A.3 PEDESTRIAN BRIDGE AND BOARDWALK SPECIFICATIONS

Scope: Design, engineer, construct and maintenance systems for:
1 – 14’ clear width x 70’ long 85PSF timber pedestrian combination span bridge consisting of (1) 41’ L center span with (2) 10’L and (1) 9’L pile supported approaches with timber abutments and 1 – 10’ clear width x 20’ long 85PSF timber pedestrian boardwalk.

Requirements:

2. The 2009 LRFD AASHTO Guide Specifications for Pedestrian Bridges shall be used for all design aspects of the Pedestrian Bridges.
3. Construction methods shall be in accordance with the construction plans and/or shop drawings. For the timber decking, fabrication procedures and tolerances shall be per the applicable ASTM specifications. Construction methods for the composite timber deck shall be per the manufacturer’s guidelines.
4. All foot traffic will be contained within six feet from bridge path.
5. Selected bridge contractor shall provide the model name(s) and elevation view(s) of the bridge and boardwalks 4 weeks prior to the design and engineering of them for approval by the County.
6. Selected bridge contractor, at the time of design and engineering, shall provide shop drawings with engineering calculations to verify structural integrity, sizing, verification and loading capacity of bridge and boardwalk designs. A professional engineer licensed in the Commonwealth of Virginia shall seal all drawings and calculations to support sizing of structural components and required load handling.
7. Bridge contractor will provide a minimum 1 year structural warranty, effective from substantial completion of the bridge and boardwalks erection/installation. Bidder must provide a written copy, with maintenance requirements that support the warranty, with bid submittal.
8. Bridge contractor will remobilize and perform follow on site visit to inspect and perform initial maintenance to include hardware and components.
9. Bridge contractor must supply references of at least 10 projects for whom the bridge contractor has built similar or higher capacity timber bridges utilizing a similar construction method. Bridge bidder must supply the names and contact information of 5 references (previous clients) for whom the company has built and completed successfully said bridges, which must be included with bid package.
10. Bridge contractor must operate in a safe professional manner as well as follow Occupational Safety & Health Administration (OSHA) safety standards at all times. A project specific safety plan must be submitted prior to construction by Bridge Contractor.
11. Bridge contractor to provide an overview of the bridge construction process, from design to construction, and include a review of the proposed construction method for this project. Must be included with bid package.
12. Bridge contractor will clean up each work site daily, placing scraps in a dumpster to be furnished and removed by the bridge contractor.
13. Bridge contractor to provide a system to catch all shavings, dust, and cutoffs before they enter the environmentally sensitive areas to every extent possible. Any that enter the environmentally sensitive areas will be cleaned up immediately. A plan will be submitted in writing to the owner.
14. Owner is responsible for posting load limiting signs and/or barriers at each end of the bridge.
15. Owner and general contractor are required to inspect and sign off on the bridge and/or site both before and after construction.
16. Boring logs (3 locations) have been included with the bid documents for informational purposes only and can be utilized for bridge design. If the Bridge Contractor desires, they can perform their own geotechnical analysis prior to the bid at their own expense.

**Minimum Material Requirements**

**A. Loading Requirements**
1. Pile Supported Pedestrian bridge and boardwalks shall be designed for a minimum uniform live load of 85 pounds per square foot.

**B. Lumber and Treatments**
1. All bridge timber/lumber shall be Southern Yellow Pine no. 1 grade and shall be graded under the Southern Pine Inspection Bureau (SPIB) rules.
2. All treatments must meet or exceed the standards for treated wood set by the AWPA.
3. All pile foundations and superstructure shall be treated with CCA water based treatment.

**C. Wood Decking**
1. Sawn lumber shall be designed in accordance with the ANSI/AF&PA NDS, ”National Design Standard for Wood Construction”, as published by the American Forest & Paper Association or the ”Timber Construction Manual” as published by the American Institute of Timber Construction (AITC). Design properties for naturally durable hardwoods shall be in accordance with “Tropical Timbers of the World”, as published by the U.S. Forest Products Laboratory.
2. Wood decking for Pedestrian bridges shall be preservative treated Southern Pine with a minimum allowable extreme fiber stress in bending of 1200 PSI and minimum modules of elasticity of 1,600,000 PSI.
3. Decking to be fastened with stainless steel screws or better. All screws will be recessed a minimum of 1/2” below deck surface. At time of installation, planks are to be placed tight together with no gaps.
4. Decking to be #1 grade lumber.

**D. Timber Pilings**
1. All pilings for timber abutment shall meet the requirements as set forth by the American Society for Testing and Materials (ASTM) under the provisions of D25 (latest edition), standard specifications for round timber piles. Final size and number of piles to be designed based on the boring logs.
2. Hand auguring and/or water jetting are not permitted for piling installation on this project.
3. All bridge pilings shall be driven. Bridge contractor’s structural engineer shall approve all required depths and any piles not driven to required depth. A minimum capacity per pile is to be established by the Bridge contractor’s structural engineer.
4. Piles shall be minimum 9” butt and up to 12” butt and driven a minimum 10’ in the ground and up to 20’ and/or refusal.

**E. Structural Steel and Other Metals**
1. After fabrication, all bolts, plates, angles and brackets (steel shapes) shall be hot dipped galvanized per A.A.S.H.T.O. specifications and sized accordingly. Flow rates and other information supplied by Owner’s engineer should be taken into consideration on sizing.
2. All welding of angles and plates to be per A.W.S. specifications.
3. All hardware to be dual coated with a primer and either galvanized or gloss paint after galvanizing.
F. Abutments
1. Each bridge shall have a standard abutment configuration at each end constructed of timber with 5’ minimum wing walls at each side of the abutment.

G. Pedestrian Handrail
1. A minimum 54” high timber pedestrian guiderail must be installed. Handrail should be designed to withstand a lateral force of 75 PLF.
2. Handrail to have no openings greater than 4”. Pickets should be reinforced in order to prevent damage from kicking, etc. (See example A, below)
3. Top of handrail should be rounded or angled in such a way as to discourage a person from sitting on the top edge. (See examples B & C, below)
4. Handrail material to be #1 grade.
5. Bridge designer to provide final design of guiderail through shop drawings and structural calculations for all components of bridge and guiderail loading.

H. Backfill/Erosion Control
1. Backfill material shall be a clean, well-draining granular soil that allows water to drain readily. Hand compaction techniques shall be utilized during backfill placement.
2. It is the general contractor’s responsibility to properly select and place backfill materials to prevent overstressing of the wall. Bridge contractor to provide initial application while on site.
3. Back fill elevation is not to exceed wall elevation within 10’ of wall location.
4. General contractor will install Rip Rap or other erosion control measures deemed necessary in front of abutments, wing walls and also around piles and coordinate with Bridge Contractor all compaction and path tie-in installation.

I. Protectant Coating
1. Bridge contractor will complete the bridge and then return to the project site approximately 3-6 months after completion to apply acrylic coating to exposed wood. At a minimum, 4 weeks prior to application of the coating, contractor shall provide color chip for approval by the County.
2. The bridge contractor will wash, clean, pressure wash and prep the bridge for coating application.
3. Bridge contractor shall take all appropriate environmental protection measures necessary to protect the environment during the application of the sealant. Use items such as tarps, visqueen, wind barriers, over spray protection and whatever measures necessary to protect the environment.
4. Bridge contractor shall apply a protectant acrylic coating package to all visible surfaces of the curb, posts and outside stringers of the bridge. This application shall include supply of all materials and labor. The three-step process must include:
   a. Step 1: Pressure washing, clean with approved cleaner and prep of the parts to be sealed
   b. Step 2: Application of primer/base coat
   c. Step 3: Application of finish coat (coating) in Owner’s choice of colors. Bridge Contractor shall coordinate with Owner to receive approval of color coat prior to application.
5. Application must be in accordance with all manufacturer recommendations, including, but not limited to:
   a. Bridge contractor must install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Product should not be installed if it is raining or snowing or if such conditions appear to be imminent. Minimal application temperature of 50 degrees F required, with surface temperature of no more than 90 degrees F. Consult Material Safety Data Sheets created by manufacturer of product for complete handling recommendations.
   b. Product shall be applied to horizontal surfaces with a roller or painter pad; product shall be applied to vertical surfaces with a roller or paint pad or sprayer if
desired. **Overspray must be eliminated to the extent possible.**

c. Bridge contractor must condition the specified product as recommended by the manufacturer.

d. Bridge contractor shall prepare surface as recommended by manufacturer which should include thoroughly pressure washing the surfaces to be treated. New wood surfaces have a mill glaze that prevents maximum penetration of the sealant; therefore, even newly installed bridges will require this prep step.

e. Bridge contractor shall clean-up work site daily and upon completion of project, including proper disposal of all materials.

6. Materials must meet the following criteria in order to be accepted for this project:

   a. A professional, premium quality UV acrylic coating must be used. Coatings primarily marketed and/or designed for homeowners (such as Thompson’s Water Seal™, Cabot™, or Olympic™ products) **will not be accepted.**

   b. Coating must be pigmented. Clear coatings will not be accepted for this project. Water repellents alone will not be accepted for this project.

   c. The multi-step coating system must be climate specific and recommended for the climate in which it will be applied.

   d. Manufacturer must provide a written warranty against defect of materials for a minimum of one year, beginning with date of substantial completion of the project.

   e. Base Coat must meet or exceed the following performance criteria:

      i. Acrylic Blend

      ii. Weight/gallon: 8.52lb / gallon or better

      iii. Flash point: greater than 200 degrees F

      iv. VOC: 200 g/L or better

J. Maintenance

1. Bridge contractor will complete the bridge and boardwalks and then return to the project site approximately 3-6 months after completion to apply coatings, perform an inspection of the bridge and to submit a report to the Owner.

2. The bridge contractor shall make any adjustments necessary as follows, but not limited to, tighten all the fasteners/bolts, check decking for warped or badly checked boards, set deck fasteners, straighten align hand rails and sand or grind any areas prior to the application of coatings.

K. Textured Polymer Deck Coating

1. The bridge contractor will apply a non-fading, slip resistant textured polymer coating (TPC) to the deck of the bridge.

2. TPC to be non-toxic, low VOC-free water based product.

3. TPC application will include deck preparation necessary, application of a primer, application of primer between exposed deck board edges, and 2 applications of the polymer coating.

4. Bridge contractor shall take all appropriate environmental protection measures necessary to protect the environment during the application of the TPC. Use items such as tarps, visqueen, wind barriers, over spray protection and whatever measures necessary to protect the environment.

L. Project Submittals Required of Bridge Contractor

1. Wood preservative treatment certification from the treating facility will be provided.

2. Engineering specifications, engineered calculations, and engineered construction shop drawings shall be provided detailing, verifying and/or sizing each individual component.

3. The above must contain an embossed seal by a professional engineer who is registered in the state of VA.

4. Specifications for pile-driving equipment and methods, including hammer calculations verifying capacity to drive the piling to required tonnage and criteria for verification of pile capacity.
Example A: Handrail pickets bracing
Example B: Rounded top handrail

Example C: Angled Top Handrail

End of Section A.3, Pedestrian Bridge & Boardwalk Specifications