

**EnWood**  
STRUCTURES

Manufacturer of **Engineered Wood** products

*Bridge Division*



# *Vehicular Bridges*



**E**nWood Structures vehicular bridges offer a viable alternative to steel and concrete structures because of ease of installation due to prefabrication, minimal maintenance, extended service life, and aesthetic quality. Standard design configurations for HS20 loading with spans ranging from 16' to 80' are available for single and multi-lane bridges.

Larger spans are possible with truss or deck arch bridge designs. Designs are in accordance with AASHTO specifications.



## Vehicular Bridges

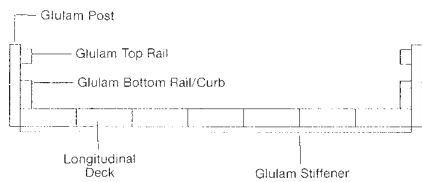
### Scope

All structural glued-laminated timbers shall be furnished as shown detailed on plans and specified herein. Complete shop drawings shall be furnished by the fabricator and shall be approved prior to fabrication.

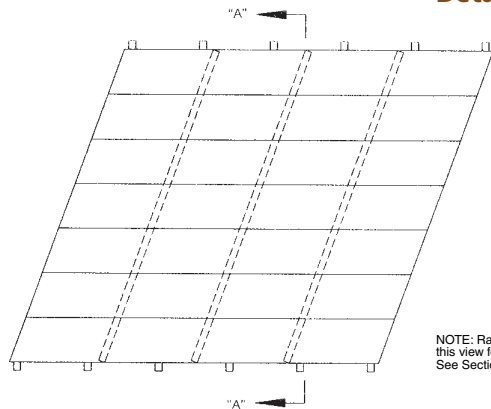
### Design

Design loads shall conform to standard highway design procedures for state, governmental land, or territories that govern. "Standard Specifications for Highway Bridges" adopted by AASHTO, latest edition, shall be used as the design reference source when specified.

## Longitudinal Systems



**Bridge Section & Plan Details**



NOTE: Rails not shown this view for clarity. See Section "A - A".

### Longitudinal Deck

Longitudinal glulam deck designs offer low profile structures which are typically used for short spans ranging from 16' to 36' where clearance below bridge deck is limited. Designs consist of deck panels spanning from abutment to abutment. Glulam stiffener beams are used to tie the panels together and to distribute wheel loads. Panel thickness varies from 6.75" to 18.25" depending on span and load conditions. Panel lengths up to 80' are available for multi-span decks.

### Quality Assurance

Material standards to comply with "Structural Glued Laminated Timber" ANSI/AITC A190.1 - latest edition. Manufacturer to provide factory-glued timber units, produced by an AITC licensed firm, qualified to issue the AITC "Quality Inspected" mark.

### Materials

Laminating lumber shall comply with ANSI/AITC A190.1 and applicable lumber association standards cited therein for grades required to achieve glued laminated timber requirements for allowable stress, appearance, fabrication limitations and species. Manufacturing adhesives shall be wet-use (waterproof) complying with ANSI/AITC A190.01.

Laminated materials to be AITC industrial appearance grade. Steel and hardware shall be furnished by fabricator as specified herein and shown on drawings. Fabricated steel shapes and hardware shall conform to ASTM-A36 and ASTM-A307, respectively, unless otherwise specified. All steel and hardware to be hot-dipped galvanized.

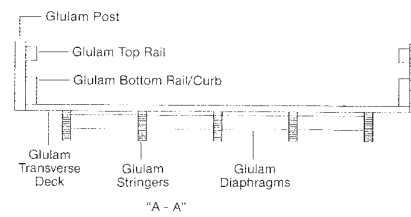
### Preservative Treatment

Preservative treatment of materials shall be in accordance with AITC 109 - latest edition and AWP standards C1, C2, C14, and C28 - latest edition.

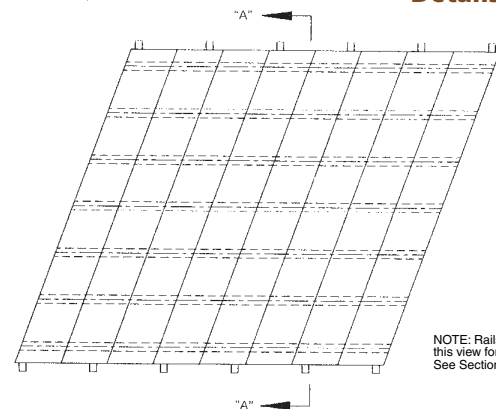
### Handling, Storage & Installation

Shall be in accordance with manufacturer's recommendations as well as AITC and AASHTO standards.

## Transverse Systems



**Bridge Section & Plan Details**



NOTE: Rails not shown this view for clarity. See Section "A - A".

### Stringer & Transverse Deck

This system utilizes a series of transverse glulam deck panels or solid sawn timbers supported by straight or slightly curved stringers. Glulam or steel diaphragms are used for transverse bracing. This system is most economical for clear spans ranging from 20' to 80'.

# *Covered Bridges*



**E**nWood Structures' covered bridges offer visual impact and practical solutions to numerous venues. The covered roof system can be either a full coverage or a partial coverage, and are ideal for golf courses, greenways, community areas, and residential developments.

Both the Woodland and the Fairway bridge models can accommodate a full or partial roof system. Roof system designs utilize laminated wood posts and beams, and tongue and groove roof decking.

For additional specifications and pricing, call the Salesteam at EnWood Structures 800.777.8648.



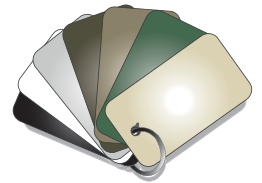
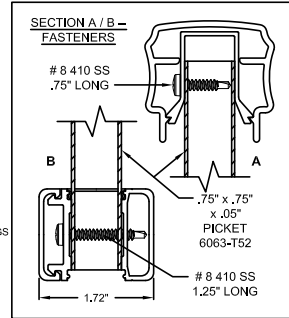
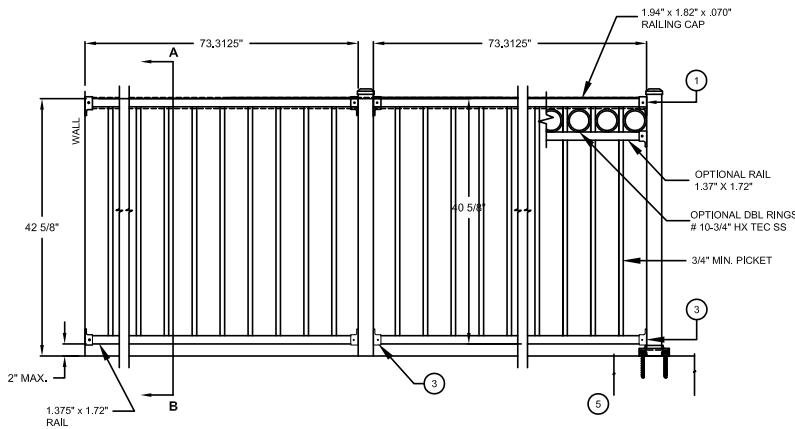
# *Arch Suspension Bridges*



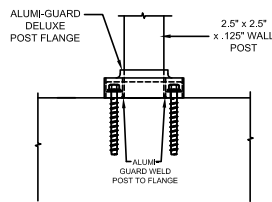
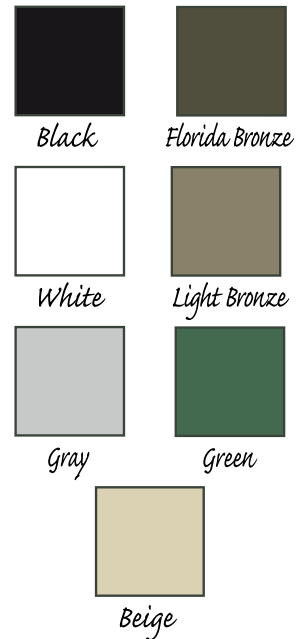
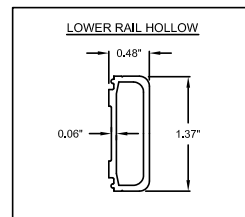
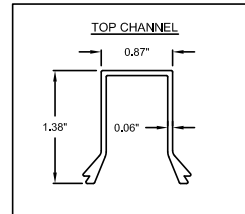
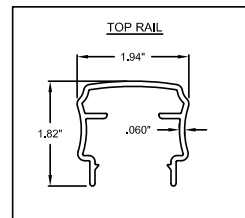
EnWood Structures is an associate member of The American Institute of Timber Construction, AITC, who has the highest manufacturing standards of the industry. Manufacturing and quality control conform to the Standard Specifications for Glued Laminated Timber.

# Optional Aluminum Guard Rail

## Standard Specifications

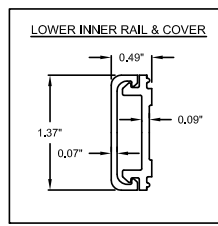
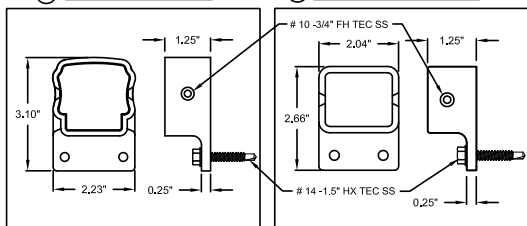


### RAILING EXTRUSIONS 6005-T5



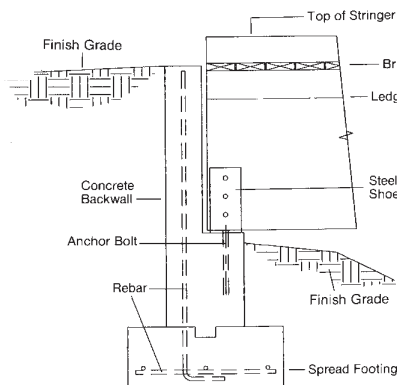
1 RAILING WALL BRACKET

3 END LOWER RAIL BRACKET

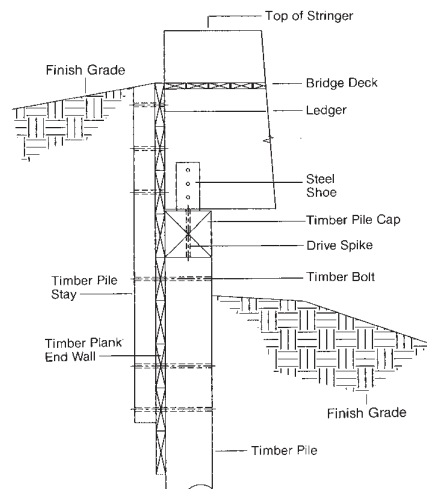


## Typical Footing Details

### Typical Concrete Abutment



### Typical Timber Pile End Wall



# *Pedestrian & Light Vehicular Bridges*



# *Production & Shipping*



**T**he benchmark for the manufacturing of an EnWood Structures bridge is quality. EnWood uses kiln dried, #1 grade Southern Yellow Pine. Lumber is pressure treated prior to lamination to give extended protection to all laminated bridge components. Interior stringers and diaphragms are also laminated components for additional strength and stability. All steel and hardware is hot-dipped galvanized. As well, steel is fabricated by EnWood's on-site steel shop to assure proper fit.

The shipping department at EnWood Structures has years of expertise with coordinating the transportation of oversized bridges and extended length bridge components. Expediting permits and escorts for oversized shipments is just part of the quality customer service the EnWood customer relies upon.



# *Custom Modifications*



**E**nWood Structures' standard designs are frequently altered to enhance the bridge appearance without creating a custom engineered structure. Variations in rail details as illustrated by the adjacent photographs add flexibility to these designs.



For golf course applications, low profile structures are usually preferred. Modifications to the Fairway design such as removing the rail system and utilizing a 6" to 8" curb or by using a single top rail at approximately 24" above the deck, can create a streamline design.



In addition to rail modifications, standard configurations have been altered to accommodate covered roofs, multiple span systems, cantilevered bridge sections, and side extensions for pedestrian seating.

# *Park & Greenway Bridges*



deflection or with a higher degree of curvature to accent the curved glulam appearance. High profile bridges are fabricated with a camber of approximately 2.1% of the total span. This produces a localized deck slope of 1 to 12 or 8.3% which is the maximum allowed for handicap access. See page 9 for specific bridge camber. Non-standard cambers per client specifications are available at no additional cost.



EnWood Structures' standard pedestrian bridges are designed for a live load of 85 PSF and a live load deflection limited to  $L/300$  of the total span. Alternate live loads of 60 PSF and 100 PSF are used per client specifications and are justified by the interpretation of the various building codes of pedestrian applications. Light vehicular loads are also possible with standard design configurations by altering interior framing member sizes as well as deck thickness. Typical light vehicular loads range from 2,000 lbs. to 12,000 lbs. EnWood Structures' client will be responsible for specifying the maximum vehicular load requirement used for design.



# *Laminated Wood*



**E**nWood Structures' pedestrian and light vehicular bridges are typically found in parks, golf courses, and greenway trails. Glulam bridges are used for these applications primarily due to their architectural design, low maintenance, and long term cost.

EnWood Structures offers three standard prefabricated designs which are known as the Woodland, Fairway, and Park models. Standard configurations are available in 4', 6', 8' and 10' widths with spans ranging from 20' to 100'. Standard designs are generally limited to a span-to-width ratio of 12:1; however, ratios as high as 15:1 are possible. Bridges up to 10' wide and 65' in length can be shipped assembled if roadway and jobsite access allows.

Standard girder type bridges can be manufactured with a minimum curvature or camber to offset long term dead load

# *Golf Bridges*



Utilizing wood as a structural material has numerous advantages. For example, the sound and thermal insulation properties of wood produce lower traffic noise and reduce the problem of “bridge freezing before road.” Timber bridges have excellent impact load characteristics and are surprisingly fire resistant. Another distinct advantage for using wood in vehicular bridges is its high resistance to deicing chemicals which cause deterioration to both steel and concrete bridges.

## **Design Capabilities**

Standard designs have been developed for both vehicular and pedestrian bridges utilizing CADD (Computer Aided Drafting and Design) capabilities. These designs have been developed by registered professional engineers who also are equipped to handle custom designs.



<b>Typical Glulam Design Configurations</b>	
<i>Pedestrian/Light Vehicular</i>	<i>Highway / Vehicular</i>
• Girder Type	• Stringer and Transverse Deck
• Bowstring Truss	• Longitudinal Deck
• Parallel Chord Truss	• Bowstring Truss
• Hinged Arch	• Parallel Chord Truss

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# *Laminated Wood*



**F**or over sixty years EnWood Structures has been designing and manufacturing vehicular and pedestrian bridges utilizing pressure treated glulam. Designs range from standard pedestrian bridge configurations to custom vehicular bridges per AASHTO specifications. EnWood Structures bridge systems are ideal for use in parks, golf courses, planned developments, as well as state and county road systems. These structures combine the inherent beauty of glulam with the advantages of modern pressure treated technology to increase wood's versatility and service life.

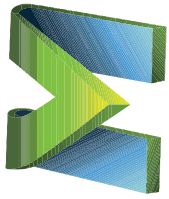
#### **Advantages of EnWood Structures' Bridges**

In addition to the aesthetic value of an EnWood Structures

bridge, there are numerous other advantages to consider. EnWood Structures' bridge packages are prefabricated prior

*Built for  
beauty  
engineered  
for utility*

to shipping in order to expedite on-site construction and reduce labor cost. Pedestrian and light vehicular bridges are frequently shipped fully or partially assembled if roadway and jobsite access allows, thus utilizing smaller installation crews to further reduce costs.



**EnWood**  
STRUCTURES

Manufacturer of **Engineered Wood** products



*LAMINATED*  
*Wood Bridges*

*Bridge Details on Page 8*  
*800.777.8648*