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## HTETCO Reclaimed Wood Flooring Using LEED Guidelines



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# HTETCO Reclaimed Wood Flooring using LEED Guidelines

## SECTION I: INTRODUCTION

The goal of this paper is to teach the reader “How to Estimate the Cost of Reclaimed Wood Flooring Using LEED Guidelines.” It is the intent that after reading this paper, a thorough knowledge and understanding of all components identified in the paper can be utilized so that the reader can properly determine and estimate all elements involved with installing reclaimed wood flooring for a complete and accurate cost estimate.

## Section 2: THE IMPORTANCE OF LEED CERTIFICATION

All building projects can benefit from obtaining a high LEED certification. This is especially true for existing commercial buildings, government buildings and school buildings.<sup>1</sup>

The following are just a few of the reasons why obtaining LEED certification is so important:

### **Reduce your environmental footprint**

The operation of your building has a huge impact on the environment. A LEED Gold certified building produces 34 percent less greenhouse gas emissions than a non-LEED certified building.<sup>1</sup>

### **Save money**

By obtaining LEED certification or even improving your LEED score, you can save more money in the long run. This is especially important for businesses in commercial spaces that need to reduce their overhead as much as possible.<sup>1</sup>

By improving things such as energy efficiency and water efficiency, the building owner will realize greatly reduced monthly utility bills, which can add up to a substantial amounts in the long run – notably for larger buildings.

### **What is LEED and why is it important?**

LEED is a Green Building program administered by the non-profit U.S. Green Building Council. LEED certifies buildings, not products or manufacturers. A building can get LEED certified if it earns a certain number of LEED credits or points. Each point or group of points relates to a different environmentally friendly technology or material. There are different levels of certification depending on how many points the building earns (LEED Certified, LEED Silver, LEED Gold, LEED Platinum), and there are many points that the project team can choose from as they design the building and plan which level of certification they want to attain.<sup>1</sup>

A flooring product might help a building qualify for one or more LEED points, but a single product doesn't guarantee that the building gets the point because the point is awarded based on how products from that category of materials were used throughout the entire building. For example, there is one LEED point that a building can earn if 50% or more of all of the wood going into the building is certified by the Forest Stewardship Council (FSC). Another point can be earned if none of the engineered and composite wood products in the building were made with urea-formaldehyde adhesives. So, a particular product selection can only contribute to the achievement of a LEED point. Also, it may be that the project team has decided not to pursue the credit that is relevant to the category of materials in question, in which case the product selections in that category may not matter, even though the building is still going for LEED certification.<sup>1</sup>

## MAIN CSI MASTERFORMAT™

**DIVISION: 06 00 00, Wood**

**Sub-Division: 06 05 00, Wood Materials**

**Sub-Division: 06 05 55, Reclaimed Wood Products & Materials**

**DIVISION: 09 00 00, Finishes**

**DIVISION: 09 60 00, Flooring**

**Sub-Division: 09 64 10, Hardwood Wood Flooring**

**Sub-Division: 09 64 20, Reclaimed Wood Flooring**

**Sub-Division: 09 64 80, Wood Flooring Finishes**

With new wood flooring, FSC certification and 'no added urea-formaldehyde' (NAUF) are the two key attributes that specifiers are looking for when they're working on a LEED project. They may still use products that don't have those attributes, since the 50% calculation allows for the use of a mixture of certified and uncertified wood, and they may decide not to pursue the 'no added urea-formaldehyde' credit.<sup>1</sup>

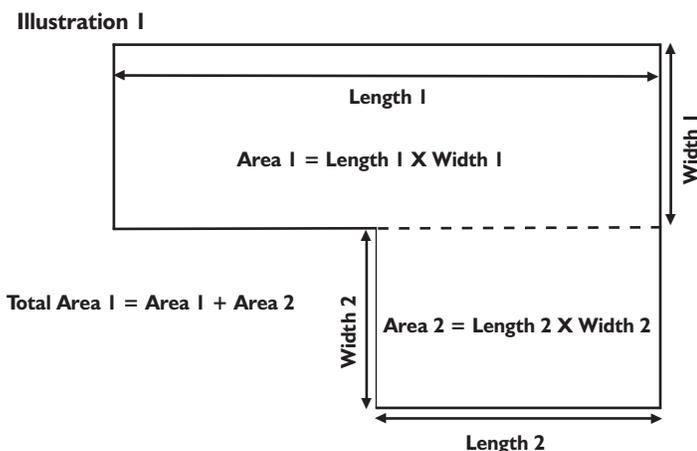
### Section 3: FACTORS TO AFFECT PRICING AND TAKEOFF

There are many factors and considerations that need to be included in the estimate so that it is a complete estimate can be compiled. After reading this paper the estimator should have a thorough understanding of all direct and indirect items required for to complete the estimate of installing reclaimed wood flooring. In this paper, the author will describe factors that will need to be included in the estimate; these items include:

- Procurement and Freight
- Site Conditions
- Substrates and Moisture Testing
- Product selection
- Acclimation, Installation, and Finishing
- Protection
- Submitting for LEED points

### Section 4: TYPES AND METHODS OF MEASUREMENTS

For the purposes for estimating reclaimed wood flooring material, the author will use the standard measuring format to determine the square footage [SF] for an area; the common "shapes" of floor plans are either square or rectangular. The following method will be used to determine the square foot for both "shapes":



There are parts of the wood floor system that we will utilize another unit of measure called **linear/lineal footage [LF]** such as quarter round trim. This will be discussed in more detail later in the paper. We will calculate installation using **man hour(s) [MH]** to determine the cost of labor. The three aforementioned units of measurements are the basics of calculating the cost of the labor and material for the product.

### Section 5: SPECIAL FACTORS TO CONSIDER THAT MAY AFFECT TAKE-OFF

There are specific factors to consider when pricing finishes, especially the installation of reclaimed wood flooring. The quantity and location can have an impact on the final cost of any installation. Both of these factors are important during this phase of the estimating process.

#### Small Quantities versus Large Quantities

There are several factors that can determine cost. The quantity of material can have a large impact on an estimate – both material and labor cost. Manufactures often offer discounts for purchasing material in bulk. For example, buying ten thousand square feet of material versus one thousand square feet can save you ten to twenty percent in material cost. This is a general rule of thumb and each manufacturer needs to be consulted prior to assigning any bulk discount.

Freight can also be a factor. If the manufacturer does not offer direct shipping to a supplier, then utilizing a private shipping company can add additional cost. In addition, five pallets of material could cost the same as shipping ten pallets if it's less than a truck load (LTL).

Labor is also attributed to quantities. Most labor contractors offer different labor rates for projects depending on the size or duration. For example, if the project is small and will last one week, labor forces would charge more per square foot than if it was a larger project that was scheduled to last three months.

#### Geographic Location

The location of the project within the United States has an effect on the cost of labor. Labor rates in more populated areas are higher than those in smaller cities. Specifically, reclaimed wood flooring is a custom trade that most flooring contractors do not specialize in or have full time labor crews that perform this type of custom flooring. In most cases, there are few installers that specialize in this trade and sometimes travel state to state to install reclaimed wood floor. In these instances, lodging, travel time, and per diem all have to be factored when estimating installing reclaimed wood floor.

## Section 6: PURPOSE OF USING RECLAIMED WOOD FLOOR

### Why use reclaimed wood flooring in a project?

Using reclaimed wood flooring in your project is one of many methods to achieve LEED certification for Building Design and Construction (LEED BD+C). There are several credits wood flooring can achieve for LEED certification:<sup>1</sup>

- MR7 Certified Wood
- MR 5.1 and 5.2 Sources Material regionally
- EQ4 Low Emitting Materials

### What is reclaimed lumber?

Reclaimed lumber is processed wood retrieved from its original application for purposes of subsequent use. Most reclaimed lumber comes from timbers and decking rescued from old barns, factories and warehouses, although some companies use wood from less traditional structures such as boxcars, coal mines and wine barrels. Reclaimed or antique lumber is used primarily for decoration and home building; for example for siding, architectural details, cabinetry, furniture and flooring.<sup>2</sup>

## Section 7: FACTORS TO CONSIDER WHILE ESTIMATING RECLAIMED WOOD FLOORS

The estimator needs to consider and include other factors that will have a direct effect on the final price. These factors need to be included in the estimate. They include:

1. **Moisture Testing - RH**
2. **Job Site Conditions**
3. **Substrate**
4. **Installation method: gluing vs. nailing vs. floating**
5. **How the floor should be installed & waste factor**

### 1. Moisture Testing - RH:

- a. A moisture test for RH (relative humidity) is required before installing the wood floor if the wood floor is being installed over a concrete substrate. Provisions for labor to conduct moisture tests, provide a written report, and the equipment required needs to be included in the estimate.

### 2. Job Site Conditions:

- a. The HVAC system must be turned on and air must be consistent throughout the installation process. This could change how you estimate the schedule. For proper installation, reclaimed wood should be given a minimum of 72 hours in a conditioned environment to acclimate to ambient conditions, potentially increasing labor costs and time to completion.

- b. Additional labor for stocking the job site with the material before the installation needs to be included as direct labor in the estimate. Other factors that needs consideration by the estimator are the size of the project, how many floors (levels) are involved; is an elevator available or will a separate piece of equipment need to be rented such a lull/fork lift to stock the project? Omitting these components could cost thousands of dollars to the bottom line.

### 3. Substrates:

- a. The estimator needs to determine and factor in the substrate the reclaimed wood floor is being installed over. For example, if the wood flooring is installed over a concrete SOG or elevated concrete slab, and if the Moisture – RH has an above normal reading, there are additional provisions that need to be included in the estimate. Different manufacturers recommend different methods for preparing a concrete substrate; the estimator needs to refer to the specific manufacture's installation guidelines for each material type selected for specific projects so that the warranty will not be voided due to improper substrate preparation.
- b. Some additional floor prep required may include:<sup>\*\*\*</sup>
  - a. Installation of a poly vapor barrier to prevent hydrostatic pressure
  - b. Installation of LiquiDam,<sup>TM</sup> a liquid moisture mitigation product
  - c. Pressure treated furring strips

*\*\*\*It is important that the estimator reads the project specifications, blueprints and the manufacture's recommendations. The manufacture's recommendation often identifies critical information and instructions for the installation of their product that will require monetary provisions that are not typically listed in the specifications or blueprints; failing to read the manufacturer's installation instructions can void the warranty and have negative impacts to the estimate.*

### 4. Installation method: gluing vs. nailing vs. floating:

- a. The manufacture's installation instructions will assist you in determining what method to use for installing the specified wood floor. The substrate will also determine this factor.
- b. The cost factors to consider with each method are:
  - i. **Gluing:** the amount of adhesive required to glue the floor and additional labor will also be required vs. a floating floor
  - ii. **Nailing:** the amount of fasteners that will be required to nail the floor in place; other cost factors include the purchase or rental equipment such as the nail gun and compressor and additional labor needs to be factored for nailing.

- iii. **Floating:** this method also uses glue – the difference between this method and the gluing method is that the adhesive is applied directly to the tongue of each plank and not troweled onto the substrate as with the gluing method. Monetary provisions for adhesive and labor need to be included in the budget.

**5. How the Floor Should Be Installed & Waste Factor**

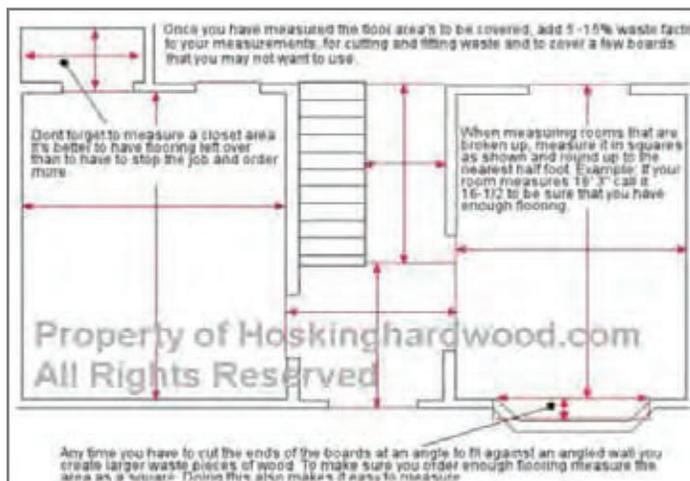
- a. The direction at which the plans call for the flooring to be installed could potentially add both additional labor and material cost. Most manufacturers suggest a 5%-10% waste factor when ordering wood flooring; this should be used as rule of thumb and not a definitive calculation.
- b. There are several factors to include when calculating waste factors. For example, the illustration below from Hosking (Illustration 2) shows large rooms, hallways, coves, and closets. The smaller rooms, unequal rooms, and coves all add additional waste versus installing flooring in large, open rooms
- c. Installing floor on a diagonal plane (45°) versus straight could add an additional 15-20% waste factor.

**SECTION 8: RATIOS AND ANALYSIS**

Typically finishes run 7% - 9% of a construction project's overall budget. Since reclaimed wood flooring is a specialty item, a 10%-12% ratio may be more in line with expected costs. Asking the general contractor to assist in obtaining this percentage to the project's overall budget would solidify this ratio.

The above percentages are dependent on the project's overall design and objectives. Usually reclaimed wood flooring has a higher procurement rate due to the sourcing requirements and additional non-manufactured requirements that increase costs compared to traditional non-reclaimed wood floor installations.

**Illustration 2**



**SECTION 9: SAMPLE SKETCHES**

**(Sketches may be viewed on the ASPE website)**

**Section 10: ESTIMATING MATERIAL AND LABOR**

Once the estimator has reviewed the project specifications, blue prints, and manufacturer's installation instructions, it is time to assemble the estimate of direct costs. The direct costs include material, labor, equipment, procurement, freight, and tax.

The estimator should start by reading the Finish Plan or Finish Schedule located on the blueprint or in the specification manual. This will show what room or areas are designated to receive the reclaimed wood floor; if there multiple reclaimed wood floor selections, the legend on the finish schedule will show the different designation (i.e. RWF-1, RWF-2, ...). The finish plan will also list the required accessories that will be installed as part of the floor assembly system. These will include transitions strips, control joints, and trim such as quarter round or shoe molding.

The estimator should next identify the rooms on the floor plans that get reclaimed wood flooring and begin to quantify the square footage of each room as shown in Illustration 1 on page 16. The dimension should always be rounded to the nearest whole foot when performing a take-off (example 12'-6" = 13'). During this point in the take-off, it should be noted what substrate is being used so the appropriate subfloor, PVB, or furring strips can be quantified to enter into the estimate. The estimator should also perform a perimeter take-off of each room – this will provide the linear foot dimensions to calculate shoe molding or quarter round trim. Also, if the wood floor butts next to a dissimilar material, such as carpet or vinyl flooring, the linear foot dimension of this area needs to be taken so that the amount of transition strips needed can be measured to complete the reclaimed wood floor installation can be calculated.

If there are multiple reclaimed wood floor selections, the estimate should be grouped by the floor material selection. The reason for this is that each individual material costs may be different for the selected materials. To save the estimator time, it is practical to use a digital or eTake-Off tool such as BlueBeam™ or Vu360™. Both programs offer user friendly interfaces that can group the parts of the estimate as outlined above. They can even be exported into a spreadsheet.

Once the estimator has performed a detailed take off of the reclaimed wood floor, the required substrates, the associated trim and any other items such as transition strips or control joints, it is time to enter the quantity take-offs into an estimating program or cost

spread sheet such as Microsoft Excel. Both will calculate the labor and material cost based on the information the estimator inputs.

Another important factor to consider is that some material used for reclaimed wood flooring is not manufactured like typical wood flooring. It is usually made from old barns, box cars, flooring from structures such as schools, houses, warehouses, etc. Sourcing this material is not like ordering from engineered wood flooring companies such as Armstrong or Lumber Liquidators. There are two companies located in Richmond, Virginia they are Wellborn + Wright, Inc and Surface Architectural Supply, that specialize in reclaimed wood to be used on floors, walls and other architectural features.

Both of these reclaimed wood specialists require the following questions to be answered before they can submit a material cost. All answers are cost factors that need to be considered when estimating reclaimed wood floor:

- a. What is the age of the wood?
- b. What is the desired wood species? The more rare the wood, the higher the cost.
- c. Is the wood painted? Yes...
  - a. Is the paint lead based? If so, it will have to be abated by a certified lead-paint abatement contractor.
- d. Does the thickness of the reclaimed wood vary? If so, it will have to be planed for a uniformed thickness.
- e. Does the reclaimed wood have tongue and groove edges? If not, the tongue and groove edges will need to be milled into the lumber.
- f. What is the final finish of the reclaimed wood?
  - a. Stained or clear coated? Smooth finish or textured finish?
- g. What are the Architect's or Owner's expectations of a "final finish"? How many mock-ups will be required?
- h. Do the contract documents specify a quantity for attic stock?

Once the above quantity take off is complete and the answers to the above questions are answered, the estimator can begin to input the collected data in the estimate format.

### **Entering Data into the Cost Sheet**

As soon as the material take-off is complete, it should be submitted to the company that the material will be sourced from. Most manufacturers require a specific quantity of material before they

submit a final material price for inclusion into the estimate to determine if bulk discounts are available or to be able to calculate the freight and shipping costs.

### **Items to Include in the Bid Submission**

When entering the quantities for the reclaimed material, the waste factor needs to be added (this percentage factor should be noted in the estimate). Enter each type of floor system separately and identify the material as per the finish schedule to eliminate confusion. The cost estimate should be set up so the per square foot for labor and material is automatically calculated and totaled. The substrate material will be entered separately for each material used (i.e. plywood, PVB, or furring strips). Next, the accessories such as transition strips, quarter round, or shoe molding will be entered. Once the unit cost for the labor rate is identified and the material cost is known, it should be entered in the appropriate cell. The estimate should be set up to calculate all of the data automatically. Any additional direct costs such as freight, lead paint abatement, or subcontracted items such as milling or planing costs should be added to the budget. The sub-total should be known at this point. Next, percentages for general conditions, burden, insurance, overhead, profit should be calculated. Once these percentages are added, the total estimate will be calculated.

When submitting the bid or estimate, a summary sheet, list of clarifications, and a list of assumptions and exclusions, if necessary, should accompany the estimate. This is important so the owner or general contractor is fully aware of all of the inclusions and exclusions that the estimator has assumed. Other items that that could be included if applicable are:

- Site conditions expected prior to the flooring installation
- The acclimation requirements that need to be addressed (climate control)
- Site readiness or preparedness expectations
- The amount of time the material needs to be acclimated onsite prior to installation
- Anticipated schedule
- Protection of installed materials and maintenance of installed materials
- Documentation for Certification of LEED points attributed to the reclaimed wood floor installation.

Providing a detailed take-off with the estimate will ensure that the project team is fully aware of what is and what is not included in the estimate. *(continues on page 21)*

**SECTION II: SAMPLE ESTIMATE**

<b>Project:</b>	<b>HAWTHORNE MILL APARTMENTS</b>	<b>GC:</b>	<b>General Contractor of America</b>
<b>Architect:</b>	<b>Main Street Architects</b>	<b>Bid Date:</b>	<b>05/05/2017 - 2:00 PM</b>
<b>Plan Date:</b>	<b>08/10/2016</b>	<b>Division:</b>	<b>09 64 20 - Reclaimed Wood Flooring</b>
<b>Sub:</b>	<b>Reclaimed Wood Specialist, LLC.</b>		
<b>Total SF:</b>	<b>65,125</b>		

CSI DIV.	ITEM	QTY	UNIT	TAX	UNIT COST	ITEM SUBTOTAL	TRADE SUBTOTAL	DIVISION SUBTOTAL	COST/ S.F.
<b>01-000</b>	<b>GENERAL CONDITIONS</b>								
<b>01-200</b>	<b>Tools and Equipment</b>								
	Nail Gun & Compressor	M 10.00	WKS	T	250.00	2,500.00			
	Dumpsters	M 4.00	LS	T	350.00	1,400.00			
	GENERAL CONDITIONS SUBTOTAL						3,900.00	3,900.00	0.06
<b>01-400</b>	<b>Management &amp; Supervision</b>								
	On-Site Superintendent	L 10.00	WK		850.00	8,500.00			
	Project Manager	L 10.00	WK		500.00	5,000.00			
	Moisture Testing — RH	L 16.00	MHS		65.00	1,040.00			
	MANAGEMENT SUBTOTAL						13,500.00	13,500.00	
	<b>GENERAL CONDITIONS SUBTOTAL</b>							<b>17,400.00</b>	<b>0.27</b>
<b>02-000</b>	<b>DEMOLITION</b>								
	Demo Carpet	L 32,665.00	SF		0.87	28,418.55			
	Demo Cove Base	L 1.00	LS		2,500.00	2,500.00			
	Demo Vinyl Flooring	L 8,167.00	SF		0.87	7,105.29			
	DEMOLITION SUBTOTAL						38,023.84	38,023.84	
	<b>DEMOLITION TOTAL</b>							<b>38,023.84</b>	<b>0.58</b>
<b>03-000</b>	<b>CONCRETE</b>								
	Flash Patch SOG for Wood Floor	L 16,264.00	SF		1.87	30,413.68			
	Flash Patch SOG for Wood Floor	M 16,264.00	SF	T	2.64	42,936.96			
	CONCRETE SUBTOTAL						73,350.64	73,350.64	
	<b>CONCRETE TOTAL</b>							<b>73,350.64</b>	<b>1.13</b>
<b>06-000</b>	<b>WOODS &amp; PLASTICS</b>								
	ST Furring Strips @ Basement Flooring	L 16,264.00	SF		1.56	25,371.84			
	ST Furring Strips @ Basement Flooring	M 16,264.00	SF	T	2.14	34,804.96			
	Milling & Planing Costs	1.00	SUB		17,254.00	17,254.00			
	WOOD & PLASTICS SUBTOTAL						77,430.80	77,430.80	
	<b>WOOD &amp; PLASTICS TOTAL</b>							<b>77,430.80</b>	<b>1.19</b>
<b>07-000</b>	<b>THERMAL &amp; MOISTURE PROTECTION</b>								
	Poly Vapor Barrier @ Wood Floor in Basement	L 16,264.00	SF		0.15	2,439.60			
	Poly Vapor Barrier @ Wood Floor in Basement	M 16,264.00	SF	T	0.80	13,011.30			
	THERMAL & MOISTURE PROTECTION SUBTOTAL						15,450.80	15,450.80	
	<b>THERMAL &amp; MOISTURE PROTECTION TOTAL</b>							<b>15,450.80</b>	<b>0.24</b>
<b>09-000</b>	<b>FINISHES</b>								
09-6420	Flooring — Includes 10% Waste Factor								
	Reclaimed Wood Floor: RWF-1	L 420.00	MHS		32.50	13,650.60			
	Reclaimed Wood Floor: RWF-1	M 24,568.00	SF	T	11.09	272,459.12			
	Reclaimed Wood Floor: RWF-2	L 320.00	MHS		32.50	10,400.00			
	Reclaimed Wood Floor: RWF-2	M 16,264.00	SF	T	9.87	160,525.68			
	1/4 Round Trip	L 8,415.000	LF		0.65	5,469.75			
	1/4 Round Trip	M 8,415.000	LF	T	0.65	5,469.75			
	Transition Strip	L 3,873.00	LF		0.86	3,330.78			
	Transition Strip	M 3,873.00	LF	T	1.06	4,105.38			
	FLOORING SUBTOTAL						475,410.46	475,410.46	7.30
	<b>FINISHES TOTAL</b>							<b>475,410.46</b>	<b>7.30</b>

**SUMMARY**

TOTAL DIRECT COSTS		698,106.54	697,066.54	697,066.54
FREIGHT	LS			3,750.00
TAX	5.3%			28,472.29
OVERHEAD & FEE	15%			109,393.32
<b>TOTAL ESTIMATE</b>				<b>\$ 838,682.16</b>
				\$12.88

**ASSUMPTIONS & EXCLUSIONS**

- 1 Excludes Floor Protection After Installation
- 2 Assumes HVAC System Will be Turned on 96 Hours Prior to Stocking Wood Floor
- 3 Price Included Demo of Existing Floor Finishes Where New Reclaimed Floor is Installed Only - all Other Floor Covering Removal is Excluded.

## **Conclusion**

Estimating the cost of reclaimed wood flooring for LEED points is more complex than that of estimating a traditional engineered wood flooring project. By following the above outlined items and answering the step-by-step questions, the estimate should be complete and accurate. The reclaimed wood flooring installation will add LEED points to the project that help achieve the LEED Certification Designation.

## **Footnotes:**

<sup>1</sup> Guide to LEED Certification (<http://www.usgbc.org/cert-guide>)

<sup>1</sup> Armstrong Sustainable Design (<http://www.armstrong.com/content2/flooring/files/75439.pdf>)

<sup>2</sup> Glossary of terms from the Guide to LEED Certification (<http://www.usgbc.org>)

## **SECTION 12: REFERENCES**

<http://www.usgbc.org/cert-guide/commercial>

<http://www.diynetwork.com/how-to/rooms-and-spaces/floors/how-to-install-a-hardwood-floor>

<http://www.homeadvisor.com/cost/flooring/install-wood-flooring/>

<http://www.homeflooringpros.com/blog-guides/hardwood-floor-installation-cost/>

<http://homeguides.sfgate.com/average-cost-hardwood-floor-installation-sanding-finishing-67958.html>

<http://www.oldewoodltd.com/what-to-know/resource-library/installation-guidelines/installation-moisture-testing>

<http://www.armstrong.com/flooring/top-10-hardwood.html>

<http://www.armstrong.com/flooring/hardwood.html>

<http://www.armstrong.com/content2/flooring/files/75439.pdf>

<http://www.delmhurst.com/blog/topic/rh>

<http://flooring-professionals.com/flooring-resources/relative-humidity-and-hardwood-flooring/>

### **Surface Architectural Supply**

1504 Belleville Street

Richmond, VA 23230

804-918-2467

<http://www.surface-supply.com/>

### **Wellborn + Wright**

3801 Carolina Avenue

Richmond, VA 23222

804-329-0079

<http://www.wellbornwright.com/>

## **SECTION 13: GLOSSARY**

**CSI:** Construction Specification Institute

**HVAC:** Heating Ventilation and Air Conditioning

**FSC:** Forest Stewardship Council

**LEED:** Leadership in Energy and Environmental Design

**LF:** Linear / Lineal Foot

**LTL:** Less Than Truck Load

**MH:** Man Hours

**NAUF:** No Added Urea Formaldehyde

**PV:** Poly Vapor Barrier

**RH:** Relative Humidity

**SOG:** Slab on Grade

**SF:** Square Foot

**USGBC:** United States Green Building Council

**VS:** Versus