

S-1 **(2422) WOOD NOISE WALL**

NOTE: The Designer is cautioned that all color choices should be made in collaboration with the Bridge Office (if this applies to your Project) and/or the Planning and Design Unit within the Office of Environmental Stewardship. They MUST be consulted when deciding on this issue.

S-1.1 **DESCRIPTION**

This work consists of furnishing all materials for and constructing wood noise walls with concrete posts in accordance with the Plan details, the applicable MnDOT Standard Specifications, and the following:

A **Definitions**

Specialty Subcontractor – Party responsible for handling, transporting, storing, installing, protecting, sampling, and patching treated wood. This may be the Contractor if Contractor is able to demonstrate to the Engineer its expertise in this area.

Manufacturer – The AWPA or ICC Accredited party or parties responsible for producing the treated wood and/or the preservative.

Retention – amount of preservative level present in the wood measured in lbs/ft³ (kg/m³).

Water resistant – Quality of the wood to repel moisture, providing long-term protection against decay, rot, and weathering.

Supplier – If no Manufacturer (as defined above) exists for the Project, then the Supplier shall be defined as the facility responsible for furnishing the treated wood planks to the Specialty Subcontractor (as defined above).

Vertical Nailer – Rough sawn timber attached to concrete noise wall posts to provide attachment substrate for horizontal planks.

Plank (Above Ground) – Dimension lumber generally used as the primary structural member spanning horizontally between noise wall posts to serve as a barrier for noise transmission. Where a noise wall makes a corner or bend, planks can be used in a vertical position to help frame the corner or bend.

Plank (Below Ground) – Rough sawn lumber generally used as the primary structural member spanning horizontally between noise wall posts to retain fill.

Batten – Generally non-structural dimension lumber used to provide a protective or aesthetic cover of splices or joints in noise wall planks.

B **General**

All thickness and width dimensions of solid sawn wood for timber facing material are nominal dimensions unless otherwise indicated in the Plans or these Special Provisions.

S-1.2 **MATERIALS**

A **Concrete Posts**

Furnish and install posts from a manufacturing facility in compliance with specification 3240.

Cast concrete posts such that the sides of posts that are not cast against a formed surface will be covered with a nailer strip or erected such that the unformed side of the post is not exposed to view in the completed construction.

Unless they are needed for erection of the post at the installation site, fill all holes or recesses for post lifting devices with an approved epoxy patching compound prior to shipping. Only use products from the MnDOT Approved Products List: (<http://www.dot.state.mn.us/products/> listed under

“Concrete” – “Epoxies (Non Bridge Applications)” – “Epoxy Patching Compounds”. Any remaining holes or recesses for post lifting devices after erection of the posts shall be filled with an approved mix-in-the-tube dispensed epoxy compound.

Fabricator to identify all posts with post number using permanent mark on the bottom of post.

Reinforce all posts located within 20 feet of the outside edge of roadway shoulder and all posts supporting glue laminated rubrail (standard figure 5-297.678) with epoxy coated prestressed strands listed on the MnDOT Approved Products List (“Walls – Noise Walls – Epoxy Coated Prestressing Strand”). Fabricator to identify posts with epoxy coated prestressed strands with “P” in addition to post number with permanent mark on the bottom of post. Refer to section “D – Hardware” for additional requirements regarding concrete anchors and inserts for posts located within 20 feet of the outside edge of the roadway shoulder.

Limit the temperature of concrete surrounding the epoxy coated strand to less than 150°F during fabrication.

A.1 Penetrating Sealer

Furnish and install a penetrating, solvent based silane sealer for the concrete posts as listed on the Department's "Approved/Qualified Product Lists of Bridge Deck Penetrating Sealers" (<http://www.dot.state.mn.us/products/bridge/bridgedecksealer.html>).

The manufacturer of the silane product must directly ship a one quart sample of the sealer to the MnDOT Materials Lab (1400 Gervais Avenue; Maplewood, MN 55109) for quality assurance testing and IR scanning at least 30 days prior to the start of the work.

Refer to the “Construction” portion of this special provision for additional requirements regarding the application of the penetrating sealer.

B MnDOT 3426 (Structural Timber) and 3457 (Lumber); Planking, Battens, and Cap Boards

B.1 Material Requirements:

Provide stress-rated timber and lumber meeting the following requirements:

- 1) Dimensional timber for planks and battens shall be any species of southern pine conforming to the requirements of MnDOT 3426 and/or 3457. The timber shall be free of natural and manufacturing defects (such as checks, decay, loose knots, holes, edge wane and warp) that would impair the strength or prevent use of the piece in its full size for purposes of strength and utility intended.
- 2) The Department will not permit intermixing of wood species within any continuous section of wall.
- 3) Planks constructed above ground shall be No. 1 Structural Grade and Better, dressed on two sides (S2S) or better, tongue and grooved worked. Planks constructed partially above ground, such as those placed opposite the earth fill side of noise walls, also shall meet these requirements. Planks constructed below ground, such as those placed on the earth fill side (supporting) of walls, and nailers shall be No. 2 Structural Grade and Better standard rough sawn. Battens and cap boards shall be No. 1 Structural Grade and Better, dressed on one side and two edges (S1S2E) or better.
- 4) All above ground timber products, including all battens, shall be treated to meet the requirements of MnDOT specification 3491 and Table 3491-1, “F2 – Lumber and Timber - Noise Wall Facing - above ground level”, with a product

listed on the MnDOT Approved Products List (<http://www.dot.state.mn.us/products/> listed under “Walls” – “Treated Wood”).

- 5) All below ground timber products shall be treated to meet the requirements of MnDOT specification 3491 and Table 3491-1, “E2 – Lumber and Timber - Noise Wall Facing – at or below ground level”, with a product listed on the MnDOT Approved Products List: (<http://www.dot.state.mn.us/products/> listed under “Walls” – “Treated Wood”).
- 6) Moisture content shall meet the requirements of B.5 (Moisture Content) of these Special Provisions.
- 7) All timber shall be treated with an integral color system using either of the following pigments formulations but shall not be intermixed on the project:
 - 1) Red Brown
 - Red iron oxide 35-40%
 - Yellow iron oxide 10-15%
 - Brown dye <4%
 - Carbon Black <2%
 - 2) Brown
 - Red/brown iron oxide 70%
 - Sorazine Bronze 30%

B.2 Wood Preservatives

Only preservatives listed on the MnDOT Approved Product List, (<http://www.dot.state.mn.us/products/> listed under “Walls” – “Treated Wood”) shall be used, and only for the purpose and exposure condition listed in MnDOT specification 3491, Table 3491-1.

B.2a Borate Preservative

The preservative shall provide protection to the wood against decay, rot, and insect attack, and act as a fungicide. Only Disodium Octaborate Tetrahydrate products approved for exposed conditions shall be allowed. Borate based preservatives shall include a binding system used to minimize leaching of the borate.

- 1) The preservative shall be applied at a rate by the manufacturer which will ensure that the measured retention level at the construction jobsite will be a minimum of 0.50 pounds per cubic foot for all applications where the timber will be installed.
- 2) The polymer shall be applied at a rate of thirty (30) gallons per one-thousand (1000) board feet as stated in the quality manual as approved by the ICC in accordance with ESR-1081. Verification of this rate of usage shall be monitored by an independent third-party inspection agency and the resulting report will be presented to MnDOT upon request.

B.2b PTI Preservative

PTI preservative shall include a non-metallic preservative system with active fungicides in a ratio of 10:10:1. The preservative shall provide protection to the wood against decay, rot, and insect attack, and act as a fungicide.

- 1) Apply the preservative at a rate specified by the manufacturer which will ensure that the measured retention level at the construction jobsite will be a minimum of 0.018 pounds per cubic foot for all applications where the timber will be installed.

- 2) Verification of this rate of usage shall be monitored by an independent third-party inspection agency and the resulting report will be presented to MnDOT upon request.

B.2c Pentachlorophenol Preservative

Pentachlorophenol preservative shall conform to American Wood Protection Association (AWPA) standards. The pentachlorophenol solution for wood treatment shall consist of not less than 5.0 percent of pentachlorophenol in heavy petroleum solvent (AWPA P9). The preservative shall provide protection to the wood against decay, rot, and insect attack, and act as a fungicide. After treating, the lumber shall be free of excess oil.

B.2d Micronized Copper Azole (MCA)

MCA preservative shall include micronized copper expressed as copper metal (Cu) to azole (tebuconazole) in the preservative at a ratio of 25:1. The preservative shall provide protection to the wood against decay, rot, and insect attack, and act as a fungicide.

- 1) Apply the preservative at a rate specified by the manufacturer which will ensure that the measured retention level at the construction jobsite where the timber will be installed will be a minimum of 0.06 pounds per cubic foot for above ground applications; 0.15 pounds per cubic foot for ground contact and general use applications; and 0.23 pound per cubic foot for ground contact and critical structural applications.
- 2) Verification of this rate of usage shall be monitored by an independent third-party inspection agency and the resulting report will be presented to MnDOT upon request.

B.3 Branding

Each treated wood timber shall be individually permanently branded on the face of each timber, not the edges or ends with the following two (2) separate brands:

Brand #1

- 1) Name of wood treating company;
- 2) Treatment plant city and state;
- 3) List the generic name of the treatment, i.e. "Borate", "PTI", "Penta", etc.
- 4) Preservative retention level;
- 5) "Approved for exterior use".

Brand #2

- 1) Name of wood treating company;
- 1) ICC or AWPA Accredited Facility
- 2) ICC Evaluation Service Report Number or AWPA Approval Stamp

B.4 Handling and Storage

Treated wood materials shall be delivered in wrapped bundles and stored above ground, protected from weather and moisture until use. **The Contractor is reminded that due diligence and care must be exercised when moving or handling any posts or wood material from their storage area(s) on the Project. Should any damage occur to any posts or wood material being installed on the Project by the result of mishandling, the Engineer may refuse to accept the placement of any such damaged material under MnDOT 1607 and at the approval of the Engineer. Such damaged and unaccepted material shall be replaced by the Contractor at his cost.**

B.5 Moisture Content Of Wood Products

The Contractor is responsible for the following:

(A) Samples shall be tested for moisture content at the rate of one (1) sample per 2000 square feet (186 square meters) of installed wood material. Testing and test equipment shall meet the requirements of ASTM D4444 [Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters], in particular Field Calibration (sections 5.2, 6.2, and 6.3) and Sampling Point (location) (section 6.6.1).

(B) The specified sampling rate may be increased prior to installation at the discretion of the Engineer (i.e., to test samples after a precipitation event).

(C) At the time of installation, test and ensure the moisture content in the planking wood does not exceed thirteen (13) percent maximum moisture content per volume tested. The moisture content for the battens shall not exceed fifteen (15) percent maximum moisture content per volume tested. Wood planking and battens which do not meet these requirements will be rejected. However, the rejected portion will be allowed to sun dry or be mechanically dried to meet moisture content requirements and then be placed with the approval of the Engineer in the noise wall installation. Treated wood materials which fail to meet moisture content requirements shall be rejected by the Engineer and removed from the Project at no cost to MnDOT.

B.6 Materials Ordering

Treated wood materials shall not be ordered until the Engineer has approved the proposed materials. If materials are ordered without the Engineer's written approval, the Contractor assumes all liability.

B.7 Submittals and Certification

Submittals and testing qualifications of the installer of the treated wood shall comply with B.1 (Material Requirements), and B.5 (Moisture Content Of Wood Products) of these Special Provisions. These instructions must be provided to the Engineer, and approved by the Engineer prior to the Contractor ordering materials.

All treated wood must be sampled, tested and inspected by the Manufacturer and/or Supplier and approved by the Department prior to being incorporated permanently in the work. Unless otherwise specified, the costs of sampling and testing shall be included in the Contract bid prices for treated wood products.

This inspection shall be performed in accordance with the following:

- 1) A Certificate of Compliance from the Manufacturer and/or Supplier certifying that the material furnished meets the specification requirements and identifying the specification number or reference and the Project number to which the material is shipped shall be furnished to the Engineer. The report also shall include the sampling procedures and results of all quality control tests, including a description of test methods used.
- 2) A Certificate of Compliance shall include Treatment and Inventory Audit Reports in accordance with the Quality Control Manual, Wood Treatment Products, Inc. This letter shall certify that all aspects of the Wood Treatment Products Quality Assurance Manual have been followed including both the retention of the treatment in the wood, and for products treated with borate, the appropriate amount of polymer as recorded by the treater upon treatment.
- 3) The Department reserves the right to request additional testing and/or verification by the Manufacturer and/or Supplier at the Contractor's expense.

Allow enough lead time so that a Certificate of Compliance can be prepared and furnished to the Engineer so as to not to interfere with the construction schedule for the completion of the wood noise walls.

C Structural Steel Tubing

If structural steel bracing is required it shall conform to the requirements of MnDOT 3306.

D Hardware

All hardware for noise walls shall meet the following requirements:

- 1) Threaded rods, bolts, nuts, washers, and concrete post lifting devices and concrete anchors and inserts shall be galvanized in accordance with MnDOT 3392 or be electroplated in accordance with ASTM B 633, Type II, SC 4. All hardware shall meet the requirements of MnDOT 3391 (Fasteners). Use stainless steel concrete anchors and inserts to fasten the vertical nailer to the concrete post for all posts located within 20 feet of the outside edge of the roadway shoulder and all posts supporting glue laminated rubrail (standard figure 5-297.678).
- 2) All battens shall be secured to planks using a No. 8, or larger, bugle head screw that is coated with a protective layer that provides full coverage and prohibits any corrosion after an exposure of 1,000 hours to ASTM B 117, "Operating Salt Spray (Fog) Apparatus". Stainless steel screws that meet the dimensional and drive system requirements are allowed without the performance of ASTM B 117.
- 3) Provide the Project Engineer with a letter or other documentation from the wood or preservative supplier indicating that the fasteners proposed for use are compatible with the proposed wood preservative treatment.

E Caulk

Caulk shall be a neutral-cure, one-component, high performance, medium modulus silicone joint sealant conforming to ASTM C920, Type S, Grade NS designed for general purpose caulking and glazing applications. Provide in a clear color.

F Stain and Paint

Furnish all materials and labor for coating exposed concrete and wood surfaces and painting of metal surfaces of in accordance with the applicable MnDOT Standard Specifications, the Plan details, and the following:

F.1 Scope

- 1) Section includes thin-film coatings for concrete and wood substrates.
- 2) Related sections include materials and construction as found elsewhere herein these Special Provisions.

F.2 Submittals

- 1) Product Data: Submit manufacturer's complete technical data sheets for stains and paints for each substrate requiring finishing, including:
 - a. Product profile
 - b. Surface preparation
 - c. Technical data
 - d. Application
- 2) Samples for Initial Color Selection: Submit manufacturer's color charts showing full range of colors available. When specified, match Federal color standards.

- 3) **Qualification Data:** For product manufacturers and installers indicated in Quality Assurance section, indicating capabilities and list of projects completed. Provide complete contact information for each reference.
- 4) **Product Estimates:** Submit calculations for the amount of stain material needed for a two-coat application (primer and topcoat or two coats of topcoat) for the Project using manufacturer’s average recommended coverage rate for each substrate type. The minimum allowable coverage is 4 mils dry film thickness.

F.3 Quality Assurance

- 1) **Manufacturer Qualifications:** Manufacturer with 10-years of experience in stain system design, product manufacture and technical consultation services.
- 2)
 - a. The product(s) shall meet or exceed the following performance requirements. The product(s) include both the primer and topcoat. The performance data must be for the primer and topcoat or two coats of the topcoat as a system and not individual components unless otherwise specified. All testing must be done following manufacturer’s specifications for film build unless the ASTM method specifies otherwise.
 - a. **General Requirements:**
 - 1. Free of toxic metals
 - 2. No pigments containing heavy metals.
 - 3. Meets latest Federal VOC regulations
 - 4. Color as specified for both the primer and topcoat.
 - b. **Specific Requirements for Topcoat:**
 - 1. Solids by volume: 30% minimum
 - 2. Solids by weight: 44% minimum
 - 3. Viscosity: 65 KU minimum
 - c. Obtain each specified material from the same source and maintain high degree of consistency in workmanship throughout the Project.
 - d. Deliver, store and handle specified products according to manufacturer’s instructions and application techniques.

Description of Performance Specification	ASTM Method	Performance Rating	Comments
Adhesion to Substrate	ASTM D 3359B	5B rating	7 day cure. Must be primer and topcoat or two coats on actual substrate.
Cold Weather Flexibility	ASTM D522	Pass – no visible cracks	¼” or smaller rod. Temp. = -5 °C or colder
Anti-Swelling Efficiency	ASTM D4446	ASE% >60%	
Thermocycling	ASTM D6944-03	Rating 9 Min. 25 cycles	One cycle is 4 hours immersion in water; 16 hours in freezer (<0 °C); 4 hours drying at RT; 16 hours in hotbox (>50 °C). Must be primer and topcoat or two coats on actual substrate.

Water Vapor Transmission	ASTM D1653	>1.0 Perm	Wet cup method at RT (72F) and 50% RH.
Elongation	ASTM D2370	>100%	
Xenon Arc Exposure	ASTM D6695-08 Cycle 3 at 0.35 W/(m ² *nm) @340 nm	1000 hours	Must be primer and topcoat or two coats on actual substrate. No blistering or cracking or delamination. Let dry at RT for 7 days and conduct crosshatch. Must obtain 2B or greater rating.
Chemical Resistance	ASTM 1308	Rating = 0 for softening, blistering, swelling	Test 20% NaCl solution and 20% CaCl solution. 45 days at RT.

- 3) Colors: Provide colors for coating specified in accordance with the following selection guide:
- NOTE: The Designer is cautioned that all color choices should be made in collaboration with the Bridge Office (if this applies to your Project) and/or the Program & Project Solutions Unit. They MUST be consulted when deciding on this issue.**
- a. Concrete Surfaces – Includes concrete posts. Match Federal Standard 595C, Color No. _____ (*Color Description*).
 - b. Wood Surfaces – Includes wood planking, nailers, battens and cap boards. Match Federal Standard 595C, Color No. _____ (*Color Description*).
 - c. Final color selections will be determined by the Engineer using test panels provided by the Contractor. The Contractor is advised that more than one color may be field tested and that the approved color may be a custom color.
- Note: Use the following only if this applies to your project**
- d. Metal Surfaces – (*Project Specific*)
Products for Metal Surfaces: Conform to the requirements of Section SB-__ (STEEL BRIDGE CONSTRUCTION – Ornamental Metal Railing) in Division SB attached to this Proposal. Deliver, store and handle specified products according to manufacturer’s instructions and application techniques.
 - e. Architectural Features – (*Project Specific*)

S-1.3 CONSTRUCTION REQUIREMENTS

A General

1) Construction of wood noise walls together with appurtenant concrete posts shall be accomplished in accordance with the Plan details, the applicable MnDOT Standard Specifications, these Special Provisions, or as otherwise approved by the Engineer.

If utilities or other obstructions prevent locating noise wall posts as shown on the plans, contact the MnDOT Structural Wall Engineer for assistance (651-366-4485).

Treated wood materials that must meet definite specification requirements shall not be incorporated in the work until all preliminary inspections and tests necessary for

moisture retention and preservative levels have been completed and the material is found to comply with requirements.

Ensure that all treated wood materials are installed in accordance with the “Use Restrictions” listed in Table 2 of MnDOT’s Approved Product List for treated wood, including all applicable distance setbacks from surface water, residential, and recreational areas.

Noise wall post holes shall be a minimum of 30” in diameter. Backfill the post holes with fine filter aggregate per specification 3149.2J.2. Propose a method for backfilling & consolidating the post holes to the Engineer for approval prior to backfilling. Test and verify the compaction at the surface of every 10th hole per specification 2105.3F.3. Test the upper 2’ and provide results to the Engineer electronically within 24 hours of completion of test. Substitution of lean mix backfill per specification 2520 in lieu of fine filter aggregate is permitted, with no additional compensation.

If recommended by the Foundations Unit, delete the paragraph above and add the following paragraph:

Noise wall post holes shall be a minimum of 30” in diameter. Fill the post holes with lean mix backfill per specification 2520. Allow sufficient room to install the vertical nailer and horizontal rough sawn planks below grade without interference with the lean mix backfill.

Remove water from the post hole prior to backfilling. If the hole continues to fill with water, or if the slope in front of a noise wall is 1:2 or steeper and the wall height “H” per Standard Figure 5-297.661 is 10 feet or greater, fill the hole for noise wall posts with structural concrete mix 1G52, placed as directed by the Plans and the Engineer. Allow sufficient room to install the vertical nailer and horizontal rough sawn planks below grade without interference with the backfill.

- 2) Vertical wood components, such as battens, shall be plumb after installation. Horizontal wood components, such as planks and cap boards, shall be level after installation. Concrete noise wall posts shall be supported during installation so as to be properly positioned within the wall and shall terminate plumb within a tolerance of ½” in 10 feet of above ground post.
- 3) Excavated material for noise wall construction shall not be used for backfilling the post holes and shall be disposed of in accordance with MnDOT specifications.
- 4) Install nails and screws in a manner that will avoid splitting boards.
- 5) Joints shall be constructed in a manner that will completely arrest the passage of light. No daylight shall be visible through the joints 120 days after completion of the wall; this shall be construed to be part of the Warranty as detailed in Section S-1.3H (Warranty) of these Special Provisions. The Contractor is advised to take whatever measures necessary to avoid excessive shrinkage or shifting which would cause the passage of light. Where passage of light does occur, the Contractor shall take corrective action, by applying caulking to the satisfaction of the Engineer, at his/her own expense.
- 6) Install planking “groove side down” in all installations. To minimize water retention issues, use a 45 degree down miter joint for battens that are to be joined in the construction of the wall.
- 7) Fill all holes or recesses for post lifting devices with an approved epoxy patching compound, including those that will be buried underground. Only use products

from the MnDOT Approved Products List: (<http://www.dot.state.mn.us/products/> listed under “Concrete” – “Epoxies (Non Bridge Applications)” – “Epoxy Patching Compounds” Any remaining holes or recesses for post lifting devices after erection of the posts shall be filled with an approved mix-in-the-tube dispensed epoxy compound.

8) Storage of materials within the Right of Way will be permitted only as approved by the Engineer.

9) Debris shall be disposed of outside the Right of Way.

10) Dispose of all treated wood scraps and cut-offs in a MPCA permitted Minnesota mixed municipal solid waste or industrial landfill in accordance with Mn/DOT 2104 and local regulations. Wood scraps shall not be burned or buried on site.

B Site Preparation

If noted in the Plans, dewater the site such that the ground water is a minimum of 1 foot (305 mm) below the bottom of the planking at all locations.

C Excavation

Excavate and fill to lines and grades as shown in the Plans. Fill placed below the noise wall shall be placed in maximum 8 inches (203 millimeters) loose lifts and compacted to MnDOT standard dynamic cone penetrometer (DCP) Standards. Measure the moisture and density of compacted fill at the rate of one test per 500 cubic yards (382 cubic meters) of fill, or a minimum of one (1) test per day.

D Application of Penetrating Sealer to Concrete Posts

Furnish and apply a penetrating sealer to the entire length of all four sides and ends of all concrete posts.

Clean all areas to be sealed by removing dirt, dust, oil, grease, curing compounds, laitance, or other contaminants that would impede the penetration of the sealant. Immediately before applying the sealer direct a 125 psi air blast, from a compressor unit with a minimum pressure of 365 ft³ / min., over the entire surface to remove all dust. Use a suitable oil trap between the air supply and nozzle. Use ASTM D 4285 “Standard Test Method for Indicating Oil or Water in Compressed Air” to ensure the compressed air is oil and moisture free. Air dry wet posts for a minimum of seventy-two hours before applying the sealer.

Do not apply sealer materials during wet weather conditions or if adverse weather conditions are anticipated within 12 hours of the completion of sealer application. Mix or apply silane at temperatures specified in product literature. Do not thin or alter the sealer unless specifically required in the Manufacturer's instructions. Mix the sealer before and during its use as recommended by the Manufacturer. Do not allow running or puddling of the sealer to occur. Apply the sealant at a minimum rate of 180 sq. ft. / gallon and apply in two coats if running or puddling cannot be controlled. Allow the sealant to dry according to the Manufacturer's instructions.

E Staining, Painting and Finishing Requirements

E.1 General

Concrete and wood surfaces shall be coated and finished on all exposed surfaces in accordance with the requirements described hereinafter in this specification. Steel surfaces shall be painted and finished on all exposed surfaces in accordance with the requirements described hereinafter in this specification.

E.2 Quality Assurance

- 1) Installer Qualifications: Installer with 5-years experience in stain application and maintenance on projects of similar scope and quality.
- 2) Notification: The Contractor shall notify the paint/stain manufacturer's authorized representative at least 1 (one) week prior to starting work on the project and inform the Engineer as to the day and time the representative will be on site. The authorized representative shall verify acceptance of the substrate to be painted/stained prior to commencing the application.
- 3) Test Panels: At a location selected by the Engineer, finish a 10-foot by 10-foot area of each substrate requiring coating application to obtain approval for the color, finish and coverage rates before proceeding with the Project.
 - a. Provide products, processes and techniques intended for use on permanent work. Adjust color shade of coating product as directed by the Engineer to achieve desired aesthetic appearance.
 - b. Retain and protect accepted test sample as the visual standard for the work of this section and quality standard for permanent work.
 - c. A one (1) pint sample of each lot number of coating to be used on the Project shall be submitted to MnDOT's Office of Materials for testing to verify:
 - i) Percent Solids
 - ii) Infrared Scan on vehicle
 - iii) Viscosity.Stain failing these tests shall be rejected, and shall not be used on the Project.

E.3 Application Requirements

- 1) Verify that surfaces to be finished are sound, dry and free of dust, dirt, oils, efflorescence, biological and chemical residues, paint, stain, curing compounds and other contaminants which may affect performance of the coating specified. Pressure washing of wood surfaces is prohibited.
- 2) In addition to the moisture content test(s) performed under S-1.2.B.5 (Moisture Content of Wood Products) of these Special Provisions, the Contractor shall test the moisture content of all wood surfaces before applying stain specified. This testing shall be performed at the rate of one (1) sample per 2000 square feet (186 square meters) of installed wood material. Except as otherwise approved by the Engineer, surfaces having a moisture content greater than 13% shall not be stained.
- 3) Apply coating specified according to manufacturer's instructions and application techniques to achieve average coverage rate shown on manufacturer's technical data sheets. This data must specifically provide surface preparation and application instructions for preservative treated timber and lumber products. **Apply two coats minimum** (primer and topcoat or two coats of topcoat) using airless spray equipment with appropriate tip/atomizing pressure for equipment, applicator technique and weather conditions to produce a wet application that provides color uniformity, but avoids buildups, lap marks and runs. **Finished areas lacking a uniform appearance shall be repaired to the satisfaction of the Engineer without additional cost or expense to the State.** If the system is applied before installation, then an alternate application method may be employed according to manufacturer's instructions and application techniques to achieve average coverage rate shown on manufacturer's technical data sheets, but it must be approved by MnDOT.

- 4) Protect and shield all surfaces that are not intended to be treated, including trees, shrubs and other plants. When multiple colors are specified, protect previously finished surfaces to avoid overspray.

F Battens and Cap Boards

- 1) Install all battens, cap boards and other architectural features to planks using a No. 8, or larger, bugle head screw using a drive system that does not strip or cause damage to the head of the screw and will penetrate completely through the batten board and through $\frac{3}{4}$ of the thickness of the facing board in all applications.
- 2) The fastener pattern used for screwing cap boards and other architectural features to planks shall utilize 2 bugle head screws placed in a staggered pattern on 4 inch or 6 inch centers on the boards, thereby hitting every facing plank (Similar to fastener pattern shown for battens in the Plans). Install the bugle head screws a minimum of 1 inch and a maximum of 1.5 inches from the edges of the board.

G Caulk

Apply after coating

H Warranty

Warrant the installation of the treated wood against defects for a period of one hundred twenty (120) days from the date of the acceptance (See Section XX.I (Noise Wall Acceptance)) by the Engineer. (Note: This warranty is separate from any warranty (ties) that the manufacturer may provide to the Contractor on the treatment chemicals and/or the treated noise wall timbers supplied). Repair any defects due to improper installation that occur during the warranty period at no cost to the Department. Furnish the Engineer with a written warranty.

I Noise Wall Acceptance

The Contractor shall retain ownership and responsibility of the noise wall until the Engineer accepts it.

The Engineer will accept the installation after:

- 1) All required documentation from the Contractor has been received and accepted.
- 2) Test reports verifying material properties have been received and accepted by the Engineer.
- 3) Construction of the noise wall is complete, including any repairs needed due to material defects or construction requirements.

S-1.4 METHOD OF MEASUREMENT

- (A) Concrete posts of each size will be measured separately by the length of the posts furnished and installed complete in place as specified.
- (B) Wood noise wall construction will be measured by the square foot of treated timber and lumber furnished and installed complete in place as specified, including quality assurance sampling and testing, architectural treatments (battens and cap feature), fire hose access holes, and coating. No increase in area will be allowed for measuring the opposite side of the wall or the architectural treatments required on this surface unless specified on drawings.
- (C) Staining, painting, silane sealing and finishing of concrete, wood and metal surfaces are considered to be incidental expense to the respective items of Wood Noise Wall construction, and no additional compensation will be made for this work.

S-1.5 BASIS OF PAYMENT

Payment will be made according to the following schedule:

NOTE: Only those pay items which are applicable to this Project shall apply.

<u>Item</u>	<u>Description</u>	<u>Units</u>
2411.501	Structural Concrete (1G52)	Cubic Yard*
2422.603	Concrete Posts 12" x 18"	Linear Foot
2422.603	Concrete Posts 12" x 20"	Linear Foot
2422.603	Glue Laminated Rub Rail	Linear Foot
2422.618	Wood Noise Wall	Square Foot
2451.513	Fine Filter Aggregate (CV)	Cubic Yard
2520.501	Lean Mix Backfill	Cubic Yard *

Payment shall be considered payment in full for all other costs incidental thereto.

* = Lean Mix Backfill and Structural Concrete (1G52) will be paid for only if its use is required in Section S-1.3A because of soils on site. If the Contractor chooses to use either for his/her convenience, they will only be paid what it would cost for (2451.513) Fine Filter Aggregate (CV) by the Cubic Yard.