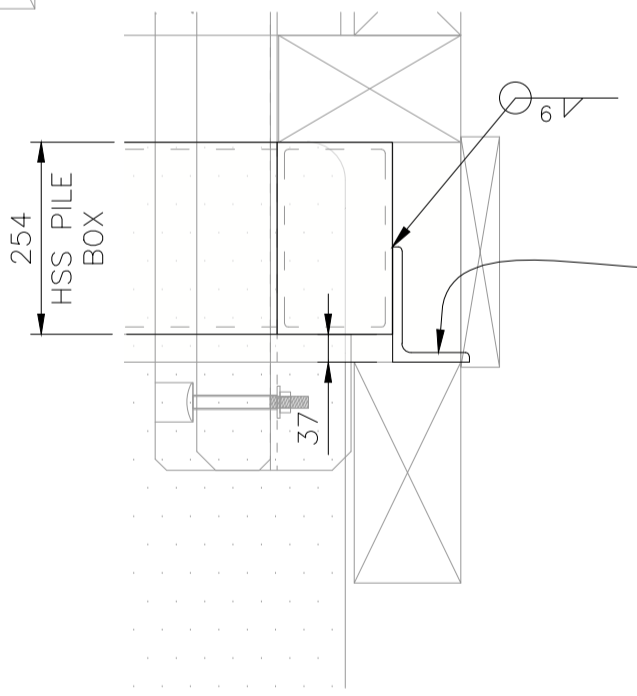


WEAR PAD - PLAN VIEW (1:5)

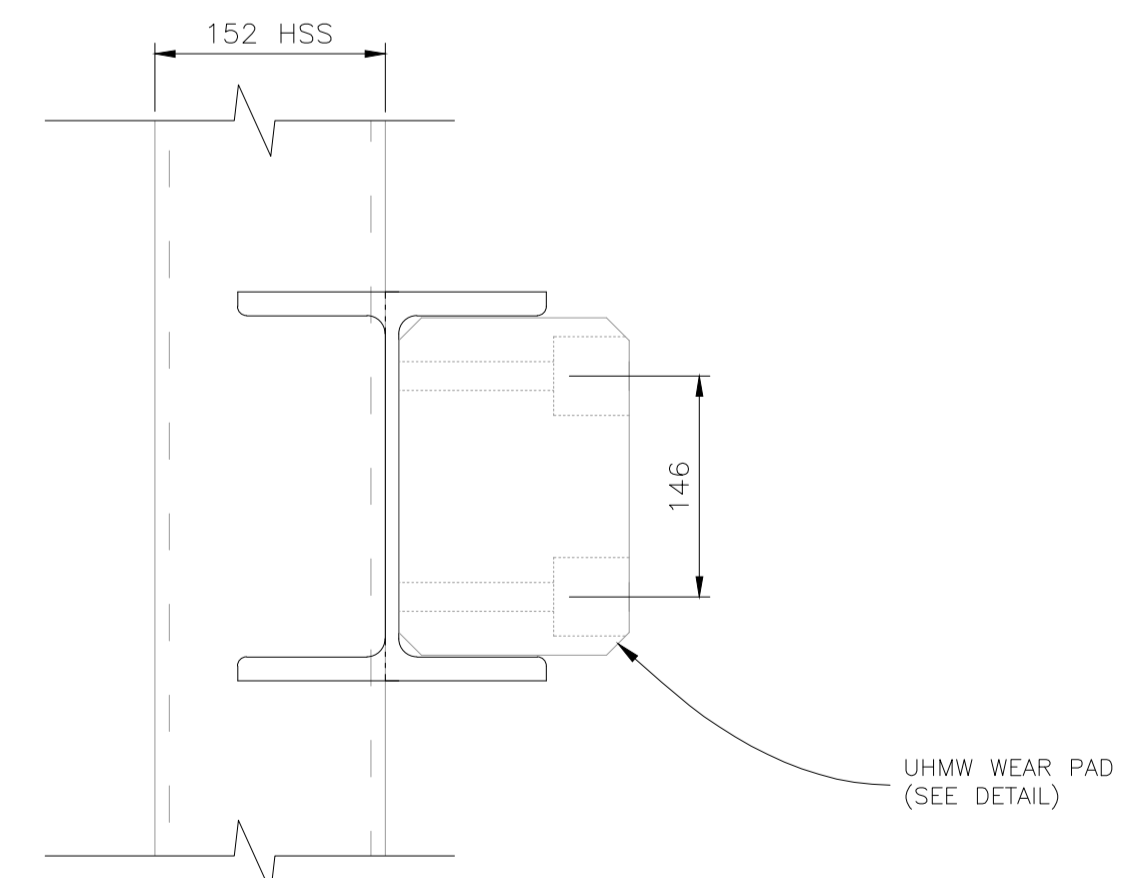


PILE GUIDE - SIDE (1:5)

SUPPORT ANGLE
 • 102x152x12.7 (4\"/>



WEAR PAD - SIDE VIEW (1:5)



PILE GUIDES - PLAN (1:5)

• W250x67x716 LONG
 • 7 REQUIRED TUS
 • 1 REQ'D WITH FLANGES CROPPED ALL THE WAY.

- NOTES:
1. COMPLETE PILE BOX ASSEMBLY TO BE GALVANIZED AFTER FABRICATION. DRAIN HOLES TO BE INSTALLED IN ACCORDANCE WITH GALVANIZES REQUIREMENTS.
 2. THE INTENTION IS FOR ALL PILE GUIDES TO BE NOMINAL 50mm CLEAR FROM PILES. CONTRACTOR TO ALLOW FOR SUPPLY OF UHMW GUIDES AS SHOWN (152x223x716, 8 EACH PER PILE BOX). FIELD ADJUSTMENT WILL BE REQUIRED AS FOLLOWS: TRIM BACK (BAND-SAW) TO MINIMUM 110mm THICKNESS (IE: 42mm REMOVED AND 15mm BEVELED), OR b.) INERT MAXIMUM 38mm CUT PIECE AS SPACER. THIS WILL PROVIDE UP TO 80mm OF ADJUSTMENT TO COMPENSATE FOR PILE POSITION.
 3. TACK WELD NUTS AFTER FINAL FITTING.

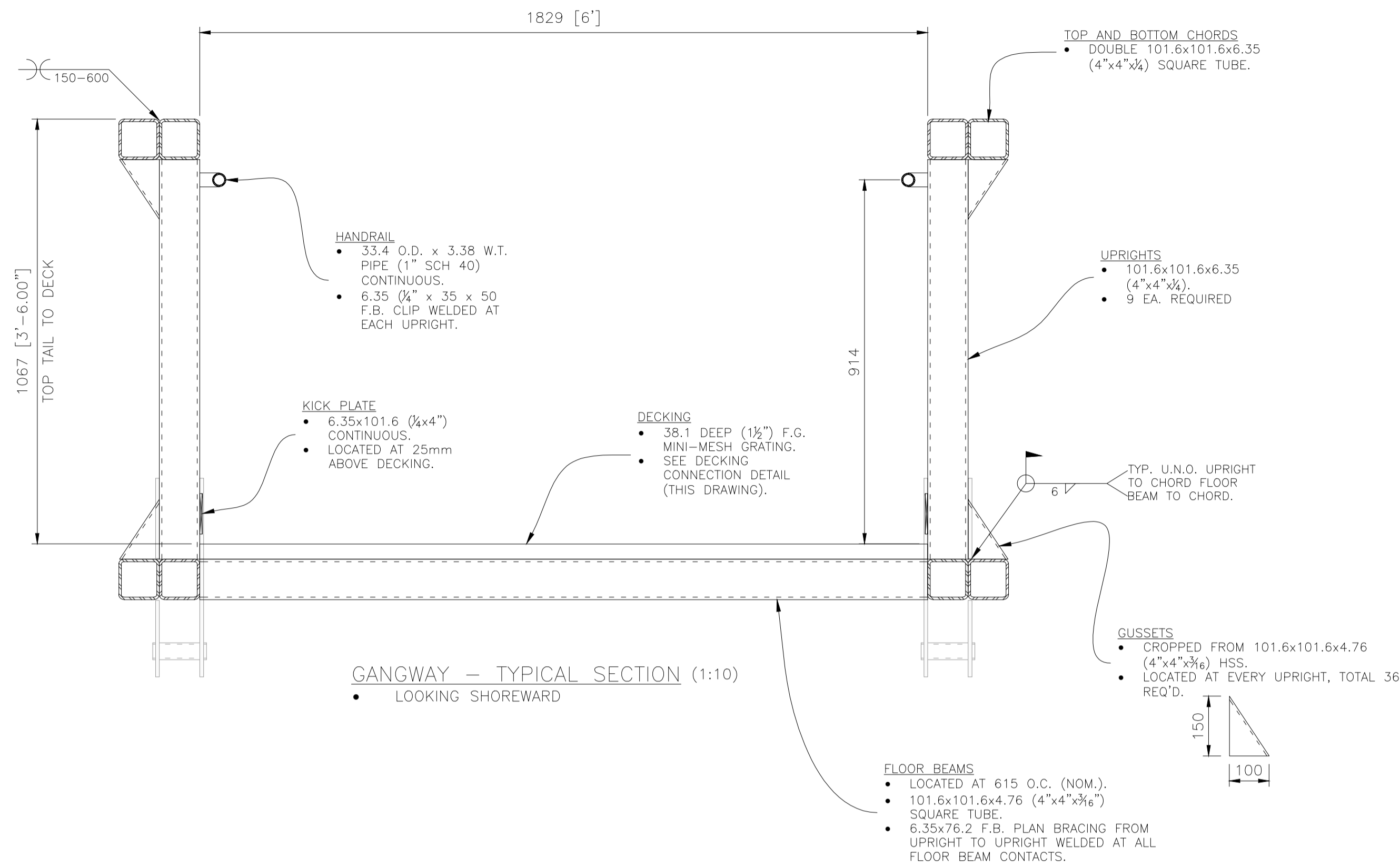
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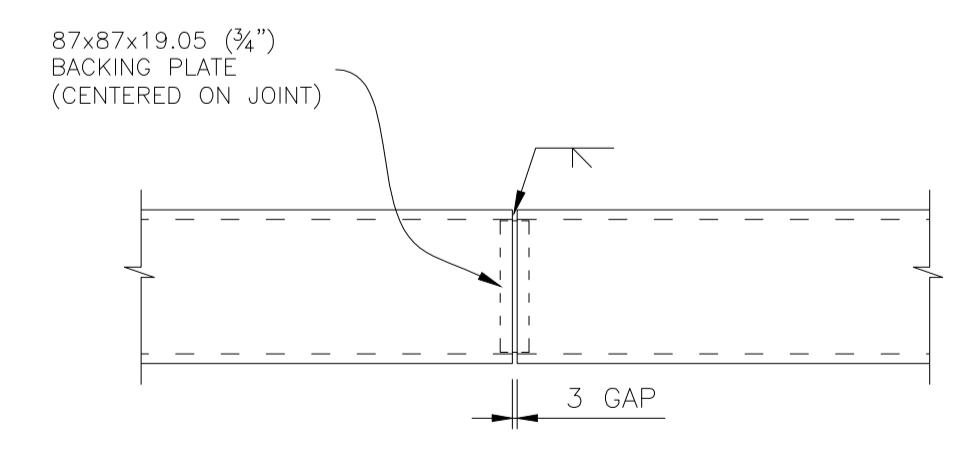
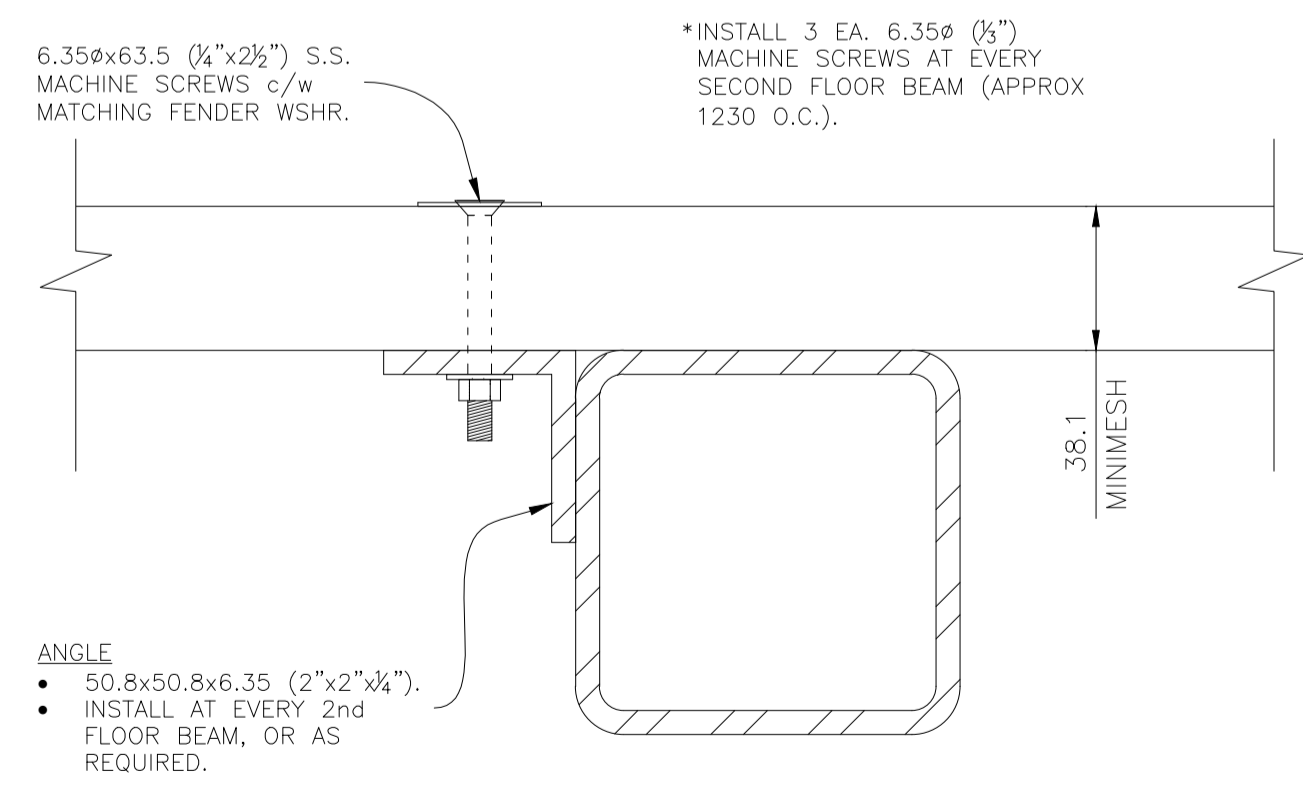
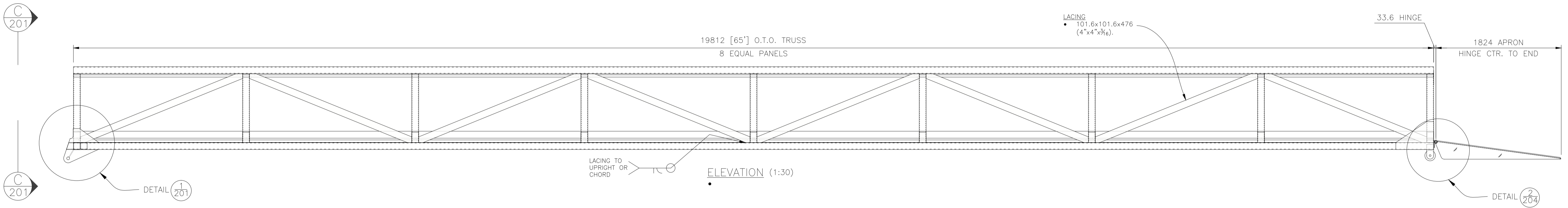
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- NOTES:**
- THE FOLLOWING MINIMUM MATERIAL REQUIREMENTS ARE TO BE FOLLOWED:
 - ALUMINUM TUBE - ALLOY 6061 - T6 TEMPER, ROUNDED CORNERS.
 - ALUMINUM PLATE - ALLOY 5052 - H32 TEMPER
 - STEEL - GRADE 300W OR BETTER.
 - DECKING: FIBERGLASS MINI-MESH NOMINAL 12x12mm OPENINGS, 38.1mm DEEP c/w INTEGRAL GRIT IMPREGNATED NON-SKID SURFACE.
 - GRATING MANUFACTURER AND DETAILS TO BE SUBMITTED TO ENGINEER FOR REVIEW PRIOR TO ORDER OF MATERIALS (BECAUSE NOT ALL "MINI-MESH" IS CREATED THE SAME)
 - WELD SIZE TO BE 6mm FILLET U.N.O.
 - ALL MISC. METAL FASTENERS TO BE HOT DIPPED GALVANIZED.
 - ALL OPEN ENDS OF TUBING TO BE CAPPED WITH 4.76mm (3/16") PLATE.
 - DESIGN LOADS:
 - LIVE - 100psf, OR 2100# GATOR.
 - RAMP WEIGHT: APPROXIMATE 7200# TOTAL WITHOUT SERVICES.
 - SERVICES: 80plf (ELECTRICAL CABLE, PLUS COMMUNICATION LINES, PLUS SEWER, AND WATER). NOTE: SERVICE ASSUMED TO BE INSTALLED IN VERTICALLY MOUNTED CABLE TRAY BETWEEN TOP AND BOTTOM RAILS.
 - 6.35x38.1 (1/4"x1 1/2") F.B. TRIMMER REQUIRED TO CONTAIN DECKING AT TOP AND BOTTOM OF RAMP (2 STRIPS x 1828 LONG).



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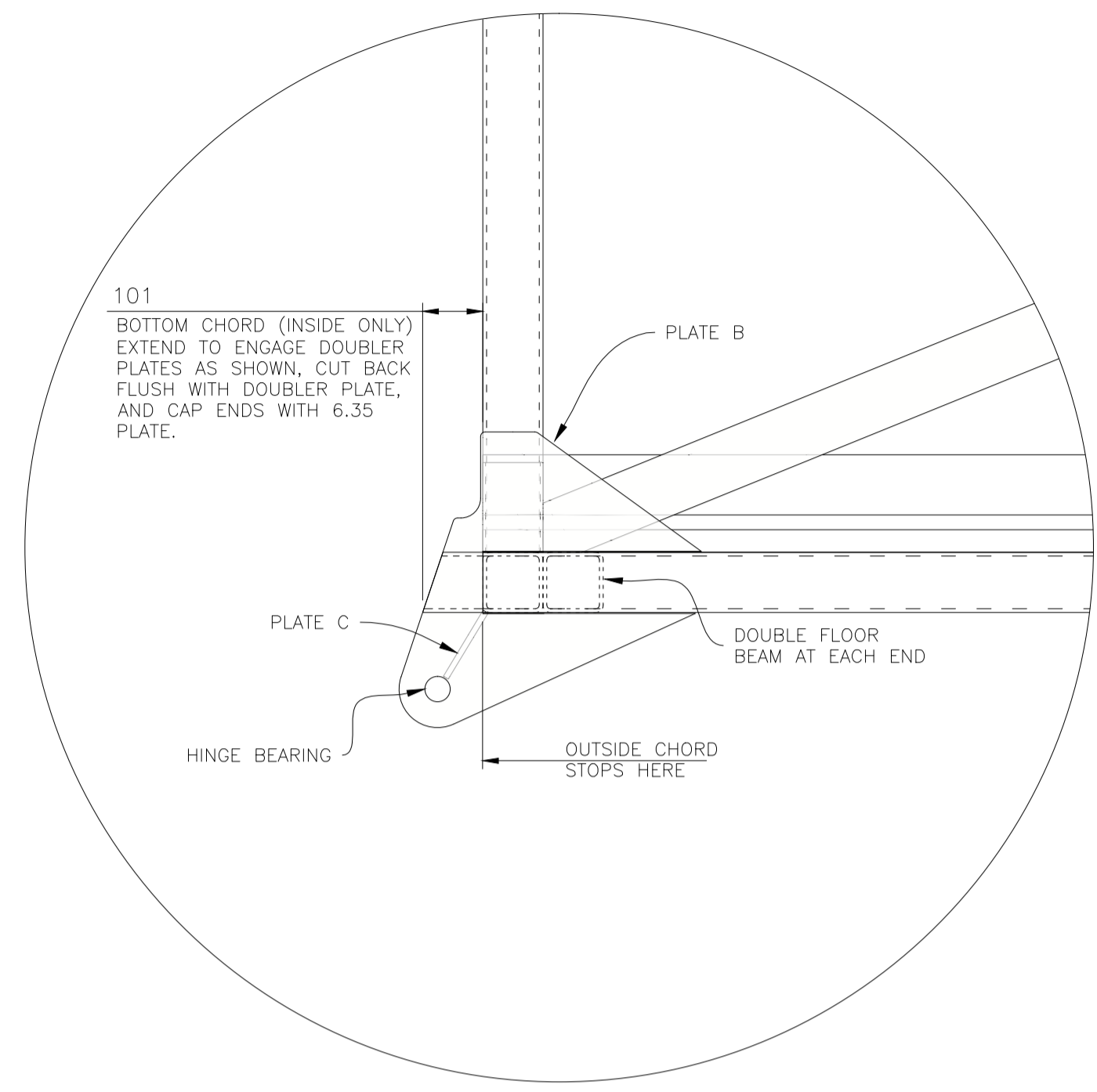
NEW FLOAT FOR MSPV MOORAGE

GANGWAY DETAILS - 1

DRAWING No.: **496 - 200** **B**

CANCEL PRINTS BEARING EARLIER REVISION

- NOTES:**
- ALL PLATES ON THIS DRAWING ARE ALUMINUM (6016 T6 OR EQ.), WITH THE EXCEPTION OF THE FOLLOWING:
 - DROP-LINK PLATES (GALV. STEEL)
 - WHARFHEAD MOUNT PLATES (GALV STEEL)
 - HINGE PINS (4140 S.S.)



DETAIL 1 GANGWAY HINGE DETAIL (1:10)
200

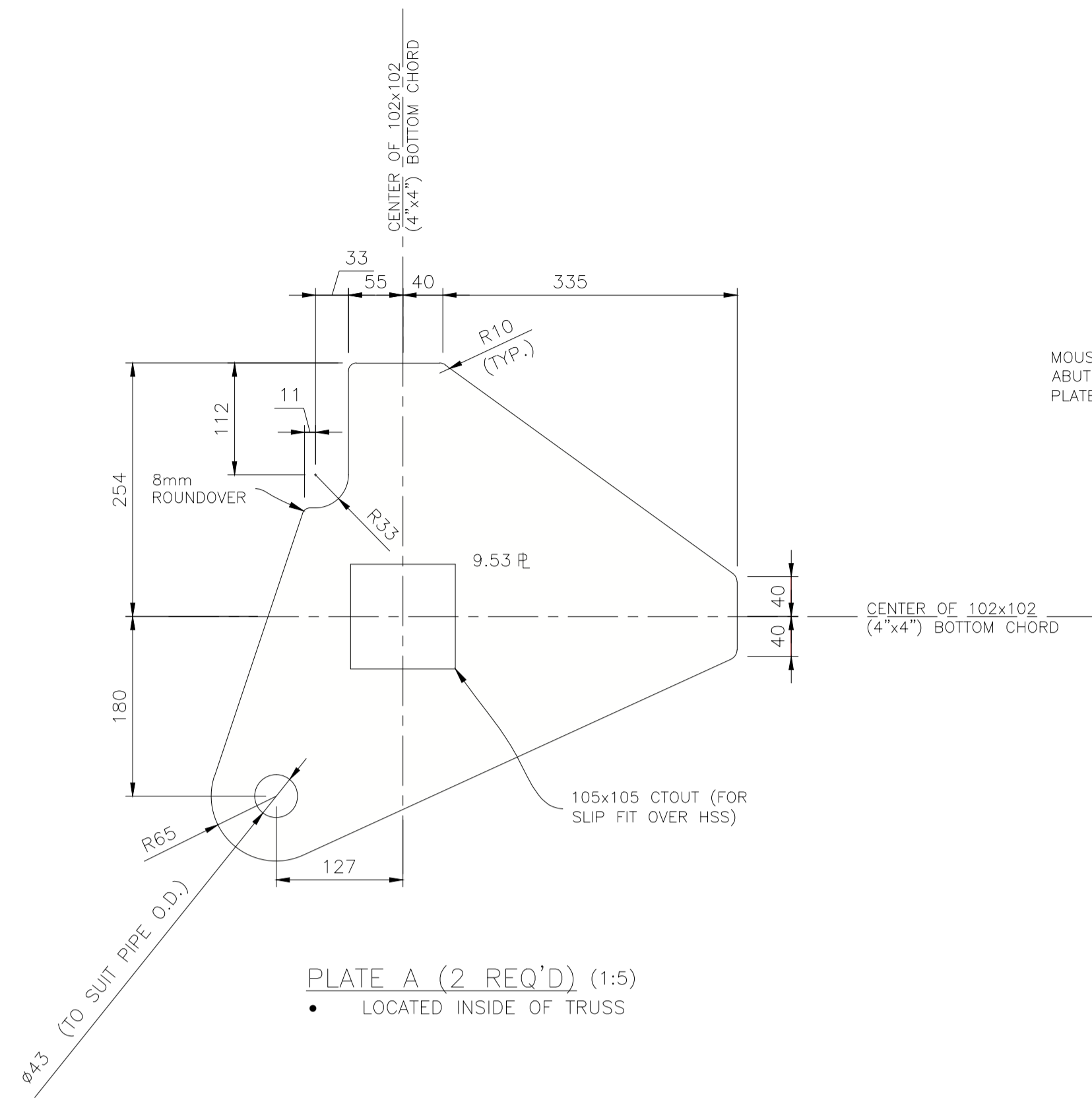


PLATE A (2 REQ'D) (1:5)
• LOCATED INSIDE OF TRUSS

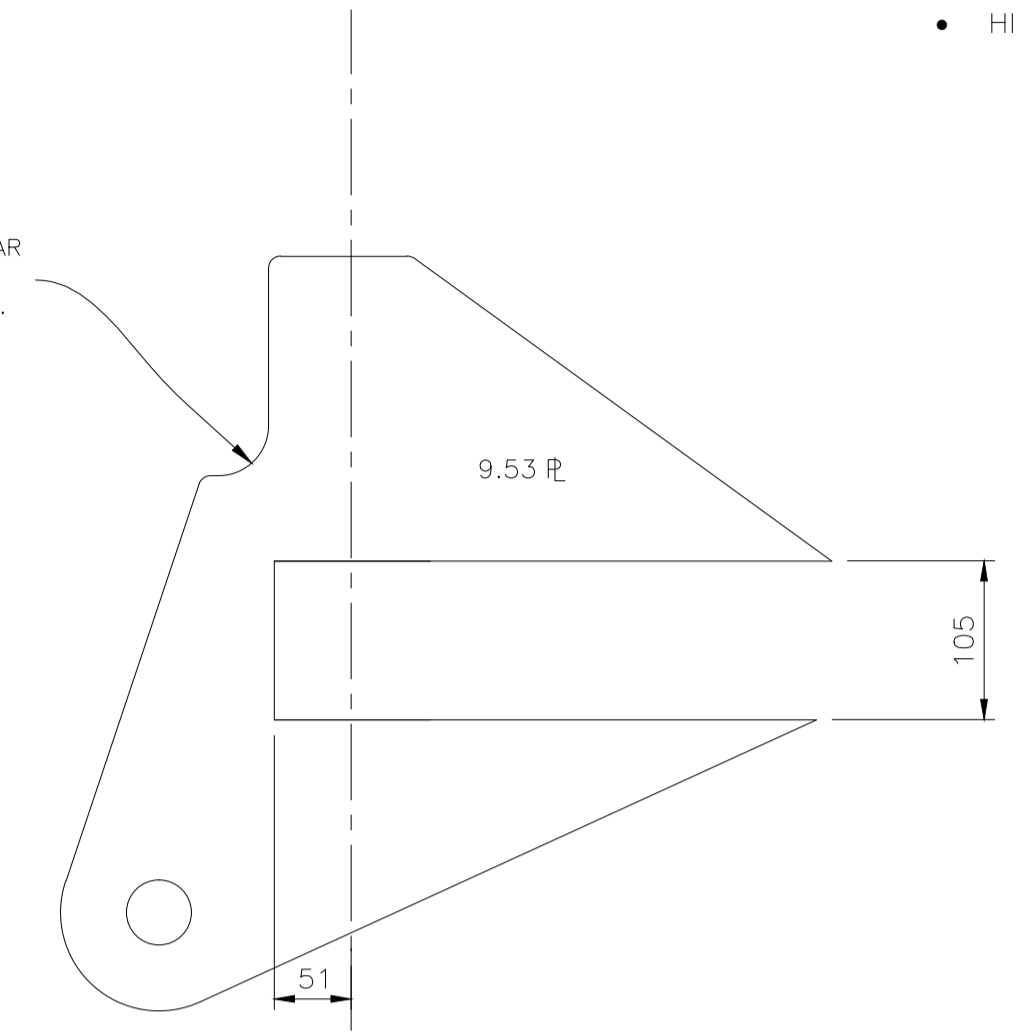


PLATE B (2 REQ'D) (1:5)
• LOCATED ON OUTSIDE OF TRUSS
• FOR DIMENSIONS NOT SHOWN SEE PLATE 'A'

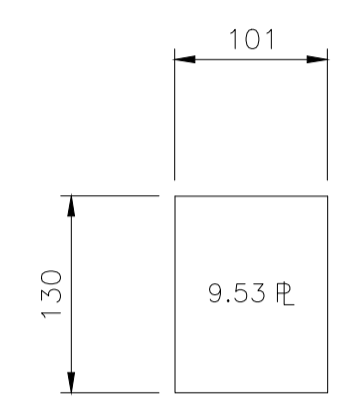
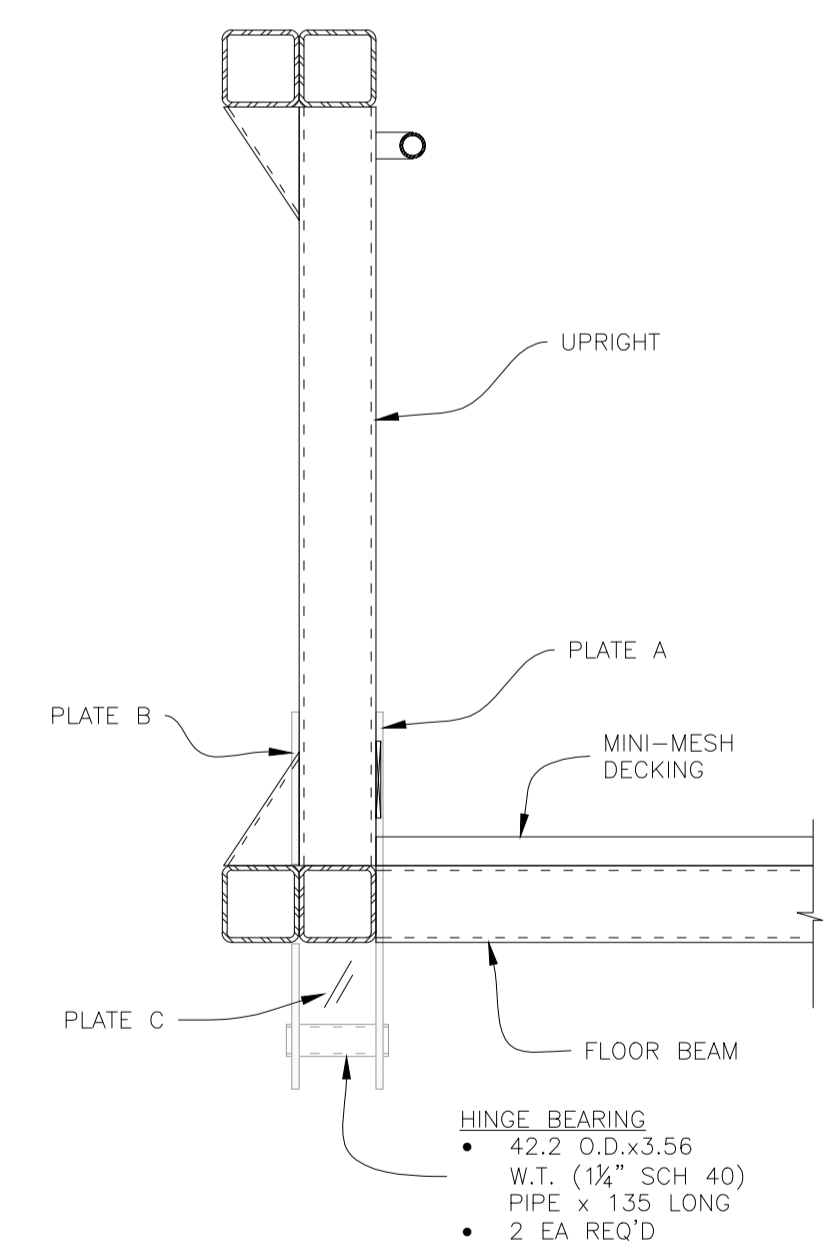
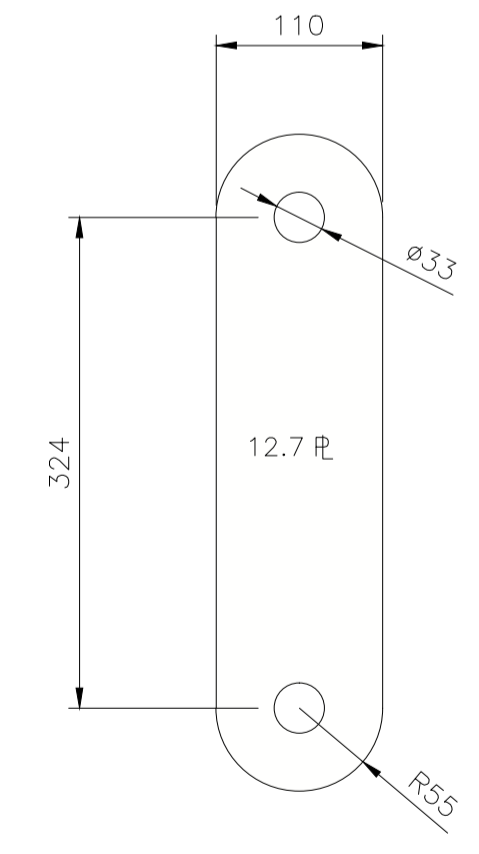


PLATE C (2 REQ'D) (1:5)
• LOCATED BETWEEN HINGE AND BOTTOM CHORD.

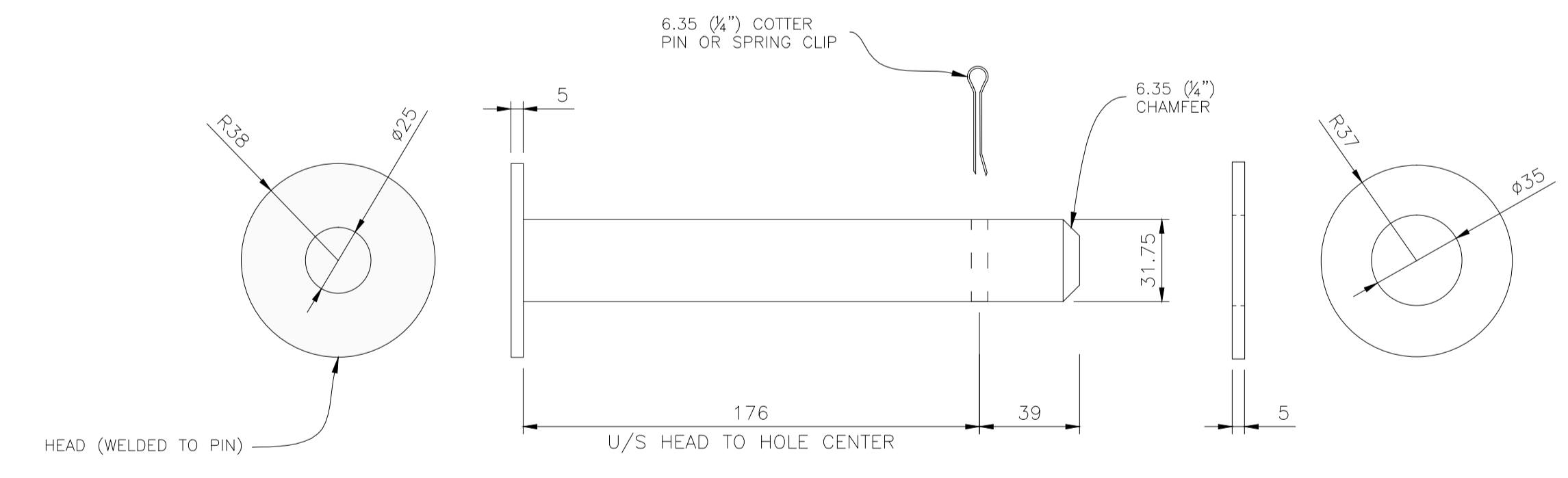


SECTION C HINGE DETAIL (1:10)
200

- HINGE BEARING
- 42.2 O.D. x 3.56 W.T. (1 1/2" SCH 40) PIPE x 135" LONG
 - 2 EA REQ'D



DROP LINK PLATES (4 REQ'D) (1:5)
• GALVANIZED STEEL.
• USE NYLON OR UHMW ISOLATING WASHERS BETWEEN DISSIMILAR METALS.



PIN DETAIL (1:2)
• 31.75ϕ (1 1/4") 4140 S.S. OR EQUIVALENT.
• EACH PIN REQUIRES 1 HEAD, 3 WASHERS AND 1 COTTER PIN.
• 4 EA x 215 LONG REQ'D.
• NOTE: S.S BOLT IS AN ACCEPTABLE ALTERNATIVE

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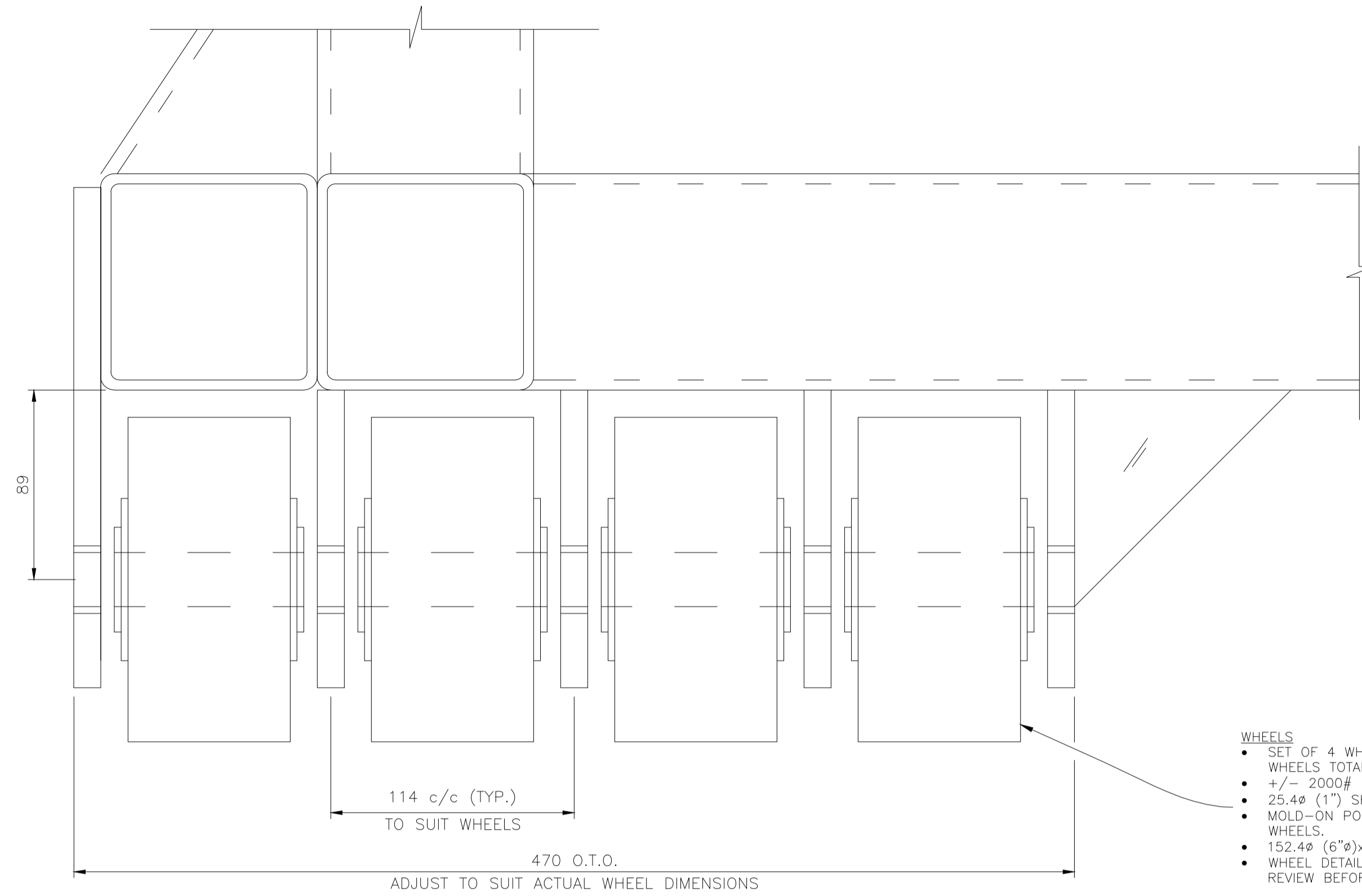
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GANGWAY DETAILS - 2 DRAWING No.: 496 - 201 B

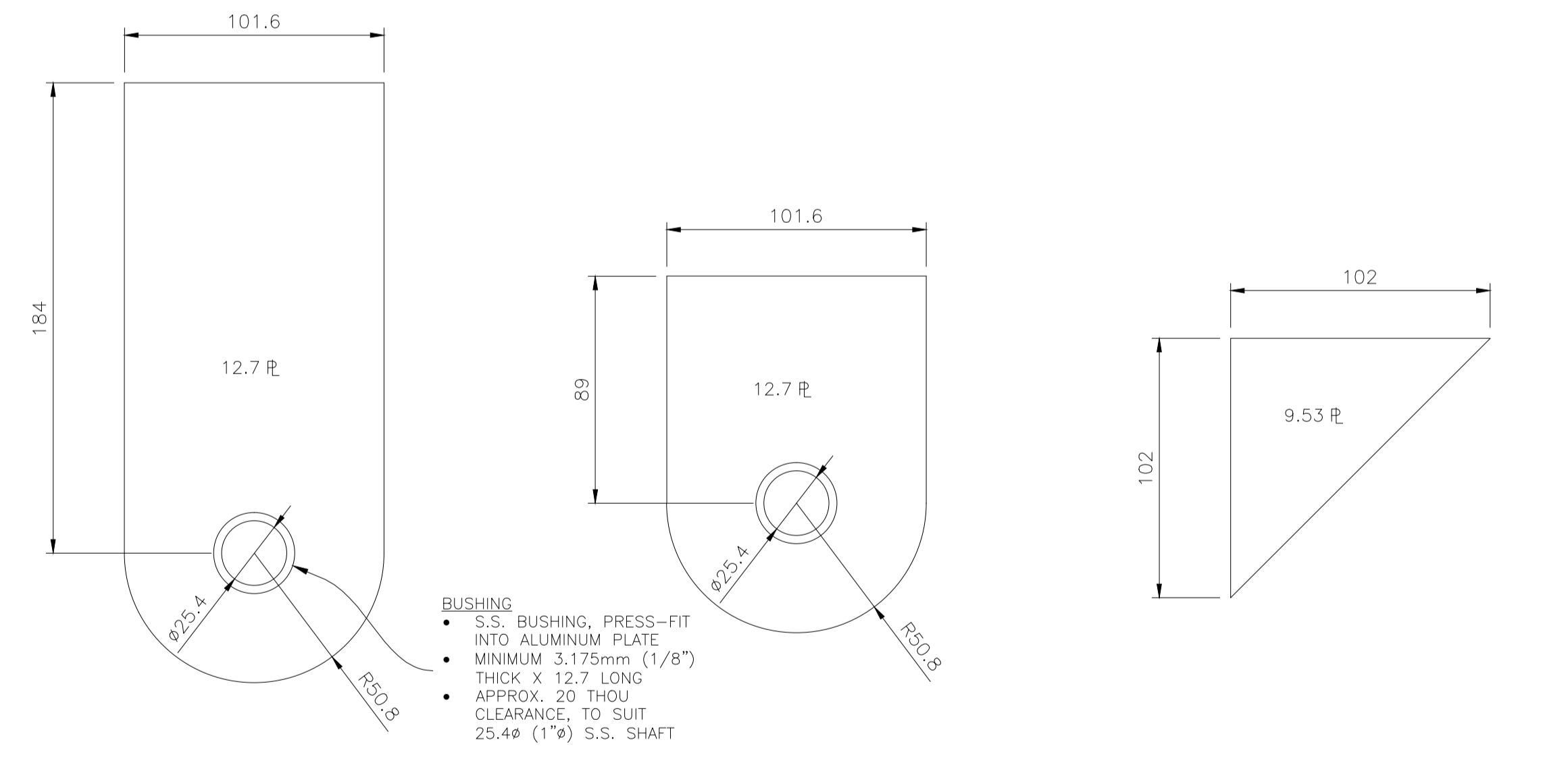
CANCEL PRINTS BEARING EARLIER REVISION



- WHEELS**
- SET OF 4 WHEELS ON EACH SIDE AS SHOWN - 8
 - WHEELS TOTAL
 - +/- 2000# PER WHEEL RATED LOAD.
 - 25.4ø (1") SHAFT (NOMINAL).
 - MOLD-ON POLYURETHANE, CAST IRON OR STEEL WHEELS.
 - 152.4ø (6"ø)x762 (3") TREAD WIDTH.
 - WHEEL DETAILS TO BE SUBMITTED TO ENGINEER FOR REVIEW BEFORE ORDERING.

WHEEL MOUNT DETAIL (1:2)
 • S.S. SHAFT NOT SHOWN FOR CLARITY

- NOTES:**
1. S.S. SHAFT TO SUIT BORE OF WHEEL BEARING +/- 25.4ø x 584 LONG (1"ø x 23") c/w COTTER PIN EACH END, GRADE 4140 OR EQ. (2 REQ'D).
 2. 50.8 O.D. x 3.175 (2"ø x 1/8") NYLON OR S.S. WASHER TO BE INSERTED BETWEEN WHEEL AND MOUNT TO PREVENT CHAFING (TOTAL 16 REQ'D).



- BUSHING**
- S.S. BUSHING, PRESS-FIT INTO ALUMINUM PLATE
 - MINIMUM 3.175mm (1/8") THICK X 12.7 LONG
 - APPROX. .20 THOU CLEARANCE, TO SUIT 25.4ø (1"ø) S.S. SHAFT

PLATE D (2 REQ'D) (1:2) **PLATE E (8 REQ'D) (1:2)** **PLATE F (4 REQ'D) @80 c/c (1:2)**

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E				J		
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B	ISSUED FOR TENDER	1/04/14	KLT	G		
A	95% - ISSUED FOR REVIEW	11/03/14	KLT	F		
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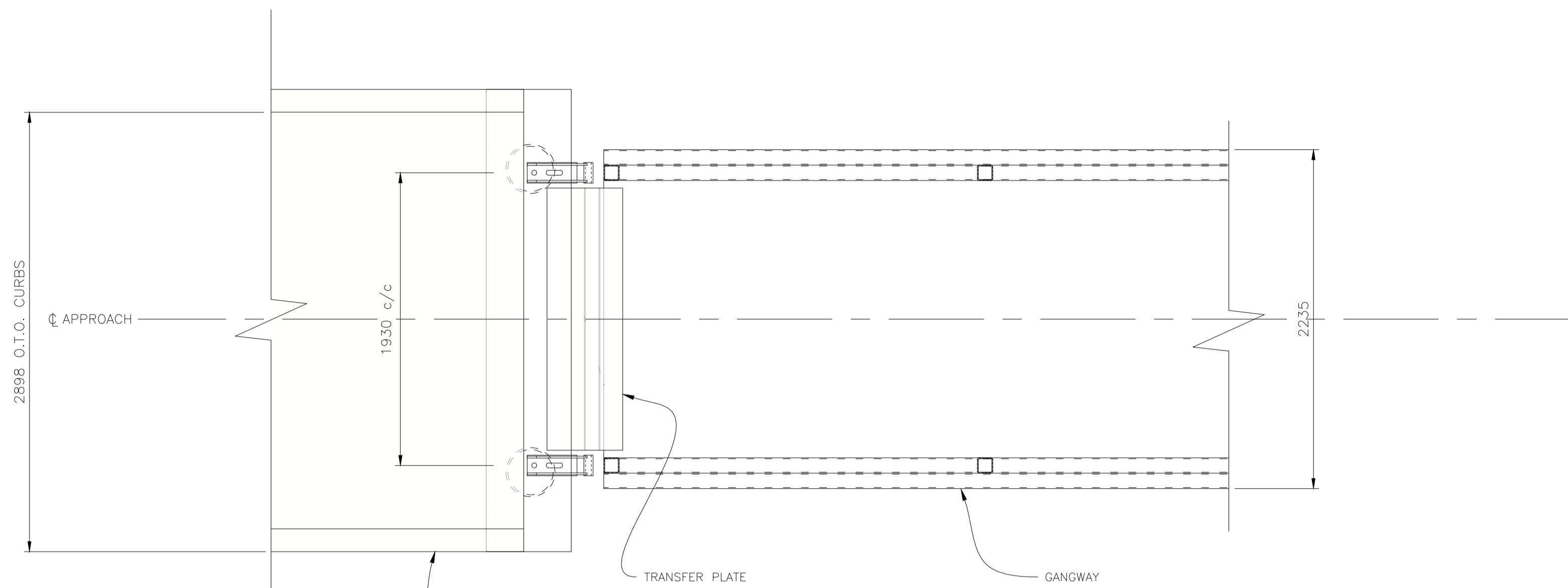
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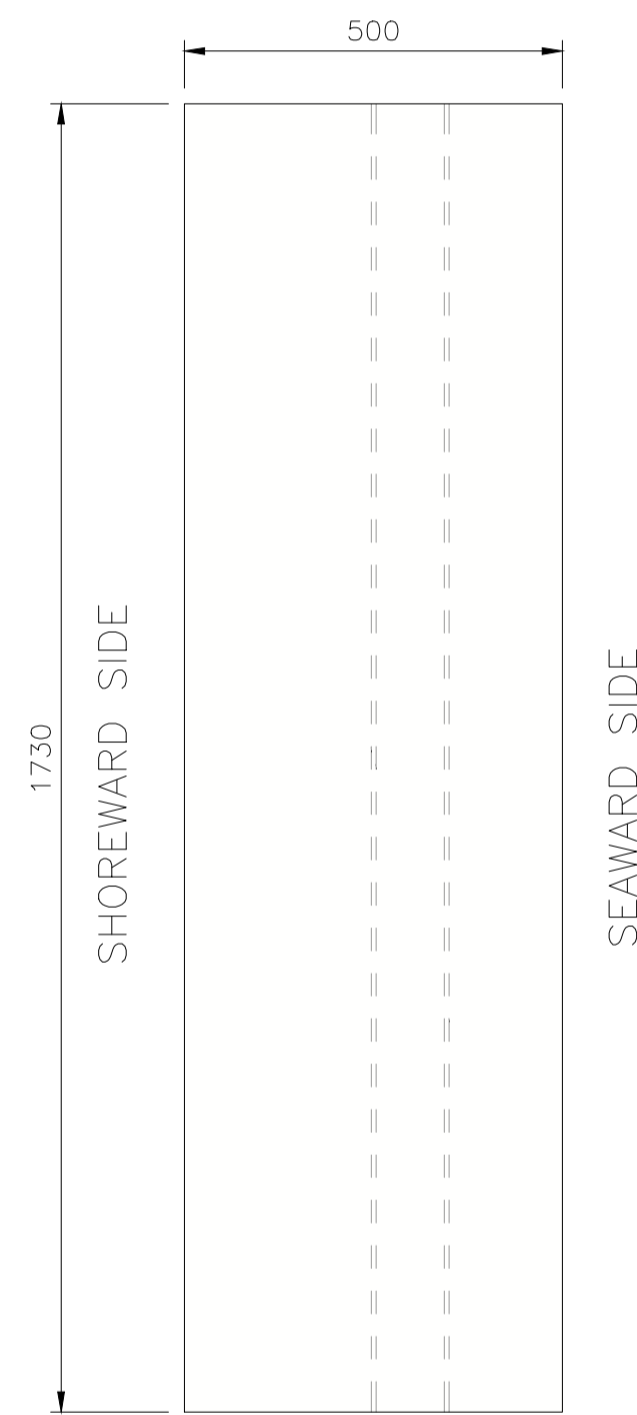
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GANGWAY DETAILS - 3 DRAWING No.: **496 - 202** **B**

CANCEL PRINTS BEARING EARLIER REVISION

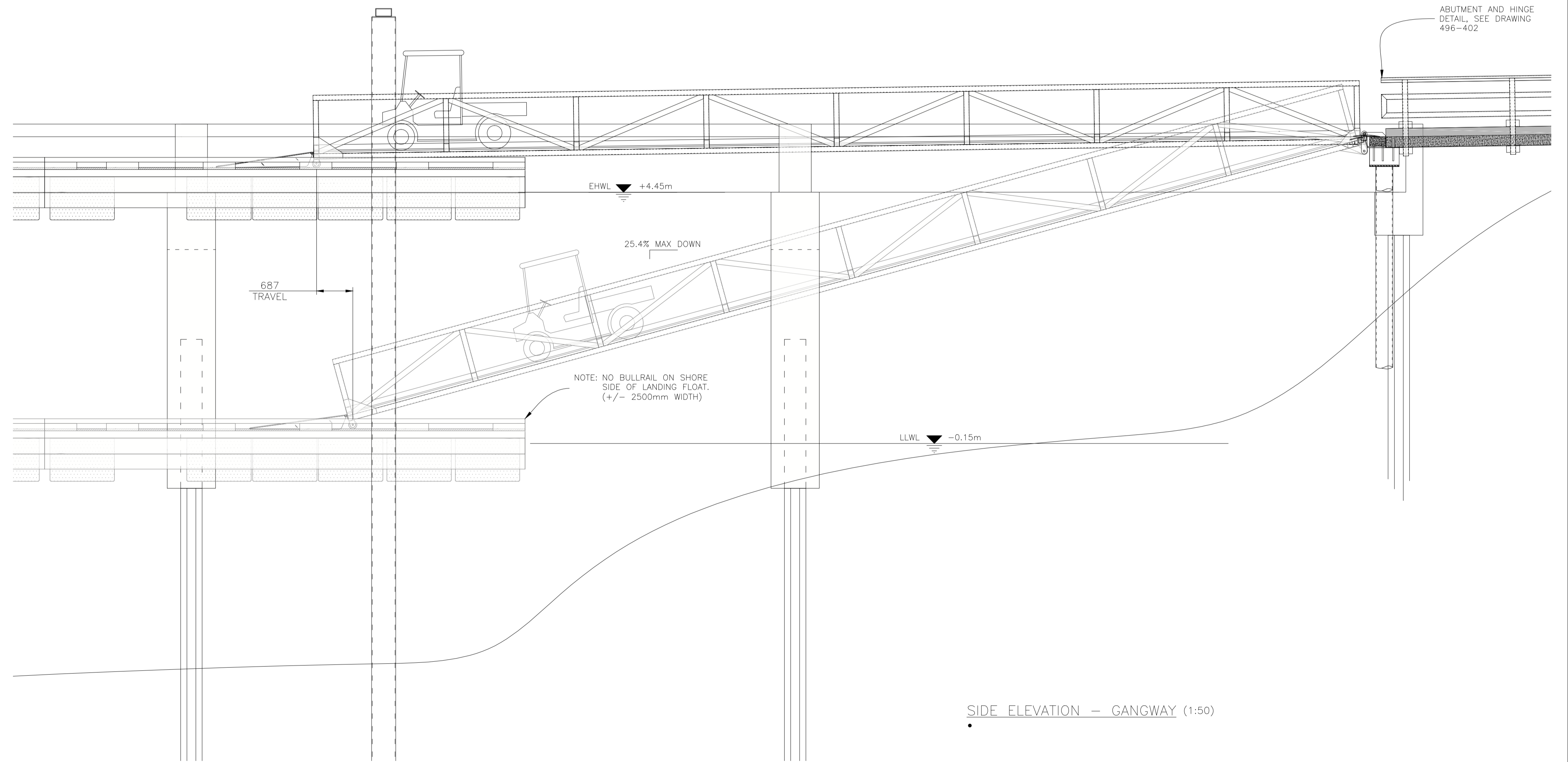
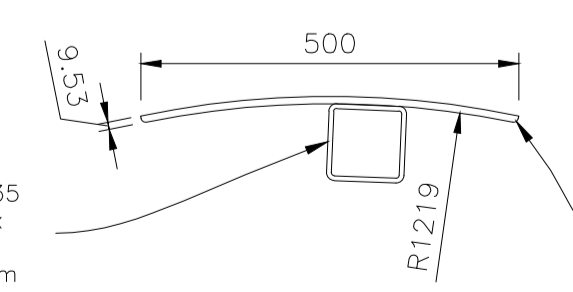


APPROACH (HANDRAIL NOT SHOWN FOR CLARITY)
 GANGWAY - PLAN VIEW OF HINGE JOINT (1:10)



- TRANSFER PLATE (1:10)**
- ALUMINUM
 - PLATE DIMENSIONS: 300(L) x 1730(W) x 9.53 PLATE.
 - FORMED TO 1219 INSIDE RADIUS AS SHOWN.

- KEEPER**
- 101.6x101.6x6.35 SQUARE TUBE x 1730 LONG.
 - INSTALLED 50mm OFF CENTER.
- GRIND 6mm RADIUS (2) BOTTOM CORNERS



SIDE ELEVATION - GANGWAY (1:50)

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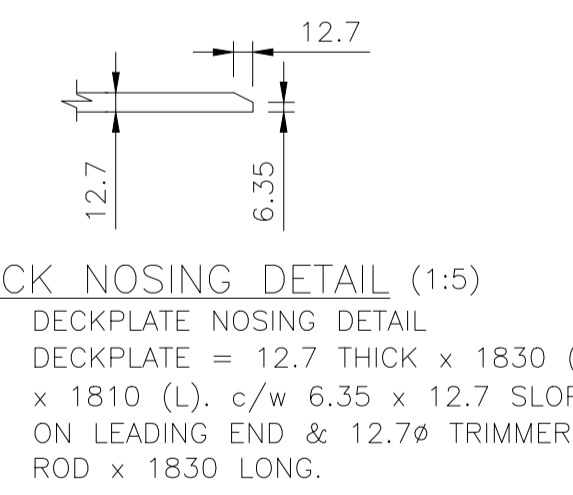
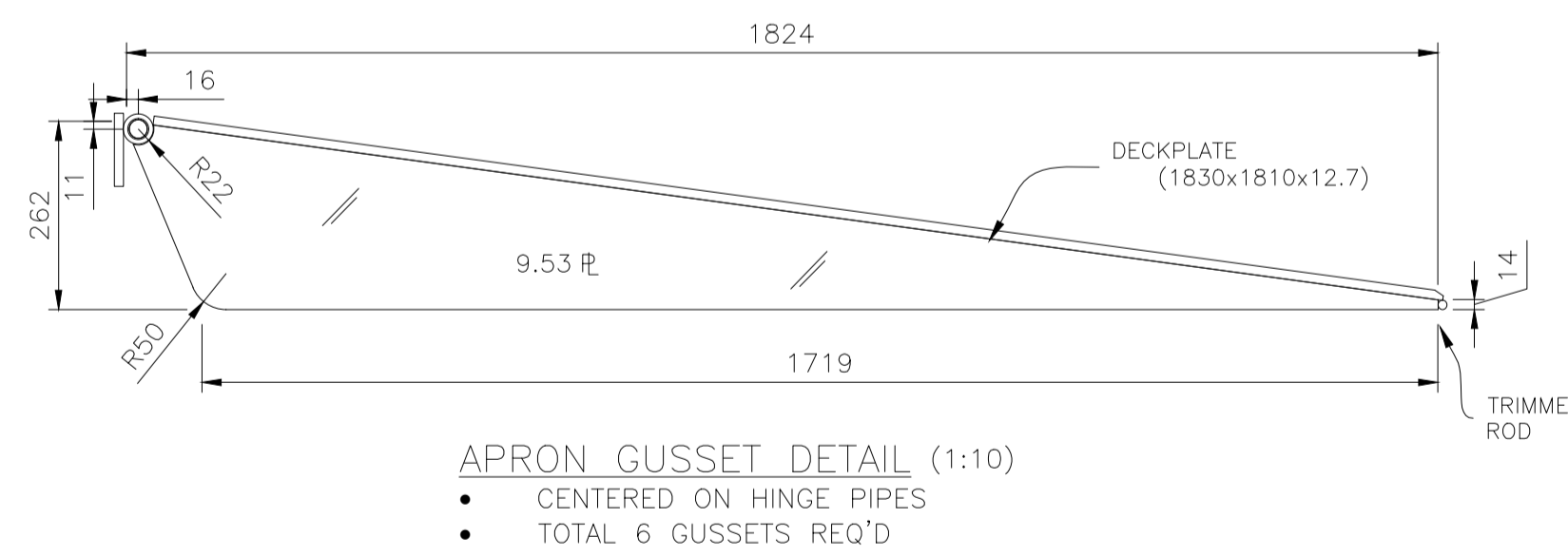
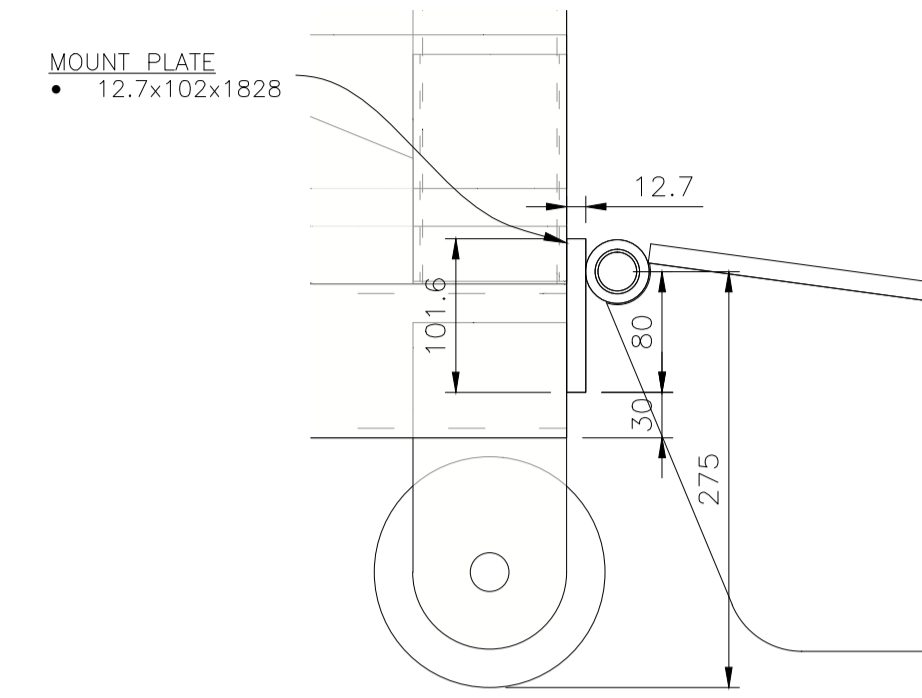
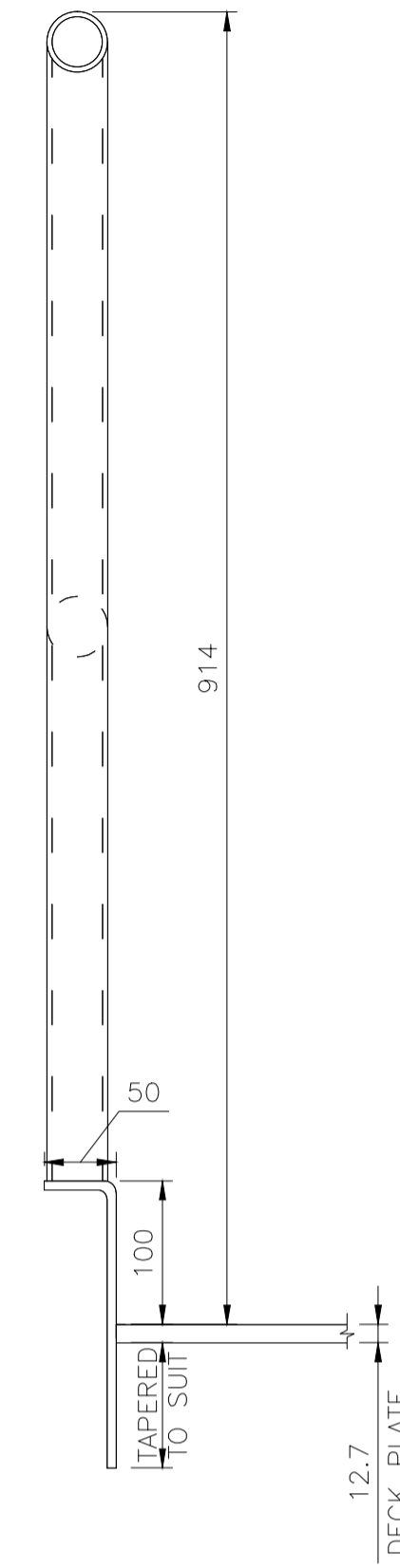
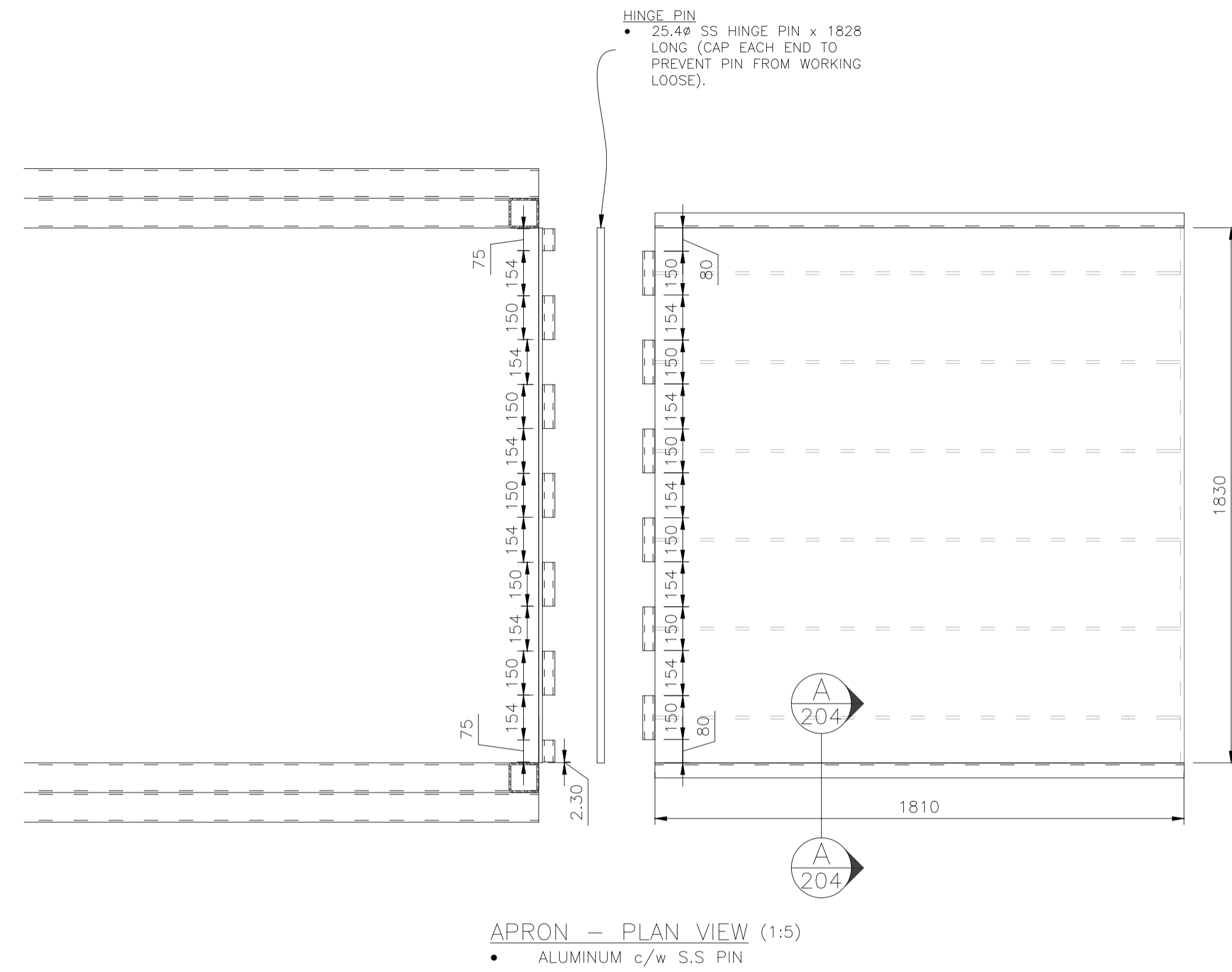
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GANGWAY DETAILS - 4

DRAWING No.: 496 - 203

B

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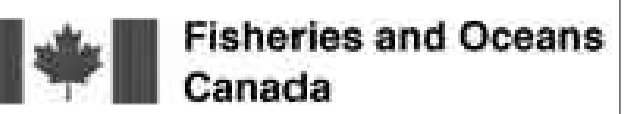


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B	ISSUED FOR TENDER	1/04/14	KLT	G		
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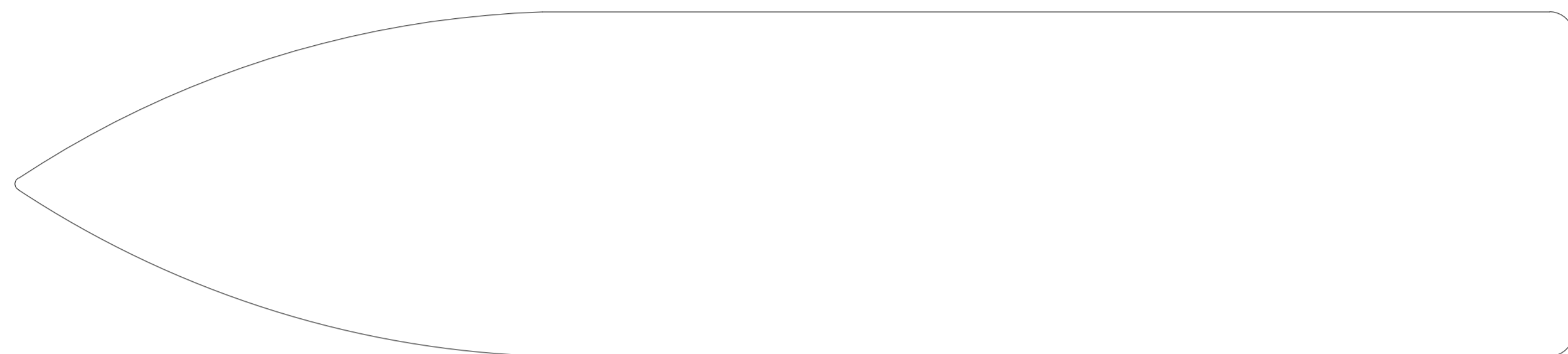
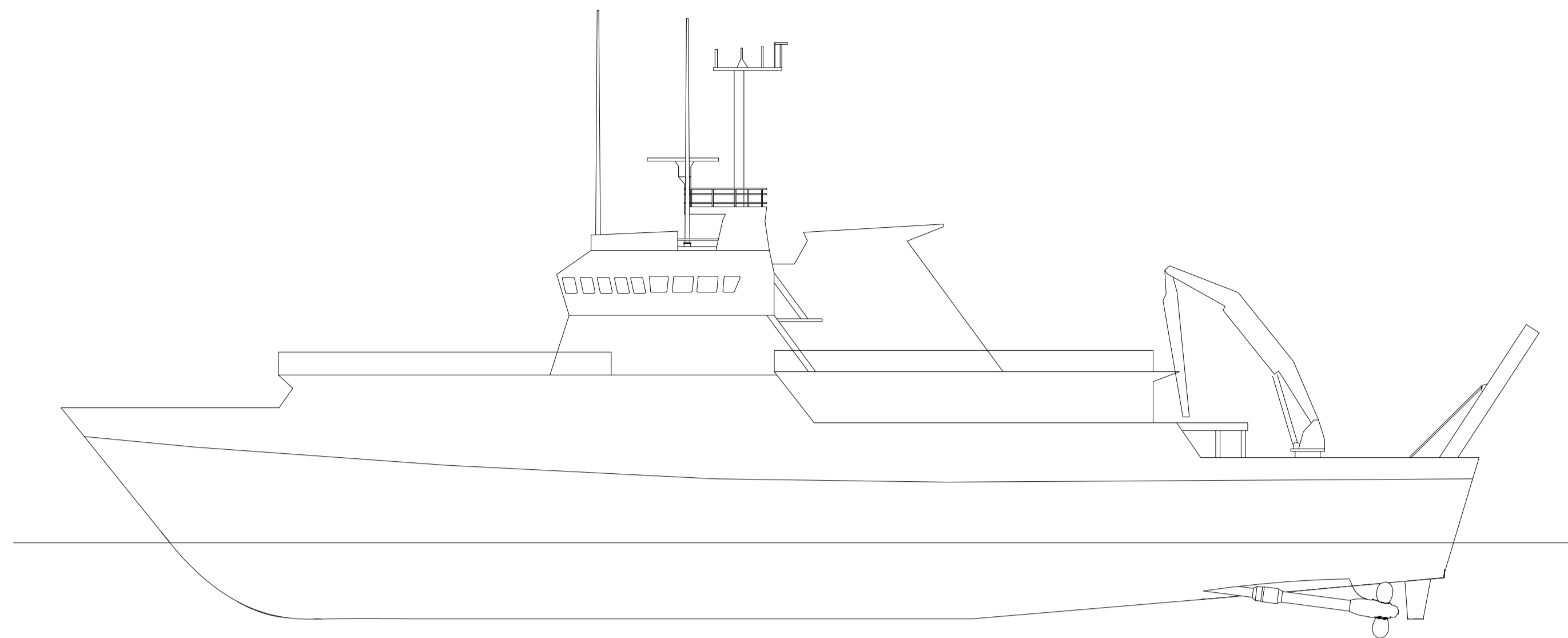
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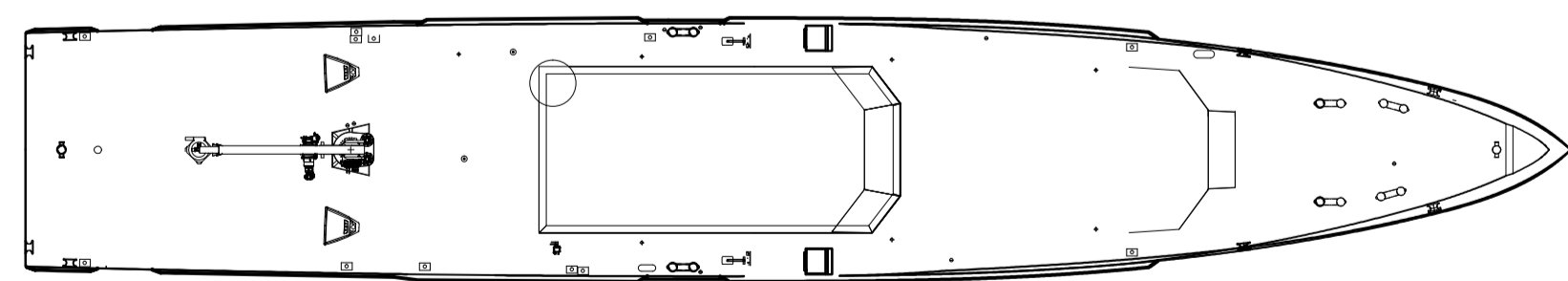
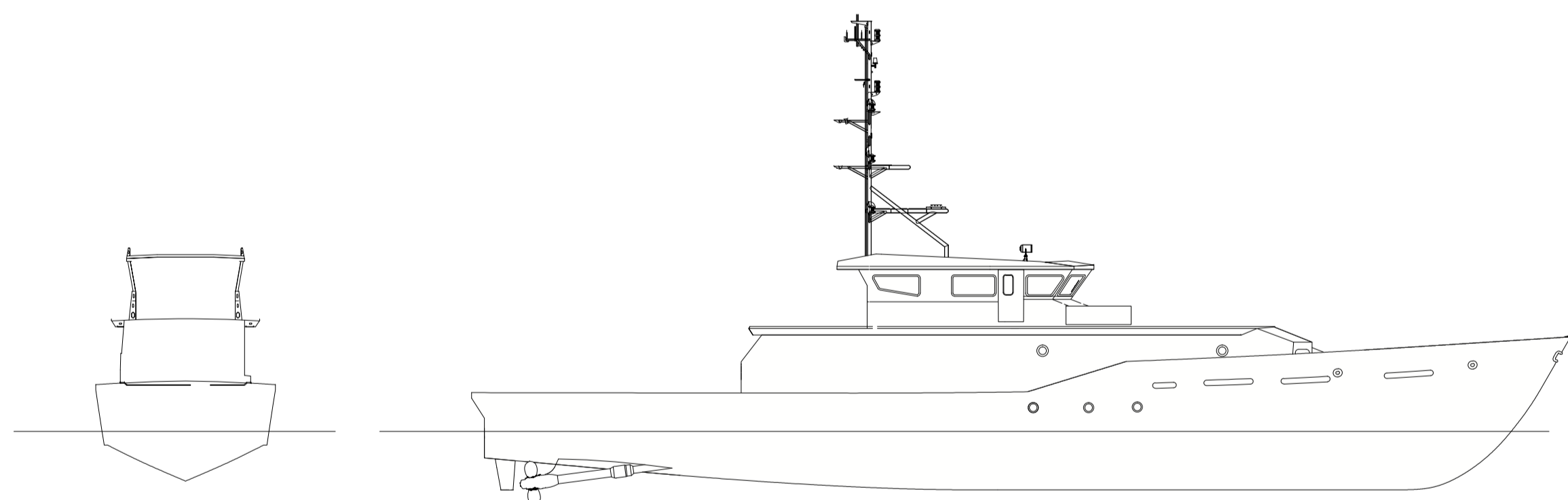
GANGWAY DETAILS - 5 DRAWING No.: **496 - 204** **B**

CANCEL PRINTS BEARING EARLIER REVISION



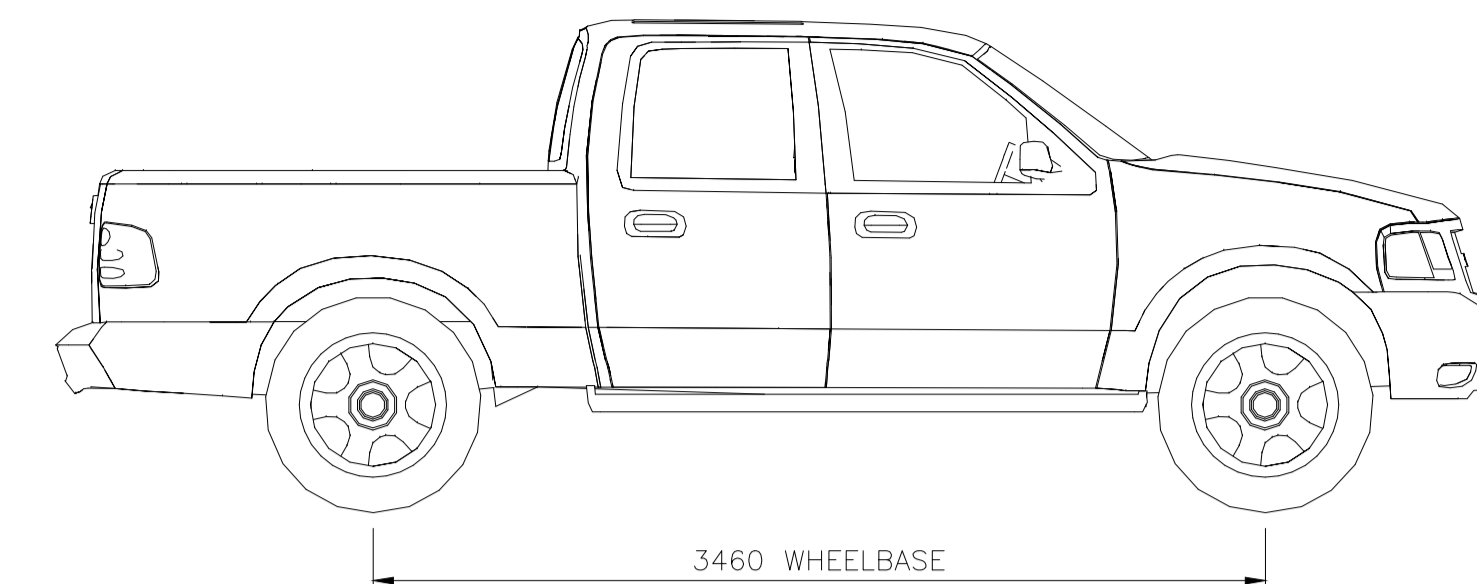
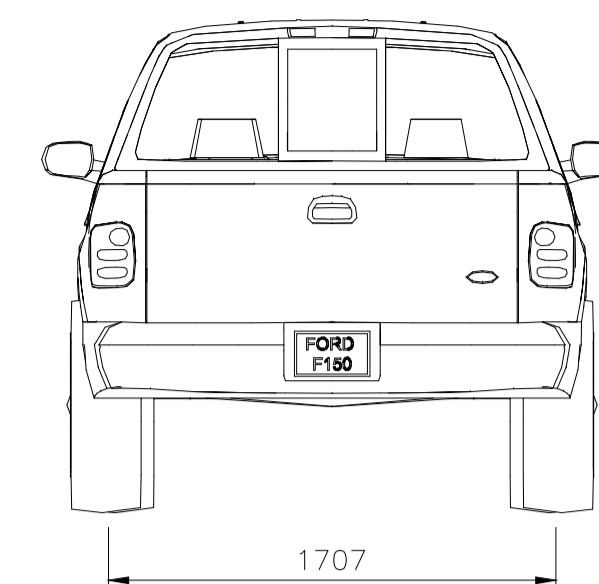
CCGS JOHN P. TULLY (1:200)

- LOA = 65.7m
- BEAM = 14.5m
- DRAFT = 4.5m
- LOADED DISPLACEMENT = 2195 TNE
- EXPOSED SAIL AREA = 579.8 m²



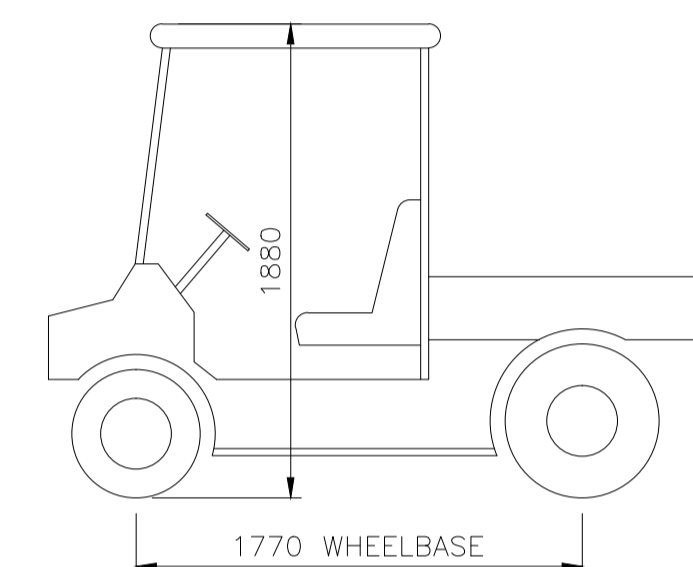
MID SHORE PATROL VESSEL (1:200)

- LOA = 43.0m
- BEAM = 7.0m
- DRAFT = 2.85m
- LOADED DISPL. = 260 TNE
- EXPOSED SAIL AREA = 166.2m²



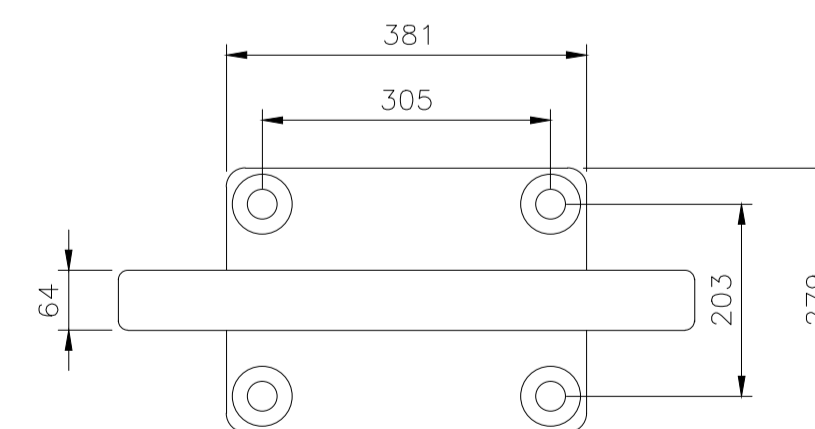
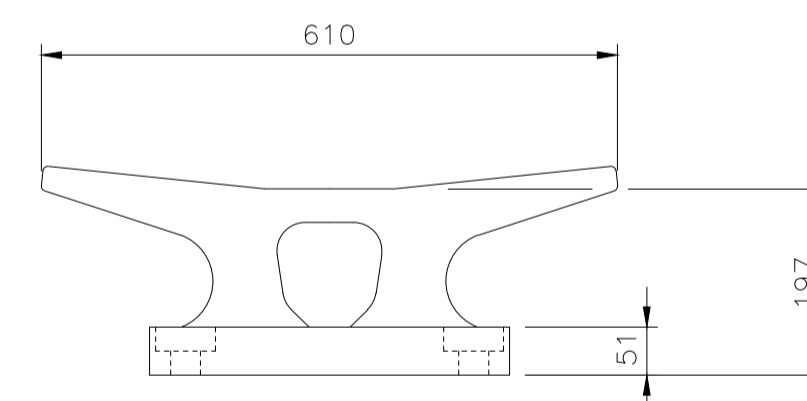
DESIGN VEHICLE – APPROACH SPAN ONLY!

- "1 TON" PICKUP TRUCK (F250 OR SIMILAR).
- 9900# GVW (65% ON REAR AXLE).



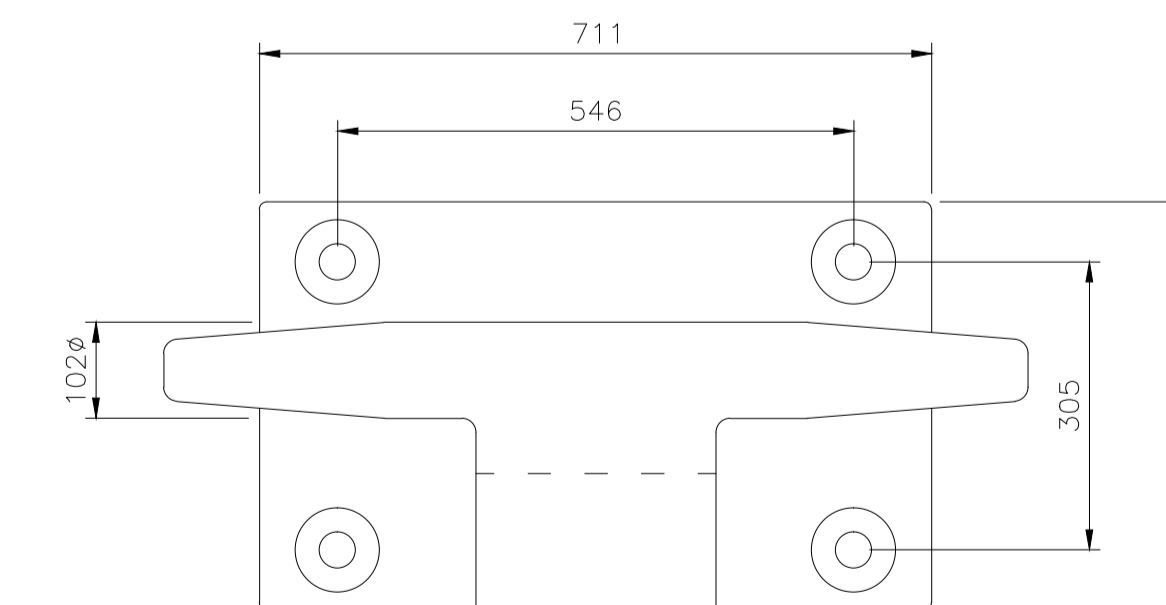
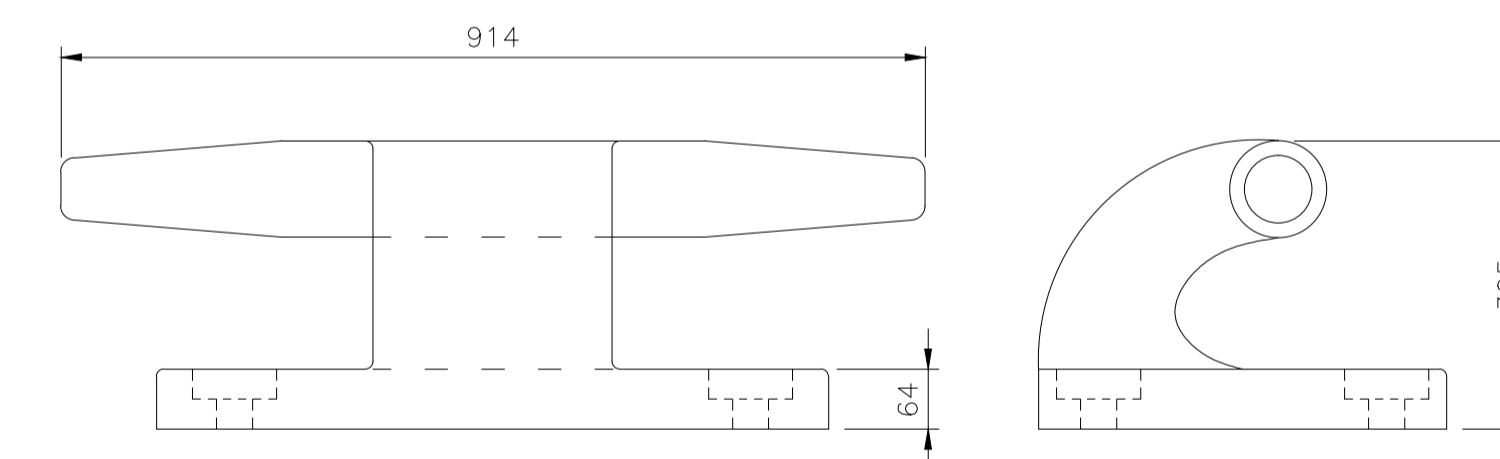
DESIGN VEHICLE – GANGWAY AND FLOAT

- GATOR 2020A, GOLF CART, OR SIMILAR.
- 2100# GVW (65% ON REAR AXLE)



SMALL BOLLARDS (EXISTING) (1:10)

- ELLIOTT B24
- RATED SWL = 12.5 TONS SINGLE ROPE LOAD
- LOCATED ON PIER CAPS
- 1"Ø BOLTS



LARGE (LIVERPOOL STYLE) BOLLARDS (EXISTING) (1:10)

- ELLIOTT B-2X
- RATED SWL = 37.5 TONS SINGLE ROPE LOAD
- LOCATED ON CAISSON CORNERS (4 PER CAISSON)
- 1-1/2"Ø BOLTS (COUNTERBORED)

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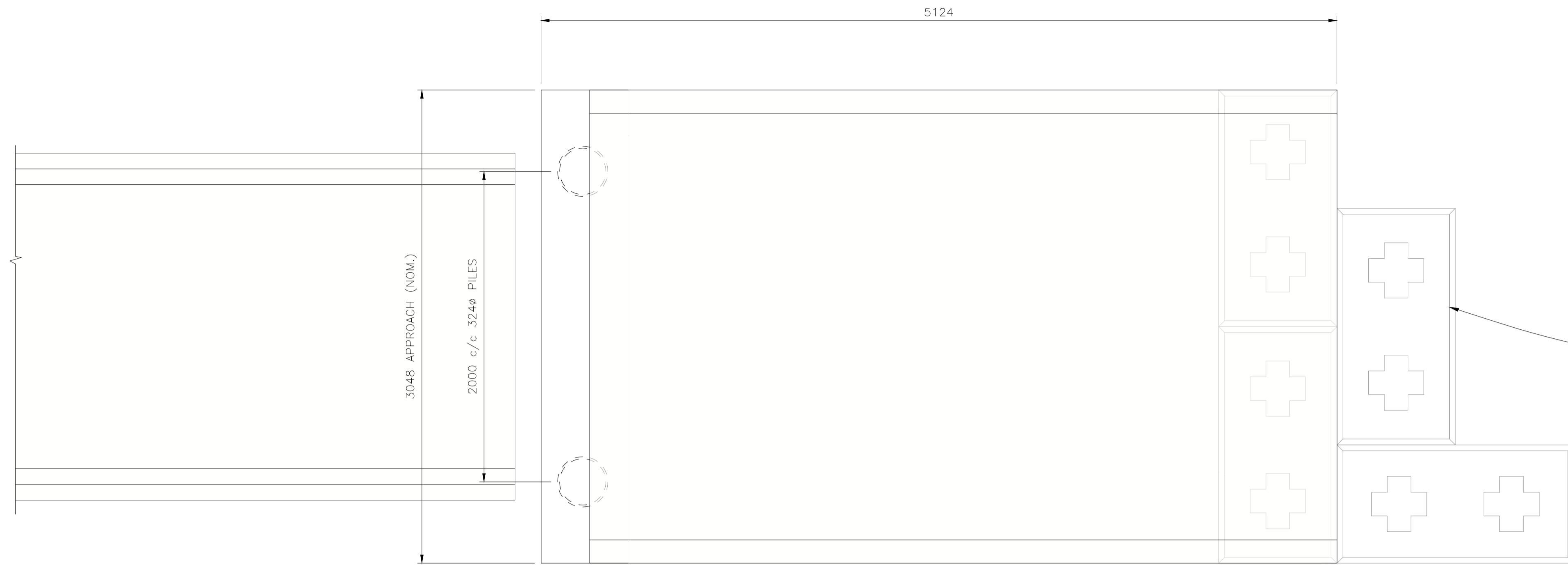
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MISC. DETAILS

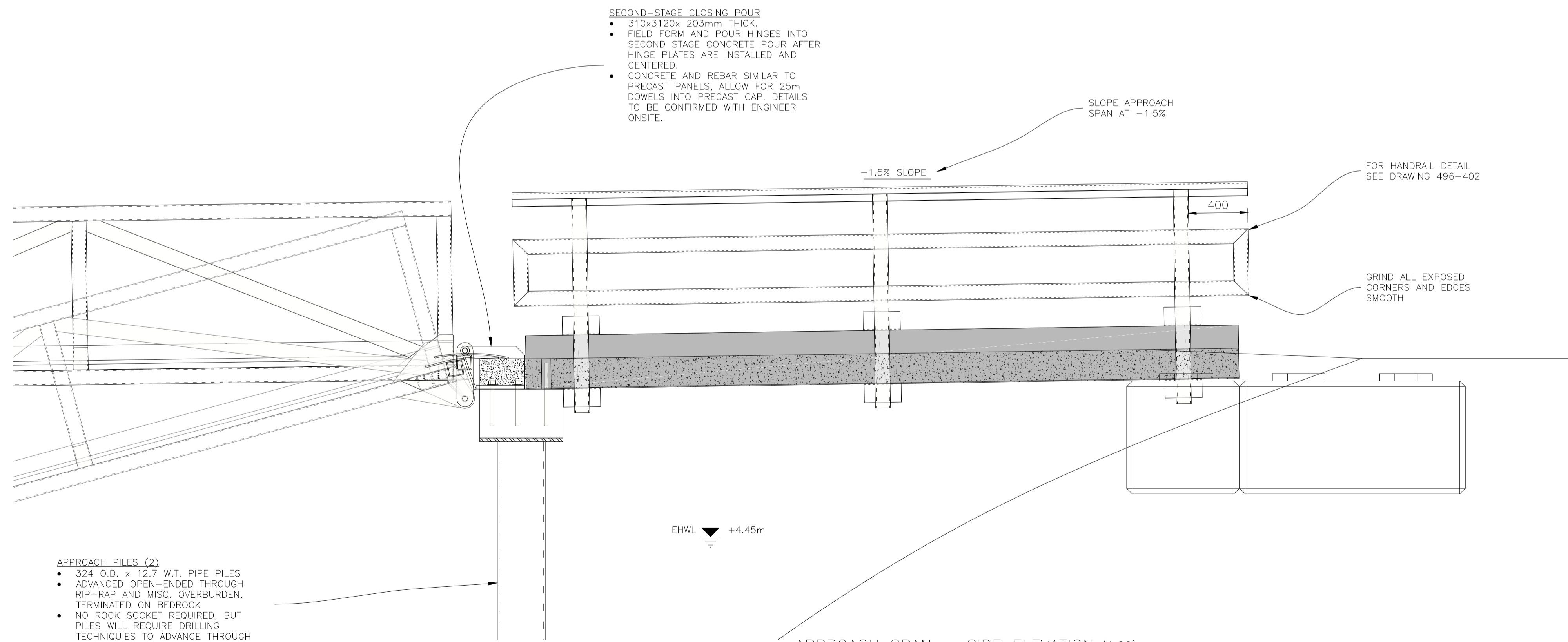
DRAWING No.: **496 - 301**
CANCEL PRINTS BEARING EARLIER REVISION

B



- LOCKBLOCKS**
- FLAT-TOPPED STYLE, AS REQUIRED TO LAND ABUTMENT.
 - ENGINEER AND CONTRACTOR TO DETERMINE ABUTMENT DETAILS ONSITE AFTER FIELD SURVEY BY CONTRACTOR.
 - ALLOW FOR LOCAL EXCAVATION OF RIP-RAP, WITH 4 LOCKBLOCKS, AND COMPACTED GRANULAR FILL GRADED BEHIND.

APPROACH – PLAN VIEW (1:20)
 • HANDRAILS NOT SHOWN FOR CLARITY



- SECOND-STAGE CLOSING POUR**
- 310x3120x 203mm THICK.
 - FIELD FORM AND POUR HINGES INTO SECOND STAGE CONCRETE POUR AFTER HINGE PLATES ARE INSTALLED AND CENTERED.
 - CONCRETE AND REBAR SIMILAR TO PRECAST PANELS, ALLOW FOR 25mm DOWELS INTO PRECAST CAP. DETAILS TO BE CONFIRMED WITH ENGINEER ONSITE.

- APPROACH PILES (2)**
- 324 O.D. x 12.7 W.T. PIPE PILES
 - ADVANCED OPEN-ENDED THROUGH RIP-RAP AND MISC. OVERBURDEN, TERMINATED ON BEDROCK
 - NO ROCK SOCKET REQUIRED, BUT PILES WILL REQUIRE DRILLING TECHNIQUES TO ADVANCE THROUGH RIP-RAP.

APPROACH SPAN – SIDE ELEVATION (1:20)

- NOTES:**
1. APPROACH SPAN IS SLOPED AT 1.5% SEAWARD FOR DRAINAGE.
 2. PILECAP AND LOCKBLOCKS ARE PLACED LEVEL.
 3. PLACE STEEL SHIMS AND PUDDLE GROUT ONTO PILECAP OR LOCKBLOCKS, FOR WET SEATING OF PANELS.
 4. THE APPROACH IS RATED FIR PICKUP TRUCK LOADING (SEE VEHICLE DETAILS ON DRAWING 301).

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A	ISSUED FOR TENDER	1/04/14	KLT	F	

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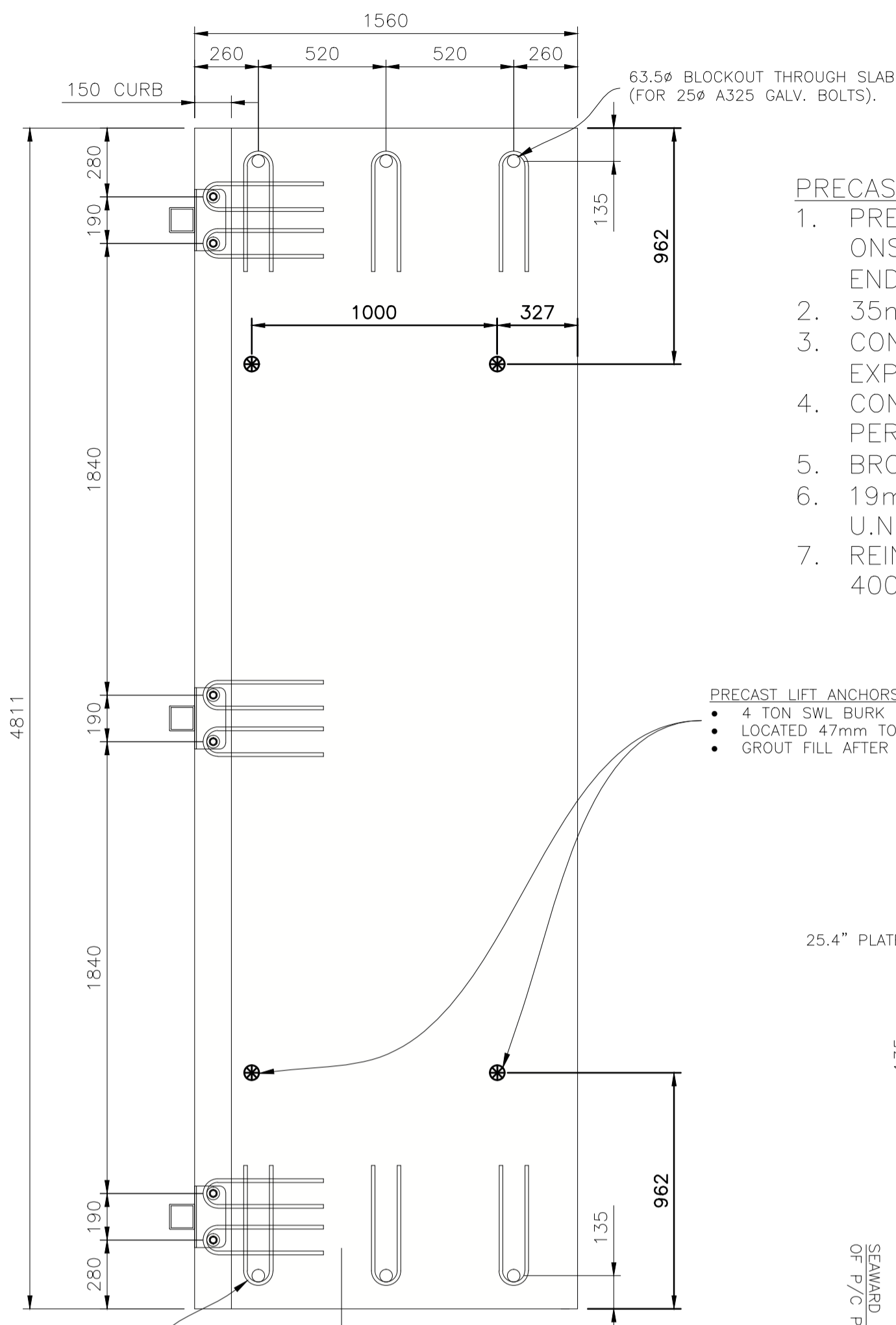
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APPROACH DETAILS -1

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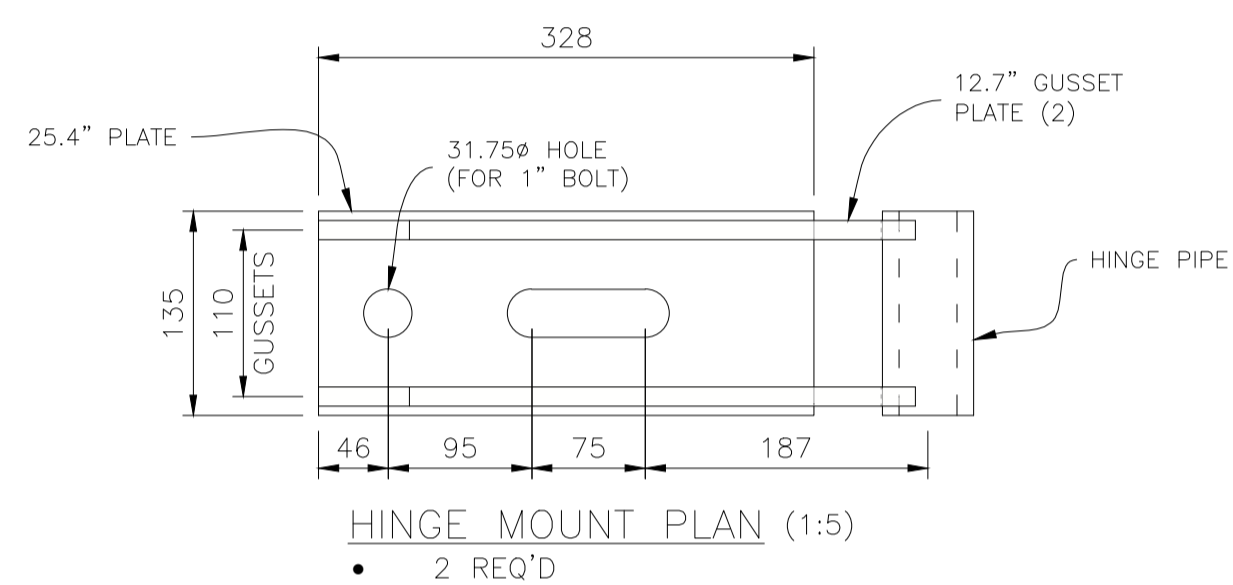
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CANCEL PRINTS BEARING EARLIER REVISION



- PRECAST NOTES:**
1. PRECAST PANELS TO BE SHIMMED AS NECESSARY ONSITE TO ENSURE SMOOTH TRANSITION ACROSS THE END JOINT (GROUT AFTER DOWELS INSTALLED).
 2. 35mm MINIMUM COVER ON ALL BAR U.N.O.
 3. CONCRETE TO BE 35MPa MINIMUM (28 DAYS), EXPOSURE CLASS C-1
 4. CONCRETE MATERIALS AND METHODS OF MANUFACTURE PER C.S.A. A23.1 & A23.4.
 5. BROOM FINISH ON TOP (DECK) SURFACES.
 6. 19mm CHAMFER ON ALL EXPOSED SHARP CORNERS U.N.O.
 7. REINFORCING STEEL TO CSA G30.1 GRADE 400R OR 400W.

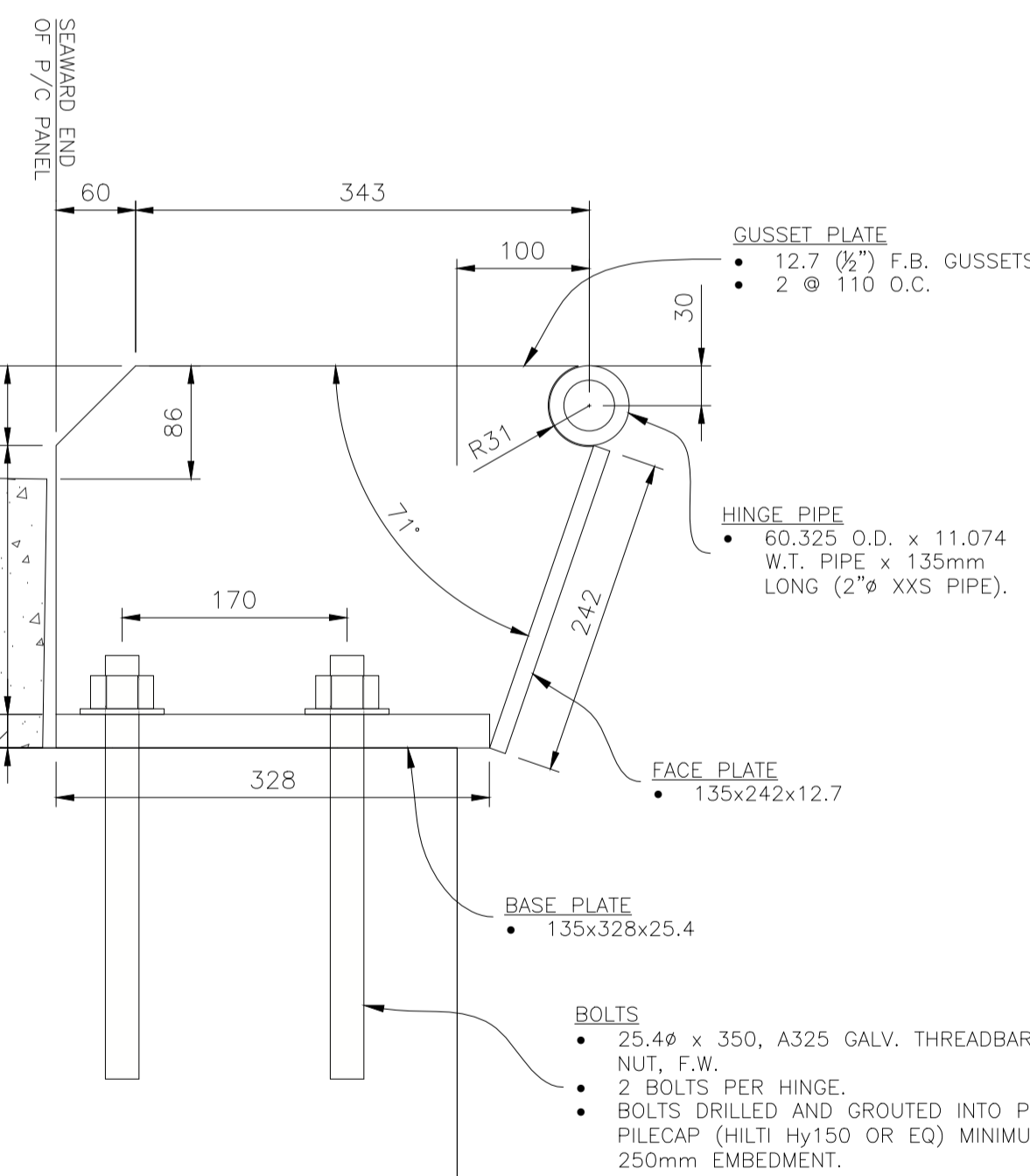
- PRECAST LIFT ANCHORS (4 EACH)**
- 4 TON SWL BURK ERECTION ANCHORS.
 - LOCATED 47mm TO CURB SIDE.
 - GROUT FILL AFTER PANELS INSTALLED.



- HAIRPIN LOOPS (2 LEVELS)**
- 10M BAR
 - 490 OVERALL LENGTH.

PRECAST PANEL PLAN VIEW (1:20)

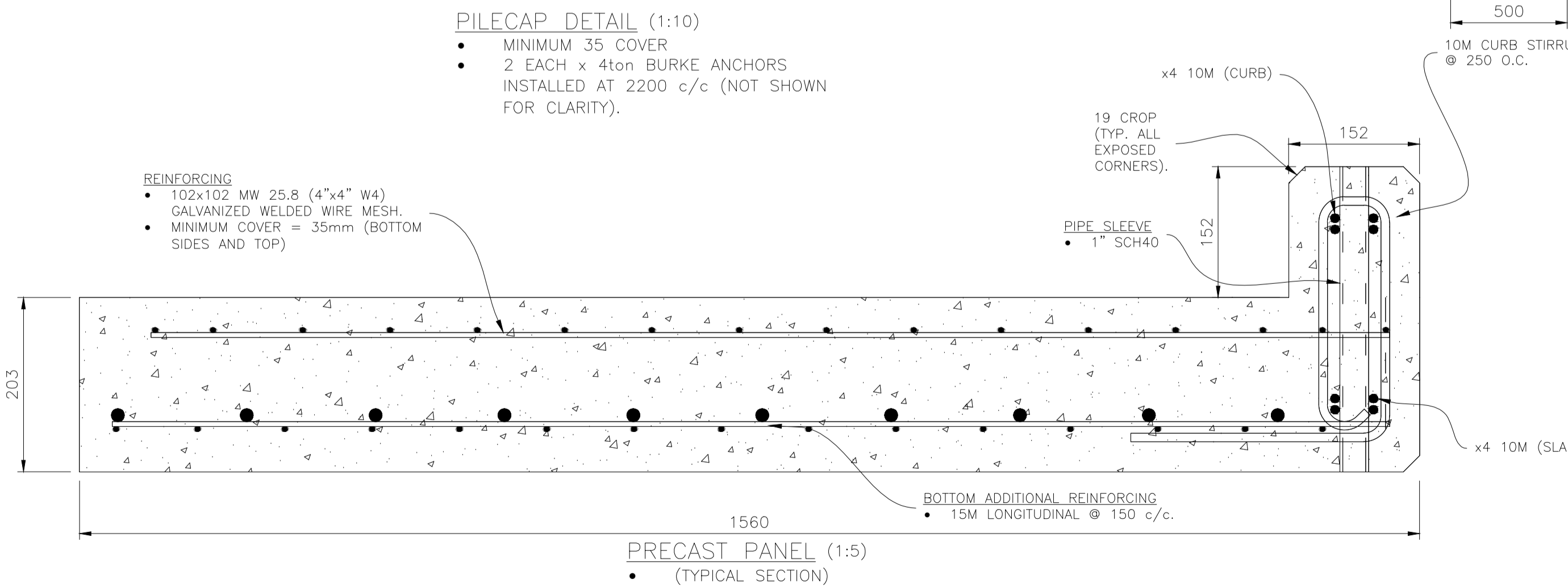
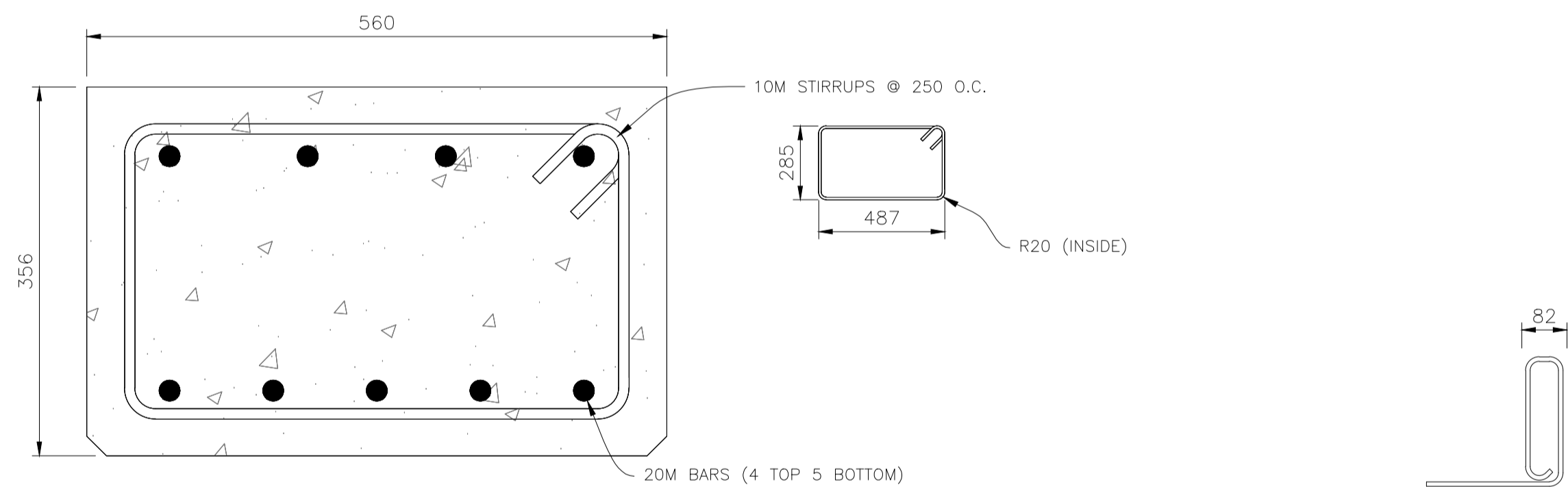
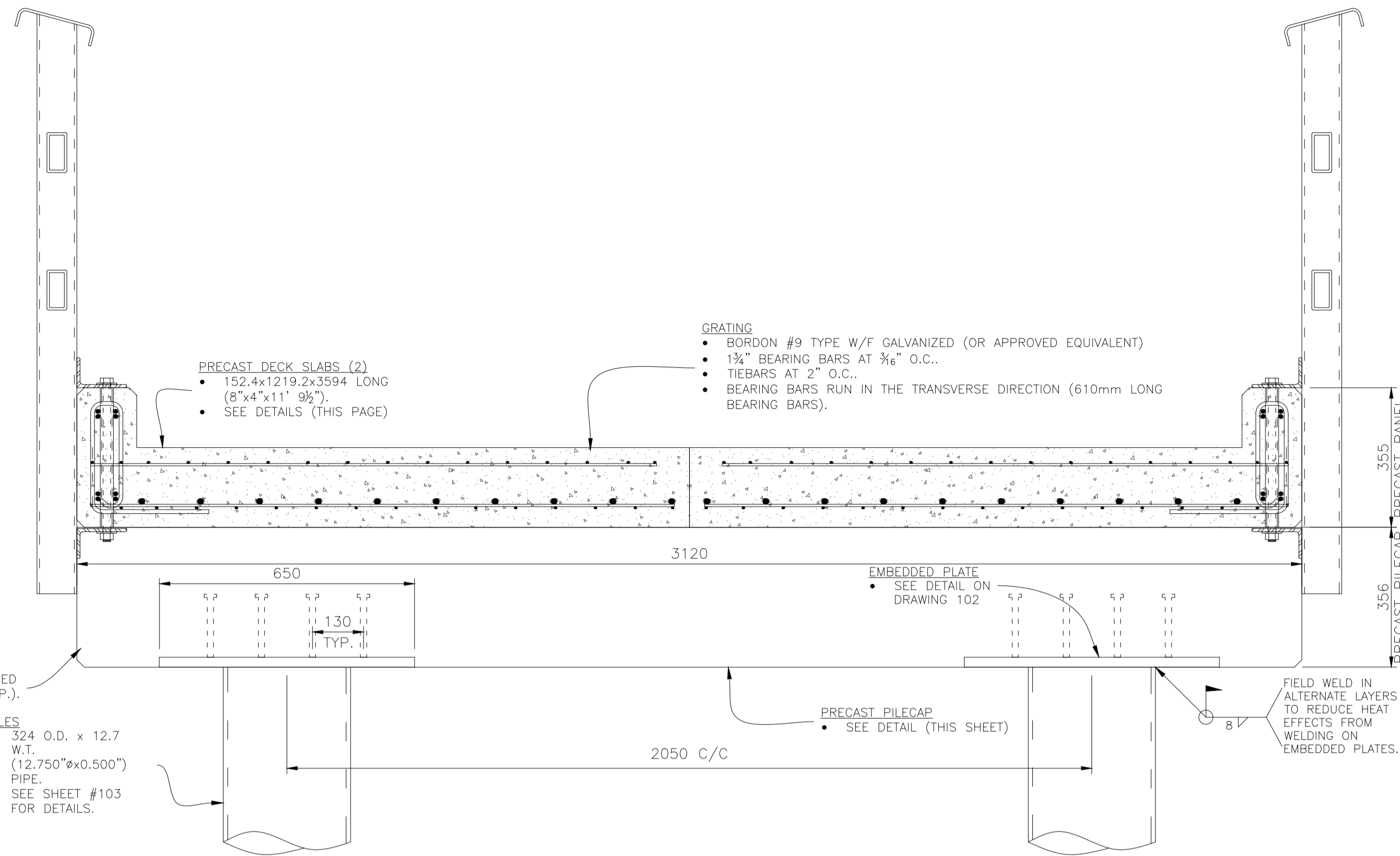
- 2 UNITS REQUIRED



- PANEL SEATING**
- PUDDLE GROUT FILL WITH STEEL SHIMS OVER, PACK GROUT THEN SET PANEL DOWN ON WET MIX.

19 CHAMFER EXPOSED OUTSIDE EDGES (TYP.).

- PILES**
- 324 O.D. x 12.7 W.T. (12,750"x0.500") PIPE
 - SEE SHEET #103 FOR DETAILS.



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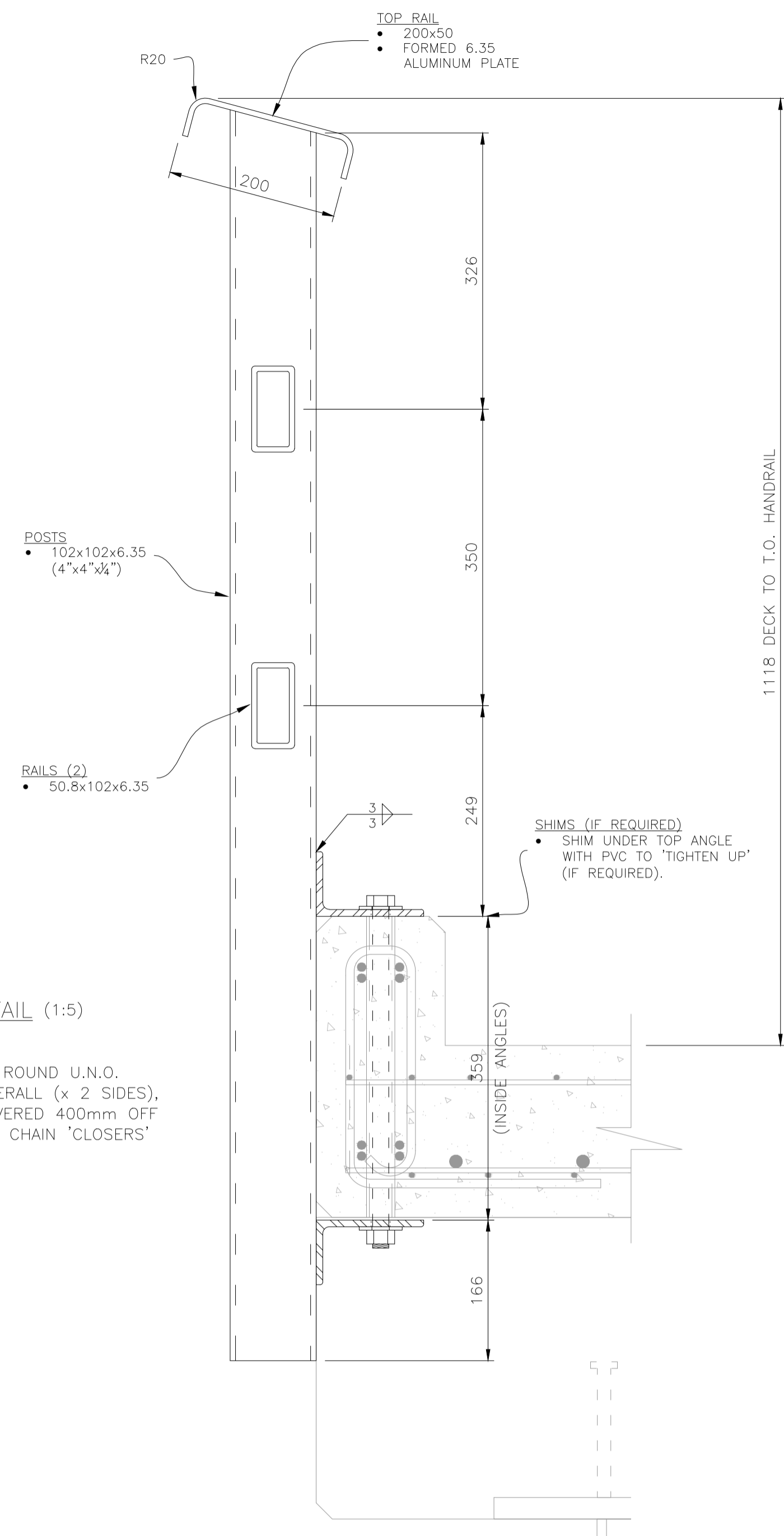


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APPROACH DETAILS - 2

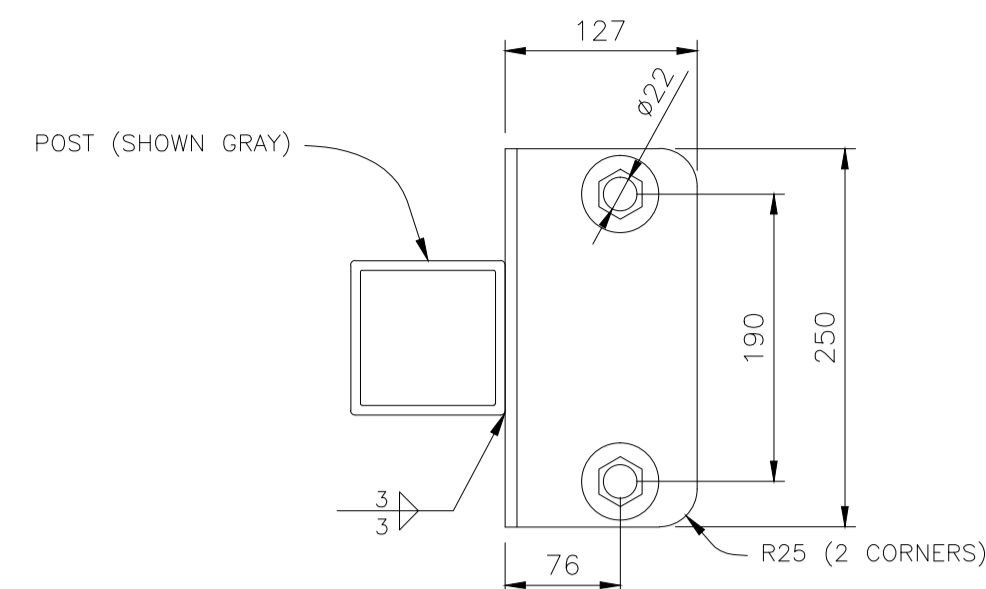
DRAWING No.: 496 - 401

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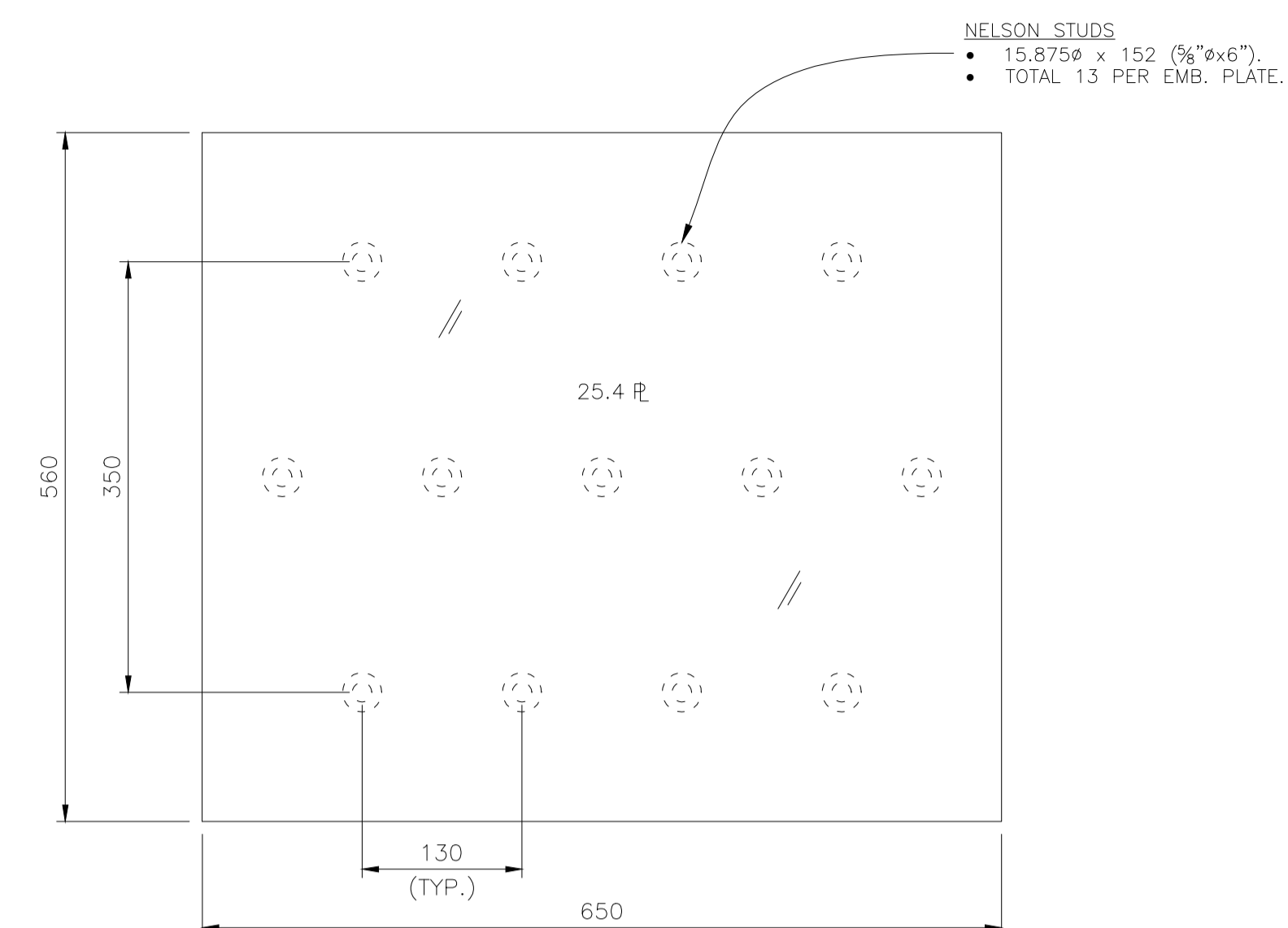
ALUMINUM HANDRAIL DETAIL (1:5)

- TUBE = ALLOY 6061-T6
- PLATE = ALLOY 5052-H32
- ALL WELDS 3mm FILLET ALL ROUND U.N.O.
- HANDRAIL 4880mm LONG OVERALL (x 2 SIDES), TOP AND MID-RAILS CANTILEVERED 400mm OFF END POSTS E/W. ALLOW FOR CHAIN 'CLOSERS' AT GANGWAY END.



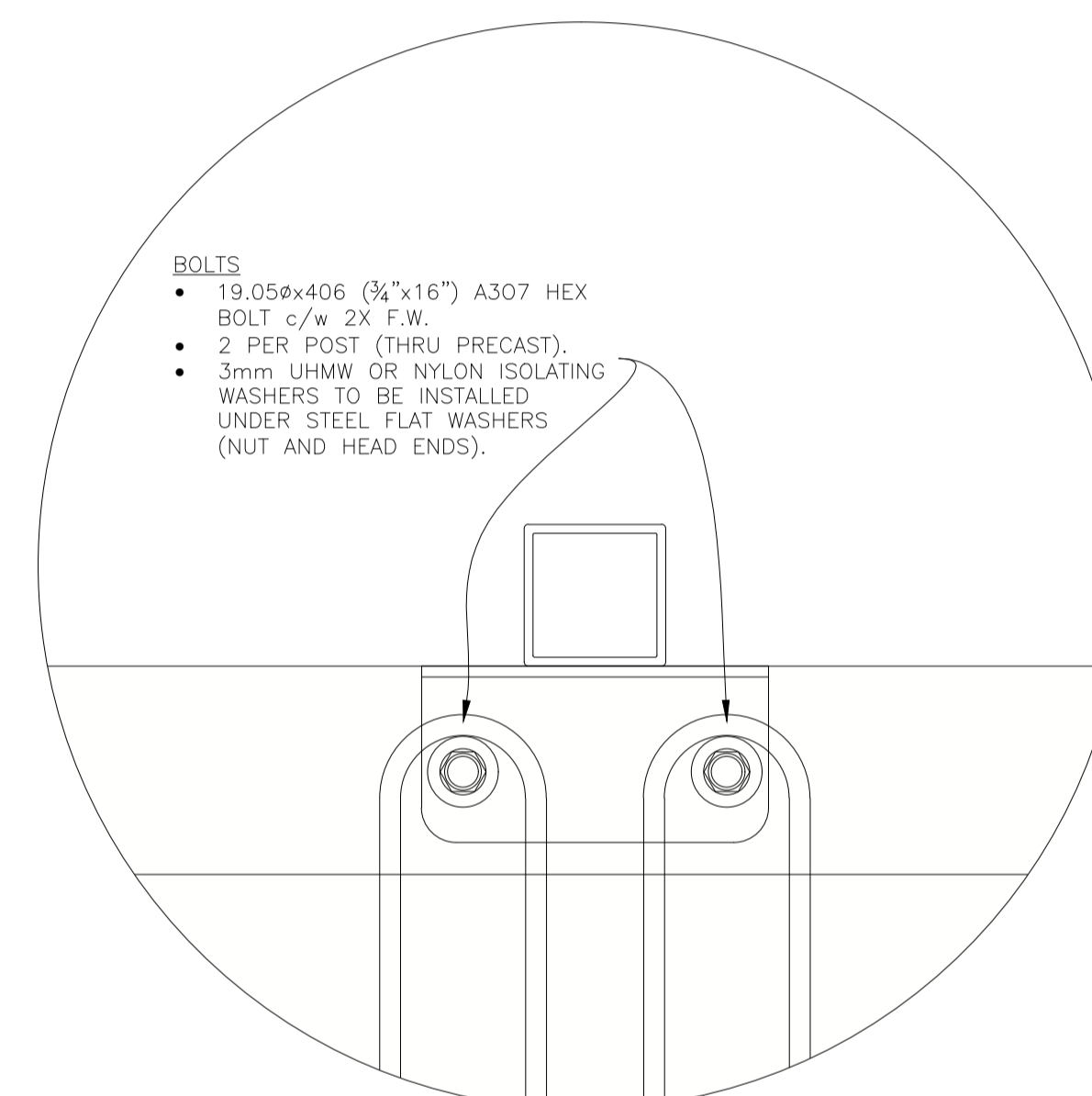
HANDRAIL SUPPORT ANGLE (1:5)

- 76x127x7.9 (3"x5"x0.312") ANGLE.
- ALUMINUM
- 2 EA PER POST
- SUPPORT ANGLES SHOP WELDED TO SUPPORT PLATE.
- GRIND ALL SHARP CORNERS (TOE-CATCHERS)



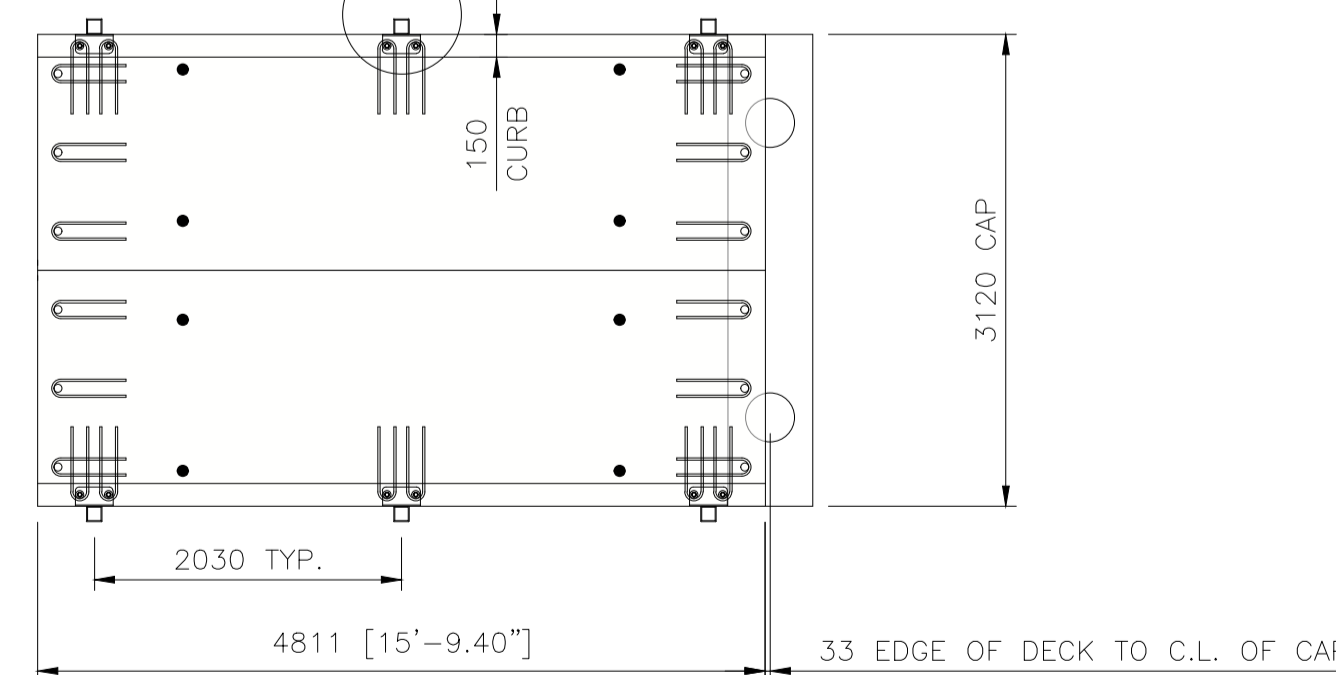
EMBEDDED PLATE DETAIL (1:5)

- 2 REQ'D, ONE PER PILE, IN PRECAST PILECAP.
- FINISH = BARE STEEL c/w WELDABLE PRIMER ON BOTTOM FACE



DETAIL 1 HANDRAIL POST CONNECTION (1:5)

- 2 REQ'D PER PRECAST PLATE.



DECK PLAN (1:40)

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APPROACH DETAILS - 3

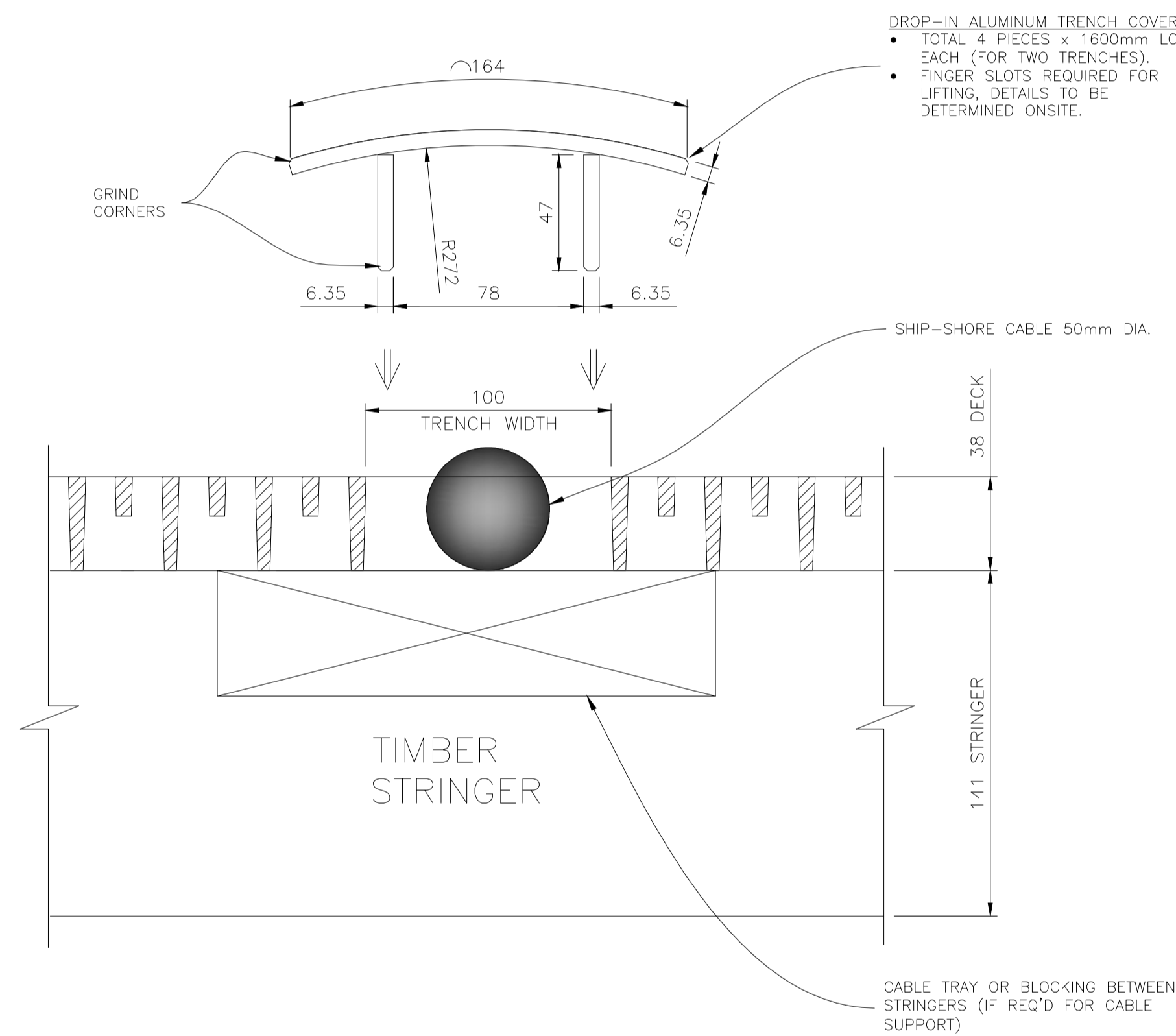
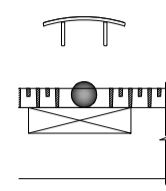
DRAWING No.: **496 - 402**

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CANCEL PRINTS BEARING EARLIER REVISION

ELECTRICAL NOTES:

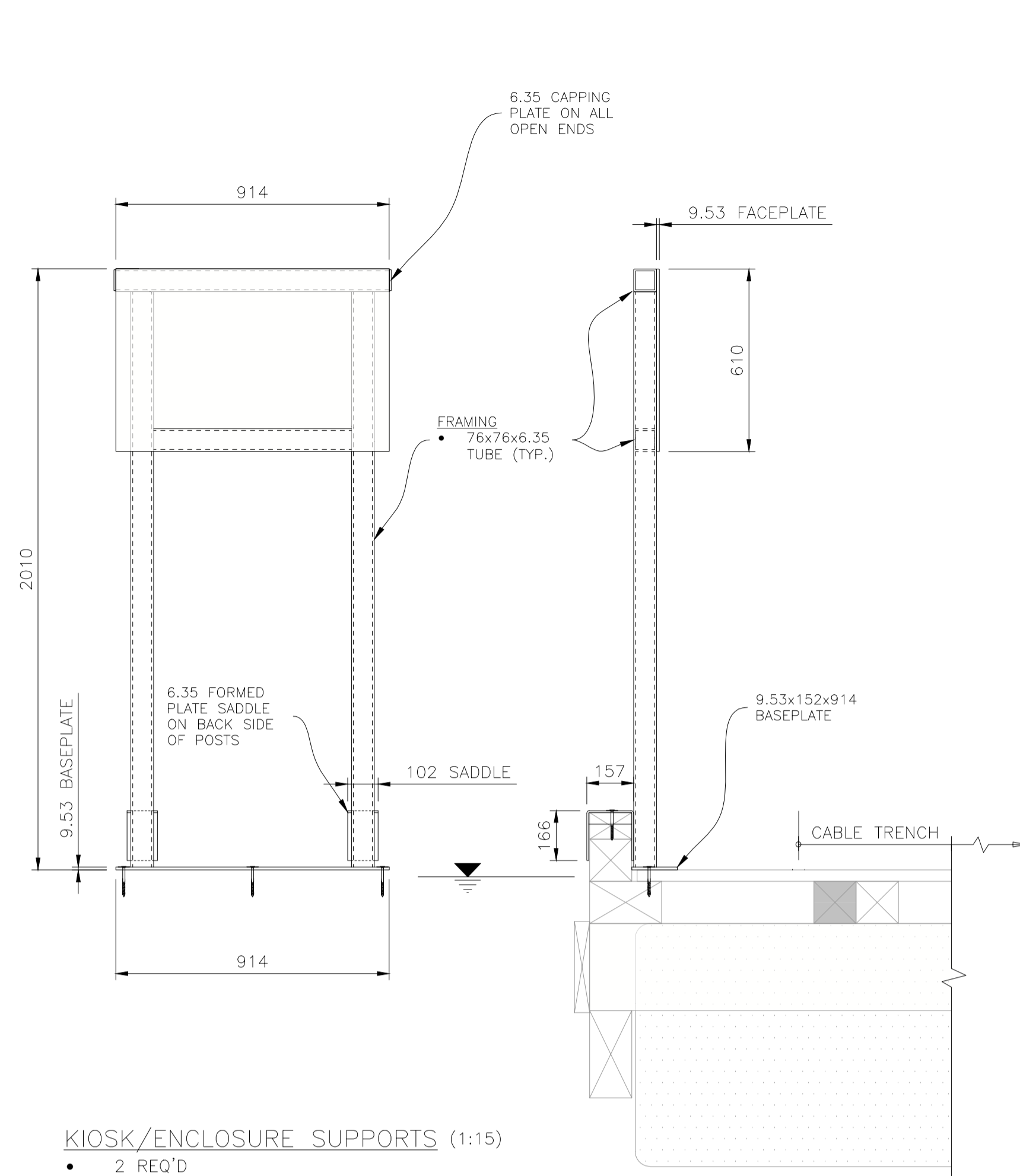
1. ELECTRICAL DETAILS AS PER RB ENGINEERING DRAWINGS 1780-E1, E2, E3
2. THIS DRAWING CONTAINS DETAILS FOR ALUMINUM SUPPORT STRUCTURES ETC. WHICH ARE NOT SHOWN ON THE ELECTRICAL DRAWINGS.
3. ALTERNATE FRAME OR SUPPORT DETAILS WILL BE CONSIDERED ON REVIEW AND APPROVAL BY THE ENGINEER.
4. ALLOW FOR TWO SHIP-SHORE CABLE TRENCHES THROUGH MINI-MESH DECKING (SEE DETAIL THIS PAGE). REMOVE TRENCH COVER, PLACE CABLE IN TRENCH, REPLACE TRENCH COVER ON TOP FOR PROTECTION OF CABLE AGAINST DAMAGE FROM WHEEL LOADS AND FOOT TRAFFIC.
5. EXACT LOCATION OF ELECTRICAL KIOSKS, TRENCHES, AND CABLE LOOPS TO BE DETERMINED ONSITE, WITH INPUT FROM VESSEL OPERATORS, AFTER AWARD OF CONTRACT.



CABLE TRENCH DETAIL (1:2)

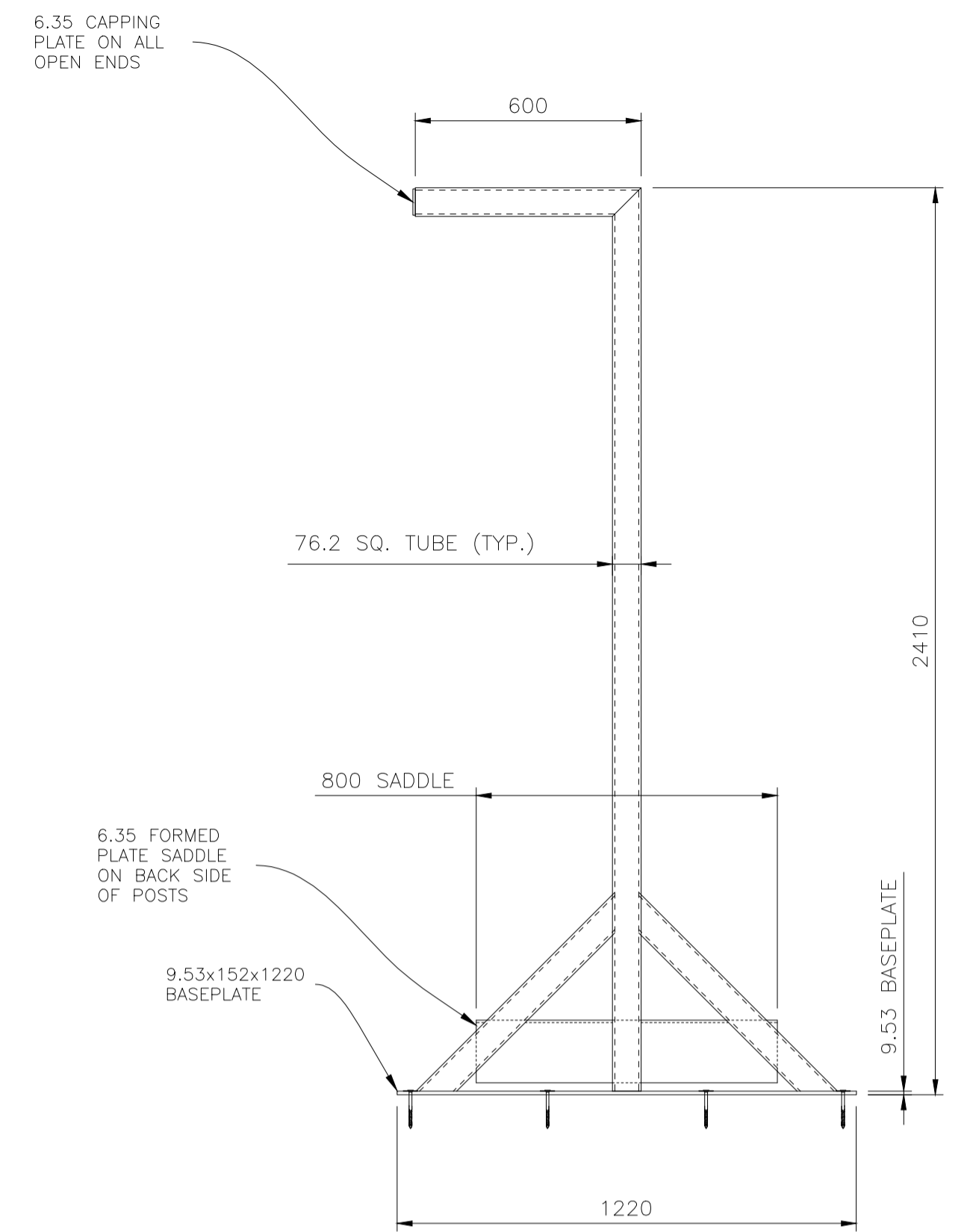
- TWO LOCATIONS, ONE FOR EACH ELECTRICAL KIOSK ON THE FLOAT.
- TRENCH LENGTH TO BE APPROXIMATELY 3300mm (FULL WIDTH OF FLOAT DECK)

- DROP-IN ALUMINUM TRENCH COVER**
- TOTAL 4 PIECES x 1600mm LONG EACH (FOR TWO TRENCHES).
 - FINGER SLOTS REQUIRED FOR LIFTING, DETAILS TO BE DETERMINED ONSITE.



KIOSK/ENCLOSURE SUPPORTS (1:15)

- 2 REQ'D
- ALUMINUM FRAMED
- SECURED THROUGH MINI-MESH DECK, AND OVER BULLRAIL AS SHOWN.



CABLE LOOP SUPPORT (1:15)

- 1 REQ'D
- ALUMINUM FRAMED
- SECURED THROUGH MINI-MESH DECK, AND OVER BULLRAIL AS SHOWN.

WATER SERVICE NOTES:

1. FIRE WATER AND POTABLE WATER CONNECTION IS AVAILABLE AT SERVICE KIOSK 12 ON THE MAIN PIER.
2. DESIGNATED HOSES FOR EACH VESSEL WILL BE STORED ONBOARD, AND CONNECTED AS NECESSARY WHEN THE VESSEL IS DOCKED AT THE MSPV FLOAT (HOSES WILL BE SUPPLIED BY COAST GUARD).
3. NOTE TO CONTRACTOR: NO WORK REQUIRED UNDER THIS CONTRACT FOR WATER SUPPLY TO VESSELS.

FILE: D:\high\05\166 - I05 - MSPV Float - Post Bay\166 - I05 MSPV Float.dwg PLOT DATE: April 9, 2014 11:57:28 AM

REVISIONS	D/M/Y	BY	REVISIONS	D/M/Y	BY
A	2/04/14	HJT	F		

Hugh Tuttle, P.Eng.
 231 Meadow Drive, SaltSpring Island B.C.,
 V8K 1T9, Tel/Fax: (250) 653-9166
 email: hugh_tuttle@hotmail.com

DRAWN BY: KRISTIN TUTTLE DESIGN BY: HUGH TUTTLE P.ENG.
 DATE: 03-APRIL-2014 CHECKED BY: _____
 FILE No.: FILE_NO SCALE: AS SHOWN



INSTITUTE OF OCEAN SCIENCES

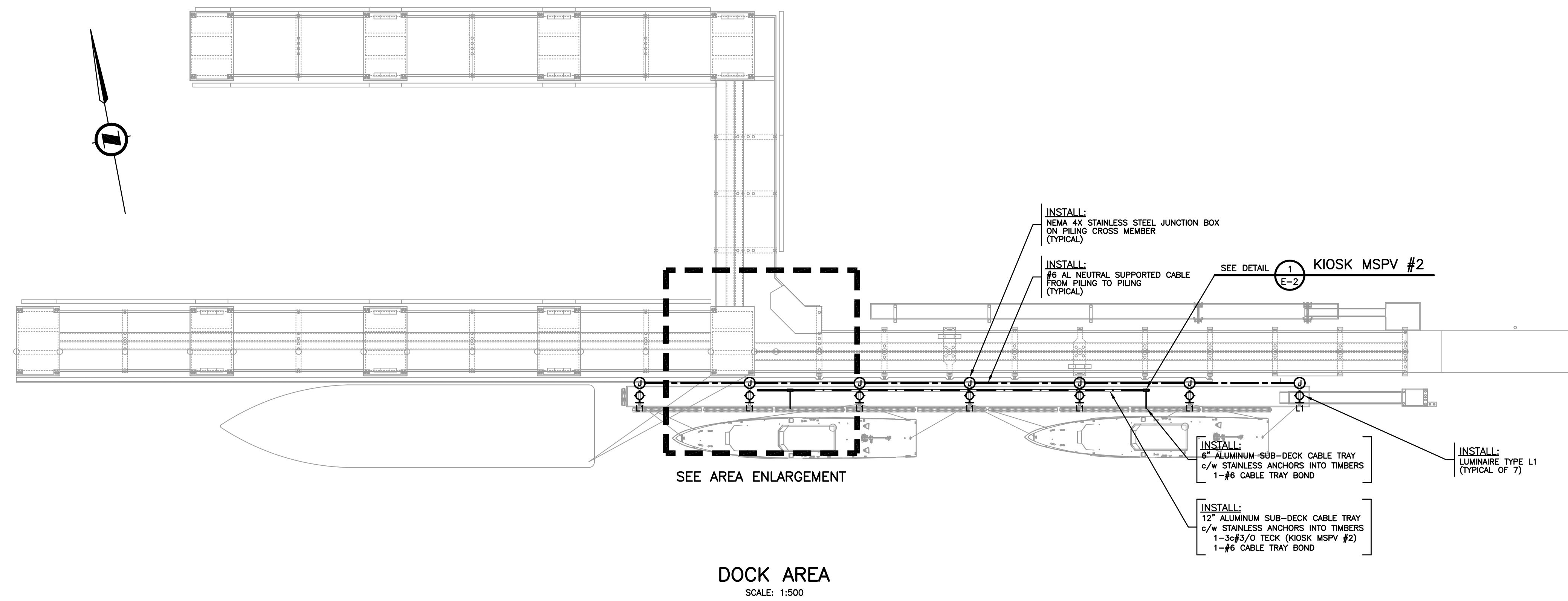
NEW FLOAT FOR MSPV MOORAGE

ELECTRICAL AND WATER

DRAWING No.: **496 - 500**

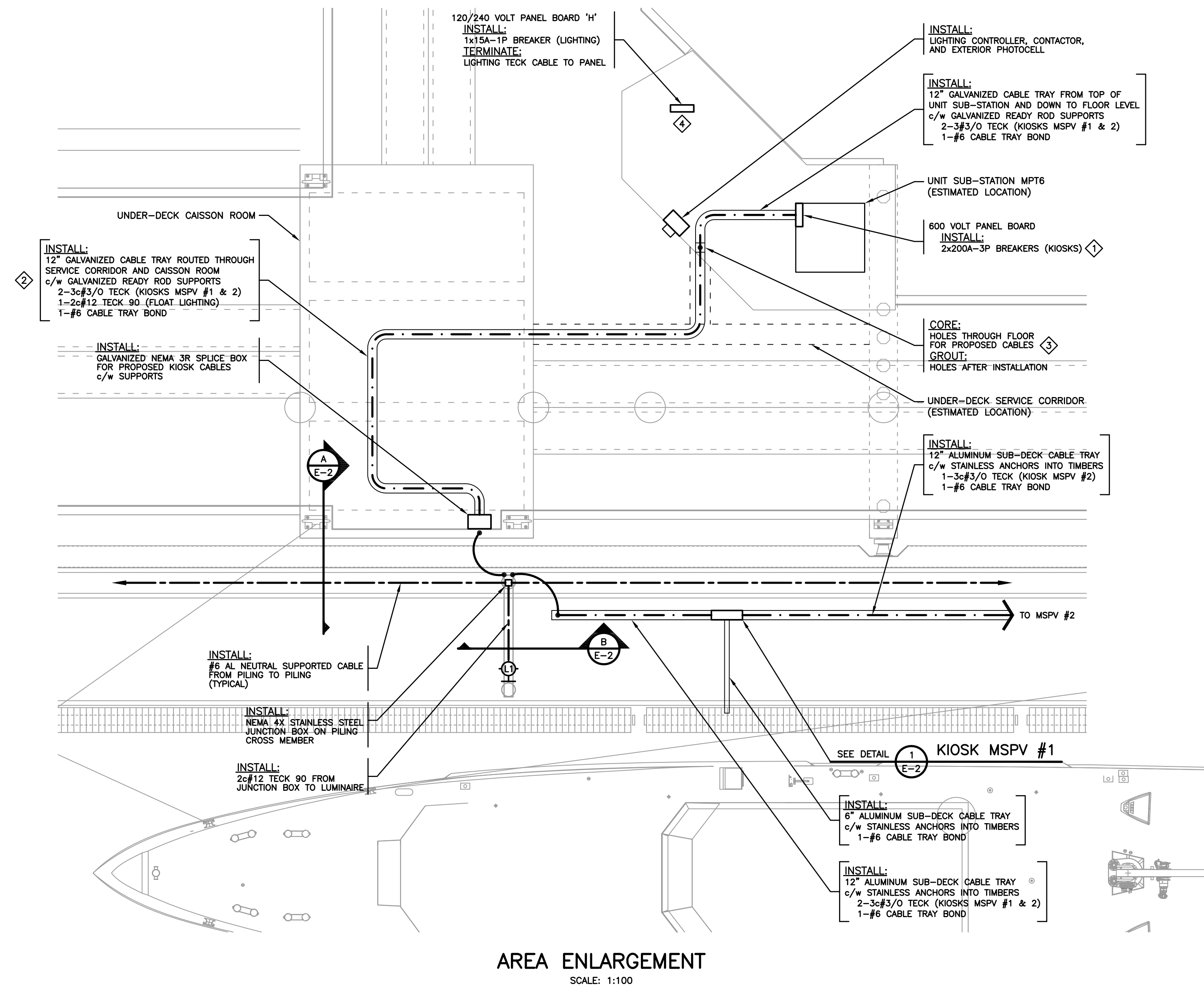
A

CANCEL PRINTS BEARING EARLIER REVISION



SEE AREA ENLARGEMENT

DOCK AREA
SCALE: 1:500

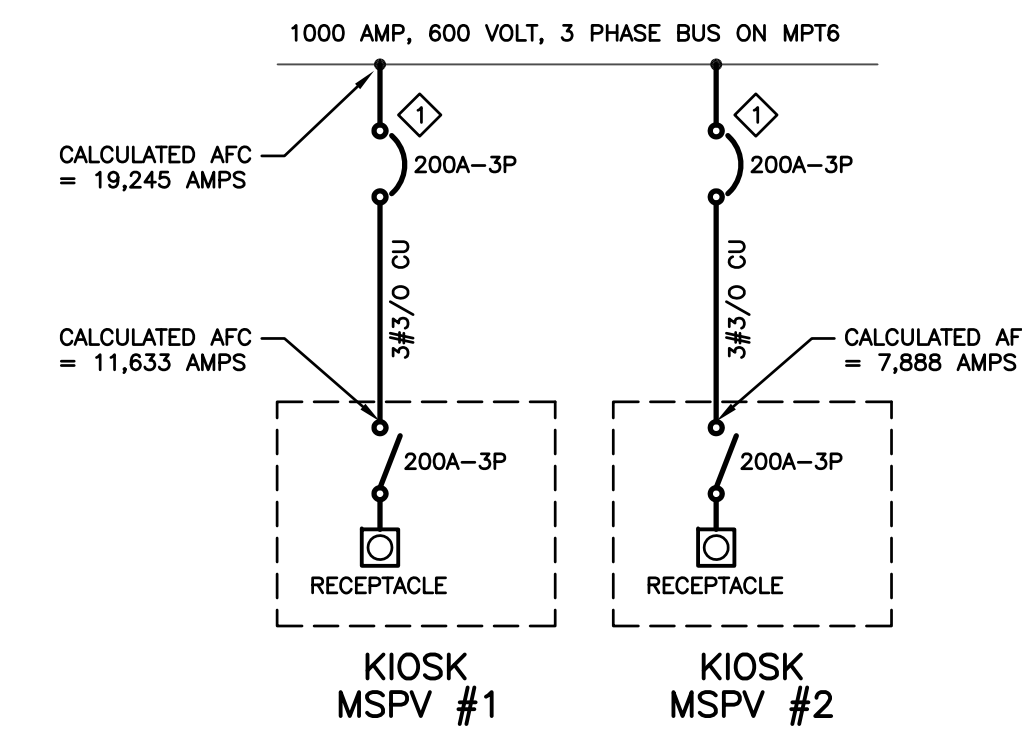


AREA ENLARGEMENT
SCALE: 1:100

LUMINAIRE SCHEDULE

TYPE	MANUFACTURER	CATALOG No.	MOUNTING	DESCRIPTION	LAMP		REMARKS
					TYPE	QTY	
FLUORESCENT							
L1	COOPER STREETWORKS	OVH-C01-LED-E-U-SL2-AP	PILING TENON	LED COBRA-HEAD	27W LED	1	GREY IN COLOUR

GENERAL NOTE:
1. ALL EQUIPMENT IS EXISTING UNLESS NOTED OTHERWISE.



SINGLE LINE DIAGRAM

KEY NOTES:

- ◆ BREAKERS SHALL BE EATON SERIES C HKD3400F c/w 200 AMP TRIP.
- ◆ SERVICE CORRIDOR & CAISSON ROOM HAVE MANY EXISTING SERVICES RUN WITHIN THEM. INSTALL TRAY BENDS & VERTICAL TRANSITIONS AS REQUIRED.
- ◆ USE X-RAY SCANNER TO ENSURE THAT CORING DOES NOT TOUCH STRUCTURAL RE-BAR.
- ◆ EXACT PANEL LOCATION NOT CONFIRMED.

NO.	DATE	COMMENT
2	MAR 28 2014	ISSUED FOR TENDER
1	MAR 04 2014	ISSUED FOR REVIEW
REVISION		

RB ENGINEERING LTD
ELECTRICAL CONSULTING ENGINEERS
#4 4488 WELLINGTON ROAD TEL 250-756-4444
NANAIMO, BC, V9T 2H5 FAX 250-756-4228

CLIENT
Fisheries and Oceans Canada

PROJECT
INSTITUTE OF OCEAN SCIENCE FLOAT SIDNEY, B.C.

TITLE
ELECTRICAL LAYOUT

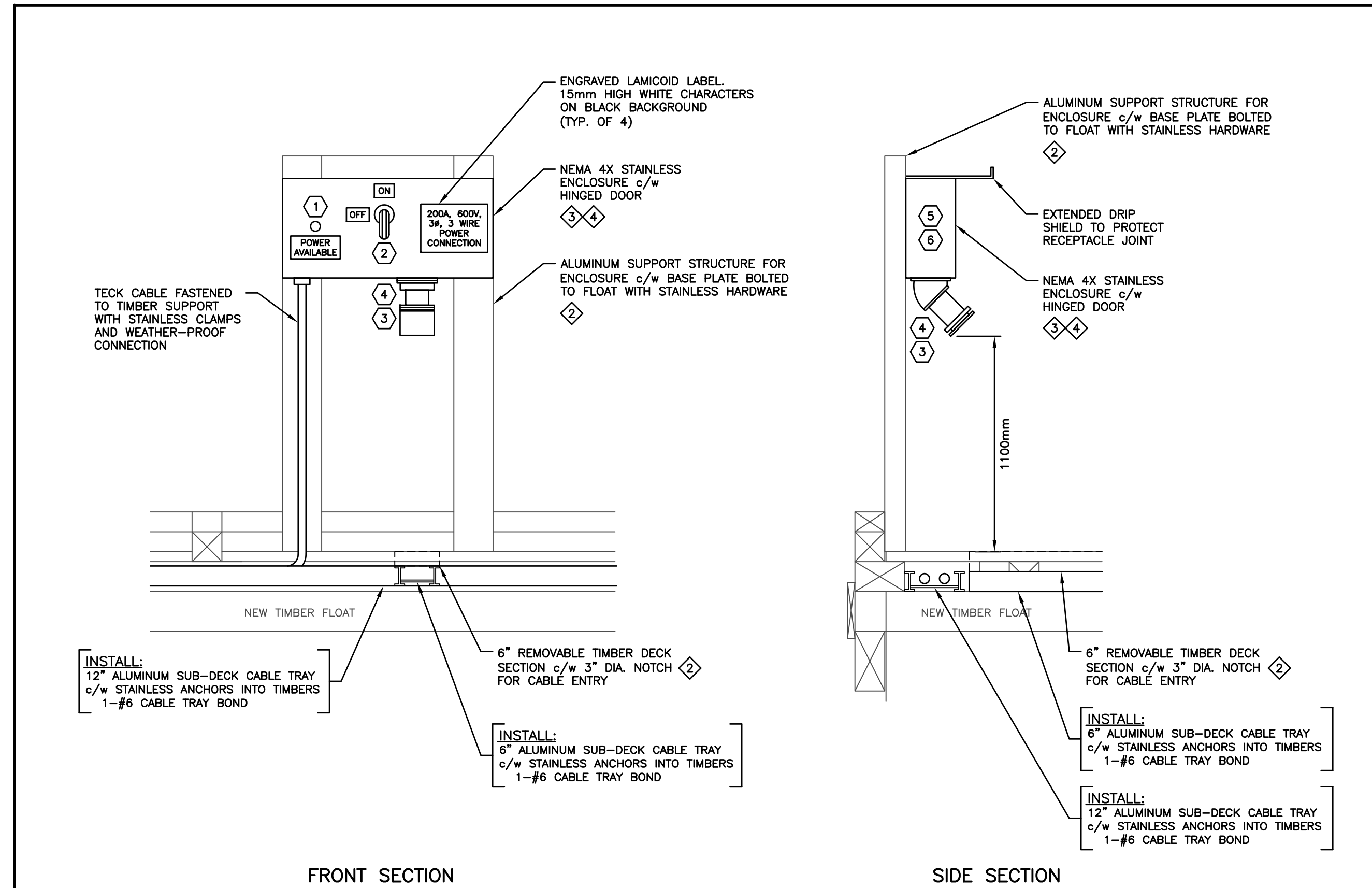
SCALE AS SHOWN DATE DECEMBER, 2013

DRAWN SEAL
DESIGNED LB
CHECKED DM

PROJECT NO. 13-1780

DRAWING NO.

E-1

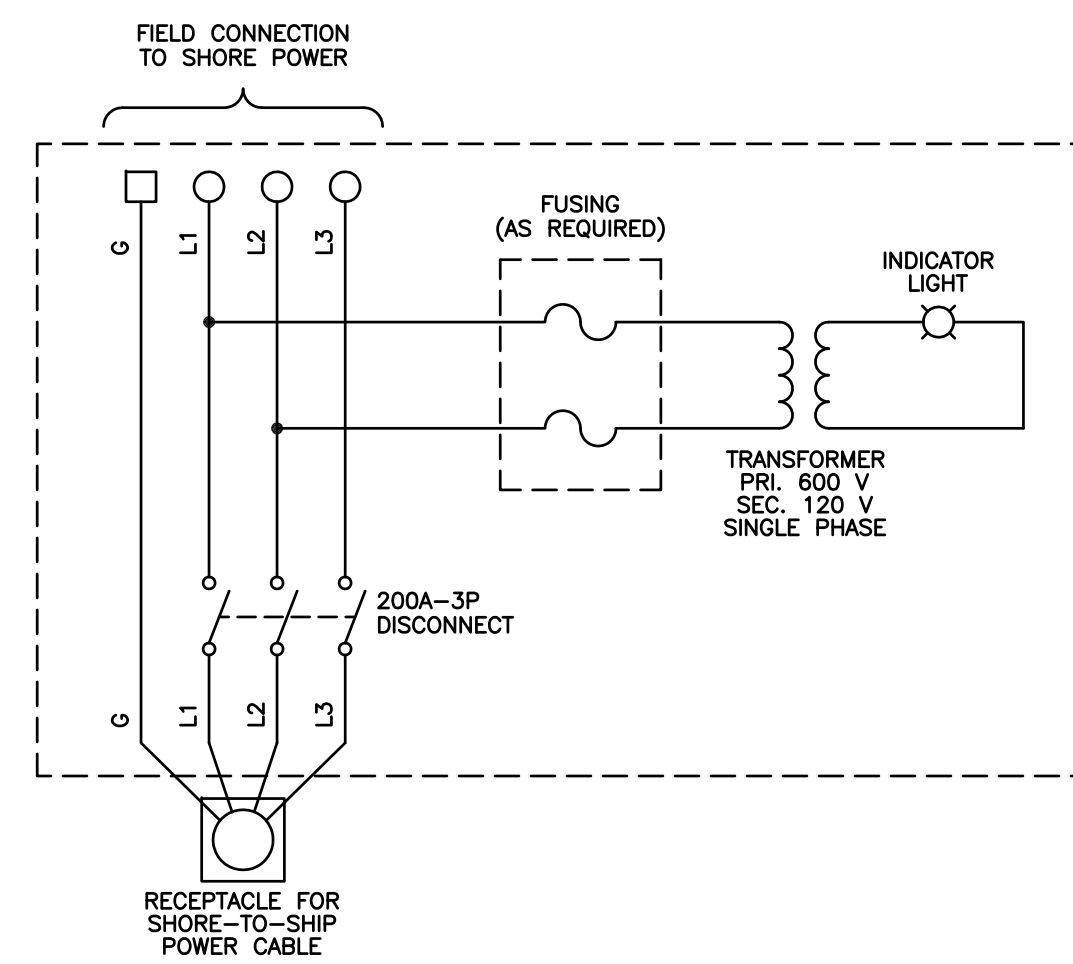


FRONT SECTION

SIDE SECTION

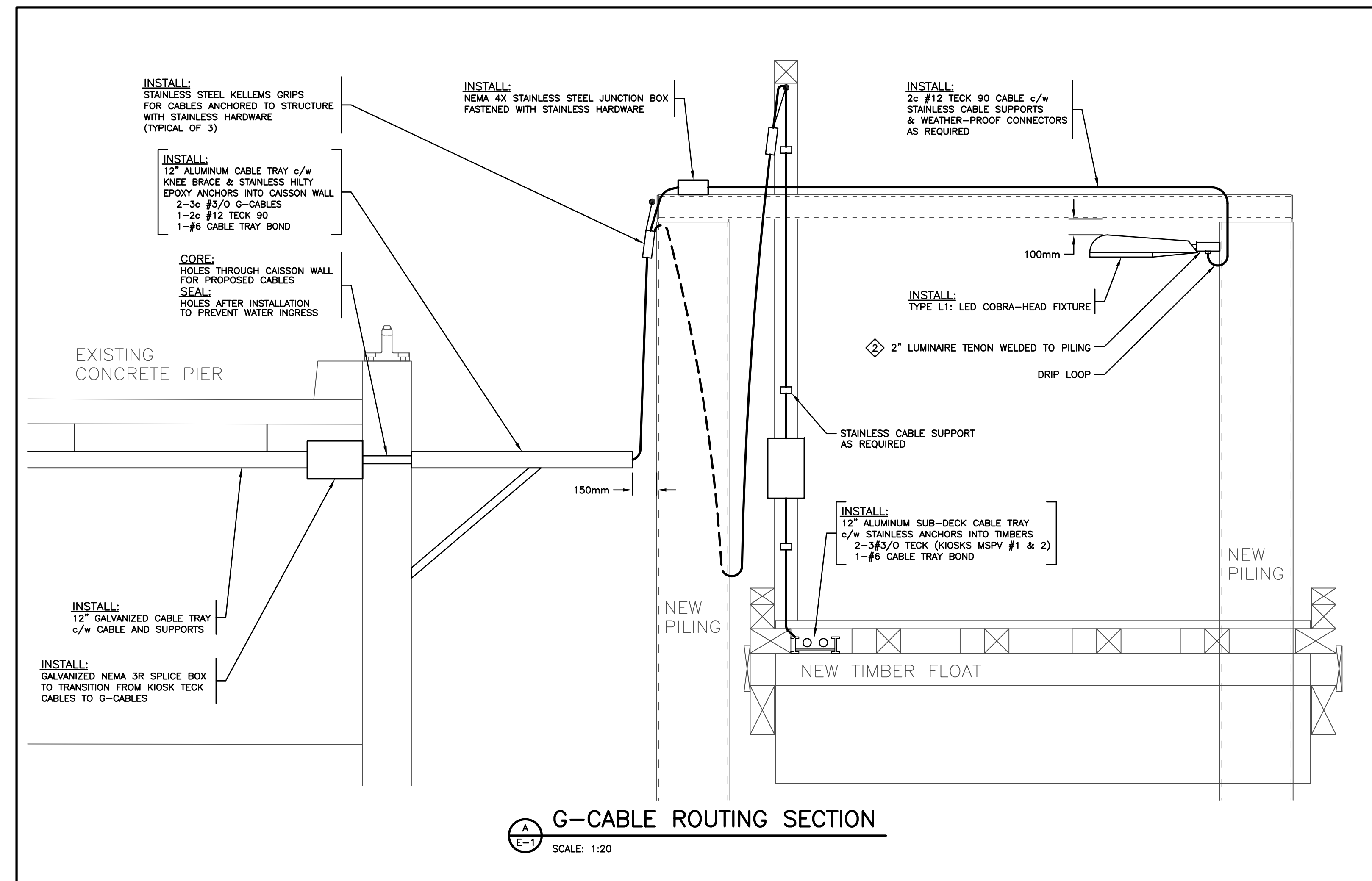
KIOSK MSPV EQUIPMENT LIST

ITEM	MANUFACTURER	MODEL	DESCRIPTION	QTY.
①	ABB	AS REQUIRED	120VAC LED YELLOW INDICATOR LIGHT (SEE KEY NOTE 2)	1
②	ABB	AS REQUIRED	2 POSITION PISTOL HANDLE c/w INTERCONNECTION HARDWARE TO OPERATE SWITCH	1
③	CROUSE-HINDS	AR2042	RECEPTACLE, 200 AMP, 3 PHASE, 4 WIRE	1
④	CROUSE-HINDS	AJ41	ANGLE ADAPTOR	1
⑤	ABB	OT200U03	DISCONNECT SWITCH 200 AMP, 3 PHASE	1
⑥	ABB	AS REQUIRED	600VAC-120VAC CONTROL TRANSFORMER c/w FUSING AS REQUIRED	1

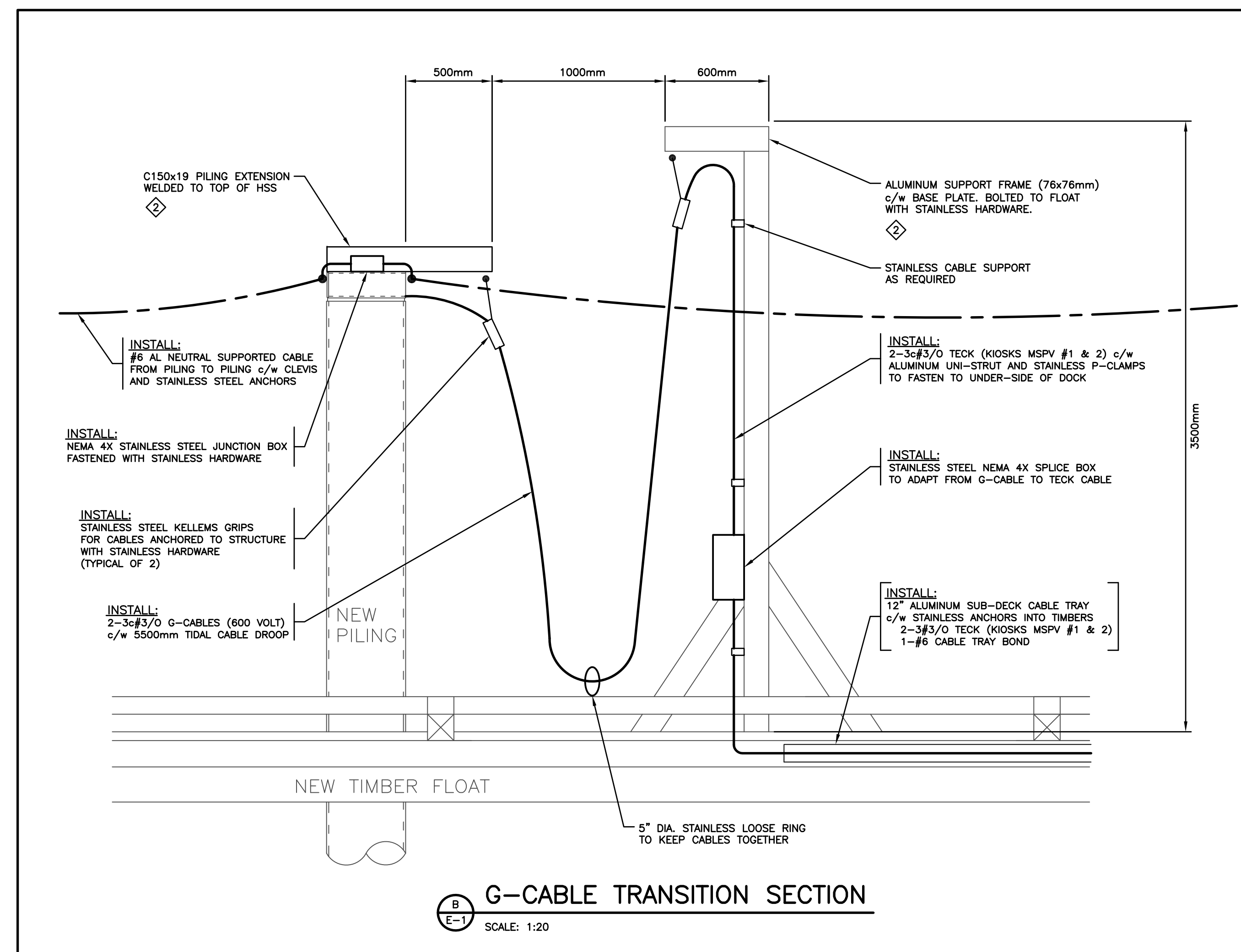


THREE LINE WIRING DIAGRAM

KIOSK MSPV #1 & 2 DETAIL
SCALE: N.T.S.



G-CABLE ROUTING SECTION
SCALE: 1:20



G-CABLE TRANSITION SECTION
SCALE: 1:20

KEY NOTES:

- ① USE X-RAY SCANNING TO ENSURE THAT CORING DOES NOT TOUCH STRUCTURAL RE-BAR.
- ② REFER TO STRUCTURAL DESIGN FOR DETAILS.
- ③ ENCLOSURE SHALL BE CSA CERTIFIED AS A COMPLETE ASSEMBLY FOR ELECTRICAL USE. SIZE AS REQUIRED TO SUIT EQUIPMENT.
- ④ INCLUDE ALL WIRING AND DEVICES AS PER THREE LINE DRAWING.

NO.	DATE	COMMENT
2	MAR 28 2014	ISSUED FOR TENDER
1	MAR 04 2014	ISSUED FOR REVIEW

REVISION

RB ENGINEERING LTD
ELECTRICAL CONSULTING ENGINEERS
#4 4488 WELLINGTON ROAD TEL 250-756-4444
NANAIMO, BC, V9T 2H3 FAX 250-756-4228

CLIENT



PROJECT
**INSTITUTE OF OCEAN SCIENCE
FLOAT
SIDNEY, B.C.**

TITLE
**ELECTRICAL
DETAILS**

SCALE AS SHOWN DATE DECEMBER, 2013

DRAWN AT SEAL
DESIGNED LB
CHECKED DM

PROJECT NO. 13-1780

DRAWING NO.

E-2

REFERENCE STANDARDS

- .1 MATERIAL SHALL CARRY CSA APPROVAL AND CONFORM WITH EEMAC STANDARDS.
- .2 EQUIPMENT WIRING AND WIRING DEVICES SHALL MEET THE REQUIREMENTS OF THE CURRENT EDITION OF THE CANADIAN ELECTRICAL CODE 22.1, PART 1.

GENERAL REQUIREMENTS

- .1 THE ELECTRICAL CONTRACTOR SHALL SUPPLY ALL LABOUR, MATERIALS, TOOLS, EQUIPMENT, TRANSPORTATION REQUIRED FOR THE COMPLETE INSTALLATION, WIRING AND TESTING OF THE SYSTEM SHOWN ON THE DRAWINGS AND DESCRIBED HEREIN & IS RESPONSIBLE TO REVIEW ARCHITECTURAL, MECHANICAL, STRUCTURAL DRAWINGS FOR DISCREPANCIES AND REPORT TO THE ENGINEER.
- .2 THE ELECTRICAL DRAWINGS INDICATE THE GENERAL LOCATION AND ROUTE. CONDUIT AND/OR WIRING SHALL BE INSTALLED TO PROVIDE A COMPLETE OPERATING SYSTEM AND SHALL BE INSTALLED PHYSICALLY TO CONSERVE HEADROOM, FURRING SPACES ETC.
- .3 THE WORK TO BE DONE IS DESCRIBED IN THE DRAWINGS.
- .4 THE DRAWINGS AND SPECIFICATIONS COMPLEMENT EACH OTHER AND WHAT IS CALLED FOR BY ONE IS BINDING AS IF CALLED FOR BY BOTH. IF THERE IS ANY DOUBT AS TO THE MEANING OR TRUE INTENT DUE TO A DISCREPANCY BETWEEN THE DRAWINGS AND SPECIFICATIONS, OBTAIN RULING FROM ENGINEER PRIOR TO TENDER CLOSING. FAILING THIS, ALLOW FOR THE MOST EXPENSIVE ALTERNATIVE.
- .5 ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW ALL CONDUIT, WIRE, CABLE, ETC., THE ELECTRICAL CONTRACTOR IS TO PROVIDE CONDUIT, WIRE, CABLE, ETC. FOR A COMPLETE OPERATING JOB TO MEET IN ALL RESPECTS THE INTENT OF THE DRAWINGS AND SPECIFICATIONS. ELECTRICAL DRAWINGS DO NOT SHOW ALL ARCHITECTURAL, STRUCTURAL AND MECHANICAL DETAILS.
- .6 IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AS TO WHICH TRADE PROVIDES SPECIFIC LABOUR AND MATERIALS. EXTRAS WILL NOT BE CONSIDERED BASED ON DIFFERENCES IN INTERPRETATION AS TO WHICH TRADE IS TO PROVIDE CERTAIN ITEMS.

SHOP DRAWINGS

- .1 PRIOR TO ORDERING OF ANY EQUIPMENT, THIS CONTRACTOR SHALL SUBMIT DIGITAL COPIES OF SHOP DRAWINGS AND DETAIL DRAWINGS FOR REVIEW BY THE ENGINEER. THE ENGINEER SHALL THEN RETURN COPIES OF THE REVIEWED SHOP DRAWINGS TO THE CONTRACTOR. SHOP DRAWINGS SHALL BE SUBMITTED ON ALL MAJOR EQUIPMENT.
- .2 ALL SHOP DRAWINGS SUBMITTED TO THE ENGINEER MUST BEAR THE CONTRACTOR'S APPROVALS.
- .3 ALL SHOP DRAWINGS SHALL BEAR THE NAME OF THE MANUFACTURER AND/OR MANUFACTURER'S REPRESENTATIVE.
- .4 SUBMIT SHOP DRAWINGS FOR AT LEAST THE FOLLOWING ITEMS:
 - .1 ALL DISTRIBUTION PANEL BOARDS, DISCONNECT SWITCHES, CIRCUIT BREAKERS, INSTRUMENT TRANSFORMERS AND RELAYS, ETC.
 - .2 KIOSK FABRICATION AND LAYOUT DRAWINGS.

MAINTENANCE AND OPERATION MANUAL

- .1 CONTRACTOR TO SUBMIT ONE COPY OF MAINTENANCE AND OPERATION MANUALS IN THREE RING BINDER TO ENGINEER FOR APPROVAL AT TIME OF SUBSTANTIAL COMPLETION.
- .2 MANUALS TO INCLUDE THE FOLLOWING:
 - .1 PROJECT CONTACT INFORMATION
 - .2 APPROVED SHOP DRAWINGS
 - .3 WARRANTIES AND GUARANTEES
 - .4 TEST RESULTS
 - .5 AS BUILT DRAWINGS
- .3 ON APPROVAL CONTRACTOR TO PROVIDE THREE COPIES OF THE MAINTENANCE AND OPERATION MANUALS IN THREE RING BINDERS c/w CD OF ALL DOCUMENTS IN PDF FORMAT.

PERMITS, CERTIFICATES, AND FEES

- .1 ON COMPLETION OF THE WORK, SUBMIT CERTIFICATE OF ACCEPTANCE FROM INSPECTION AUTHORITY TO THE ENGINEER.
- .2 PRIOR TO COMMENCEMENT OF WORK, SUBMIT THE NECESSARY DRAWINGS TO THE ELECTRICAL INSPECTION DEPARTMENT AND THE ELECTRICAL SUPPLY AUTHORITY.
- .3 PAY ALL ASSOCIATED FEES, AND OBTAIN DOCUMENTS POSTING AS REQUIRED.

ALTERNATIVES

- .1 ALL MATERIALS OR EQUIPMENT AS CALLED FOR ON THE DRAWINGS AND IN THE SPECIFICATIONS BY TRADE NAMES OR BY CATALOGUE REFERENCE NUMBERS, ARE THE MATERIALS ON WHICH THIS TENDER IS TO BE BASED. ALL EQUIPMENT MUST BE INSTALLED AS SHOWN ON THE DRAWINGS OR IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. THE REQUEST FOR APPROVAL SHALL BE ACCOMPANIED BY COMPLETE SPECIFICATIONS OF PROPOSED SUBSTITUTION, SHOWING DIMENSIONS, RATINGS, PHOTOMETRICS DATA, ETC. IT SHALL BE THIS SUB-CONTRACTOR'S RESPONSIBILITY TO MAKE AND ALLOW FOR ANY CHANGES AND CHARGES WHICH WILL OCCUR IF HE WISHES TO SUBMIT ALTERNATIVE EQUIPMENT. NO SUBSTITUTION BY THIS CONTRACTOR WILL BE PERMITTED AFTER CLOSING OF THE TENDERS.
- .2 THE ENGINEER RESERVES THE RIGHT TO ACCEPT OR REJECT ANY ALTERNATIVES PROPOSED.

GUARANTEE

- .1 AFTER THE WORK IS COMPLETED BUT BEFORE FINAL PAYMENT, FURNISH TO THE OWNER A WRITTEN GUARANTEE THAT FOR ONE YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION, ANY DEFECTS IN MATERIALS OR WORKMANSHIP WILL BE CORRECTED AT NO COST TO THE OWNER, EXCEPT WHERE, IN THE OPINION OF THE ENGINEER, SUCH DEFECTS ARE DUE TO MIS-USE OR NEGLIGENCE BY THE OWNER.

MINOR FIELD CHANGES

- .1 THE LOCATION, ARRANGEMENT AND CONNECTION OF EQUIPMENT AND MATERIAL AS SHOWN ON THE DRAWINGS REPRESENTS A CLOSE APPROXIMATION OF THE INTENT AND REQUIREMENTS OF THE CONTRACT. THE RIGHT IS RESERVED BY THE ENGINEERS TO MAKE REASONABLE CHANGES REQUIRED TO ACCOMMODATE CONDITIONS ARISING DURING THE PROGRESS OF THE WORK. SUCH CHANGES SHALL BE DONE AT NO EXTRA COST TO THE OWNER, UNLESS THE LOCATION, ARRANGEMENT OR CONNECTION IS MORE THAN TEN FEET FROM THAT SHOWN AND THE ITEM IN QUESTION HAS BEEN INSTALLED. CONFIRM FINAL LOCATION PRIOR TO INSTALLATION.

CABLE TRAY

- .1 TRAY SHALL BE INSTALLED AS PER CSA 22.2 No. 126.1-02.
- .2 TRAY SHALL BE CSA CLASS A RATED LADDER STYLE (6" RUNG SPACING) FOR 3m SPANS.
- .3 INSTALL 1" EXPANSION SPLICE PLATES EVERY 20m.
- .4 BOND TRAY EVERY 15m AS PER CANADIAN ELECTRICAL CODE.
- .5 GALVANIZED TRAY SHALL BE HOT DIPPED GALVANIZED.
- .6 ALUMINUM TRAY SHALL BE 6063-T6 ALLOY.

WIRE AND CABLE

- .1 GENERAL WIRE: 98% CONDUCTIVITY COPPER, 90°C RATED 600V INSULATION, RW90 X-LINK FOR DAMP LOCATIONS UNLESS OTHERWISE NOTED. COPPER CONDUCTORS SHALL BE STRANDED WHEN LARGER THAN #8 AWG OR AS NOTED.
- .2 G-CABLE SHALL BE CUL OR CSA LISTED WITH 75° C (OR HIGHER) 2000V INSULATION. CABLE SHALL HAVE OPERATING RANGE FROM -40° C TO +90° C AND BE SUN-LIGHT AND OIL RESISTANT. CABLE TO INCLUDE BONDING CONDUCTOR IN ADDITION TO STATED CONDUCTOR COUNT.
- .3 NEUTRAL SUPPORTED CABLES SHALL BE ALUMINUM 90°C RATED 600 VOLT INSULATION NS90.
- .3 BRANCH CIRCUIT WIRING: THE MINIMUM SIZE OF CONDUCTORS TO BE NO. 12 AWG CU.
- .4 LOW VOLTAGE SIGNAL WIRING SHALL BE SEPARATED FROM POWER WIRING AND RUN IN SEPARATE RACEWAYS. THIS INCLUDES PANEL WIREWAYS.
- .5 SURFACE WIRING ALLOWED IN MECH/ELEC ROOMS ONLY.
- .6 COLOUR CODE TO CSA C22.1 CURRENT EDITION.
- .7 ALUMINUM CONDUCTORS CAN NOT BE USED.

OUTSIDE LIGHTING CONTROL

- .1 PROVIDE LIGHTING CONTROL SYSTEMS AS INDICATED.
- .2 EXTERIOR LIGHTS SHALL BE CONTROLLED BY PHOTOCELL & TIMECLOCK. INCLUDE CONTACTOR(S) AND OVERRIDE SWITCHES.
- .3 TIMECLOCK TO BE ELECTRONIC, 1 CHANNEL, 7/32 SET POINTS, ALKALINE BATTERY BACK-UP, TORK DT120.
- .4 PHOTOCELL TO BE SPEC GRADE.

LIGHTING

- .1 SUPPLY AND INSTALL LUMINAIRES AND LAMPS AS PER LUMINAIRE SCHEDULE.
- .2 UNIT LUMINAIRES TO BE SUPPLIED BY OTHERS, INSTALLED BY ELECTRICAL CONTRACTOR.
- .3 LAMPS TO BE OSRAM, PHILIPS, OR GE.

DISCONNECT SWITCHES

- .1 SWITCHES: HEAVY DUTY RATED.
- .2 PROVIDE FUSES FOR ALL DISCONNECTS AS SHOWN.

NAME TAGS

- .1 PROVIDE LAMICOID NAME TAG INDICATING AMPACITY, VOLTAGE AND PHASE OR INDICATED SYSTEM.
- .2 LAMICOID TO BE 1/8" THICK PLASTIC ENGRAVING SHEET, BLACK FACE, WHITE CORE.
- .3 LETTERS TO BE 1/4" HIGH UNLESS SPECIFIED OTHERWISE.
- .4 ALLOW FOR AVERAGE OF 25 LETTERS PER NAMEPLATE.
- .5 PROVIDE LAMICOID NAME TAG FOR BREAKERS METERS, DISCONNECTS, MOTOR PROTECTION SWITCHES, PANEL BOARDS ETC. NAME TAGS SHALL BE MECHANICALLY FASTENED.

SUPPORTS AND HARDWARE

- .1 ALL FASTENING HARDWARE SHALL BE MARINE GRADE 316 STAINLESS STEEL.
- .2 ALL ITEMS IDENTIFIED AS STAINLESS SHALL BE MARINE GRADE 316 STAINLESS STEEL.
- .3 ALL ITEMS IDENTIFIED AS ALUMINUM SHALL BE MARINE GRADE 6061 ALUMINUM ALLOY.
- .4 ALL ITEMS IDENTIFIED AS GALVANIZED SHALL BE HOT DIPPED GALVANIZED. ANY FIELD CUTS OR SCRATCHES SHALL BE TREATED WITH 2 COATS OF GALVAPOX.

AS BUILT DRAWINGS

- .1 PROVIDE A CLEAN SET OF DRAWINGS AT THE JOB SITE, FOR AS BUILT MODIFICATIONS ONLY.
- .2 MARK ALL MODIFICATIONS IN RED, IN A NEAT, LEGIBLE MANNER.
- .3 SUBMIT AS BUILTS TO ENGINEER FOR APPROVAL.

FIRE SEPARATIONS

- .1 THE CONTRACTOR SHALL PROVIDE FIRE STOPPING FOR ALL ELECTRICAL PENETRATIONS THROUGH FIRE RATED ASSEMBLIES.
- .2 FIRE STOP SYSTEMS SHALL, WHEN SUBJECTED TO THE FIRE TEST METHOD IN CAN 4-5115-M "STANDARD METHOD OF FIRE TESTS OF FIRE STOP SYSTEMS", HAVE AN F OR FT RATING (AS REQUIRED) NOT LESS THAN THE RATING OF THE FIRE SEPARATION.
- .3 CONTRACTOR SHALL PROVIDE TO ENGINEER/ARCHITECT COMPLETE LISTINGS FOR ALL FIRE STOPPING INSTALLATIONS. PROVIDE SPECIFIC DETAILS REGARDING TYPE OF FIRE STOPPING COMPOUND, APPLICABLE APPLICATIONS, MANUFACTURE, TESTING AGENCY, ETC.
- .4 CONTRACTOR SHALL NOTIFY ENGINEER/ARCHITECT A MIN. OF ONE WEEK PRIOR TO CONCEALING OF ENCLOSING FIRE STOP ASSEMBLIES AND BE AVAILABLE ON SITE FOR ENGINEER'S FIELD REVIEW.

EQUIPMENT REMOVALS

- .1 REMOVE CONDUIT AND WIRE FOR ASSOCIATED ELECTRICAL EQUIPMENT. POWER WIRING TO BE REMOVED BACK TO NEAREST JUNCTION BOX OR BREAKER. COMM. WIRING TO BE REMOVED BACK TO TERMINATION POINT. LIMIT THE FOREGOING SO AS NOT TO DEMOLISH WALL OR CEILINGS THAT WOULD OTHERWISE REMAIN.
- .2 DISPOSE OF REMOVED ITEMS OFF SITE IN ACCORDANCE WITH APPLICABLE RECYCLING AND DISPOSAL GUIDELINES.
- .3 REPAIR AFFECTED AREAS TO MATCH SURROUNDING FINISHES.

PROJECT CLOSE OUT PROCEDURES

- .1 PROVIDE 7 DAY NOTICE TO THE ENGINEER FOR FINAL FIELD REVIEW FOR ELECTRICAL DISCIPLINE. ELECTRICAL CONTRACTOR TO ENSURE ALL LIFE SAFETY DEVICES ARE INSTALLED AND OPERATIONAL. ELECTRICAL CONTRACTOR TO ENSURE ALL ELECTRICAL WORKS NOT INSTALLED ARE MADE SAFE.
- .2 THE FOLLOWING DOCUMENTS TO BE FORWARDED TO THE ENGINEER PRIOR TO FINAL FIELD REVIEW:
 - .1 MAINTENANCE MANUALS
 - .2 FIELD SAFETY REPRESENTATIVE (FSR) DECLARATION

NO.	DATE	COMMENT
2	MAR 28 2014	ISSUED FOR TENDER
1	MAR 04 2014	ISSUED FOR REVIEW
REVISION		



PROJECT
**INSTITUTE OF OCEAN SCIENCE
 FLOAT
 SIDNEY, B.C.**

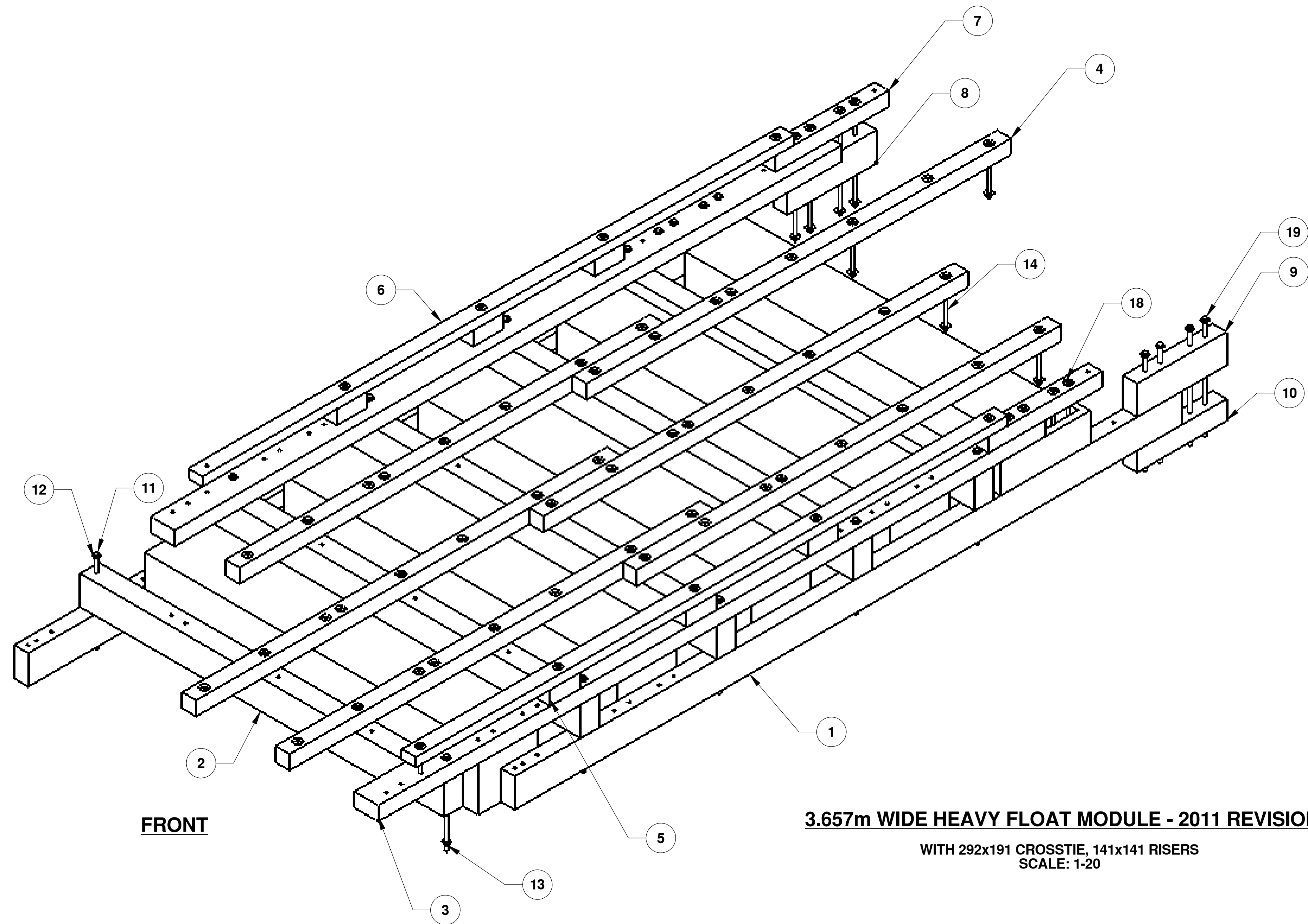
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**ELECTRICAL
 SPECIFICATIONS**

SCALE AS SHOWN	DATE DECEMBER, 2013
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DRAWN AT	SEAL
DESIGNED LB	
CHECKED DM	

PROJECT NO.
13-1780

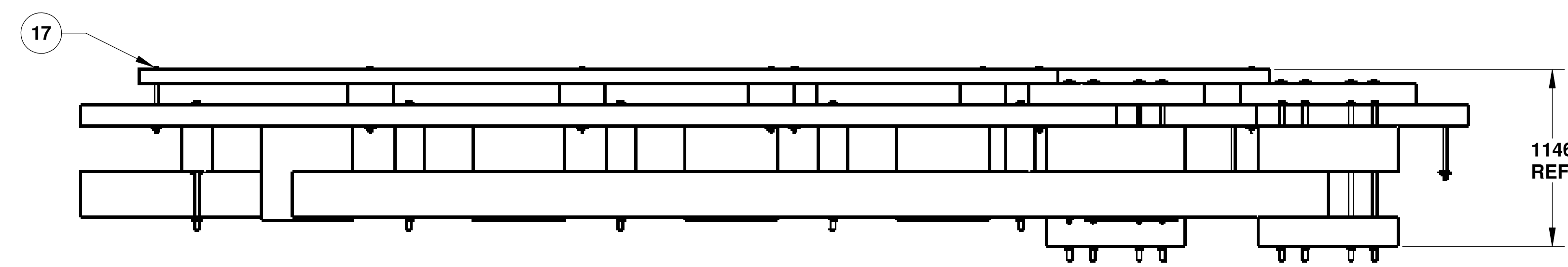
DRAWING NO.
E-3



FRONT

3.657m WIDE HEAVY FLOAT MODULE - 2011 REVISION

WITH 292x191 CROSSTIE, 141x141 RISERS
SCALE: 1-20



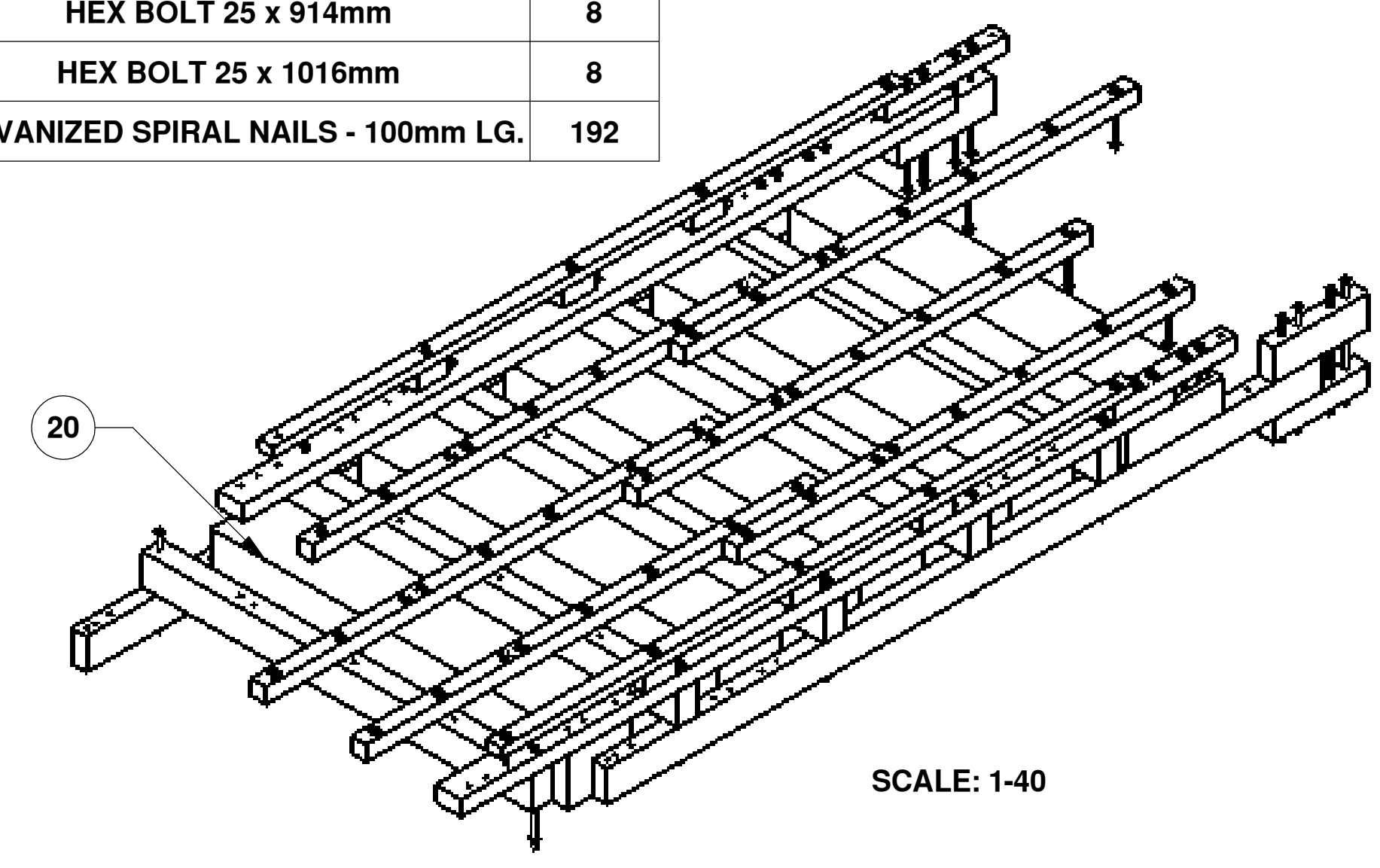
FRONT

SIDE VIEW
SCALE: 1-25

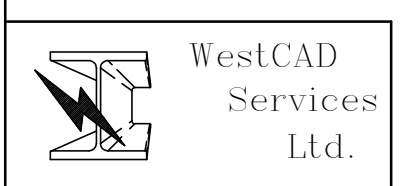
TIMBER MEMBERS				
ITEM NO.	QTY.	TIMBER MEMBERS	DESCRIPTION	MATERIAL
1	2	FLANGE	(12x6) 292 X 141 x 6706 LG.	14 LB CREOSOTE TREATMENT #1 BTR FIR
2	5	CROSSTIE	(12x8) 292 x 191 x 3658 LG.	14 LB CREOSOTE TREATMENT #1 BTR FIR
3	2	STRINGER	(10x6) 241 X 141 X 6706 LG.	ACZA
4	6	JOIST	(6x6) 141 x 141 x 4267 LG.	ACZA
5	6	RISERS	(6x6) 141 x 141 x 300 LG.	ACZA
6	2	RAIL	(4x6) 89 x 141 x 5950 LG.	ACZA
7	2	UPPER STRINGER SPLICE	(6x6) 141 x 141 x 1140 LG.	ACZA
8	2	LOWER STRINGER SPLICE	(6x12) 141 x 292 x 900 LG.	14 LB CREOSOTE TREATMENT #1 BTR FIR
9	2	UPPER FLANGE SPLICE	(6x12) 141 x 292 X 900 LG.	14 LB CREOSOTE TREATMENT #1 BTR FIR
10	2	LOWER FLANGE SPLICE	(6x8) 141 x 191 x 900 LG.	14 LB CREOSOTE TREATMENT #1 BTR FIR
20	5	FOAM BOUYANCY BILLET	610 x 597 x 3352 LG.	
21	28	DECK PLATES	(12x2) 305 x 38 x 2440 LG.	ACZA

HARDWARE

ITEM NO.	HARDWARE	QTY
11	HEX BOLT 25 x 812mm	10
12	WASHERS 25mm	112
13	HEX NUTS 25mm	56
14	HEX BOLT 25 x 457mm	21
17	HEX BOLT 25 x 406mm	9
18	HEX BOLT 25 x 914mm	8
19	HEX BOLT 25 x 1016mm	8
22	GALVANIZED SPIRAL NAILS - 100mm LG.	192



SCALE: 1-40



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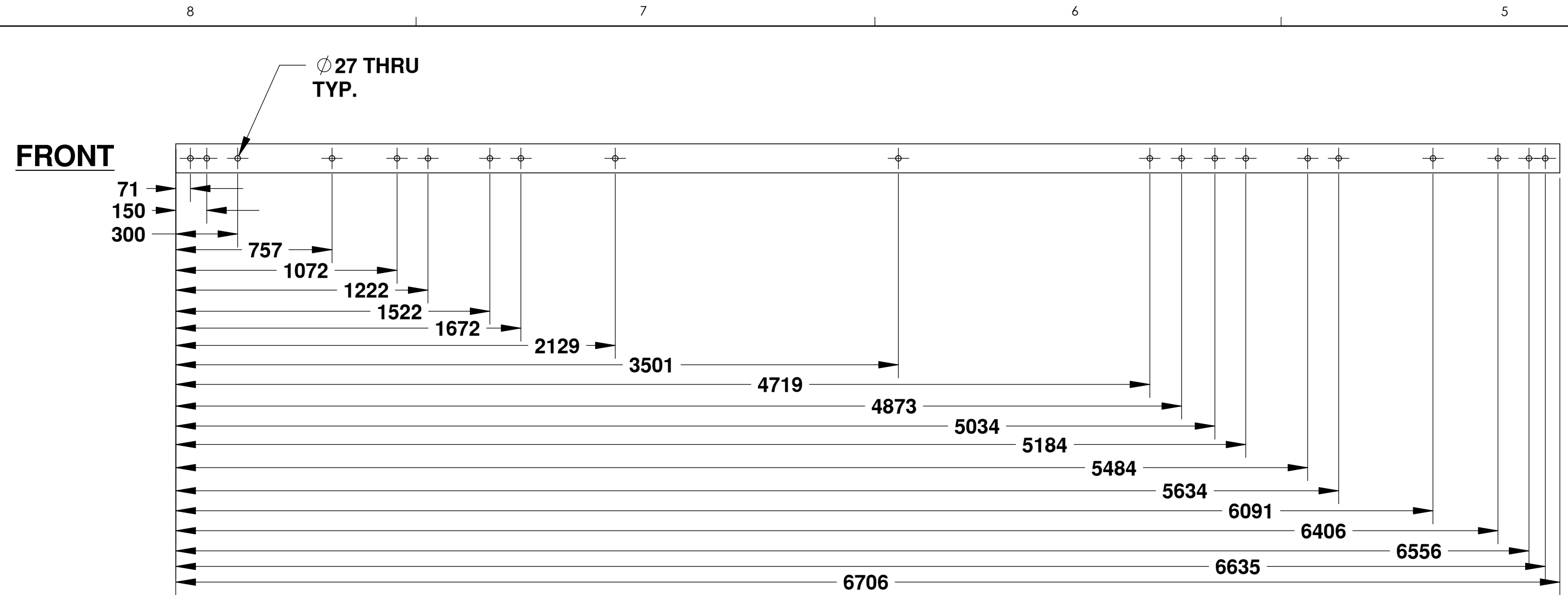
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TOLERANCES:			
FRACTIONAL ±			
ANGULAR: MACH ±			
TWO PLACE DECIMAL ±			
THREE PLACE DECIMAL ±			
CHECKED	ENG APPR.		
MFG APPR.	G.A.		
COMMENTS:			
INTERPRET	GEOMETRIC	TOLERANCING PER:	
MATERIAL	---		
NEXT ASST	USED ON	FINISH	---
APPLICATION		DO NOT SCALE DRAWING	

Fisheries & Oceans / Pêches et Océans
Small Craft Harbours Branch

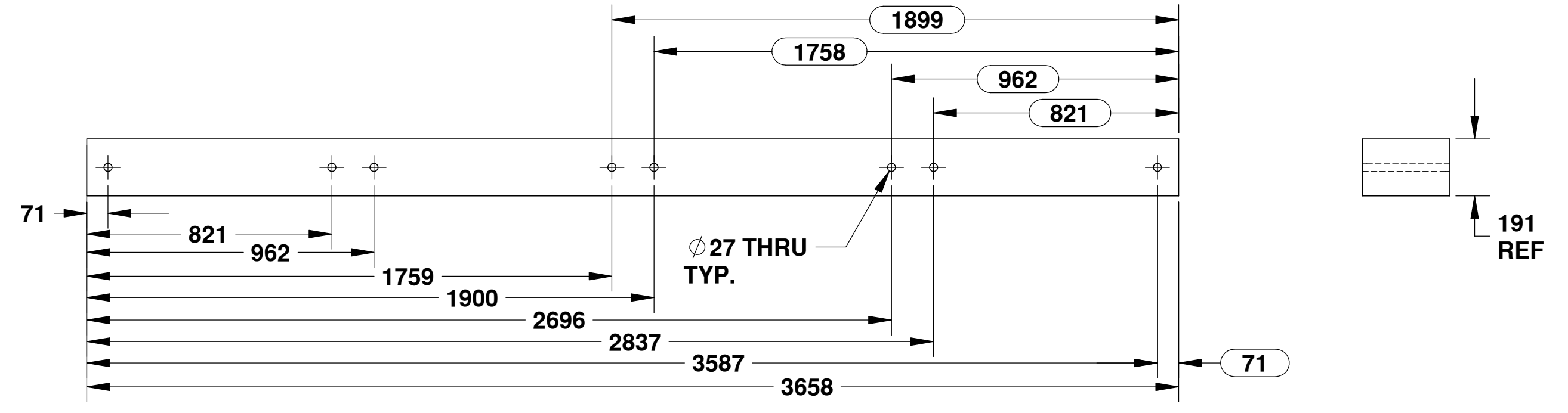
TITLE: **'2011 REVISION'**
**3.657m WIDE HEAVY
FLOAT MODULE ASSEMBLY**

SIZE DWG. NO. REV
D FM12-HV-000 E

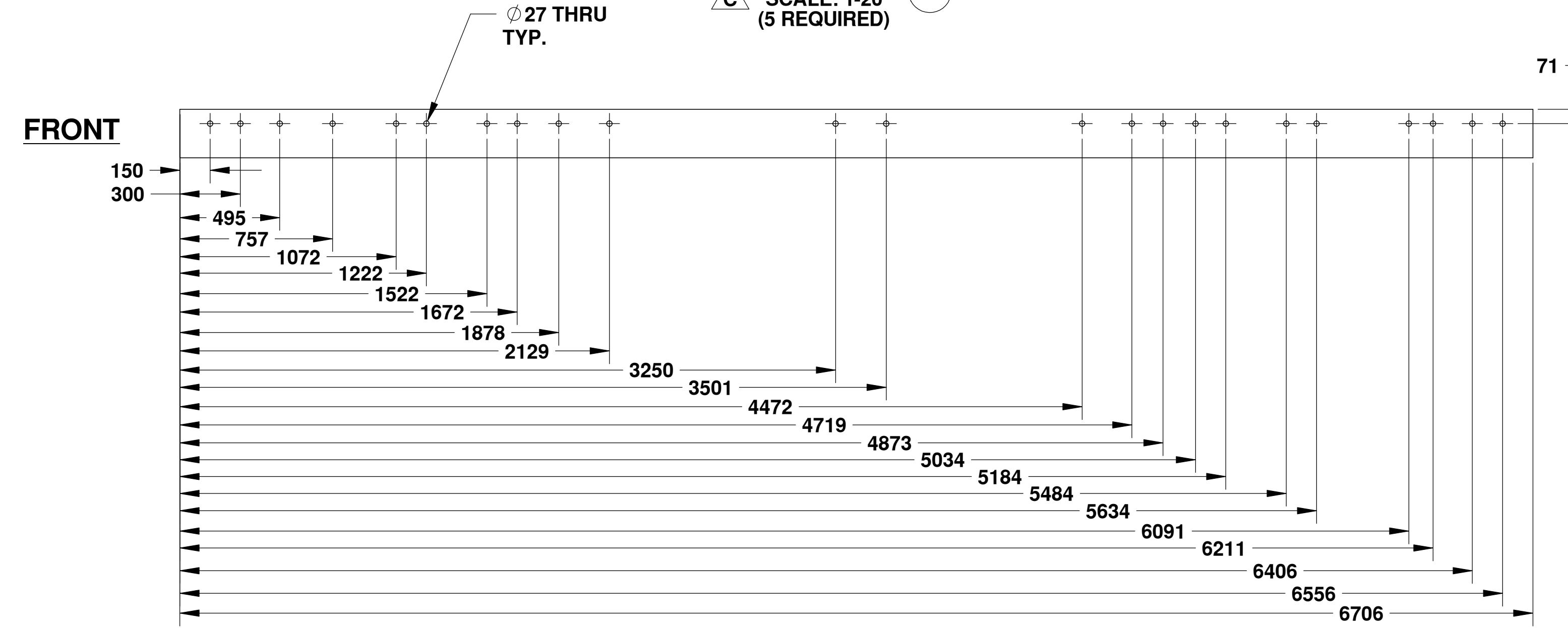
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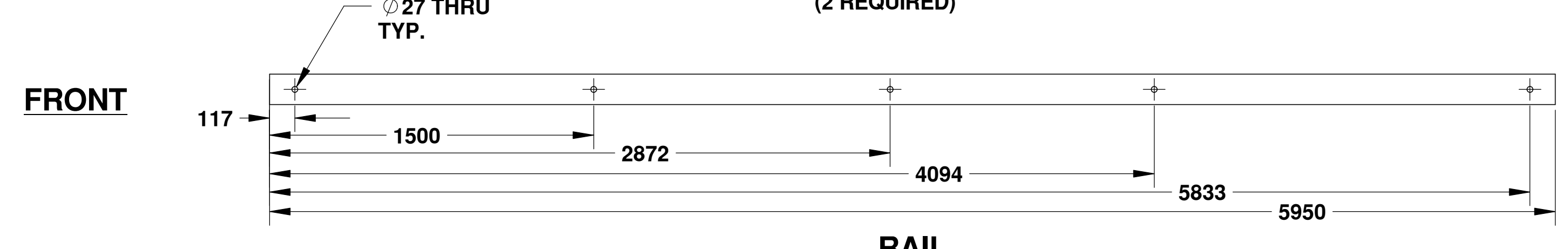
FLANGE
292 x 141 (12x6)
SCALE: 1-20
(2 REQUIRED) ①



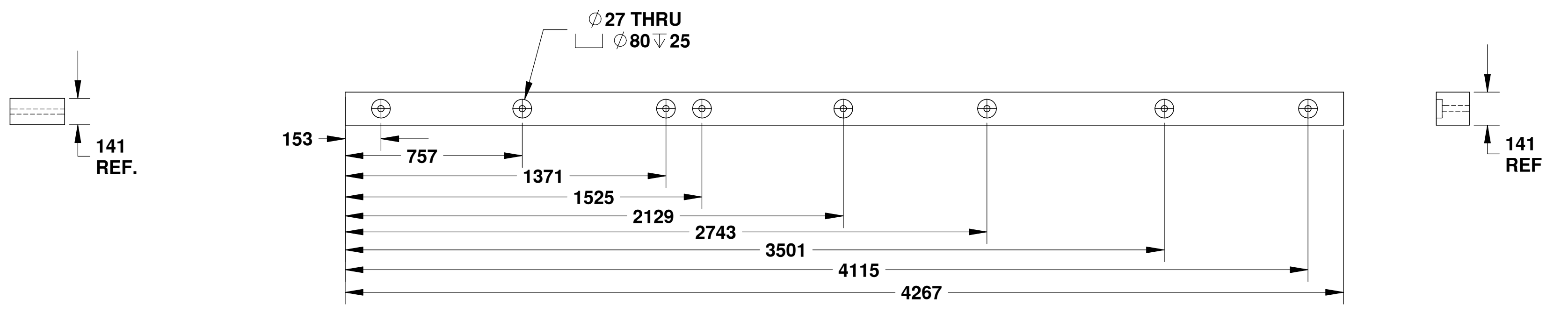
CROSTIE (Reversible)
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(5 REQUIRED) ②



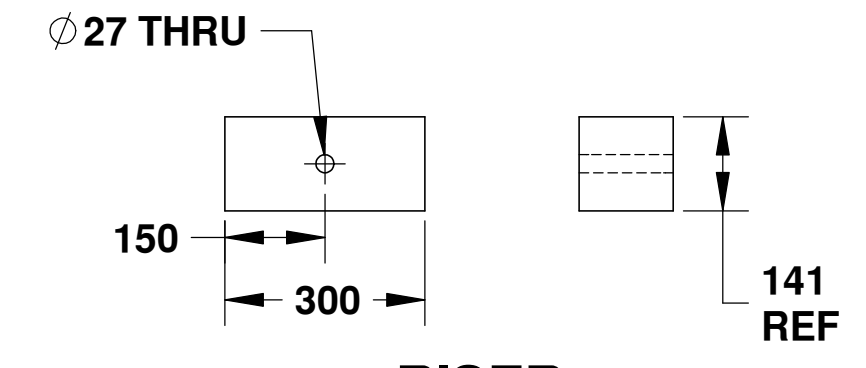
STRINGER
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SCALE: 1-20
(2 REQUIRED) ③



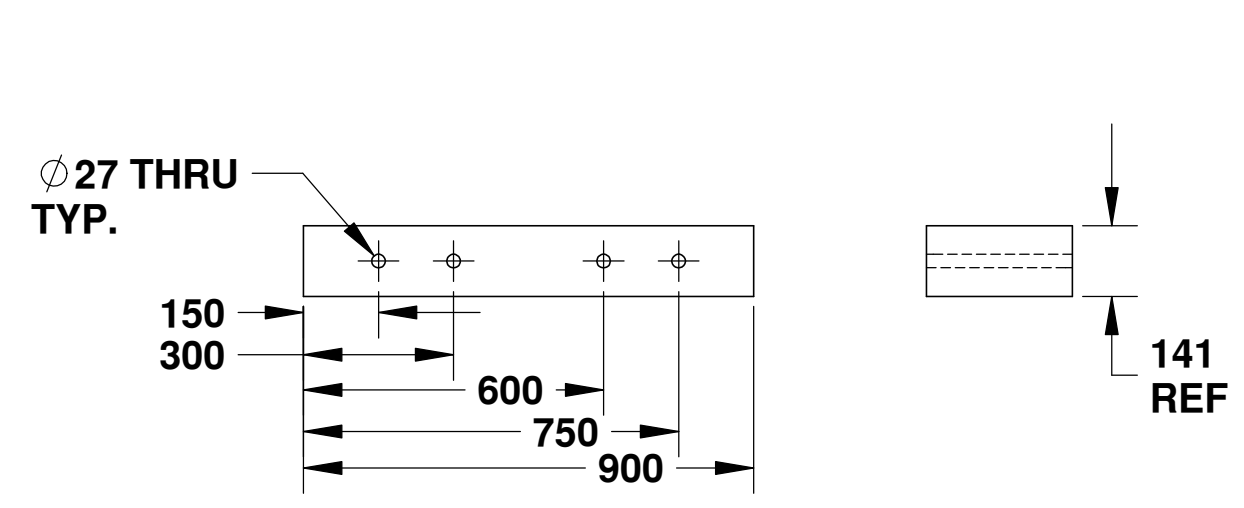
RAIL
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SCALE: 1-20
(2 REQUIRED) ⑥



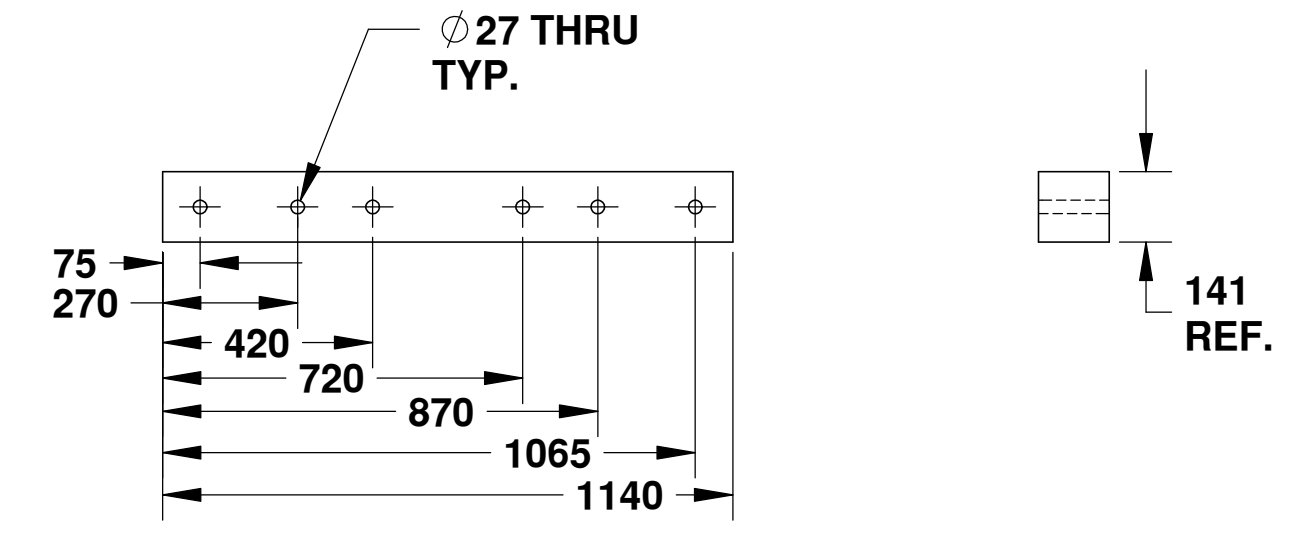
JOIST
141 x 141 (6x6)
SCALE: 1-16
(6 REQUIRED) ④



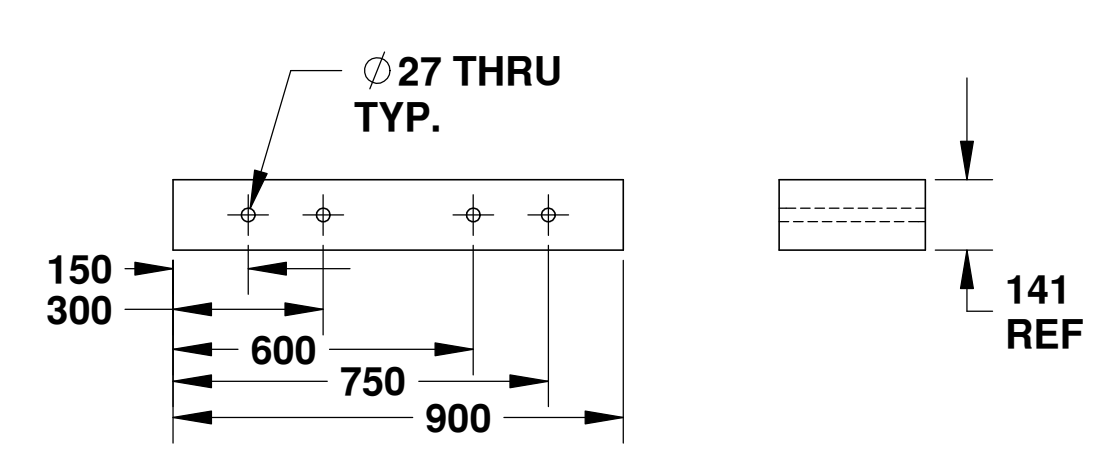
RISER
141 x 141 (6x6)
SCALE: 1-16
(6 REQUIRED) ⑤



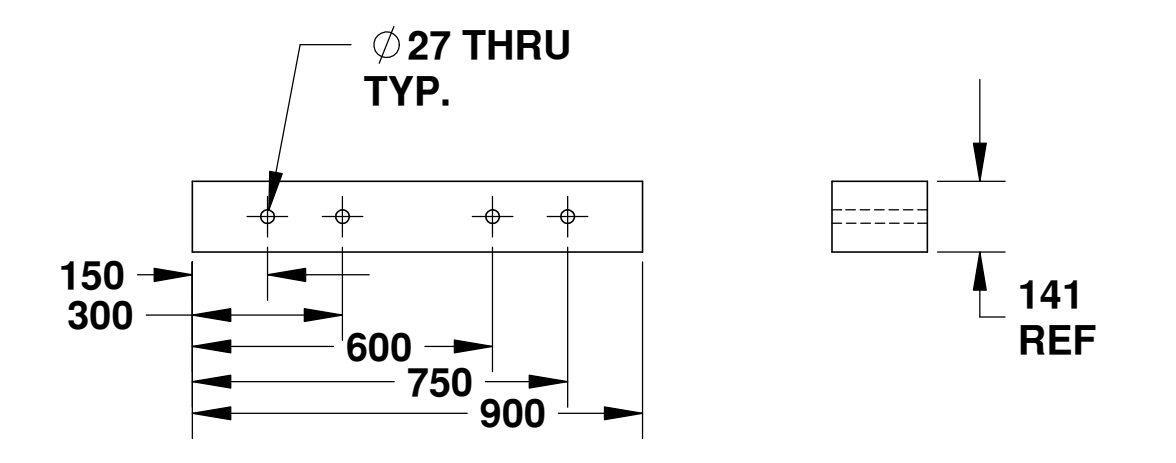
LOWER STRINGER SPLICE
292 x 141 (12x6)
SCALE: 1-16
(2 REQUIRED) ⑧



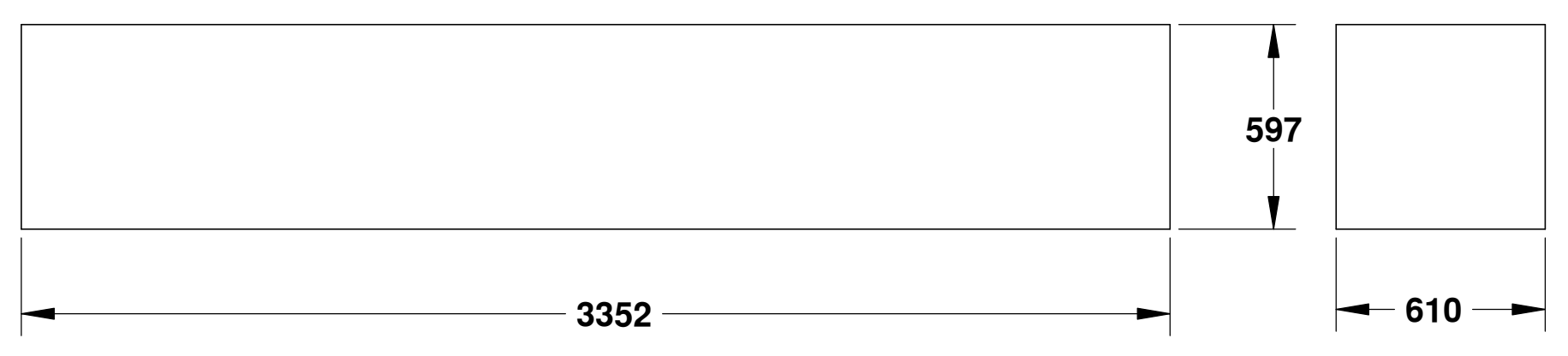
UPPER STRINGER SPLICE
141 x 141 (6x6)
SCALE: 1-16
(2 REQUIRED) ⑦



UPPER FLANGE SPLICE
292 x 141 (12x6)
SCALE: 1-16
(2 REQUIRED) ⑨



LOWER FLANGE SPLICE
141 x 191 (6x8)
SCALE: 1-16
(2 REQUIRED) ⑩



FOAM BUOYANCY FLOAT
610 x 597 x 2438 LG.
SCALE: 1-20
(5 REQUIRED) ⑳

HOLES ARE TO BE DRILLED CENTER LINE UNLESS OTHERWISE NOTED

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UNLESS OTHERWISE SPECIFIED:		DATE	NAME
DIMENSIONS ARE IN INCHES		12/11	WSL
TOLERANCES:			
FRACTIONAL ±	CHECKED		
ANGULAR: MATCH BEND ±	ENG APPR.		
TWO PLACE DECIMAL ±	MFG APPR.		
THREE PLACE DECIMAL ±	G.A.		
INTERPRET GEOMETRIC TOLERANCING PER:		COMMENTS:	
MATERIAL	---		
FINISH	---		
APPLICATION	DO NOT SCALE DRAWING		

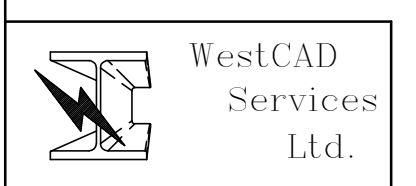
Fisheries & Oceans / Pêches et Océans

Small Craft Harbours Branch

TITLE: **'2011 REVISION' 3.657m WIDE HEAVY FLOAT MODULE ASSEMBLY**

SIZE DWG. NO. REV: **D FM12-HV-001 E**

SCALE: 1:16 WEIGHT: SHEET 1 OF 1

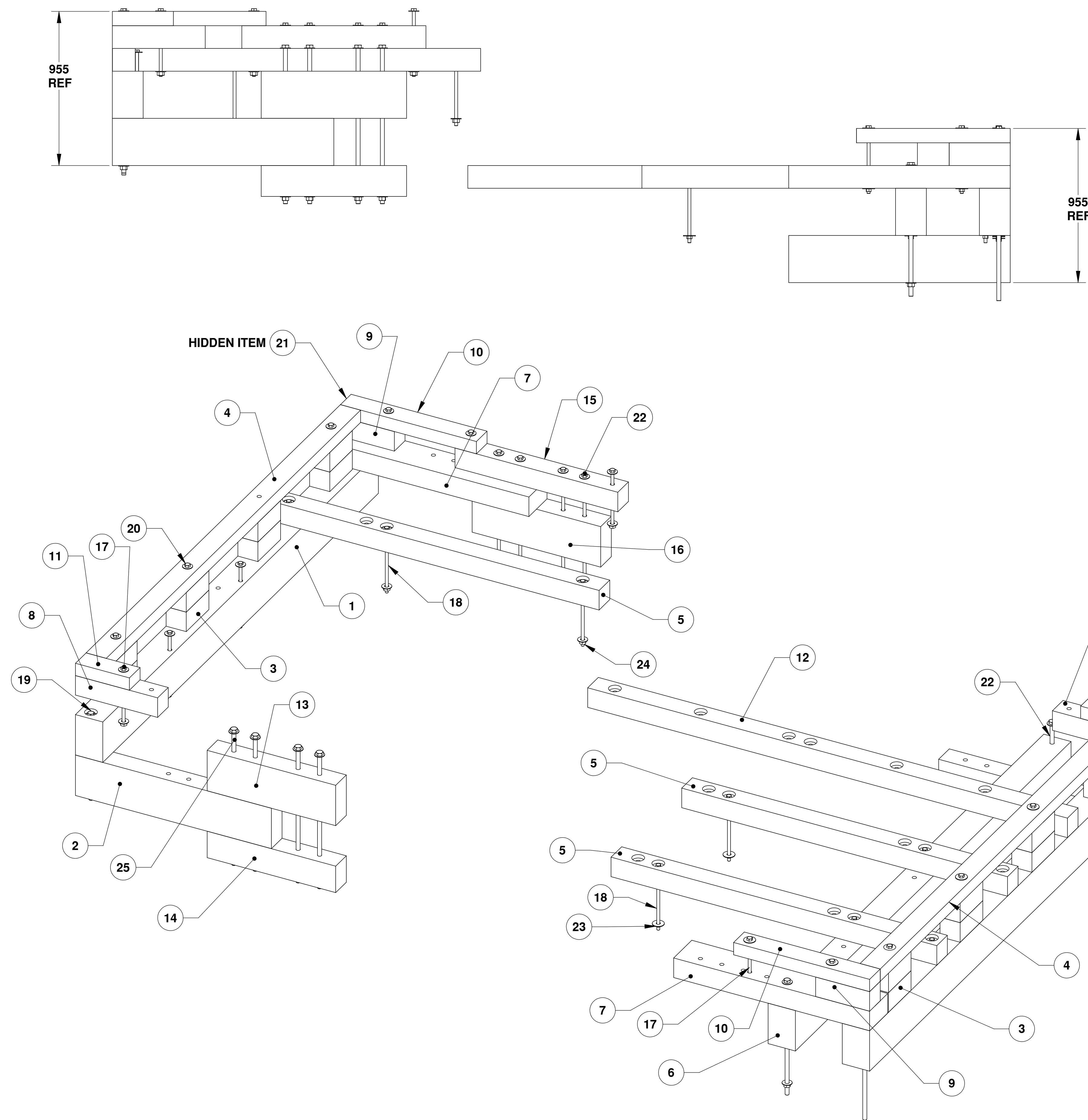


TIMBER MEMBER REQUIREMENTS

ITEM NO.	QTY	TIMBER MEMBER	DESCRIPTION	MATERIAL
1	2	END CROSSTIE	(12x8) 292 x 191 X 3658 LG.	14 LB. CREOSOTE TREATMENT #1 BTR FIR
2	2	FLANGE END	(6x12) 141 x 292 x 1372 LG.	14 LB. CREOSOTE TREATMENT #1 BTR FIR
3	16	END BLOCK	(6x6) 141 X 141 x 300 LG.	ACZA
4	2	END RAIL	(4x6) 89 x 141 X 3374 LG.	ACZA
5	3	JOIST END 'B'	(6x6) 141 x 141 X 2281 LG.	ACZA
6	1	STANDARD CROSSTIE	(12x8) 292 X 191 X 3658 LG.	14 LB. CREOSOTE TREATMENT #1 BTR FIR
7	2	STRINGER END	(6x10) 141 x 241 x 1372 LG.	ACZA
8	2	SPACER END	(6x6) 141 x 141 x 575 LG.	ACZA
9	2	SPACER END 'B'	(6x6) 141 x 141 x 378 LG.	ACZA
10	2	RAIL END	(4x6) 89 X 141 x 952 LG.	ACZA
11	2	RAIL END 'B'	(4x6) 89 X 141 X 378 LG.	ACZA
12	1	MODIFIED JOIST	(6x6) 141 x 141 x 3359 LG.	ACZA
13	1	UPPER FLANGE SPLICE	(12x6) 292 x 141 X 900 LG.	14 LB. CREOSOTE TREATMENT #1 BTR FIR
14	1	LOWER FLANGE SPLICE	(6x8) 141 x 191 X 900 LG.	14 LB. CREOSOTE TREATMENT #1 BTR FIR
15	1	UPPER STRINGER SPLICE	(6x6) 141 x 141 x 1140 LG.	ACZA
16	1	LOWER STRINGER SPLICE	(6x12) 141 x 292 x 900 LG.	14 LB. CREOSOTE TREATMENT #1 BTR FIR

HARDWARE

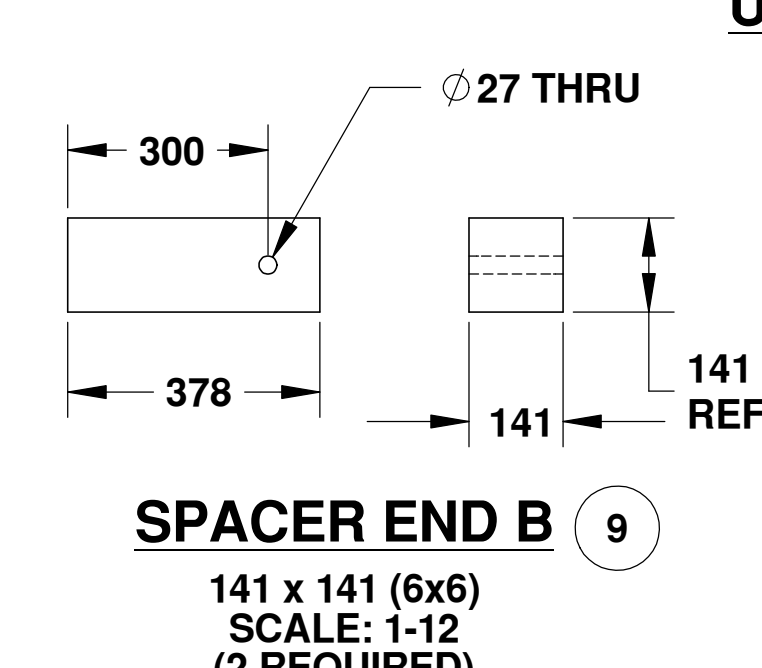
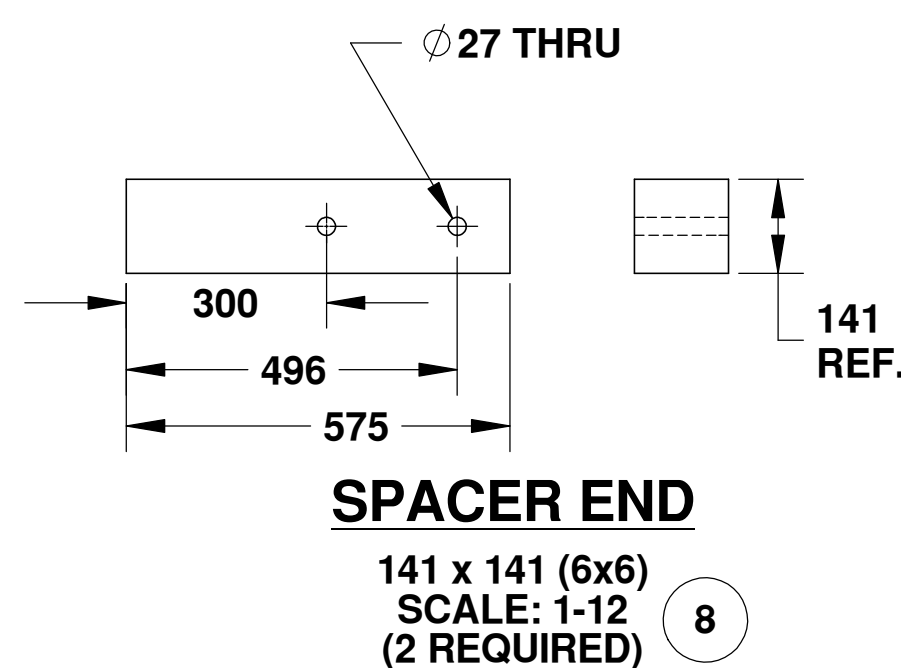
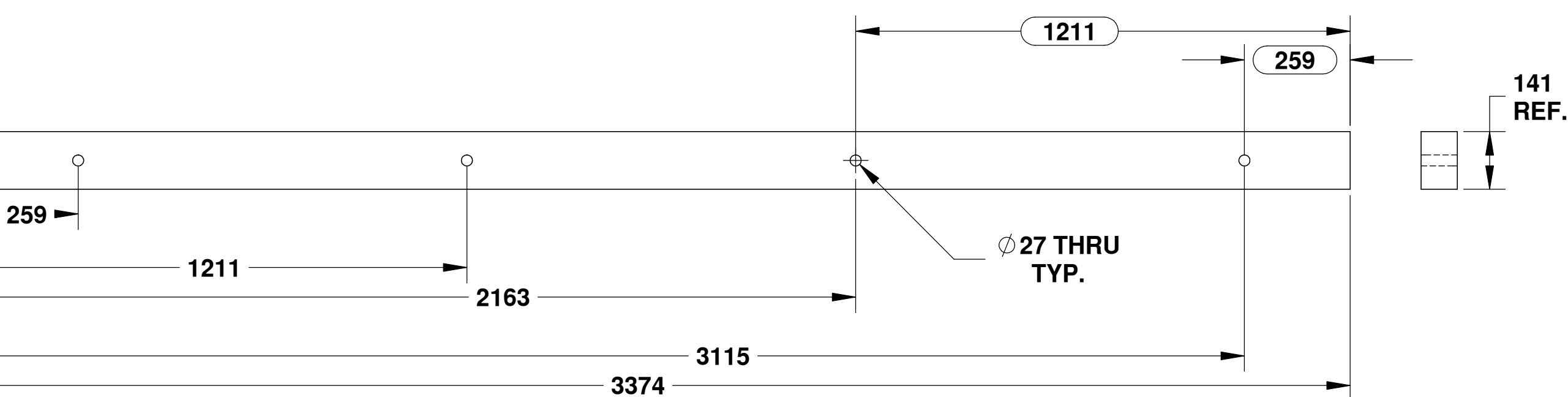
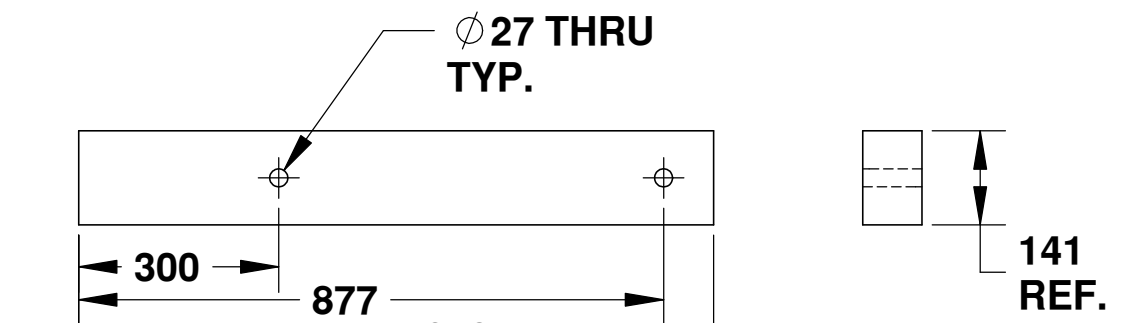
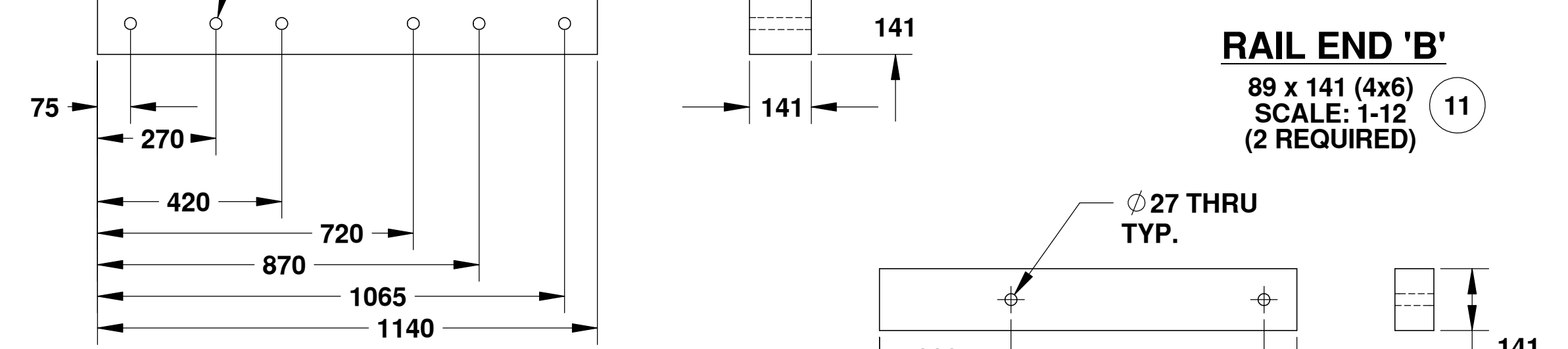
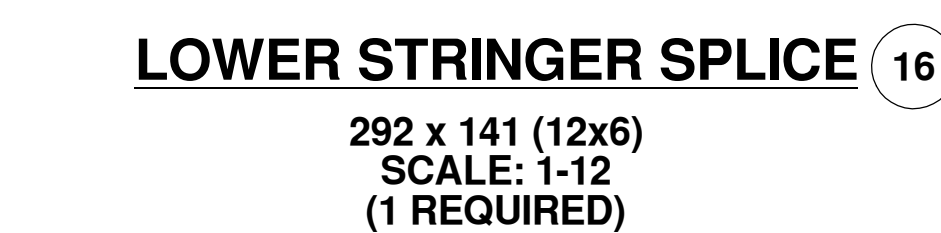
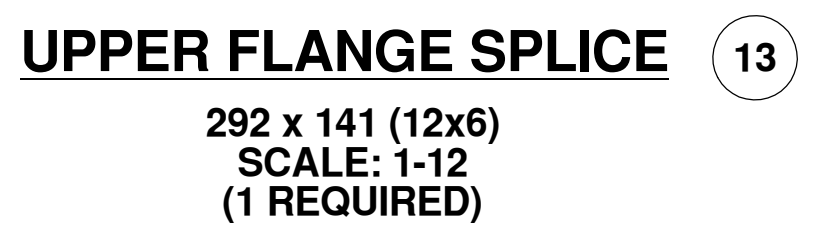
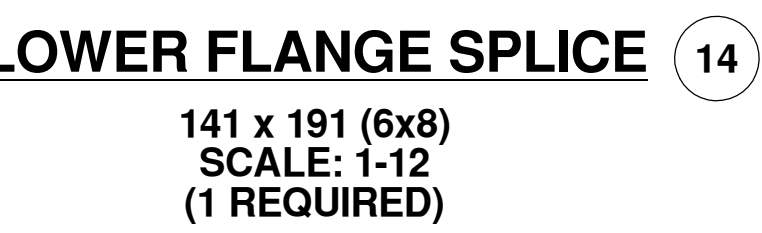
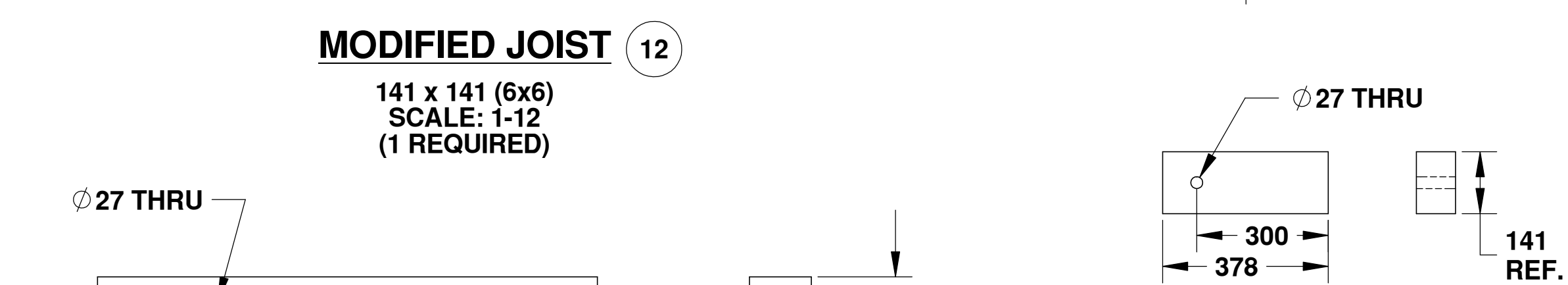
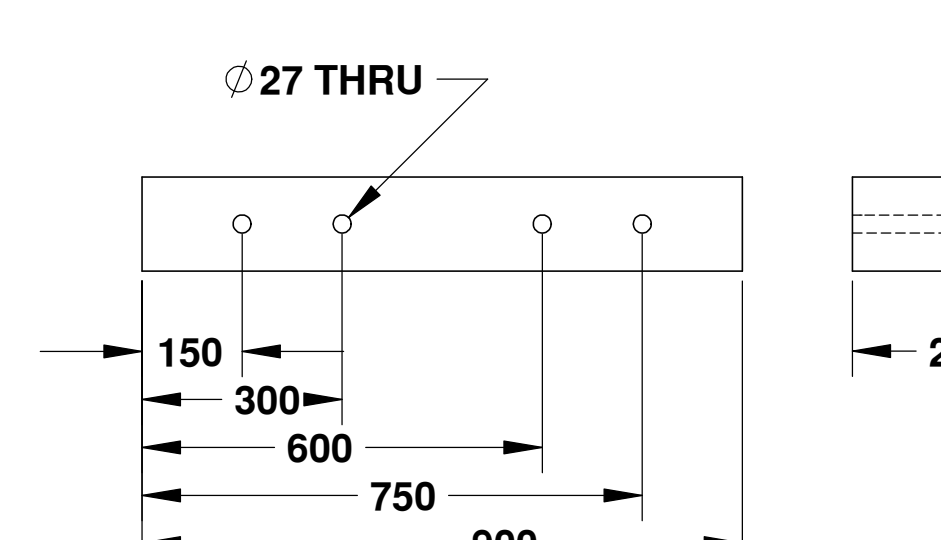
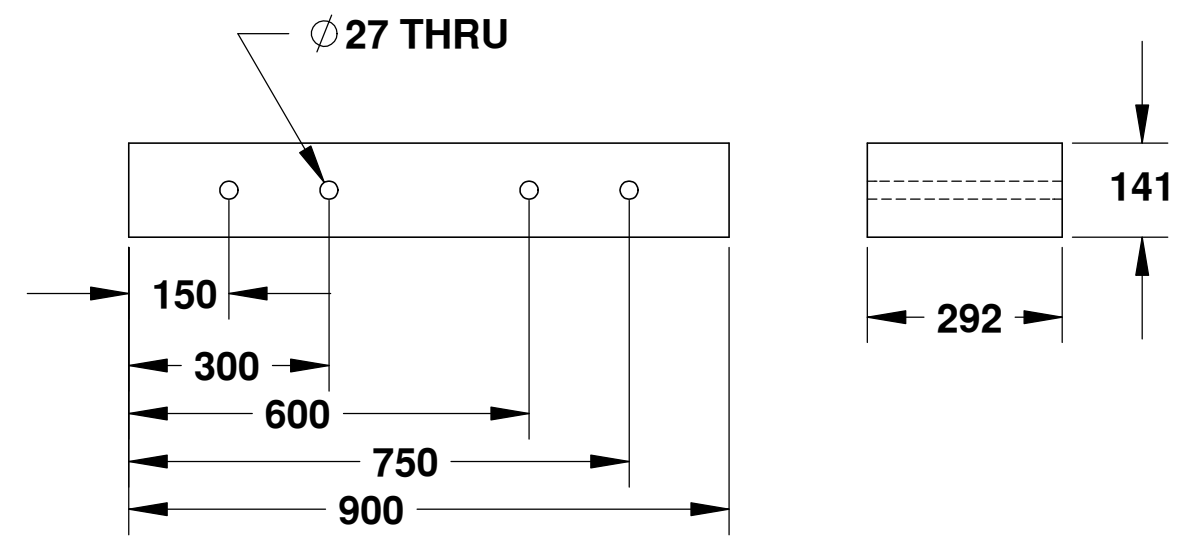
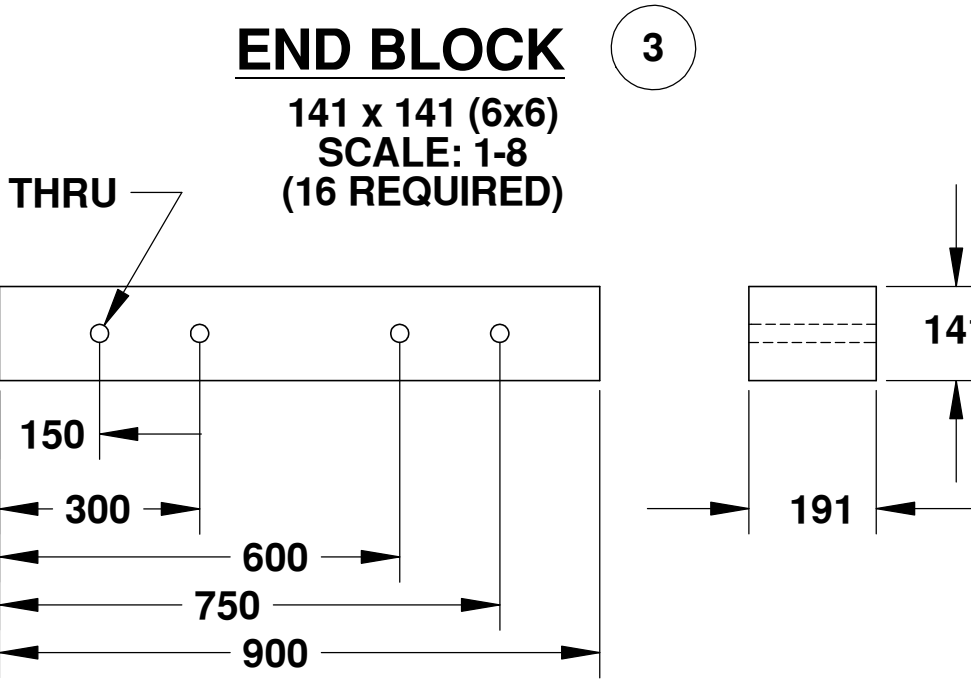
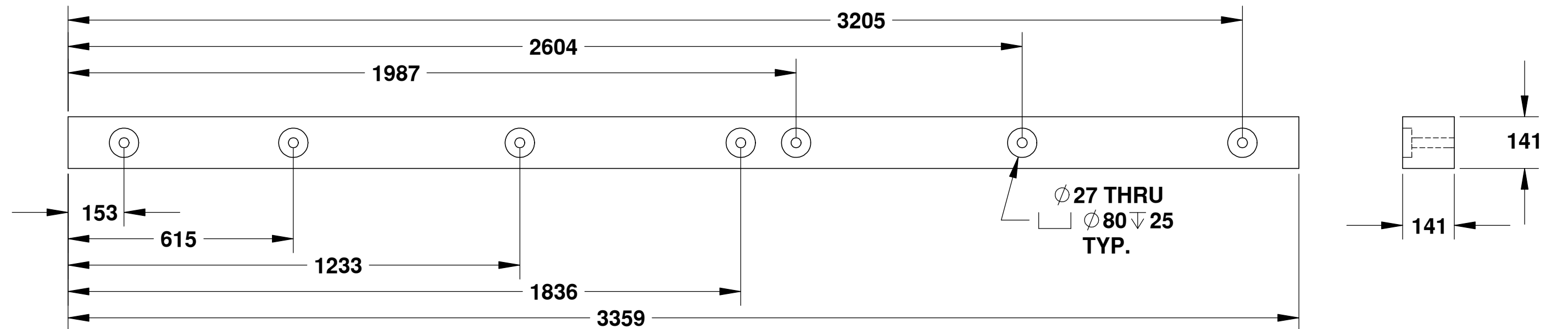
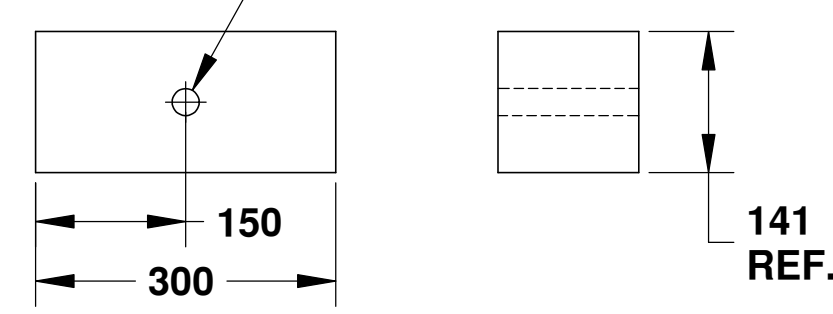
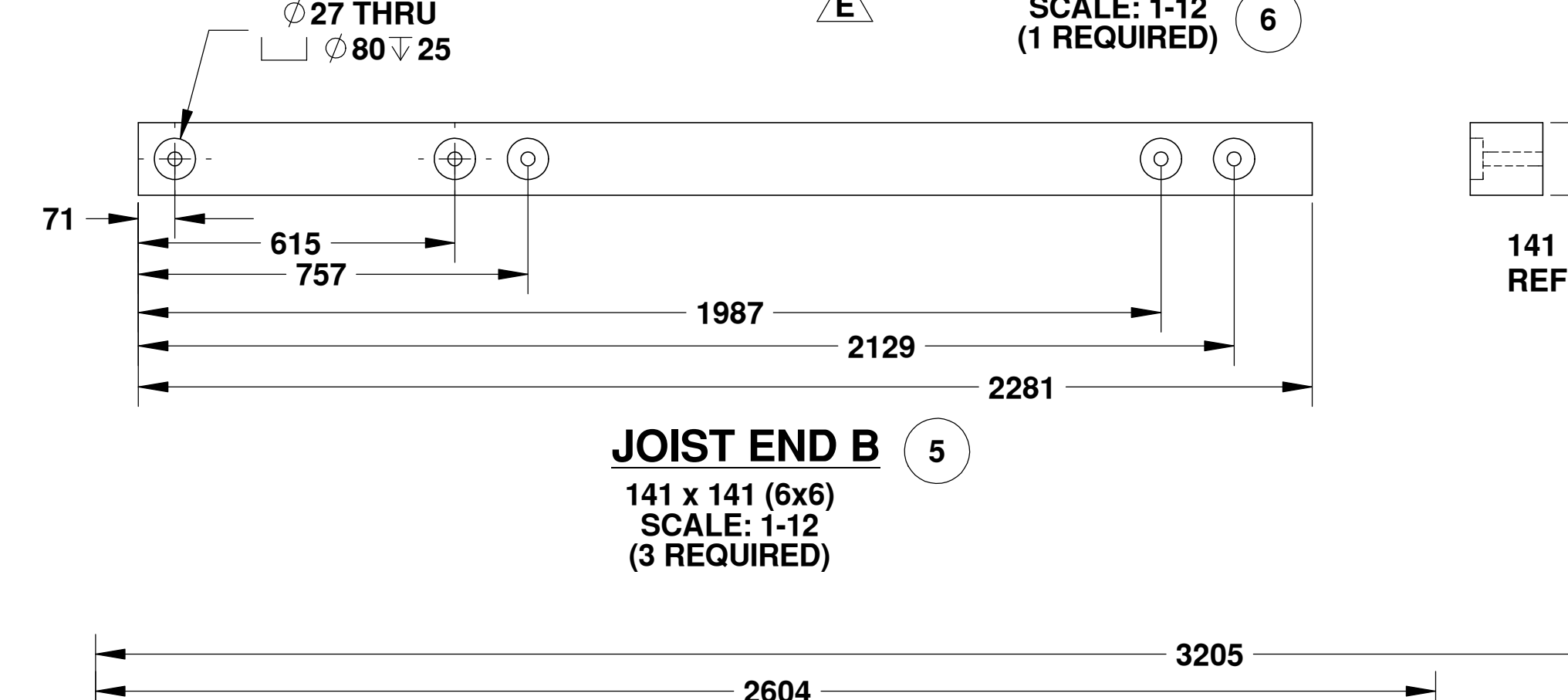
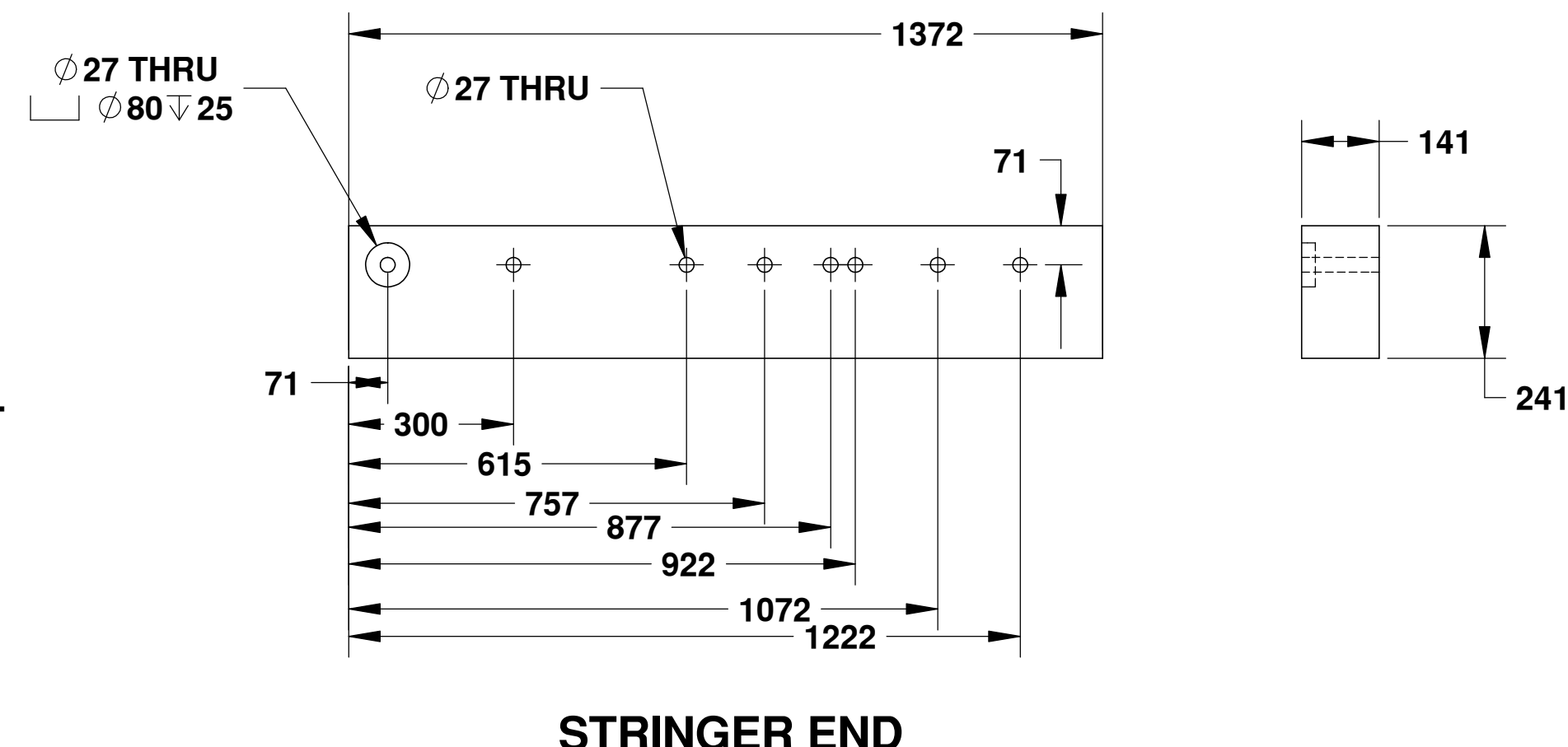
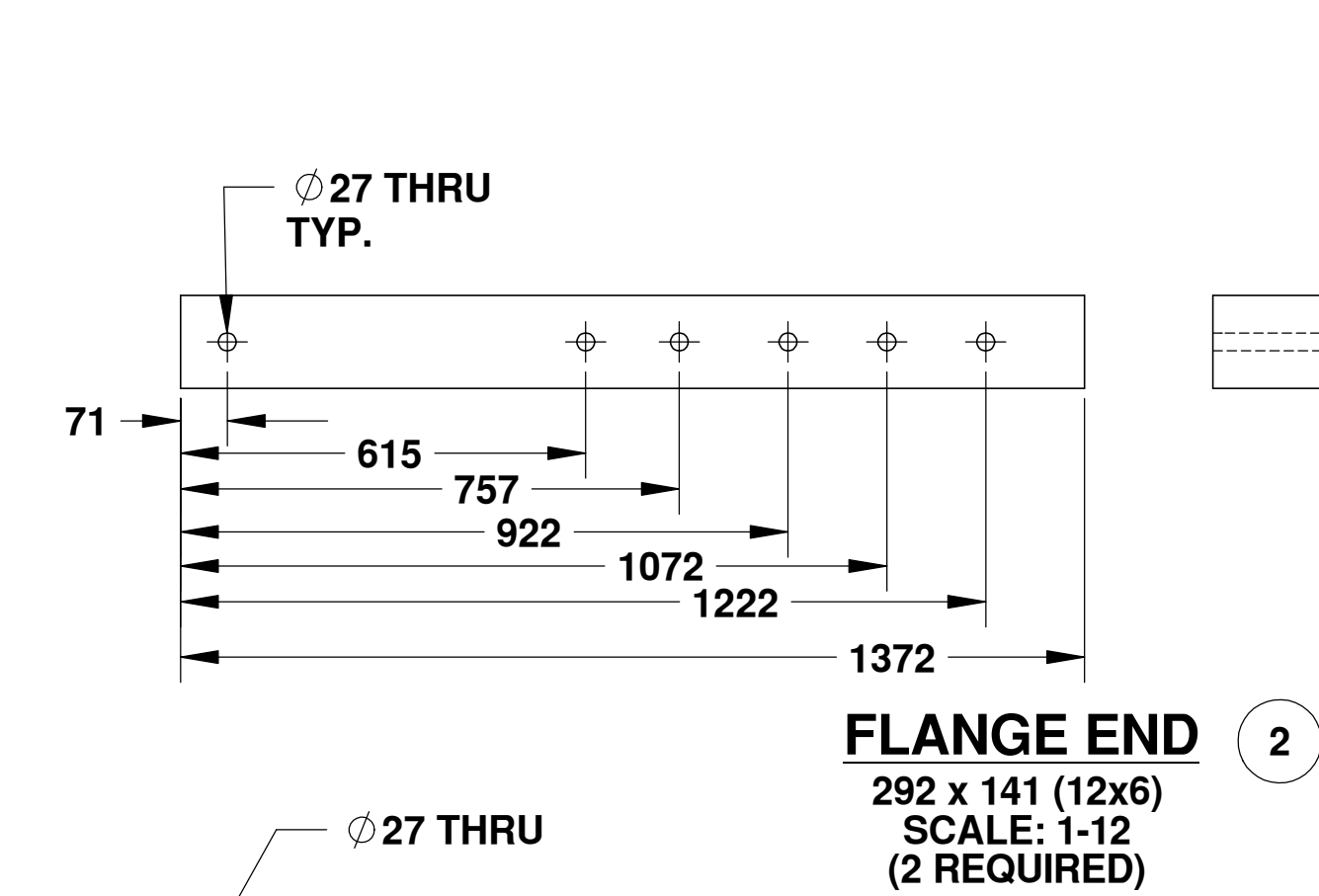
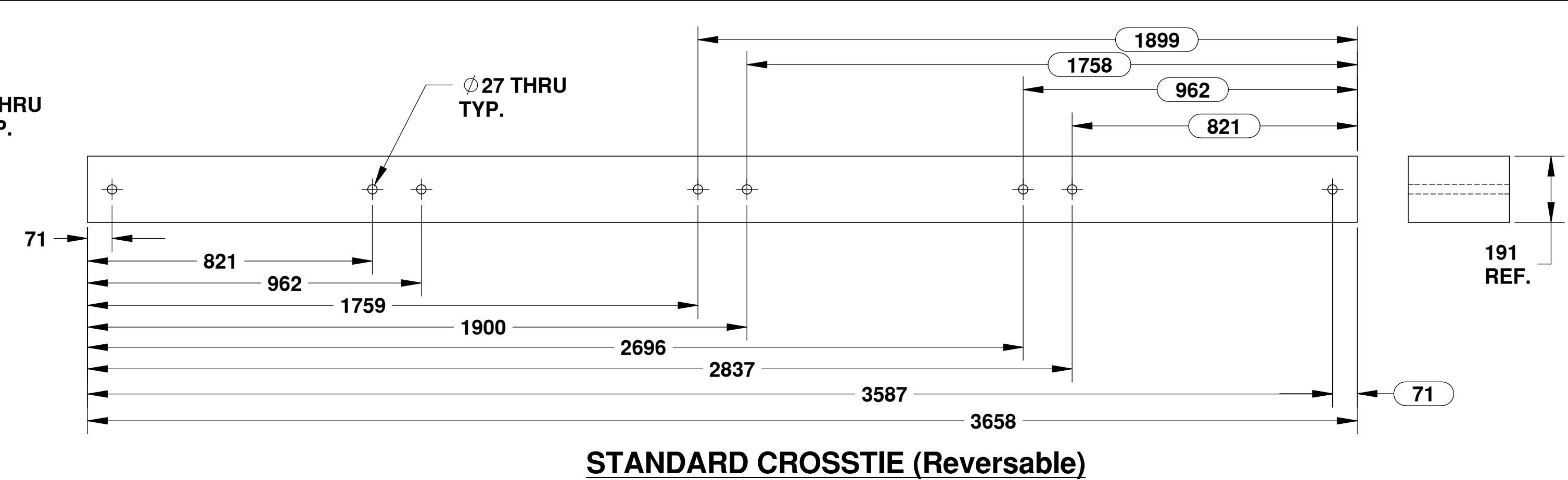
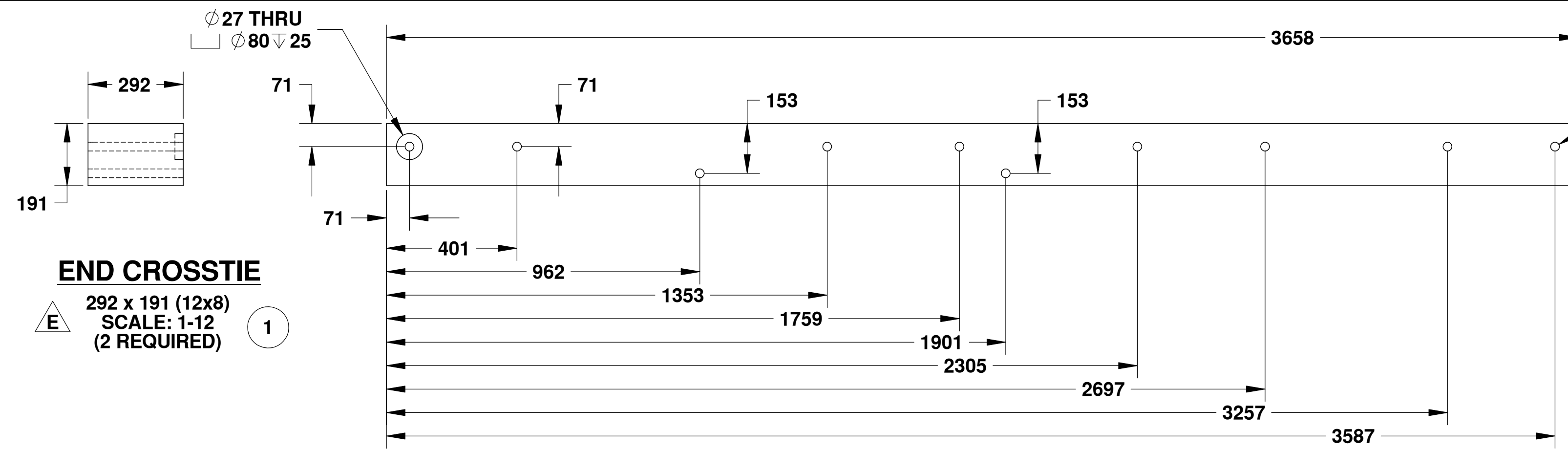
ITEM NO.	QTY	DESCRIPTION
17	7	HEX BOLT 25 X 406
18	13	HEX BOLT 25 x 457
19	2	HEX BOLT 25 X 610
20	8	HEX BOLT 25 x 711
21	4	HEX BOLT 25 X 762
22	4	HEX BOLT 25 X 914
23	84	WASHER 25mm DIA.
24	42	HEX NUT 25mm DIA.
25	4	HEX BOLT 25 x 965



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TOLERANCES:		
FRACTIONAL ±		
ANGULAR: MATCH		
TWO PLACE DECIMAL ±		
THREE PLACE DECIMAL ±		
INTERPRET GEOMETRIC TOLERANCING PER:		
MATERIAL		
NEXT ASSY	USED ON	FINISH
APPLICATION	DO NOT SCALE DRAWING	

Fisheries & Oceans / **Pêches et Océans**
 Small Craft Harbours Branch
TITLE: 3.65m WIDE FLOAT MODULE 2011 REVISION
 SIZE DWG. NO. REV
D FM12-HV-END-000 G
 SCALE: 1:15 | WEIGHT: | SHEET 1 OF 1



HOLES ARE TO BE DRILLED CENTER LINE UNLESS OTHERWISE NOTED

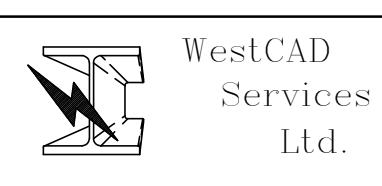


Small Craft Harbours Branch

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UNLESS OTHERWISE SPECIFIED:		DATE	NAME
DRAWN	12/11	WLS	
CHECKED			
ENG APPR.			
MRG APPR.			
G.A.			
COMMENTS:			

TITLE:		2011 REVISION
3.657m WIDE HEAVY		
END MODULES ASSEMBLY		
SIZE	DWG. NO.	REV
D	FM12-HV-END-001	G
SCALE: 1:12	WEIGHT:	SHEET 1 OF 1



APPENDIX B
GEOTECHNICAL REPORT

Cook Pickering & Doyle Ltd.

CONSULTING ENGINEERS

PHONE 879-0494

835 WEST 7TH AVENUE
VANCOUVER 9, B.C.

February 11, 1974

Project #3877 - P

Your File #988-520-1

Public Works Canada,
Pacific Region,
1444 Alberni Street,
Vancouver, B.C.

Dear Sirs:

Re: Soils Investigation Patricia Bay, B.C.

SCOPE

This report gives the results of a soils investigation for the proposed wharf at Pacific Ocean Environment Centre, Patricia Bay, Saanich, B.C. The field work consisted of drilled test holes at locations specified by the Public Works Canada Personnel; who also laid out the range lines to determine test hole locations in the field. This report gives comments with regard to pile capacity in compression and tension, dredging characteristics of the soil and general comments with regard to soil stability.

GENERAL SOIL CONDITIONS

All test holes were taken to bedrock and the three to five feet of core were taken in order to prove that bedrock was encountered rather than boulders above the bedrock. In general, the soils over the bedrock consist of a surface layer three to nine feet thick of loose silty sand and gravel over layers of dense sand and gravel with clayey silt and in some cases layers of glacial till. The total overburden thickness above the bedrock is fairly thin, ranging from eight to sixteen feet.

cont...

DISCUSSION AND RECOMMENDATIONS

The proposed dock will consist of a piled structure with a deck designed for a load of 500 psf. The main lateral loads on the dock will consist of earthquake inertia forces, berthing forces and wind forces. These lateral forces will be resisted by batter piles in tension and compression.

no tension capacity

Compression piles at this site will have fairly high capacity dependent only on the crushing strength between the bedrock and the pile tips. In general, compression piles driven to 80 or 100 tons capacity will penetrate the overburden and achieve their capacity in end bearing on the bedrock. The main problem associated with compression piles will be stability during construction. The thin overburden will have difficulty supporting the batter piles during construction and wave action may tend to cause the vertical piles to rock with an associated unseating at the pile tip. Thus, many of the piles will require substantial ties or false work to achieve stability during construction.

Tension piles at this site will have undependable capacity as is indicated from the soil conditions and the pile pull out tests completed by Public Works Canada Forces. We have analyzed the results of the fifteen pile pull out tests and find there is no dependable correlation between pull out capacity and driving records, soil conditions or depth of penetration. The pull out tests indicate that all tension piles required for the wharf must be field tested to ensure adequate capacity. As a basis for design, we suggest an allowable tensile capacity in the order of 10 kips per pile, (for piles in the order of 13 inches diameter) or a linear increase for larger diameter piles. These piles should be proof loaded during construction to at least 1.5 times the design load. The pile pull out tests indicate that with the above design criteria, at least six out of fifteen piles will fail and thus require replacement or re-driving. The alternate

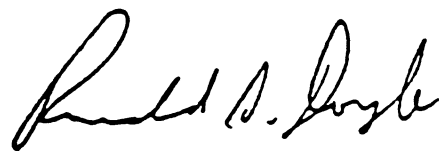
February 11, 1974

Public Works Canada

method of developing tensile capacity is to use rock anchors. Rock anchorage can be designed by either socketing a pipe pile, drilling through a hollow pile (either pipe or hollow concrete) or installing separate anchors in small protective conduits. In general, the anchors should be installed from either the wharf deck or a false work platform, since it is difficult to drill a battered hole from a floating rig. Anchor capacity, generally, depends on bond strength between the grout and the rock. In sound rock, anchors should achieve a design capacity of 100 psi bond between the grout and rock. We recommend that anchors be proof loaded to 1.5 times design capacity.

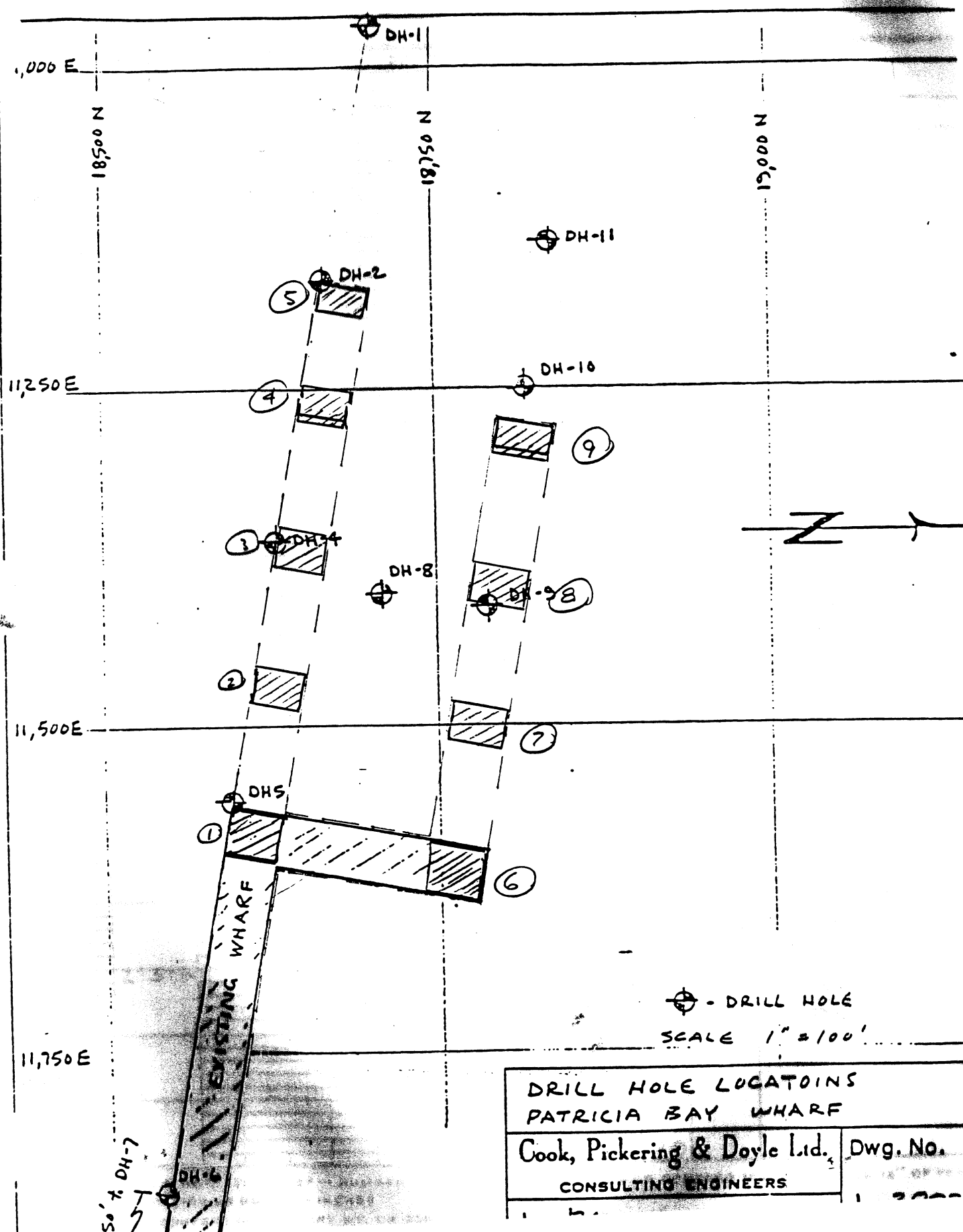
Dredging will be required in order to establish sufficient draught adjacent to the wharf. The loose surface sand and gravel will dredge easily with standard methods. However, the denser sand and gravels (blow counts greater than 30 blows per foot) will be difficult to dig and in some cases may require a very heavy small volume clam bucket to achieve satisfactory progress. These dense glacial tills and dense sand and gravel would be similar to some of the soils encountered in the deepening program of the First Narrows Channel in Vancouver.

Yours very truly,



RONALD G. DOYLE, P. ENG.
COOK, PLICKERING & DOYLE LTD.

RGD/twb



⊕ - DRILL HOLE
SCALE 1" = 100'

DRILL HOLE LOCATIONS PATRICIA BAY WHARF	
Cook, Pickering & Doyle Ltd. CONSULTING ENGINEERS	Dwg. No.

COND	N	SAMPLER	10 20 30 40 50 60 70 80 90																	DEPTH ELEV	SYMBOL	DESCRIPTION
																				36		DH-1 SAND, some silt
																				10 46		TILL
																				20		ROCK
																				0		DH-2
																				26		SAND & GRAVEL
																				10 36		Silty SAND & fine GRAV
																				20		Gravely TILL
																				20		ROCK
																				0		DH-4
																				18		Silty SAND
																				10		Sandy clayey SILT
																				10 28		Clayey SILT
																				20		ROCK

N - STANDARD PENETRATION TEST - NUMBER OF BLOWS OF 140 LB. HAMMER DROPPED 30" TO PRODUCE 1" OF PENETRATION OR PENETRATION AS NOTED - INCHES
 ○ - MOISTURE CONTENT IN % BY DRY WT. OF SOIL
 ▽ - PLASTIC LIMIT

Cook Pickering & Doyle Ltd.

838 WEST 7TH AVENUE, VANCOUVER 9, B.C.

PROJECT PAT. BAY
 JOB NO. 227

COND. N	SAMPLER	10	20	30	40	50	60	70	80	90	DEPTH ELEV.	SYMBOL	
0											22		DH-5
10	2" STA										10		Clayey SILT, Gravel & Org.
											32		ROCK
20											20		
0											0		DH-6
											90		SAND + GRAV.
											10		Clayey SILT layers of Sand + Gravel
											19		ROCK
0											0		DH-7
											90		SILT
10											10		Clayey SILT
											19		ROCK

N - STANDARD PENETRATION TEST - NUMBER OF BLOWS OF 140 LB. HAMMER DROPPED 30" TO PRODUCE 12" OF PENET OR PENETRATION AS NOTED - INCHES
 ○ - MOISTURE CONTENT IN % BY DRY WT. OF SOIL
 X - UNCONFINED COMPRESSION STRENGTH - PSI.
 ▶ - PLASTIC LIMIT ◀ - LIQUID LIMIT ▼ - GROUND WATER LEVEL
 (X) - TORVANE OR PENETROMETER IN EQUIV. UNCONFINED

Cook Pickering & Doyle Ltd.

838 WEST 7TH AVENUE, VANCOUVER 9, B.C.

PROJECT

PAT B...

JOB NO.

3877

COND	N	SAMPLER	10 20 30 40 50 60 70 80 90																	DEPTH ELEV	SYMBOL	DESCRIPTION
																				20		DI-8 Soft silt SAND
																				10		Silt SAND & GRAVEL
																				30		
		WILD 2 STA																		20		ROCK
																				40		
																				0		DI-9 Silt SAND & GRAVEL
																				22		
		WILD 2 STA																		10		ROCK
																				32		
																				0		DI-10 Silt SAND & GRAVEL
																				23		
		WILD 2 STA																		10		ROCK
																				33		

N - STANDARD PENETRATION TEST - NUMBER OF BLOWS OF 140 LB. HAMMER DROPPED 36" TO PENETRATE 12" OF PENETRATION AS NOTED - INCHES

APPENDIX C
ENVIRONMENTAL
REQUIREMENTS

Standard Mitigation Organized by Project Activity

PROJECT ACTIVITY	MITIGATION
<p>GENERAL (to be incorporated into all activities below)</p>	<ol style="list-style-type: none"> 1. Ensure all personnel involved with activities are adequately trained and utilize appropriate personal protective equipment. 2. Storage of fuels and petroleum products will comply with safe operating procedures, including containment facilities in case of a spill. 3. Waste or any miscellaneous unused materials will be recovered for either disposal in a designated facility or placed in storage. Under no circumstances will materials be deliberately thrown into the marine or terrestrial environment. 4. Onsite crews will have emergency spill equipment available. 5. All activities should be completed in such a way as to minimize stress and disturbance to resident flora and fauna. 6. Operations should only operate where entirely necessary to complete the works to reduce effects to nearby soils, vegetation, and resident species. Respect should be given to the natural environment to minimize the footprint of the project. 7. Aesthetic effects created by activities will be short-term and localized. Sites should be kept in a tidy manner during activities and left in a good condition at the end of the project. 8. Archaeological sites in remote locations are not likely to have been previously identified. Care should be taken to observe archaeological deposits while work is being completed. Work must be stopped if evidence shows a potential archaeological artifact or deposit.
<p>MACHINERY OPERATION</p>	<ol style="list-style-type: none"> 1. All equipment will be maintained in proper running order to prevent leaking or spilling of potentially hazardous or toxic products. This includes hydraulic fluid, diesel, gasoline and other petroleum products. 2. Vehicles should not be operated below the line of Highest High Water in the intertidal zone. 3. Operations should only operate where entirely necessary to complete the works to reduce effects to nearby soils, vegetation, and resident species. Respect should be given to the natural environment to minimise the footprint of the project. 4. Machinery must be operated efficiently, to ensure that noise and air quality issues are short-term and local.
<p>POWER-WASHING</p>	<ol style="list-style-type: none"> 1. Activities should be completed in such a way as to minimise the amount of fines and organic debris that may enter nearby aquatic environments.
<p>EXCAVATION/ROCK DRILLING</p>	<ol style="list-style-type: none"> 1. Rock drilling and excavation activities must be conducted conservatively so that physical changes to rock remain small and localized. 2. Dust and fines entering the water must be avoided. 3. Archeological sites in remote locations are not likely to have been previously identified. Care should be taken to observe archaeological deposits while work is being completed. Work must be stopped if

Standard Mitigation Organized by Project Activity

PROJECT ACTIVITY	MITIGATION
EXCAVATION/ROCK DRILLING continued	<p>evidence shows a potential archaeological artifact or deposit.</p> <ol style="list-style-type: none"> 4. Loose material at excavation sites should be managed to avoid excessive migration of silt and debris to nearby waters, especially during heavy rainfall events. 5. All excavation below Highest High Water should be completed by hand, as no vehicles should be operated in the intertidal zone. 6. Any blasting will follow the Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters.
PILE INSTALLATION	<ol style="list-style-type: none"> 1. All equipment will be maintained in proper running order to prevent leaking or spilling of potentially hazardous or toxic products. This includes hydraulic fluid, diesel, gasoline and other petroleum products. 2. Contractors where possible will position their water borne equipment in a manner that will minimize damage to identified fish habitat (e.g. eel grass). Where possible, alternative methods will be employed (e.g. use of anchors instead of spuds). 3. Proper notice should be given to transportation authorities to warn of potential disruptions to navigability during works. 4. Whenever Contractors are working in areas where spawning is present, appropriate monitoring by a qualified person will be undertaken and activities ceased if spawn disruption is apparent. 5. Where possible, new timber piles will comply with the BMP for the use of treated wood in aquatic environments as developed by the Canadian Institute of Treated Wood and the Western Wood Preservers Institute. 6. Where the BMP pilings are not available, creosote piling will stand for a minimum of 45 days prior to installation. These requirements are for new pilings only and will not restrict the use of re-used timber pilings. Reused pilings will not be subject to any additional treatments. 7. If pile installation activities are causing fish kill, work must cease immediately and contractors will be responsible for introducing effective means of reducing the level of shock waves or introduce measures that will protect fish from entering the potentially harmful shock wave area. For example, appropriate mitigating measures would include the deployment a bubble curtain over the full length of the wetted pile that would defuse the shock waves to an acceptable level. 8. If, after preventive measures are introduced, visual monitoring reveals unacceptable conditions (fish kill), then work will stop immediately and the system reviewed and corrected. 9. Any instances of fish kill must be reported to the appropriate agencies (DFO). 10. When cleaning out pipe piles (i.e. air lifting), if the material that is to be removed inside the pipe is non-toxic, then it shall be redistributed in a manner that will minimize damage to the surrounding aquatic fish habitat.

Standard Mitigation Organized by Project Activity

PROJECT ACTIVITY	MITIGATION
CONCRETE WORKS	<ol style="list-style-type: none"> 1. When pouring concrete all spills of fresh concrete must be prevented. If concrete is discharged from the transit mixer directly to the form work or placed by wheelbarrow, proper sealed chutes must be constructed to avoid spillage. If the concrete is being placed with a concrete pump, all hose and pipe connections must be sealed and locked properly to ensure the lines will not leak or uncouple. Crews will ensure that concrete forms are not filled to overflowing. 2. All concrete forms will be constructed and sealed in a manner which will prevent fresh concrete or cement laden water from leaking into the surrounding water. 3. All tools, pumps, pipes, hoses and trucks used for finishing, placing or transporting fresh concrete must be washed off in such a way as to prevent the wash off water from entering the marine environment. The wash water will be contained and disposed of upland in an environmentally acceptable manner.
SITE ACCESS	<ol style="list-style-type: none"> 1. Site access practices must be undertaken with regard to resident flora and fauna, especially during times of the year when they are most sensitive.
AID MAINTENANCE	<ol style="list-style-type: none"> 1. Equipment maintenance activities must be completed in a manner that prevents the deposit of foreign materials to the environment. 2. Power washing activities must follow mitigation provided under “POWER-WASHING” 3. An approach of “contain and recover” should be adopted. Drop sheets or other means should be used to prevent paint chips and other debris from entering the surrounding environment. Refuse should be disposed of properly. 4. Painting activities should be completed in such a way as to minimise the amount of fumes that may enter the environment. The amount of paint used should be minimized and unused containers must be covered.
PILE REMOVAL	<ol style="list-style-type: none"> 1. Contractors will position their water borne equipment in a manner that will minimize damage to identified fish habitat (e.g. eel grass). Where possible, alternative methods will be employed (e.g. use of anchors instead of spuds). 2. When demolition is required on timber pile structures, the contractor will remove the piling by mechanical means and avoid breaking the piling at the mud line or below. All demolition operations should be monitored in order to control and contain the construction debris.
CONCRETE BASE REMOVAL	<ol style="list-style-type: none"> 1. Contractors where possible will position their water borne equipment in a manner that will minimize damage to identified fish habitat (e.g. eel grass). Where possible, alternative methods will be employed (e.g. use of anchors instead of spuds). 2. All debris deposited throughout the life of the aid should be removed from the site.
CONCRETE BASE ABANDONMENT	<ol style="list-style-type: none"> 1. Care should be taken to remove all components of the Fixed Aid that are not incorporated into the concrete base.

Standard Mitigation Organized by Project Activity

PROJECT ACTIVITY	MITIGATION
CONCRETE BASE ABANDONMENT continued	<ol style="list-style-type: none">2. All debris deposited throughout the life of the aid should be removed from the site.3. Areas near the base should be protected from excessive disturbance.4. Concrete base abandonment will be conducted only in remote sites, where aesthetic effects are not a concern.