

New Marginal Wharf

Newellton

Shelburne County, N.S.

Project No. R.064747.001

Aggregates General

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PART 1 - GENERAL

- 1.1 Related Work
- .1 Refer to other Specification Sections for related information.
 - .2 Refer to **Section 01 33 00** for Shop Drawing/Submission requirements.
- 1.2 Source Approval
- .1 Source of materials to be incorporated into work or stockpiled requires acceptance.
 - .2 Inform *Engineer* of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.
 - .3 If, in opinion of *Engineer*, materials from the proposed source do not meet, or cannot reasonably be processed to meet specified requirements, procure an alternative source to demonstrate that materials from source in question can be processed to meet specified requirements.
 - .4 Should a change of material source be proposed during work, advise *Engineer* 4 weeks in advance of proposed change to allow sampling and testing.
 - .5 Acceptance of material at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is found to be unsatisfactory.
- 1.3 Production Sampling
- .1 Aggregate will be subject to continual sampling during production.
 - .2 Provide *Engineer* with ready access to source and processed material for purpose of sampling and testing.
- 1.4 Measurement for Payment
- .1 This item will not be measured separately.

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PART 2 - PRODUCTS

- 2.1 Materials
- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material or other deleterious substances.
 - .2 Flat and elongated particles are those whose greatest dimension exceeds four times their least dimension.
 - .3 Fine aggregates satisfying requirements of applicable section shall be one, or a blend of following:
 - .1 Natural sand
 - .2 Manufactured sand
 - .3 Screening produced in crushing of quarried rock, boulders, gravel or slag
 - .4 Coarse aggregates satisfying requirements of applicable section shall be one of following:
 - .1 Crushed rock or slag
 - .2 Gravel composed of naturally formed particles of stone.

PART 3 - EXECUTION

- 3.1 Development of Aggregate Source
- .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by the *Engineer*.
 - .2 Clear, grub and strip an area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
 - .3 When operating in stratified deposits use excavation equipment and methods that will produce a uniform, homogeneous aggregate.
 - .4 When excavation is completed, provide drains or ditches as required to prevent surface standing water.

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- .5 Trim off and dress slopes of waste material piles and leave site in a neat condition.
- 3.2 Processing
- .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
- .2 Blend aggregate if required to obtain gradation requirements specified. Use approved methods and equipment.
- .3 Blending to increase percentage of crushed particles or decrease percentage of flat and elongated particles is permitted.
- .4 Wash aggregates if required to meet specifications. Use only equipment accepted by *Engineer*.
- 3.3 Handling
- .1 Handle and transport aggregates to avoid segregation, contamination and degradation.
- 3.4 Stockpiling
- .1 Stockpiling aggregates on stabilized, clean and well drained surfaces.
- .2 To ensure that no material other than stockpiled aggregate is used, do not incorporate bottom 250 mm of stockpile into work, if aggregates are stockpiled on ground.
- .3 Stockpile far enough apart to prevent intermixing.
- .4 Reject intermixed or contaminated materials. Remove and dispose of rejected materials as directed within 48 hours of rejection.
- .5 Stockpile materials in uniform layers of thickness as follows:
- .1 Max 1 m for coarse aggregate and base course materials.
- .2 Max 2 m for fine aggregate and subbase materials.
- .3 Max 1.5 m for other materials.

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- .6 Complete each layer over entire stockpile area before beginning next layer.
- .7 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .8 Coning of piles or spilling of material over edges of pile will not be permitted.
- .9 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

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Sitework and Removals

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PART 1 - GENERAL

1.1 Description of Work

This Section includes but is not limited to the the following:

- .1 All normal removals as required to complete the work, including but not limited to:
 - .1 Removal, sorting and salvage of existing excavation and dredge material for reuse within new work limits.
 - .2 Construction of new service area and approach road utilizing both existing salvaged material and new materials.
 - .3 Excavation and preparation of crib mattress for new cribwork.
- .2 All items to be verified by a site visit prior to submission of a tender. All available plans of the existing structure are available for viewing at the Project Manager's office, 2nd floor, 1713 Bedford Row, Halifax, N.S.
- .3 Any derricks, gas lines or buildings to be removed by others unless otherwise indicated.

1.2 Site Information

- .1 Results of prior soundings, soil borings and soil investigations may be available for inspection at offices of Public Works and Government Services Canada, P.O. Box 2247, 1713 Bedford Row 2nd Floor, Halifax, N.S. B3J 3C9
- .2 Results of most recent soundings are included with the drawings. This data is made available for tendering purposes only. It should be noted that this information may differ from present site conditions.
- .3 The Contractor will be responsible for making his own interpretation of soil conditions at any location, other than borehole locations.

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Borehole descriptions shown on the logs are only descriptive of conditions at locations described by boreholes themselves.

- 1.3 Related Work .1 Refer to other specification sections for related information.
- .2 Refer to **Section 01 33 00** for Shop Drawing/Submission requirements.
- 1.4 Submissions .1 Methodology:
Provide methodology for carrying out the work.
- .2 **Provide submission in accordance with Section 01 33 00.**
- 1.5 Protection .1 Prevent movement, settlement or damage of adjacent structures. Provided bracing and shoring as required. In event of damage, immediately replace such items or make repairs to approval of *Engineer* and at no additional cost to *Engineer*.
- .3 All damage to existing structures, roadways, pipelines, electrical systems not specified for removal to be repaired at the Contractor's cost to the satisfaction of the *Engineer*.
- 1.5 Measurement for Payment .1 Sitework, demolition and removals will be measured in accordance with **Section 01 29 00.**
- PART 2 - PRODUCTS Not applicable.
- PART 3 - EXECUTION
- 3.1 Preparation .1 Inspect site and verify with *Engineer* items designated for removal and items to be preserved.

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- .2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.
- .3 Provide temporary power and lighting as shown on the plan or as required by the *Engineer*.
- .4 Existing fill and vent pipes, oil waste tanks and underground storage tanks to be protected from any damages. All repairs to damages as a result of Contractor's operations to be at his cost and to the satisfaction of the *Engineer*.
- 3.2 Removal
- .1 Remove items indicated.
- .2 Do not disturb adjacent structures designated to remain in place.
- .3 At end of each day's work, leave work in safe condition so no part is in danger of toppling or falling.
- 3.3 Salvage and Sorting
- .1 Salvage and sort existing materials to meet the new material specifications prior to placement within the new work limits.
- 3.4 Dredge material Source
- .1 Remove, load and transport existing dredge material from stockpile source on site as required to complete new service area.
- 3.5 Excavation and Preparation of Cribwork Mattress
- .1 Excavate to lines and grades indicated on the drawings to permit crib installation.
- .2 Prepare crib mattress in accordance with Section 31 53 13 - Timber Cribwork and Section 31 37 10 Riprap & Mattress.
- 3.6 Restoration
- .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.
- .2 Reinstate areas and existing works outside areas of sitework and removals, to conditions that existed prior to commencement of work.

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Filter Fabric

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PART 1 - GENERAL

- 1.1 Related Work .1 Refer to other Specification Sections for related information.
- 1.2 References .1 ASTM D4595-86(1996)(or latest edition), Tensile Properties of Geotextiles by the Wide-Width Strip Method.
.2 CAN/CGSB-4.2 No.4.2-M87 (or latest edition), Textile Test Methods.
.3 CAN/CGSB-148.1 No 14-M93 (or latest edition), Methods of Testing Geotextiles and Geomembranes.
.4 ASTM D4751-95, Determining Apparent Opening Size of a Geotextile.
- 1.2 Mill Certificates .1 At least two weeks prior to start of work, furnish *Engineer* with copies of mill test data and certificate that filter fabric delivered to job site meets requirements of this section.
- 1.4 Approval .1 Obtain written approval of *Engineer* for filter fabric before installation of material in work.
- 1.5 Measurement for Payment .1 Filter fabric will be measured in accordance with **Section 01 29 00.**

PART 2 - PRODUCTS

- 2.1 Materials .1 Synthetic fiber: rot proof, unaffected by action of oil or salt water and not subject to attack by insects or rodents.
.2 Fabric: nonwoven polyester and/or polypropylene fabric.
.3 Seams: sewn in accordance with manufacturer's recommendations.

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- .4 Physical properties: to ASTM D4595, CAN/CGSB-4.2 No.4.2, CAN/CGSB-148.1 No 14 and ASTM D4751 ;
- .1 Tensile Strength 900 N
 - .2 Tear Strength 360 N
 - .3 Elongation at break 50%
 - .4 Filtration Opening Size = 100 - 80um.
 - .5 Permeability = 2×10^{-1} cm sec.

PART 3 - EXECUTION3.1 Preparation
of Base

- .1 Fine grade area to be covered with filter fabric to a uniform surface area. Fill depressions with suitable material.

3.2 Placing
Filter Fabric

- .1 Place filter fabric on prepared surface loosely from top of the cribwork to the bottom allowing fabric to conform easily to contours of the ballast stone over the widened crib base before completion of ballasting operations.
- .2 Allow one (1) metre of fabric for overlapping and anchoring purposes, 700 mm at the top and 300 mm at the bottom of the slope.
- .3 Longitudinal seems will have a minimum of 450 mm overlap and will be pinned every 600 mm with 100 mm nails.
- .4 Anchor top of fabric at 1 metre intervals with 15mm diameter steel rods 600 mm in length. Anchor bottom of fabric by folding fabric and placing fill on top.

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Scour Protection, Rock Mattress & Rockfill

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PART 1 - GENERAL

- 1.1 Related Work .1 Refer to other Specification Sections for related information.
- .2 Refer to **Section 01 33 00** for Shop Drawing/Submission requirements.
- 1.2 Reference Standards .1 ASTM C127-88(1993)e1 (or latest edition) Specific Gravity and Absorption of Coarse Aggregate
- .2 AASHTO T85-88 (or latest edition) Specific Gravity and Absorption of Coarse Aggregate
- 1.3 Submissions .1 Product Data/Samples:
.1 Provide samples of materials proposed for the work.
- .2 Methodology:
.1 Provide methodology for carrying out the work.
- .3 Provide submissions in accordance with **Section 01 33 00**.
- 1.4 Measurement for Payment .1 Rock mattress will be measured in accordance with **Section 01 29 00**.
- Prices will include the entire cost of supplying and placing the material in the work, rough grading as necessary, the levelling and finish grading of the crib seat mattress, taking soundings, diving inspections, all as shown on the drawings, and as specified.
- .2 Scour protection will be measured in accordance with **Section 01 29 00**.
- .3 Rock Fill will be measured in accordance with **Section 01 29 00**.

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PART 2 - PRODUCTS2.1 Materials

- .1 Hard durable crushed quarried rock, free from silt, clay, organic matter and other foreign substances and free from splits, seams or defects likely to impair its soundness during handling or under action of water.
- .2 Rockfill material gradation will be within the following limits:

| ASTM SIEVE SIZE | % PASSING BY MASS |
|--------------------|----------------------|
| 300 mm | 100 |
| 150 mm | 44 - 75 |
| 100 mm | 25 - 50 |
| 50 mm | 7 - 14 |

- .2 Specific gravity of not less than 2.65 when tested to ASTM C127 or AASHTO T85.
- .3 Mattress material will be 50 - 150 mm angular crusher run rock, free from fines. Top surfaces may be smaller, subject to approval of *Engineer*, to facilitate levelling.
- .4 Scour protection will be 200 mm diameter blasted rock and will be free of seams that would affect its durability.

PART 3 - EXECUTION3.1 Preparation

- .1 Complete Dredging and Sitework, Demolition and Removals in accordance with Sections 31 11 00 & 35 20 23, in the area where crushed rock mattress is to be placed.
- .2 Sound area and record elevation of material on which mattress will be placed before

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placing mattress material and/or rip rap protection.

**3.2 Rock Mattress
Placement**

- .1 Do not place rip-rap or mattress material until bottom area has been accepted by *Engineer*.
- .2 Place mattress material to avoid segregation of material sizes. Do not drop material through water.
- .3 Do not place material under poor weather conditions. Place immediately prior to planned placement of timber cribs.
- .4 Level top surface of mattress to specified grade. Use a sweep beam suspended from a barge as a screed to level surface of each mattress layer. Other methods of levelling may be employed subject to acceptance by *Engineer*.

**3.3 Rockfill
Placment**

- .1 Place rockfill over graded dredge material to the layer thickness indicated on the drawings.

3.4 Tolerances

- .1 Surface of Mattress bearing layer to be within 50 mm of elevation indicated and variation in elevation over whole area of bearing layer not to exceed 75 mm.
- .2 Rockfill and Scour protection layers to be within 100 mm of lines shown.

3.5 Protection

- .1 Take into account anticipated weather conditions and degree of exposure of site in setting requirements for protection.
- .2 Schedule and carry out construction so that each phase of work is not left exposed longer than necessary.
- .3 The Contractor should note that the work site is subject to water level variations due to tidal action.

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- .4 The Contractor will be responsible to replace any mattress lost due to storms, tidal erosion or by his own activities.

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Timber Cribwork

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PART 1 - GENERAL

- 1.1 Related Work
- .1 Refer to other Specification Sections for related information on aggregates, mattress, and miscellaneous items.
 - .2 Refer to **Section 01 33 00** for Shop Drawing/Submissions requirements.
- 1.2 Reference Standards
- .1 CAN/CSA-080 Series M89 (or latest edition)- Wood Preservation (including CSA preliminary standard 080.31-M1989).
 - .2 AWPA P7-85 (or latest edition)- Creosote for Brush or Spray Treatment for Field Cuts (American Wood Preservers Association).
 - .3 NLGA standard grading rules for Canadian Lumber 1980 edition or most recent edition at time of tendering.
 - .4 CAN/CSA-G164-M92 (or latest edition) - Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .5 ASTM A307-94 (or latest edition), Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
 - .6 ASTM B111-1974 (or latest edition), Wire Nails, Spikes and Staples
- 1.3 Submissions
- .1 At least two weeks prior to finalizing timber order, submit drawings, clearly indicating assembly of timber pieces for construction of cribwork wharf. Show splice locations, splice details, fastening arrangements.
 - .2 Submit detailed methodology for field treatment, crib building, launching, setting and ballasting.
 - .3 Provide submissions, in accordance with **Section 01 33 00**.
- 1.4 Measurement for Payment
- .1 Timber cribwork will be measured in accordance with **Section 01 29 00**.

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PART 2 - PRODUCTS2.1 Materials

- .1 Timber: Graded and stamped to National Lumber Grading Authority (NLGA) No. 1 Structural. Eastern Hemlock, Western Hemlock or Douglas Fir Species, only, will be used.
- .2 Timber Treatment:
 - .1 Preservative treatment to CAN/CSA-080 Series - M89 for Marine Construction Coastal Waters. Where assay retentions are not indicated, they are to be taken as 1.5 times the indicated gauge retention. Use one type and color of treatment throughout unless otherwise indicated.
 - .2 Make arrangements for timber testing by:
 - .1 Plant Inspection: Provide treatment plant identification, date of treatment, list of various pieces in the charge, charge number, plant assay testing results, concentration and type of preservative used, duration of treatment, gauge retention, species of wood; and make arrangements with the treatment plant to locate bundles, move bundles, break open bundles and carry out other measures to facilitate the inspection.
 - .2 Field Inspection: Providing same information as above and facilitating the inspection in the field.
 - .3 Filling in and submitting a preprinted form, agreed to by the *Engineer*, containing the above information.
 - .3 Plywood to be treated to marine grade standard.
 - .4 The *Engineer* may test in the plant or in the field or may choose to not test some

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Timber Cribwork

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charges at either the plant or the field.

- .5 Timber will be protected during handling, shipping, offloading and field handling, by use of suitable equipment and procedures. Use rope or fabric strap slings on site for moving bundles or individual timbers, rather than metal grabs, chains or cables.

.3 Miscellaneous Hardware

Hardware must meet the following specifications:

- .1 Machine bolts, lag bolts, drift bolts, anchor bolts, nuts, round plate washers: to ASTM A307.
- .2 Spikes: to CSA B111.
- .3 Hot dip galvanized hardware, bolts, nuts, washers and spikes to CSA G164, with minimum zinc coating of 600 g/m².
- .4 All hardware will be galvanized unless otherwise shown on plans.

.4 Ballast Stone:

Minimum specific gravity of 2.65. Supply hard durable stone containing no organic material, silt, clay or foreign substances. Ballast stone to be graded within the following requirements.

PART 3 - EXECUTION

3.1 Crib Construction

- .1 Timber supplied precut to required length. Refer to appendix for pre-ordered materials for cribwork which will be supplied by the harbour authority.
- .2 Boreholes for drift bolts to be 1.5mm smaller in diameter than bolt and for full length of bolt. Boreholes for machine bolts to be same diameter as bolts. Boreholes for lag bolts to be same diameter as shank for unthreaded portion and 0.70 times the shank diameter for the threaded portion. Threaded portion of lag bolts will be installed using a wrench, not by driving.

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Timber Cribwork

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- .3 Construct timber cribwork to height indicated in crib building methodology, prior to placing in work.
 - .4 Bottom timbers: Secure three courses of bottom timbers together with machine bolts at every intersection with each other and vertical posts. Splice locations shown on plans.
 - .5 Splices: Provide at locations and per details shown on plans or reviewed drawings, if changed.
 - .6 Ballast floor: Place ballast floor, as indicated. Omit ballast floor in bays, as shown on plans.
 - .7 Longitudinals: Secure longitudinals to intersection of cross ties with drift bolts and to intersection of vertical binder posts with machine bolts, as shown on plans.
 - .8 Crossties: Secure cross-ties to intersection of longitudinals with drift bolts and to intersection of vertical binder posts with machine bolts, as shown on plans.
 - .9 Vertical binder posts: To be in one length from bottom of cribwork, unless splice details are shown on plans.
 - .10 Fillers: Place filler timber as indicated. Secure fillers with drift bolts to timbers immediately below.

3.2 Handling Treated Timber

- .1 Handle treated material to avoid damage causing Timber alteration in original treatment.
- .2 Treat in field, spike holes, boreholes, plugged holes, cuts and any damage to treated material, using An approved waterbourne preservative, as specified herein, regardless of plant treatment type.

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Timber Cribwork

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- .3 An approved waterbourne preservative is to be applied to dry surfaces for maximum benefit.
 - .4 Treat boreholes, using a pressurized container with an extension rod, to produce a fine spray in the holes with one application. Alternately a cylindrical brush may be used.
 - .5 Treat field cuts and any abrasions with minimum of two liberal applications, using either spray or brush.
 - .6 In addition, field cuts and underwater damaged areas will receive a coating of plastic compound, capped with lead flashing secured with galvanized roofing nails. Plastic compound not to be water soluble and is subject to approval.
 - .7 Environmental Concern: Ensure no spillage or excess application of field preservative. Provide workmen with sufficient training and protective gear to properly and safely handle the treated materials and to apply field treatment, so as to prevent undue hazard to themselves, others, or the environment.
 - .8 **Contain all debris and leachates (films on water surface) within the area of the work by using containment facilities such as floating booms or screens.**

3.3 Preparation

- .1 Mattress:
 - .1 Level top of levelling course, using a sweep beam capable of sweeping the entire width of the mattress in one operation. Once sweeping is done and elevations taken on a grid consisting of every meter along a cross-tie location and the same along lines one half meter each side of and parallel to the cross ties, have a diver carry out an inspection to locate hollows, humps, extent of mattress and to check side slope stability. Touch up, re-sweep and repeat the above procedure until the mattress is within the tolerances

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Timber Cribwork

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specified. If any delay what-so-ever exists between final touch-up and crib setting, repeat the above procedure - starting with elevations - immediately prior to placing crib.

- .2 Alternate methods of levelling subject to acceptance by *Engineer*.

.2 Setting Crib:

- .1 Prior to setting crib, mark locations on all crib vertical posts of known distances above bottom of lowest crosstie, so that elevations of bottom of crib can be easily determined using the tide or survey equipment. Once crib bottoms out on the falling tide, and prior to placing any ballast, have a diver check bearing at each crosstie location. At same time, determine elevation of bottom of crib at each crosstie location along the perimeter and down the middle. If diver report is flawless and crib is located within tolerances in all respects, commence ballasting. Provide crib setting report, showing the above information.

3.4 Ballasting

- .1 Place ballast stone in a manner which will not damage timber cribwork. As a minimum, the top courses of timber will be protected with planks. *Engineer* to accept placing methodology.
- .2 When placing the crib, ballast the bays containing the ballast floors with sufficient (less than 1 meter) ballast to just start setting of the crib. Have crib rechecked for bearing and elevation. If there is no need to refloat, then ballast these bays just sufficiently and evenly to prevent floatation. Then ballast the bays containing no ballast floor to L.N.T. unless otherwise shown. Thereafter ballast crib uniformly throughout, ensuring ballast differential is maintained at less than two meters.

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Timber Cribwork

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- 3.5 Tolerances
- .1 Construction crib overall dimensions to within tolerance of 1 in 300.
 - .2 Locate crib within 50 mm of location indicated.
 - .3 Adjoining cribs to line up exactly.
 - .4 Final bottom elevation of fully ballasted crib to be 0 to 150 mm below the elevation indicated on the plans.
 - .5 Refloat a crib out of alignment, not correctly located or at wrong elevation. Repair mattress, prior to resetting.
 - .6 Some settlement of the crib structure is anticipated into the mattress. Prior to installation of the upper courses of timbers and the concrete deck, check the elevations and provide any shimming necessary, to ensure that the elevations, as shown on the drawings, are met.