

**Healthy Neighborhoods, Inc.**  
**Neighborhood Stabilization Plan 2**  
**Specifications and Performance Standards**  
**for**  
**Housing Rehabilitation**

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## 01 GENERAL CONDITIONS

### PROGRAM COMPLIANCE

**0110.** The contractor shall comply with all applicable programmatic requirements and terms of the Neighborhood Stabilization Plan 2.

**0111.** The Specifications and Performance Standards for Partial Housing Rehabilitations are to serve as guidelines for projects that are not Gut Rehabilitations and shall assist the Owner on those projects of various sizes which do not meet the criteria of Gut Rehabilitations and the subsequent NSP2 requirement to meet the Energy Star Qualified New Homes standard and eligibility for voluntary compliance with Green Rating Certifications. They shall also serve as supplemental guidelines to specifications currently in use by the Owner. **[See Section 1541.]**

#### **0112. Insurance**

- a. **Liability Insurance** - The contractor shall carry a minimum of \$50,000 liability insurance in compliance with Maryland state law. Additional insurance requirements:
- b. **Worker's Compensation Insurance** will cover all employees and meet statutory limits in compliance with applicable state and federal laws. The coverage must also include Employer's Liability with minimum limits of \$100,000 for each incident.
- c. **Business Auto Liability** - \$300,000.00 per occurrence, combined single limit for: bodily Injury Liability and Property Damage Liability
- d. **Builder's Risk** - To be purchased by Owner and to be a minimum of the amount of the rehabilitation contract.

**0113. Procurement and Contracting** - The procurement process shall follow the guidelines of HUD Document: *Playing by the Rules, Chapter 3*. (Handbook for CDBG Sub recipients on Administrative Systems)

In accordance with this document, the Owner will comply with the following:

- a. Small purchases may be used for procurement of \$100,000 or less. Documentation of a competitive process (i.e., receipt of oral or written price or rate quotations) must be kept.
- b. Competitive sealed bids shall be solicited by non-profit consortium members through formal advertisement for projects over \$100,000.
- c. Competitive proposals shall be used only when conditions are not appropriate for the use of formal advertising. Proposals shall be clear in intent for the goods and services required, pricing and technical proposals fully evaluated, an opportunity for final and best offer extended with the acceptance of the proposal that is clearly the most advantageous source of goods and services.
- d. Non-competitive sole source procurement may only be used under very limited circumstances. Refer to *Playing by the Rules, Chapter 3* for the list of qualifying conditions.
- e. For construction or facility improvement sub contracts exceeding \$100,000, a Performance Bond for 100 % of the contract price and a Payment Bond for 100 % of the contract price shall be provided by the (sub) contractor. (Non-profits must follow their own mandated compliance for equal to or less than \$100,000 of similar work).
- f. Affirmative steps to use small firms, minority and /or women owned firms, and labor surplus area firms must be taken.

- g. **HUD Section 3** – All contracts and bids must contain the required Section 3 language. The contractor shall provide hiring and training opportunities for individuals from the immediate neighborhood in compliance with HUD Section 3. Details will provided by the Owner

Additional Procurement and Contracting compliance information can be found at:

[www.hud.gov/offices/cpd/.../library/.../playing/chapter3.pdf](http://www.hud.gov/offices/cpd/.../library/.../playing/chapter3.pdf)

**0114. Lead** - Owners are required to certify and ensure that construction activities comply with HUD's Lead Disclosure Rule ( 24 CFR part 35 subpart A) and HUD's Lead Safe Housing Rule provisions for rehabilitation (subpart J) – and for acquisition, leasing, support services, and operation subpart (K) and the accompanying procedural requirements in subparts B and R.

In accordance with 24 CFR part 35, Subpart J (section d) : Projects over \$25,000 shall be required to be inspected by a certified lead inspector and risk assessor for lead hazards; lead hazards shall be identified and abated; the property shall be cleared and certified in accordance with 24 CFR 35.1340.

Additional Lead Rule compliance information can be found at:

[www.hud.gov/offices/lead/enforcement/regulations.cfm](http://www.hud.gov/offices/lead/enforcement/regulations.cfm)

**0115. Contract Procedures and Change Orders:**

- a. Each project shall have a Preconstruction meeting which includes the NSP2 inspector.
- b. Maximum amount for General Requirements shall be 10 % of the contract price.
- c. Maximum overhead and profit shall be 10% of the contract price.
- d. The combination of the General Requirements and Profit and Overhead shall not exceed 20% of the contract price.
- e. Change Orders shall have a maximum of 15 % overhead and 10 % profit for subcontractors plus 10% profit and overhead and bond increase cost for the Contractor.
- f. Change Order must be approved before submittal of the requisition.
- g. A Project Change Order log shall be kept.
- h. Minutes shall be kept for all meetings.

**0116. Payment:** Contractor shall use AIA G702 - Application for Payment and AIA G703 - Continuation Sheet which must match the approved CDA Form 212/215 (approved construction budget). If the amounts differ from the approved budget as evidenced by Form 212/215, the request for payment will be returned to the borrower.

**GOVERNING CODES**

**0120.** All work will be done according to all applicable federal, state and local governing agencies, codes, regulations and specifications.

**0121.** The contractor is responsible for applying for and obtaining all building and zoning permits that impact this project and for taking all the necessary steps to schedule submission of permits to minimize delays.

**0122.** The contractor and all sub contractors shall be licensed by the appropriate state and local regulatory agencies to perform the work and shall schedule all required inspections to ensure final Use

and Occupancy of the project. MHIC and trade license numbers shall be displayed on all contracts and in accordance with state law.

**0123. Historic Districts** - Units in Historic Districts will be designated by Owner and related work will be coordinated by the Owner. Work shall be in compliance with the Secretary of Interior's Standards for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings ([www.nps.gov/hps/tps/standguide](http://www.nps.gov/hps/tps/standguide)). The contractor also shall comply with all Baltimore City Commission for Historical and Architectural Preservation (CHAP), Urban Renewal and Neighborhood Design Guidelines for historic districts. These can be found at: [www.baltimorecity.gov/Government/BoardsandCommissions/HistoricalArchitecturalPreservation.aspx](http://www.baltimorecity.gov/Government/BoardsandCommissions/HistoricalArchitecturalPreservation.aspx)

**0124. Lead Safe Certification** - all contractors shall be trained and certified in compliance with the EPA's Lead Renovation, Repair and Painting Rule and Maryland's Department of Labor Licensing and Regulation and implement safe work practices per Lead Safe Housing Rule 35.1350. Training certificate shall be submitted with Bid. The contractor shall consult with the Owner on the extent of affected interior and exterior work surfaces.

#### **EXISTING CONDITIONS**

**0130.** Confine stockpiling of materials, etc. to areas approved by the Owner and in a manner that does not impede construction or cause an overload of the structure.

**0131.** Fires and smoking will not be permitted on the premises. An operable, charged and certified fire extinguisher is recommended to be kept on site during construction.

**0132.** Keep access to the site clear and available at all times.

**0133.** The contractor and subcontractors shall schedule weekday work hours per Baltimore City regulations - no work to occur between 7:00 PM and 7:00 AM. Requests to work on weekends must be approved by the Owner and be in accordance with Baltimore City work hour requirements.

#### **CONTRACT DOCUMENTS**

**0140.** If the project scope is described by drawings, the contractor shall not scale from the drawing. Field verify all dimensions. Any discrepancies or omissions on the drawings and specifications will be reported immediately upon discovery to the owner, architect and rehabilitation specialist prior to the submittal of the bid; otherwise it shall be understood that the drawings and specifications are perfectly clear as to what is intended and claims for additional funds shall not be honored if submitted after the bid.

**0141.** By submitting a bid, the bidder agrees and warrants that he has examined the existing conditions, drawings (if provided) , and specifications and has found them completely adequate for proper completion of this project.

**0142.** By submitting a bid, the bidder acknowledges that he understands the full scope of work as it pertains to the drawings and specifications.

## **SUBSTITUTIONS**

- 0150.** Requests by the Contractor will be considered when reasonable, timely, fully documented and qualifying under one or more of the following circumstances:
- a. Related to an “or equal” or similar provision in contract documents.
  - b. Required product cannot be supplied in time for compliance with the contract time requirements.
  - c. Required product is not acceptable to governing authority, or is determined to be incompatible, or cannot be properly coordinated, warranted, or has other recognized deficiency as certified by the contractor.
  - d. Substantial advantage (financial or other) so offered by the owner after deducting offsetting disadvantages including delays, additional compensation, to Engineer for redesign, investigation, evaluation, and other necessary services and/or similar considerations.

**0151.** Submittals are to include, at most, full documentation including product data, samples where appropriate and/or requested, detailed performance comparisons and elevation information for proposed Change Order, and any other useful or necessary documentation when requested by the Owner.

**0152.** Approval of substitutions is possible only by the submittal procedure. Changes that do not receive Owner and Architect approval will be the responsibility of the contractor to rectify and or to bear with regard to any additional cost.

## **COORDINATION**

**0160.** Contractor shall coordinate with the Owner for appropriate communications with utility companies for disconnection and reconnection of services, sizing of service, and evaluation of existing service.

**0161.** Contractor is responsible for all costs that may occur because of unintentional disruption of service caused by his employees or subcontractors.

**0162.** The Contractor is responsible for complete coordination of all trades and is held responsible for damage repairs of one trade's work to another.

**0163.** The Contractor is responsible for the coordination of not only their contracted work, but also the coordination of work by separate sub-contractors as directed by the Owner.

**0164.** Contractor is required to have all installers of each major unit of work inspect substance and conditions before installation. Correct all unsatisfactory conditions, inspect each product immediately prior to installation, and do not install damaged or defective products, materials, or equipment, Schedule deliveries to minimize long term storage.

**0165.** Contractor is required to receive, store, and handle all products, materials, and equipment in a manner which will prevent loss, deterioration, and damage.

**0166.** Contractor is required to clean each element of work at the time of installation. Provide sufficient maintenance and protection during construction to ensure freedom from damage and

deterioration at time of substantial completion. Appliances, hardware, cabinetry, fixtures, and finished surfaces (i.e. floors, etc.) should be properly protected as directed by the Owner.

**0167.** Contractor is also required to provide inspection, protection, and cleaning of other work or items provided by the Owner or other Contractors.

## **QUALITY**

**0170.** All workmanship and materials shall conform to the most recent standard adopted by the local governing agencies, by building, mechanical, and other trade and product associations and by professional associations including The American Institute of Architects and National Association of Home Builders.

**0171.** Upon the completion of the NSP 2 Program inspections and based on their results, the Contractor will be required to repair damaged work and restore substrates and finishes. The Owner also has the right to collect outside bids for repairs.

## **SITE PROTECTION**

**0180.** The Contractor is responsible for maintaining the site in compliance with governing agencies, codes, and specifications.

**0181.** The Contractor is responsible for administrating the use of temporary facilities in a manner which conserves energy, but without delaying work or endangering persons or property; comply with reasonable requests by Owner.

**0182.** The Contractor is to provide facilities and services as necessary to effectively protect from losses and personal injury during the course of construction.

**0183.** The Contractor as the construction progresses and as it becomes feasible to secure the project against intrusion, will provide temporary security enclosures or systems, doors and locks as necessary to prevent unauthorized entrance.

**0184.** The Contractor shall provide temporary heat as required to protect the work and to ensure a safe work environment.

**0185.** The Contractor shall protect all building openings as required to prevent damage from weather and exposure.

## **PROJECT CLOSE OUT**

**0190.** The Contractor may request the Final Payment for the work only when the following are completed:

- a. Workmanship bonds, (if required.) maintenance agreements, and inspection certificates for specific units of work, all of which enable Owner's unrestricted Use and Occupancy
- b. Submit record documentation, maintenance manuals, tools, spare parts or materials, touch up paint, keys and similar operational items as directed by the Owner.

- c. Complete instructions of start-up of systems and operation to the Owner and to include labeling all valves, circuit breakers, controls or other operational devices as directed by the Owner or required by Code.
- d. Complete final cleaning and removes temporary facilities and tools.
- e. Completion of the Punch List and submittal of final lien releases from the subcontractors
- f. Submittal of the Use and Occupancy permit
- g. Retainage will be 10 % during project until its completion.

**0191.** Upon Contractor's request, the Owner will produce a punch list of prerequisites not fulfilled and incomplete items and unacceptable conditions. For the Contractor, this procedure may repeat itself until the Owner upon completion of inspection, recommends final acceptance and final payment.

**0192.** The Contractor is to maintain a complete set of prints when drawings are used, contract documents and shop drawings for record mark-up purposes throughout the contract duration which will become the property of the Owner.

**0193.** The Contractor is to provide the Owner with product information that will contribute to an Operations and Training Manual, outlining the required maintenance items, with instructions and appropriate data for each system or equipment item. Green Materials used on the project will also be submitted to the Owner and will be included in a Green Maintenance Guide explaining the intent, benefits and maintenance of implemented Green building features and shall encourage additional Green activities such as recycling, gardening, and use of healthy cleaning materials. This Guide will be created by NSP2/Healthy Neighborhoods, Inc with information provided by the Owner.

**[Green Spec - See Section 15.]**

**0194.** The Contractor shall require each installer to provide the Owner with on site instruction sufficient to ensure safe, secure, ongoing and efficient operation of systems.

**0195.** The Contractor is responsible for providing cleaning or re-cleaning of entire work area to a normal level for "First class cleaning". Remove non-permanent protection and labels, polish glass, clean exposed finishes, touch up mirrors, finish damaged goods and/or areas, clean or replace filter of mechanical system, remove debris, and broom clean non-occupied spaces, sanitize plumbing, clean light fixtures and replace burned out dimmed lamps, sweep and wash paved areas, police yards and grounds and perform similar cleanup operation needed to produce a "clean" condition as judged by the Owner. Contractor shall use to be the best degree possible, cleaning agents which carry the Green label or adhere to the EPA's Alternative Assessments Program for cleaning agents.

## **02 SITE CONSTRUCTION**

**0201.** Scope of Work defined in this section : All work directed by the Owner related to driveways , foundations , concrete walks, and steps , all patios , terraces, utilities , and related items as applicable to the project necessary to complete the work as outlined on the work order or drawings.

**0202.** Acceptance of the site: additions and exterior improvements: The Contractor shall inspect the site prior to starting his work for proper grades, soft spots, etc. The Contractor shall be responsible for fine grading the sub grade under all areas before placing finished surfaces. For existing structures with interior work only: The Contractor shall inspect for drainage problems, steps, walks, and retaining walls in poor condition and hazardous utility hook ups. The Owner shall pull the Minor Privileges Permits for

all pertinent exterior work encroaching into public right of way before work commences. This includes but is not limited to new steps, awnings, bay windows, cornices etc.

**0203.** All work shall be done in accordance with 1994 Maryland Standards and Specifications for Sediment Control and Soil Erosion, as issued by Maryland Department of the Environment and Natural Resource Conservation Service.

**0204.** The Contractor shall be responsible for all clearing, grubbing, excavating, filling, rough grading, finished grading and seeding, and related items to complete the site work. Grubbing shall be done to 12" below grade. Positive drainage from all structure shall be achieved with a minimum ½" per foot for 6'-0".

**0205.** Site verification of all affected grades should be done before work commences.

**0206.** Bid Line for excavations and cut and fill is the existing grade as verified by the Owner.

**0207.** The Contractor shall notify Miss Utility @1-800-257- 7777 at least 48 hours prior to beginning work. Relocation of existing gas, electric, telephone, communication or CATV lines, if necessary shall be by the respective service provider.

**0208.** Contractor shall maintain traffic along right of ways at all times during the course of construction except during those times that excavation may pose a safety risk. Permits shall be obtained for any closures. Repair of damage of right of ways during construction will be the Contractor's responsibility.

**0209.** The Contractor shall coordinate with Owner to verify the extent of removing trees, paving, structures, etc. prior to submitting his bid for this work. Preservation of mature vegetation is a priority. The use of a Maryland licensed tree expert to protect mature vegetation shall be used if the line of disturbance encroaches on root systems. Dead, dying and hazardous trees shall be removed.

**0210.** Retain and protect from damage all healthy plant materials, trees, and landscape features, especially those which perform passive solar energy functions such as sun shading and wind breaks. **[Green Spec - See Section 15.]**

**0211.** The Contractor shall permanently stabilize any area disturbed by this construction with fine grade topsoil, seed and mulch.

**0212.** New landscaping vegetation shall be non –invasive and preferably native species with low water use requirements and where possible provide passive solar energy functions such as sun shading and wind breaks. **[Green Spec - See Section 15.]**

**0213.** Contractor shall submit a separate unit price for the following items when requested by the Owner. The Owner may have a recipient for suitable fill. Verify before disposal:

- a. Borrow with offsite disposal of unsuitable material per cubic yard
- b. Class 3 excavation with select backfill offsite disposal of unsuitable material per cubic yard
- c. Rock excavation in trenches with offsite disposal of unsuitable material per cubic yard

**0214. Piping Notes**

- a. All construction shall be accomplished in accordance with the current industry standards and details for construction and the current National Standard Plumbing Code as amended by Baltimore City.
- b. All cleanouts located per Baltimore City. Verify location with the Owner.
- c. The Contractor shall identify all utilities prior to the beginning of construction.

**0215.** Provide all trenching and hook up for new electrical service if required. Verify all loads. (HVAC, appliances, lighting, outlets, etc.) Coordinate with the Owner for any possible future electrical load requirements. **[See Green Spec - Section 15.]**

**0216.** When possible, storm water, site drains, and exterior foundation drainage tile will be piped to downhill outfalls which are to be sized and located per Baltimore City Code. Foundation drainage tile to be placed on minimum 4" bed of gravel over undisturbed soil. Gravel of a minimum depth of 2'-0" by 2'-0" wide shall cover drainage tile topped with geo-textile fabric or 30 lb. felt. Rinse gravel of all fines before installation.

**0217.** Provide gravel for temporary gravel drive/ work turn arounds etc. as required to handle heavy equipment to site. Remove, fine grade and seed disturbed area at the end of construction. Coordinate with Owner on location of all access drives.

**0218.** Contractor to retain the services of a geotechnical engineer as needed but not required unless requested by Baltimore City Inspector to verify soil conditions and design capacity in accordance with Section 0219 before work begins. Submit report to the Owner and Architect.

**0219.** Soil bearing capacity of 2,000 PSF shall be used for footings. If soil of this capacity is not encountered at elevations required, increase footing size or lower as directed by the geotechnical engineer.

**0220.** All footing bottoms and pier bottoms shall be 2'-6" minimum below existing grade or compacted fill whichever is higher.

**0221.** When recommended by the Owner, row houses shall have rear yard pads as wide as the house and 6'-0" deep with 4" concrete with 18" turn down at extremities over 4" stone base and float broom finish. Provide a similar 30" concrete walkway with 2"x4" gutter formed into the walkway to rear yard gate. All exterior concrete shall be air entrained and have a 28 day compressive strength of 3,500 PSI. **[See section 12 and Green Spec - Section 15.]**

**0222.** All privacy and decorative fences shall adhere to Baltimore City Zoning Code height restrictions Section 3-209 Article C - Projections and Obstructions into Required Yard.

**0223.** New chain link fences when approved by the Owner shall be a maximum 42" tall with a 36" wide gate at rear and side yards when facing a right of way. Posts to be set in concrete at least 30" deep, 8" diameter and 1" above grade. Verify in the field. Metal mesh and post finish per Owner.

**0224.** Based upon the termite report, the Owner shall treat the property for termite extermination. Minimum 1 year guaranty plan. If work affects basement slab, utility locations shall be verified. Refer to Green Standard Section 1534 for measures to consider.

### **03 DEMOLITION**

**0301.** All work shall be performed in accordance with local codes and authorities. Demolition Application Guidelines for Baltimore City exterior and interior demolition shall be followed. In cases of significant masonry exterior wall demolition, the contractor shall verify if a Baltimore City registered demolition contractor is required.

**0302.** Contractor is responsible for obtaining all applicable permits.

**0303.** Contractor shall coordinate with the Owner regarding all utility companies and scheduling of disconnections and reconnection of service as necessary. The Contractor shall notify Miss Utility @1-800-257- 7777 at least 48 hours prior to beginning work that may affect underground utilities.

**0304.** If any unusual, uncommon, or unanticipated conditions are exposed during demolition, notify the Owner immediately.

**0305.** All demolition shall conform to the EPA's Lead - Safe Renovating, Repairing or Painting Rule, 2010. Only EPA Lead - Safe Certified Firms may perform this work.

**0306.** All demolition work shall be accomplished in a manner that protects the existing house. This includes all fixtures, doors, windows, flooring, walls, ceilings, cabinetry, appliances, and mill work.

**0307.** Contractor shall secure structure before moving walls by bracing or shoring. This is to be done in a manner that is safe for workers, inspectors, and inhabitants using the site. Contractor shall notify Architect and Owner when structural walls are to be opened. The Owner will provide stamped design documentation when structural walls are to be removed or modified when requested by the City Inspector.

**0308.** Existing structure exposed by demolition shall be protected from weather and exposure.

**0309.** Demolition shall include a waste management plan which documents the salvaging and recycling of non- hazardous waste when recommended by Owner. Salvage for possible reuse all reusable materials or items including windows and doors including their jambs, glazing, beams, lintels, columns, connectors, lumber, piping, radiators, valves, cabinetry, appliances, outlets, switching, lighting, etc. Revenues and other incentives for recycling will be determined by the Owner.

**0310.** Remove existing lighting fixtures, wire molding, junction boxes, switches, etc. involved in the work, safely cap and label. Label HOT, GND, switch locations and destinations as appropriate. **[See electrical notes Section 13.]**

**0311.** During demolition, Contractor is to be mindful of the existing landscape that surrounds the site of the construction. The Contractor is to make every effort to see that no landscaping is destroyed. Site access will be determined by the owner. **[See Green Standard 1509.]**

**0312.** Rubbish and trash shall not be stored on site or on adjacent yards whether they are vacant or occupied properties. These items should be removed as collected in accordance with the Owner's waste management plan.

**0313.** Any demolition to existing building that is necessary to accomplish new construction should result in the affected areas being returned to the state in which these areas were found unless otherwise noted. This includes work around the electrical panel, all plumbing and electrical lines, etc. that are run through the existing house.

**0314.** Approval to proceed with the cutting and patching does not waive right to later require removal/replacement of work to be cut-and-patched in an unsatisfactory manner, as judged by the Owner.

**0315.** Restore exposed finishes of patched areas and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.

**0316.** Use temporary enclosures and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Enclosures shall comply with the EPA's Lead- Free Renovate Right guidelines.

**0317.** Contractor to fully investigate existing building as to the demolition necessary to accomplish the intent of the new renovation and addition. This means that the Contractor will do all demolition and repair necessary to complete the job and include said work in bid.

**0318.** Contractor is responsible for moving all existing services (HVAC, plumbing, electrical) that are necessary to complete the intent of the job.

**0319.** Rodent and pest infestation may become evident during demolition. The contractor shall examine the site and structure for infestation and submit a cost to address this problem as directed by the Owner.

**0320.** Underpinning of basement walls must comply with Baltimore City's Requirements for Underpinning Walls including Underpinning Permit Application and Associated Documents and Letter of Certification by a licensed structural engineer.

**0321. Historic Districts** – demolition must comply with the Secretary of Interior's Guidelines for Rehabilitating Structures. A plan coordinated with the Owner identifying, retaining and preserving historic elements affected must be submitted to the Owner. Location of these structures will be provided by the Owner.

**0322.** Before demolition, the Contractor shall coordinate with the Owner for possible evidence of asbestos and vacated oil tanks (hazardous materials) and shall bid on the removal, stabilization or abatement of all hazardous material using licensed abatement subcontractors who carry appropriate insurance for such work. Disposal of waste generated in the course of the abatement process shall comply with EPA and Maryland Lead Paint abatement policies (Comar 26.02.07) and the Maryland Department of the Environment Policies for disposal of hazardous material. **[See Section 0114.]**

#### **04 CONCRETE AND PAVING**

**0401.** Concrete work including, forming, mixing, placing and curing shall be in accordance with A.C.I. 301.

**0402.** Concrete reinforcing: A.S.T.M. A-615, GRADE 60.

- 0403.** Portland cement: A.S.T.M. C-150, TYPE I.
- 0404.** Aggregate: A.S.T.M. C-33. 1" maximum for footings, walls and slabs on grade, 1/2" maximum for thin slabs and 3/8" for wall fill.
- 0405.** Concrete shall have a 28 day compressive strength of 3,000 PSI
- 0406.** Exterior concrete to be air entrained and shall have a have a 28 day compressive strength of: 3,500 PSI.
- 0407.** Water cement ratio not to exceed .54 for 3,000 PSI concrete and .45 for air entrained concrete.
- 0408.** Air entrain exterior exposed concrete 5% +/- 1%.
- 0409.** Reinforcing for footings and other concrete using earth forms shall have 3" concrete cover
- 0410.** Use a water reducing admixture in the concrete mix.
- 0411.** Use a minimum of 5 ½ bags of cement and a maximum of 6 ½ gallons of water per bag for each cubic yard of concrete.
- 0412.** When requested by the Owner: Slump – as required by ACI (211.1). Should extra water be required before depositing concrete, be sure that the water/cement ratio accepted mix design has not been exceeded. Additional water added to mix after leaving batch plant shall be indicated on the truck ticket and signed by person responsible. Submit copy of ticket for review.
- 0413.** Where new full basement slabs are to be installed, a 4" reinforced slab over 4" rinsed stone with a minimum 6 mil. Vapor barrier lapped 12" at seams. Provide perimeter drainage tile to submersible sump pump with battery backup. Outfall pump per Code to storm water system.

## **05 MASONRY**

- 0501.** Manufacture and install masonry in accordance with (ACI 530/ASCE 5/TMS 402), (ACI 530.1/ASCE 6/TMS 602). CMU Block : A.S.T.M. C-90 with minimum density of 125 lbs. per cu. ft. for normal weight units.
- 0502.** Block used in exterior walls, interior bearing walls and walls with vertical steel reinforcing shall be manufactured and laid such that webs are in complete alignment.
- 0503.** Mortar: A.S.T.M. C-270 TYPE S. **[See Historic Restoration - Section 0513.]**
- 0504.** Grout: A.S.T.M. C-476 (non shrink, non - metallic).
- 0505.** Reinforcing: A.S.T.M. A-615, GRADE 60.
- 0506.** Brick, block, or any combination shall have galvanized ladder type horizontal joint reinforcing at 16" O/C maximum with prefabricate corner and "T" pieces unless noted. Lap splices 6" minimum.

- 0507.** Horizontal joint reinforcing shall be in accordance with ASTM - A951 and shall be manufactured from 9 Gage (0.148) min. cold drawn steel wire conforming to ASTM A-82 and shall consist of two deformed longitudinal side rods welded at 16" plus or minus intervals to a perpendicular cross rod forming a ladder design. Cross rod and side rods shall be located in the same plane as the longitudinal rods. Out to out spacing of side rods shall be approximately 2" less than the nominal thickness.
- 0508.** Joint reinforcement to be hot dipped galvanized, after fabrication, in accordance with ASTM A-153 CLASS B2 (1.80 oz./sq. ft.).
- 0509.** Block shall be laid in full bed of mortar including cross webs.
- 0510.** Walls to be filled solid shall have cores of block filled with grout in six course maximum lifts, water cement ratio not to exceed .58 grout for wall fill to be in accordance with ASTM C-476.
- 0511.** Brick cleaning and restoration shall be done in manner that is not abrasive and damaging to the brick. Smartstrip by Peel /Away and Cathedral Stone D/2 Cleanser are acceptable cleansing agents. Collection of liquids, paste and paint residue shall be in compliance with Baltimore City Code and MDE disposal regulations, whichever is more stringent. Protect adjacent surface areas and properties from damage during the cleaning process. **[Green Spec – See Section 15.]**
- 0512. Historic Restoration:** Re-pointing shall be done in compliance with Technical Preservation Services "Re-pointing Mortar Joints" in historic masonry buildings by the National Park Service. Rake joints a minimum of 5/8". Deeper rake may be required to hit solid mortar. Mortar color to match historic color - Type O for typical Baltimore historic brick. When requested, provide 2'-0" x 2'-0" test panel for Owner and Architect approval. ([www.nps.gov/hps/tps/briefs/brief02.htm](http://www.nps.gov/hps/tps/briefs/brief02.htm)).
- 0513.** For products having recycled content, the contractor shall coordinate with the Owner on the extent of content for a Green Maintenance Guide. **[Green Spec – See Section 15.]**
- 0514.** Stone work: Inspect all stone. Note and report any unusual conditions or damaged stone and select only those pieces that will provide level and consistent surface for repair or new work. New stones to match color and size of existing wall in case of repair work. Set stone in mortar setting bed appropriate for type of stone and its density. (Joints to have mortar color as approved by Architect and Owner and shall match adjacent mortar style.) Clean all stone with fiber brush, clean water and mild detergent. Submit type of detergent to be used. Sandblasting, wire brushes and acids are not to be used under any circumstances. Protect adjacent surface areas and properties from damage during the cleaning process. **Historic Restoration:** Re-pointing shall be done in compliance with Technical Preservation Services "Re-pointing Mortar Joints" in historic masonry buildings by the National Park Service.

## **06 METALS**

- 0601.** All metal contractors shall properly licensed and experienced in residential steel and ornamental metal work.
- 0602.** Structural steel shall be fabricated and erected in accordance with A.I.S.C. Manual of Steel Construction, Thirteenth Edition.

- 0603.** Steel - A.S.T.M. A36 for angles, channels, and miscellaneous shapes. - A.S.T.M. A992 (50 KSI ) for WF shapes.
- 0604.** Structural Tubes - A.S.T.M. A500 (GRADE B).
- 0605.** Structural Pipes - A.S.T.M. A501, or ASTM A53, TYPE E, GRADE B.
- 0606.** Hooked Anchor Rods - ASTM F1554 / A307, GRADE A.
- 0607.** Headed Anchor Rods - ASTM A307, GRADE A.
- 0608.** Threaded Rods - ASTM A193.
- 0609.** Nuts - ASTM A563, Heavy.
- 0610.** Washers - ASTM F436.
- 0611.** Plate Washers - ASTM A36.
  
- 0612.** Coat steel exposed after building is completed with one shop coat of an approved rust inhibitive primer. Paint steel exposed to weather after building is completed with two additional coats of rust inhibitive paint after erection. Paint shall be compatible with shop coat. All such products must have VOC content in compliance with Maryland COMAR 26.11.33.05 (see appendix for VOC Content limits).
  
- 0613.** When applicable, manufacturer shall design guardrails/handrails and connections to structure at balconies, stairwells, ramps, and floor openings (both exterior and interior) to support the following design loads: 50 pounds per lineal foot 200 pound concentrated load whichever is greater, applied at any point and in any direction to top of rail, and 50 pound concentrated load applied on a 1-square –foot area at any point for remaining guardrail infill components. When requested by the City Inspector, submit shop and erection drawings indicating sizes and connections of hardware and handrail components. Install handrails and guardrails at all necessary locations in accordance with International Residential Code 2009 Sections R311- R312.
  
- 0614.** The Contractor shall submit manufacturer’s shop drawings containing a certification seal by a professional engineer ( registered in the jurisdiction where the project is located ) stating that the guardrail and handrail components have been designed to support specified loads in locations that are considered fall/height hazards by the Owner or when requested by the City Inspector.
  
- 0615.** For products having recycled content, the contractor shall coordinate with the Owner on the extent of content for a Green Maintenance Guide. **[Green Spec – See Section 15.]**

**07      CARPENTRY**

- 0701**    Framing shall be nominal wood framing unless the Building Code mandates non-combustible material.
  
- 0702.**    Attach plywood floor sheathing using glue and nails. All plywood shall be APA rated.
  
- 0703.**    Unless otherwise instructed from a licensed engineer, attach plywood to framing with min. 8d nails at 6" O/C on edges of sheet and 12" O/C on each interior support.
  
- 0704.**    For plywood 5/8" and thicker use T & G edges or H Clips at midpoint for spans greater than 16" O/C. For 48" spans provide 2-H Clips at 1/3 points of span or provide T & G Plywood.

**0705.** Structural Lumber – Spruce Pine Fir #1/#2 or better with 19% maximum moisture content in use and shall have the following minimum unfactored properties :

E = 1,400,000 P.S.I.	fe = 425 P.S.I.
fb = 875 P.S.I.	ft = 425 P.S.I.
fc (Parallel to grain) = 1,100P.S.I.	fv = 70 P.S.I.

**0706.** Structural lumber (5"X5" and larger) - Southern Pine #2 or better with 19%maximum moisture content in use.

**0707.** Pressure Treated Lumber – Southern Pine #2 with the following retention levels: for above ground use - .4 PCF for processes using ACQ and CBA-A, .2 for process using CA-B.

**0708.** Spike (2) layers of joists and headers together with minimum 16d nails at 18" O/C staggered. Bolt (3) layers of 2x members together with 5/8" bolts at 2'-0" OC staggered.

**0709.** Provide flush framed joists and headers with a prefabricated galvanized (saddle type) metal connector unless noted otherwise. Hangers shall be 18 Gauge minimum thick and have capacity to resist 400 lb. minimum for each 2x member in shear for species of wood used.

**0710.** Provide a minimum of 1 row of solid bridging for wood joists (floor and roof) in all new construction and in extensive infill of replacement joist systems. Repair any existing bridging affected by new work.

**0711.** Provide stud bearing walls with 2 continuous top plates and 1 continuous bottom plate plus a minimum of one row of horizontal bridging at mid-height of wall unless noted otherwise.

**0712.** Exposed structural framing members in above ground use and wood plates in contact with slabs on grade to be pressure treated lumber. Treated wood shall have been manufactured with a waterborne preservative material with one of the following: Alkaline Copper QUAT (ACQ) TYPES B or D, or Copper AZOLE (CBA-A, CA-B).

**0713.** Steel materials in contact with pressure treated lumber to be hot dipped galvanized. Minimum galvanized coating for prefabricated metal connectors to be G-185 per ASTM A653. Connectors, hot dipped galvanized after fabrication, in accordance with ASTM A123. Fasteners hot dipped galvanized after fabrication in accordance with ASTM A153. Mechanically galvanized fasteners in accordance ASTM B659, Class 55.

**0714.** Provide solid (continuous) bridging at bearing points.

**0715.** In new construction, connect roof joists at each bearing point with prefabricated galvanized metal connectors unless otherwise noted. Each connector shall be 18 Gauge minimum thick and shall have a minimum uplift and shear capacity not less than 350 lb. uplift and 150 lb. shear ( equivalent to (2) – H4 Simpson, Inc. Anchors ) for the species of wood used.

**0716.** Install double stud each end of wood beams unless instructed otherwise.

**0717.** For each stud wall openings not specifically called out by Architect use wood lintel schedule below. Provide one bearing stud and one full height jamb stud each end of the wood lintels and headers

unless instructed otherwise. For openings over 7'-0" provide two bearing studs and one full height jamb stud unless noted otherwise. Install window and door lintels in load bearing walls only. Frame to allow for insulation in non-bearing locations.

WL-1  
2-2x6 for 4" stud wall  
for openings up to 3'-8"

WL-2  
2-2x8 for 4" stud wall  
for openings 3'-9" to 5'-0"

WL-3  
2-2x10 for 4" stud wall  
for openings 5'-1" to 7'-0"

WL-4  
2-2x12 for 4" stud wall  
for openings 7'-1" to 9'-8"

**0718.** Recommended renewable resources: wood based products certified in the following product programs qualify for Green Designation [**Green Spec – See Section 15 Green Standards.**]:

- a. American Forest Foundation's "American Tree Farm System" *tm* (ATFS)
- b. Canadian Standards Association's Sustainable Forest Management System Standards
- c. Forest Stewardship Council
- d. Program for endorsement of Forest Certification Systems (PEFC).
- e. Sustainable Forestry Initiative (SFI)
- f. other product programs mutually recognized by PEFC

**0719.** Laminated veneer lumber: Section includes microlam - laminated veneer lumber (LVL) and parallel strand lumber (PSL) as manufactured with I-Level Inc. by Weyerhaeuser.

LVL Beams minimum requirements:

E = 1,900,000 P.S.I.  
fb = 2,600 P.S.I.  
fc (PARALLEL TO GRAIN) = 2,700 P.S.I.  
fe = 750 P.S.I.  
ft = 1,850 P.S.I.  
fv = 285 P.S.I.

PSL Beams minimum requirements:

E = 2,000,000 P.S.I.  
fb = 2,900 P.S.I.  
fc (PARALLEL TO GRAIN) = 2,900 P.S.I.  
fe = 750 P.S.I.  
ft = 2,025 P.S.I.  
fv = 290 P.S.I.

Wrap each LVL beam with a waterproof covering until area where beam is placed is protected from the elements. Nail (2) layers laminated veneer lumber's (LVL) together with (2) rows of 16 d nails at 18" O/C . If more than (2) layers, use 5/8" bolts 2'-0" OC. Stagger pattern. Holes, notches, etc. shall be approved by the LVL manufacturer. PSL's used in exterior conditions shall be womanized in accordance with manufacturer's recommendations.

**0720. Prefabricated Wood Trusses (when specified by the Owner)**

0720-1. Design and install trusses, design bracing and connectors in strict for trusses in strict accordance with applicable codes requirements as well as “The Wood Truss Council of America (WTCA) and by the “Truss Plate Institute” (TPI ).

0720-2. Provide Trusses with camber in accordance with design specifications for light metal plate connected wood trusses TPI 85P and PCT -85.

0720-3. Install bracing of wood trusses in accordance with manufacturer’s design WTCA AND TPI unless instructed otherwise. The minimum bracing elements noted below are to remain in place in the finished structure.

- a. Continuous lateral bracing required by the truss design including diagonal bracing at ends of the building and at 16’-0” maximum intervals in the length of the building.
- b. Web member plane bracing
- c. Bottom chord bracing

0720-4. Truss supplier shall take special care to design and supply lateral bracing for compression members of trusses shipped in multiple pieces and field connected.

0720-5. Members shall be Southern Pine #2 or better (surfaced at 19% max. moisture content in use).

0720-6. Lumber shall conform to the recommendations of the American Forest and Paper Products Association, National Design Specifications for Wood Construction”. Each piece shall be grade marked.

0720-7. When required, the truss manufacturer shall coordinate plate material with any specified treatment process.

0720-8. Connect roof trusses at each bearing point with prefabricated galvanized metal connectors at each truss unless otherwise noted. Each connector shall be 18 gauge minimum thick and shall have the uplift and shear capacity as required by the truss manufacturer, but shall not be less than 350lb. uplift and 150 lb. shear. (Equivalent to 2 –H4 Simpson Anchors) for the species of wood used.

0720-9. Truss to truss and truss to header connectors shall be designed by truss manufacturer.

0720-10. Prior to fabrication, submit a complete set of shop drawings of the trusses. Shop drawings shall include member stresses member grades and sizes, size and location of connector plates, size and location of permanent truss bridging and member bracing, data relative to prefabricated hangers for truss to truss and truss to header connections, design computations, and erection plans. Reprints of contract documents are not acceptable. Design computations and shop drawings shall be signed by a professional engineer registered in the jurisdiction where the project is located. Only shop drawings also bearing the stamp of the Architect of record shall be used for fabrication and erection.

0720-11. Basic stability of the structure is dependent upon the diaphragm action of floors, walls, and roof acting together. Contractor to provide guys, braces struts, etc. as required to accommodate live, dead, and wind loads until final connections between these elements are made. Permanent bridging required by truss design shall be sized and supplied by truss manufacturer. Special care shall be taken to

size supply lateral bracing required for compression members of trusses shipped in two pieces and field connected.

0720-12. Bridging, member bracing, etc., shall be as required by manufacturer's design and shall be installed by contractor in strict accordance with manufacturer's requirements.

0720-13. Engage the services of an independent inspection agency to visually inspect trusses before and after erection. Inspection agency shall certify that the trusses, connections, and bracing have been installed in compliance with requirements of the contract documents. The project engineer of record may also provide this service.

**0721.** Wood stair framing, handrails, and guardrails designs shall be manufactured with connections to the structure at stairwells and floor openings (both interior and exterior) to support the following design loads:

- a. **Stair**                      Dead Load – as required by construction  
Live Load - 40 PSF or 300 pound concentrated load at center of tread or at any point on a landing
- b. **Handrails**                20 pounds per lineal foot or 200 pound concentrated load, whichever is greater, applied at any point and in any direction
- c. **Guardrails**               50 pounds per lineal foot or 200 pound concentrated load, whichever is greater, applied at any point and in any direction to top rail and 50 pound concentrated load applied on a (1) square foot area at any point for remaining guardrail infill components.

Provide hangers, clip angles, blocking, etc. as required for connection of stair framing to surrounding framing. When requested by the City Inspector, submit manufacturer's shop drawings and erection drawings indicating framing sizes and wood grades as well as connections of stair components as well as drawings for stairs, handrails, and guards containing a certification sealed by a professional engineer or Architect registered in the jurisdiction where the project is located, stating that the stair components have been designed to support the specified loads. Special construction and curved stairs will be reviewed case by case.

**0722.** In rehabilitation of existing rowhouses, install new 2x4 stud walls at 16" O.C. at all exterior walls, partitioning and side demising walls by direction of the Owner. Use 2x6 and 2x8 walls for chases as required for plumbing waste lines and mechanical ducts. Fire separations at property lines and fire-stops at penetrations and concealed spaces shall be in accordance with Baltimore City Code.

**0723. Historic Cornices** – match details to the greatest degree possible using compatible material and sufficient structure. Fire stop per Code. Metal cornices shall be repaired by lapping new work a minimum of 2" and sealing seam within joint overlap. Metal details by W.F. Norman (800-641-4038) or approved equivalent. Paint in historic color as approved by Owner and CHAP.

## **08 THERMAL AND MOISTURE PROTECTION**

**0801.** All roofs shall comply with applicable Codes, the National Roofing Contractors Association, and associated trade organization standards.

**0802.** Metal roof and flashing details shall comply with Sheet Metal and Air Conditioning Contractors National Association (SMACNA) standards and roof manufacturer's recommended details. Copper roof and flashing details shall comply with Copper and Common Sense, 8<sup>th</sup> Edition by Revere Copper.

**0803.** Built up roofing (BUR Systems) shall only be used in the repair and extension of existing built up roofs and shall meet the standards established by the American Society for Testing and Materials (ASTM) for new work and repairs in accordance with National Roofing Contractors Association's recommendations. BUR Systems shall receive a "silver coat".

**0804.** New low slope roofs shall be Energy Star Rated cool roofs in accordance with all proprietary ASTM standards, the National Roofing Contractors Association and manufacturer's recommendations for the following roof types: Modified Bitumen, EPDM, TPO and PVC membranes. (Find Energy Star Roofing Partners at [www.energystar.gov/index/roof](http://www.energystar.gov/index/roof)) **[See Green Standards – Section 15 for Cool Roofs.]**

**0805.** Slate roofs shall comply with standards established by the National Slate Association. Additional educational resources include 2009 reprinting of Slate Roofs, *New York: National Slate Association, 1926* and The Slate Book, *Stearns, Brian; Stearns, Alan; and Meyer, John, n.p., Stowe, VT, 1998.*

**0806.** Shingle roofs shall have a 30 year manufacturer's defect warranty and be installed in accordance with current International Residential Code, the National Roofing Contractors Association and manufacturer's recommendations on roof slopes, underlayments, flashing, and ventilation requirements. It is recommended that shingle roofs be Energy Star rated. Neighborhood design/color compatibility and Historic Guidelines should be coordinated with the Owner.

**0807.** Gutters and downspouts shall be repaired. Install 5" K-type gutter seamless or better, .027 gauge aluminum gutter to service roof for new work except when **Historic** profiles or existing materials require replication and replacement. White or brown color choice by Owner. Where a water drainage system is not available and whenever possible, extend downspout outfall no less than 3 feet from foundation. **[See Green Standards Section 15 for recommended on site filtration systems.]**

**0808.** When possible and when instructed by the Owner, insulate with R values consistent with Department of Energy Zone 4 for Maryland : Attic R-38 to R-60; Cathedral Ceiling R-30 to R-38 ; 2x4 wall cavity R-13 to R-15 ; 2x6 wall cavity R-19 to R-22; Floor R-25 to R-30. **[See Section 14 Energy Conservation and Indoor Environmental Quality.]**

**0809.** Wall Insulation: Whenever exterior siding is removed on a house and whenever possible and instructed by the Owner:

- a. Uninsulated wood-frame wall:
  - Drill holes in the sheathing and blow insulation into the empty wall cavity before installing the new siding, and
  - Zones 3–4: Add R5 isolative wall sheathing beneath the new siding
- b. Insulated wood-frame wall:
  - For Zones 4 to 8: Add R5 isolative sheathing before installing the new siding

**0810.** When applicable and directed by the Owner, exterior waterproofing system shall be Warm-N-Dri by Tuff-N-Dri or approved equivalent.

**0811.** Exterior foundation drainage systems shall use PVC Schedule 40 pipe. Pipe shall be manufactured in strict accordance to the requirements of ASTM D1785. **[See section 0414.]**

**0813.** When necessary, interior waterproofing shall be done in a manner recommended by the Owner.

## **09 DOORS and WINDOWS**

**0901.** Pre-hung exterior replacement doors shall be Energy Star thermally rated (See Section 0902). Doors from attached garages shall be 1 HR. rated with spring hinges for closure.

**0902.** Verify security peep hole and energy efficient mail slot location requirements. Minimum entry lock and handle and dead bolt with thumb latch by Schlage or approved equivalent. Install storm doors as directed by Owner.

**0903.** Properly frame and install Owner approved interior doors sympathetic or matching existing doors with the exception to openings at laundry closets or mechanical rooms where full louver doors will be used. Use Masonite Safe and Sound doors or equivalent "no added" urea-formaldehyde product. Bi-folds and wood sliders at closets shall not be used. (Exception: new sliders may only be used when replacing existing units.) Provide flexible coil type door stops unless otherwise instructed. Submit hardware cut sheets for Owner approval. Schlage or approved equivalent.

- a. CLOSETS : Butt hinges, dummy knob, ball latch, doorstop as required (use passage knob when possible)
- b. MECHANICAL and LAUNDRY CLOSETS: Butt Hinges, Dummy knob, ball latch. doorstop as required.
- c. BATHROOM : Butt Hinges , Privacy lock , doorstop
- d. BEDROOMS : Butt hinges, Privacy lock, doorstop
- e. MECHANICAL and LAUNDRY ROOM : Butt Hinges , Passage lock, doorstop

**0904.** Submit shop drawings or manufacturer's cut sheet for approval when requested by the Owner. Coordinate unit with location.

**0905.** All window units to have manufacturer's standard insect screen.

**0906.** Provide and install all necessary shims and insulate shimmed spaces around door and windows.

**0907.** At new construction, extend and attach house wrap and vapor barriers to all window and door frames.

**0908.** Seal all exterior cracks and joints at adjacent surfaces to windows and doors. Coordinate color with adjacent color(s) and submit for approval to Owner. At interior, seal units to rough openings with door and window grade foam sealant.

**0909.** Install all required jack studs, posts, lintels and beams per structural engineer or Architect for new or enlarged openings. Report any unusual conditions on existing openings to Owner.

**0910.** Provide additional flashing to supplement manufacturer's flashing as required per wall construction type to ensure complete water tight exterior finish including flashed and beveled shim at sill to shed water.

**0911.** Provide jamb extensions as required for new window frames.

**0912.** In combination units, provide the strongest joint attachment as per the manufacturer.

**0913.** High Performance Glass (insulated, undetectable Low- E Glass and argon gas) with Energy Star ratings shall be used for all replacement windows. Provide safety glass where applicable per Code.

**0914.** Verify hardware style and finish with Owner.

**0915.** Verify interior finish with the Owner.

**0916. Historic Windows - Retain and Restore** - where possible retain and restore existing windows. Make windows weathertight and more energy efficient by re-caulking and replacing or installing weatherstripping. Additional energy efficiency may be gained by installing interior storm windows with air-tight gaskets, ventilating holes, and/or removable clips to insure proper maintenance and to avoid condensation damage to historic windows or installing exterior storm windows which do not damage or obscure the windows and frames.

**0917. Historic Windows - Replacement** - All new windows on street elevations including end of group side street elevations shall be Energy Star wood construction matching existing windows in size of stiles and rails and profile of frame. One over one units shall be undetectable Low- E and argon filled insulated glass. The National Park Service (Replacement Windows that Meet the Standards) [www.nps.gov/hps/tps/tax/download/windows\\_replacement.pdf](http://www.nps.gov/hps/tps/tax/download/windows_replacement.pdf) and C.H.A.P. (Design Guidelines for Historic Structures) allow insulated glass with three dimensional simulated divided lights (SDL's) under certain conditions. Owner to verify use of three dimensional SDL's on a case by case basis with C.H.A.P.

**0918.** Replacement windows in non-Historic houses and on "secondary elevations" in Historic houses shall be allowed to use Energy Star rated vinyl windows.

**0919. Historic doors** – exterior historic doors shall be retained and restored. If door(s) cannot be repaired, replicate original door(s) design to the greatest degree possible. Make doors weather tight and more energy efficient by caulking and replacing or installing weather stripping.

## **10 FINISHES AND ASSESSORIES**

### **1001 GYPSUM and WALL BOARDS**

**1001.** At locations directed by the Owner:

- 1/2" and 5/8" Thickness Gypsum Board
- High Performance Abuse Resistant Boards (Fiberock or approved equivalent).
- Tile backer board at showers and tubs shall be in accordance with IRC 2009 704.2.2. **[See Section 1057.]**

- High humidity locations shall use gypsum board in accordance with ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

**1002.** Wood studs and joists in accordance with building code, rehab conditions, and gypsum board manufacturer's recommendation for spacing. Ensure that specified waterproofing and/or vapor barrier membranes are installed before installation in wet locations.

**1003.** Supplement low/no VOC adhesive with permanent fasteners as recommended by manufacturer, ASTM C557.

**1004.** Fasteners permanent type recommended by gypsum bd. manufacturer. Fasteners to be countersunk to below finish face of gypsum bd. Bugle Type screws with length per wall type and edge and field spacing per manufacturer.

**1005.** Joint tape, ASTM - C 475/C 475M Paper reinforcing tape.

**1006.** Joint compound, ASTM - C475/ C-475 M. Provide ready mix vinyl-type for all interior work.

**1007.** Trim accessories. Provide manufacturer's standard galvanized metal trim accessories, of the beaded type with face flanges for concealment in joint compound. Provide counter beads, L-type edge trim beads, and U-type trim beads.

**1008.** Finish. Apply joint tape and joint compound at joints and in both directions between gypsum board. Apply compound at trim accessories flanges, penetration, fastener heads, and surface defects. Continue until surface is consistently smooth and ready for paint.

**1009.** Sand consistently and smoothly in prep for tile set, sizing and/or priming.

**1010.** Specific details for type of board will correspond with use, location and Code requirements. The Contractor shall maintain or install fire assemblies in accordance with residential use group designations and required separations on or adjacent to property lines.

**1011.** Specialty construction: all plaster work shall adhere to IRC 2009 Section 702.2.

## **1020 WOOD TRIM**

**1020.** Comply with Architectural Wood Work Quality Standards and all Lumber Associations' standards related to the production of specific wood types used on the project.

**1021.** Owner to specify material for exterior and interior trim and siding. Back prime all wood used in exterior applications and in interior damp locations: basements, baths, laundry rooms, kitchens etc.

**1022.** Install with minimum number of joints possible using full length pieces from maximum length of lumber available. Cope at returns and miter at corners.

**1023.** Install architectural woodwork plumb, level and straight with no distortion, shim as required using concealed shims. Scribe and cut woodwork to fit adjoining work.

## **1030 PAINT and STAIN**

**1031.** All paints and finishes shall comply with Maryland COMAR 26 11.33.05 – VOC Content Limits - for applicable type of architectural coating (See Appendix for VOC Content limits.). **[Green Spec – See Section 15.]**

**1031.** Prior to beginning work, verify colors with Owner and submit color chips for surfaces to be painted and stained. In addition to the manufacturer's data, application instructions and label analysis for each coating material submit samples for Owner's review of color and texture only. Resubmit samples if requested until required sheen, color, and texture is achieved.

**1032.** Sand lightly between succeeding coats of enamels and seal coats.

**1033.** Paint surfaces behind moveable equipment and furniture same as adjacent surfaces. Paint surface behind permanent fixed equipment or furniture with primer coat only before equipment is installed.

**1034.** Paint back sides of access panels and removable or hinged covers to match exposed surface.

**1034.** Finish interior doors on top, bottom, and edges same as exterior face, unless otherwise indicated.

**1035.** Omit first coat (primer) on all metal surfaces which have been shop primed. Touch up primer and paint with two coats paint. Coordinate and verify with Architect prior to submitting samples the type of paint finish on door frames and decorative metal.

**1036.** Paint interior surfaces of ducts, where visible through registers, or grills, flat non-specular black.

**1037.** All new construction and restored surfaces shall have a minimum of one coat primer/sealer and one coat paint with touch up coats of appropriate paint as required. Apply primer coat to material which has not been prime coated by other. Tint primer for deep color paints.

**1038.** All low /no VOC semi-transparent stain and sealants shall require submittal of 6"x6" sample for approval when requested by Owner. **[See Appendix for VOC Content Limits.]**

**1039.** Edge and back prime all exterior wood and wood trim in high moisture interior locations including basements, baths, kitchens, and laundry rooms.

## **1050 TILE**

**1050.** Work to comply with the most recent edition of the Tile Council of America's "Handbook for Tile Installation", the International Residential Code 2009, and the manufacturer's instructions for application of proprietary materials.

**1051.** Joint pattern, use grid pattern 1/16 "wide joints unless otherwise indicated or as recommended per manufacturer.

- 1052.** Expansion control, contraction and isolation joints to comply with recommendations of most recent edition of TCA booklet "Handbook for Tile Installation".
- 1053.** Sealing tile joints material selected for compatibility with each other and with substrates in each joint system; confirm with manufacturer.
- 1054.** Cleaning and protection, clean tile in accordance with application ANSI standard for type of tile and method of installation used and in accordance with manufacturer's instructions. Apply protective covering to prevent surface damage as directed by the Owner.
- 1055.** All grout joints are to be sealed immediately to protect against staining in accordance with manufacturer's recommendations.
- 1056.** All ceramic tile adhesive shall have a VOC content not to exceed 65g/l.
- 1057.** Contractor to supply and install all necessary subfloor and/or substrates, flashings, tile flanges, vapor and waterproofing membranes and all supplemental material recommended by the TCA and manufacturer for installation type and location. Where replacing units, utilize one piece fiberglass or similar enclosure in tub and shower areas or if using tile and grout, use cement backing board material or fiberglass reinforced board in compliance with IRC 2009 Section 702.4.2. **[Green Spec – See Section 15.]**
- 1058.** For products having recycled content, the contractor shall coordinate with the Owner on the extent of content for a Green Maintenance Guide. **[Green Spec – See Section 15.]**

## **1060 CARPET**

- 1060.** No carpet shall be placed in basements, entry ways, laundry rooms, baths or kitchens.
- 1061.** Clean surfaces to be carpeted. Scrape up cementitious and resinous deposits. Vacuum dust. Uneven subfloors in historic houses shall be repaired and covered with underlayment as directed by the Owner and in accordance with The Engineered Wood Association Guide.
- 1062.** Preplan installation for uniform direction of pattern and lay of pile and proper sequencing with other work. Locate seams properly centered under doors and without seams in direction of traffic at doorways and similar traffic patterns. Do not bridge expansion joints. Extend carpet under removable obstructions and into closets and alcoves.
- 1063.** All Carpet shall comply with Carpet and Rug Institute's Green Label Plus and all padding with CRI's Green label program. Mohawk, Shaw, or Beaulieu products using PET (recycled bottles) shall be used. Submit certifications to Owner. **[Green Spec – See Section 15.]**
- 1064.** Use tackless stripping wear resistant plywood of thickness matching cushion narrow with two rows of pins, except wide with three rows of pins where width of carpet exceeds 20'.
- 1065.** Provide stretch in tackless installation using nailed tackless stripping and/or low/no VOC glue with edges of carpet concealed at wall base. Tape and/or sew seams after buttering trimmed edge with seaming cement.

**1066.** Metallic edge guards are discouraged. Colored rubber of size and profile as required. Installer to submit samples. Use wood reducing strips at thresholds as required accommodating subfloors and level changes.

**1067.** For products having recycled content, the contractor shall coordinate with the Owner on the extent of content for a Green Maintenance Guide. **[Green Spec – See Section 15.]**

#### **1070 WOOD FLOORING**

**1070.** Cleaning, refinishing and protection. Clean wood flooring in accordance with type and method of refinishing. Apply heavy Kraft paper or other heavy protective covering to prevent to prevent surface damage.

**1071.** Contractor to supply and install all necessary subfloor.

**1072.** Use true wood flooring to repair existing floors.

**1073.** All work shall be in accordance with NOFMA standards - The Wood Flooring Manufacturer's Association.

**1074.** Use dust containment systems in the sanding process as directed by the Owner. **[Green spec – see section 15]**

**1075.** Clear wood coatings shall have a VOC content compliant with Maryland COMAR 26.11.33.05 VOC Content Limits not to exceed 350 g/l for wood floors ( see Appendix for VOC Content Limits ) **[Green spec – See section 15.]**

**1076.** Recommended: Use renewable resources: wood based products certified in the following product programs qualify for Green Designation:

- a. American Forest Foundation's "American Tree Farm System" *tm* (ATFS)
- b. Canadian Standards Association's Sustainable Forest Management System Standards
- c. Forest Stewardship Council
- d. Program for endorsement of Forest Certification Systems (PEFC).
- e. Sustainable Forestry Initiative (SFI)
- f. other product programs mutually recognized by PEFC **[Green Spec –See Section 15.]**

**1077.** Engineered bamboo and hardwood flooring shall be by Mannington or approved equivalent. Install per NOFMA and manufacturer's recommendations. **[Green Spec – See section 15].**

**1078.** Cork flooring shall be by Gerbert Limited or approved equivalent. Install in accordance with manufacturer's recommendations. **[Green spec – See section 15.]**

**1079.** Use wood reducing strips at thresholds as required accommodating subfloors and level changes.

#### **1080 COMPOSITE TILE**

**1080.** Uneven wood subfloors shall be repaired and covered with an underlayment as directed by the Owner and in accordance with The Engineered Wood Association Guide to achieve a consistent level

surface.

**1081.** All substrates shall be installed in accordance with manufacturer's recommendations.

**1082.** Patch, level, and clean all concrete surfaces which will receive composite tile.

**1083.** All composite tile adhesives will be low/no VOC.

**1084.** Composite tile or equivalent in living spaces shall be Armstrong "Alterna", Congoleum "DuraStone", or Mannington "Acura". **[Green Spec - See Section 15.]**

**1085.** Laundry rooms and other utility areas may use VCT tile as approved by Owner. Install in accordance with manufacturer's recommendations. **[See Sections 1083 and 1087.]**

**1086.** Linoleum tile is recommended for utility areas: Armstrong "Marmorette" or approved equivalent. **[Green Spec - See Section 15.]**

**1087.** For products having recycled content, the contractor shall coordinate with the Owner on the extent of content for a Green Maintenance Guide. **[Green Spec - See Section 15.]**

## **1090 BATHROOM**

**1090.** Towel bars, medicine cabinets, toothbrush holders, soap dishes, shelves, toilet paper dispensers, and shower curtains etc. shall be approved by Owner. Moen or approved equivalent. Provide blocking for secure installation whenever possible.

**1091.** Grab bars with required blocking may be installed at the request of the Owner. Verify with Owner for locations.

## **11 CABINetry**

**1101.** Cabinetry: No cabinet work shall begin until the contractor has site measured and only after drywall and other noted finished surfaced surfaces have been installed.

**1102.** Contractor is responsible for field verifying all dimensions shown that could affect his cabinet work. If discrepancies occur, contractor should notify Owner or Architect immediately.

**1103.** Any changes from the submitted designs without approval will not be acceptable and the contractor will accept all costs for the changes.

**1104.** The general contractor is responsible for the coordination of all trades and is responsible for repairs and replacement of cabinetry in the event of damage by any of the trades.

**1105.** If cabinets are made of laminates, contractor is responsible for submitting samples of laminates to be used to Owner. Composite materials must contain no added urea-formaldehyde. **[See Section 1119.]**

**1106.** Contractor will coordinate with Owner for approval of all internal hardware: glides, hinges, pegs, connectors, etc. All hardware should be of good quality.

**1107.** In areas where continuous lengths beyond board length occur, cabinet maker is to notify architect for approval of all visible seams.

**1108.** When cabinets are made of wood, cabinet maker is responsible for submitting samples of wood and stained wood to Owner for approval. It is recommended that wood and structural components be made of products from renewable resources or bio-based products including but not confined to certified woods per Section 15, engineered wood, bamboo, and natural fiber products made from crops (wheat/straw particle board). **[Green Spec – See Section 15.]**

**1109.** Verify extent of overhead cabinetry.

**1110.** All surfaces that are or can be exposed to view are to be finished as per the cabinetry finish. All exposed edges will be finished.

**1111.** Interiors of all cabinets to be finished.

**1112.** Contractor to submit preliminary design intent through shop drawings and/or stock cabinet sizes when requested by the Owner. Ensure proper blocking and structural attachment. Mounting screws shall be collared to avoid surface damage to cabinets.

**1113.** By submitting a bid the cabinetry maker acknowledges that the full intent of the work. Any questions as pertaining to details, finishes, hardware, etc. that are not addressed before the bids are submitted cannot be called as an extra. It is up to the cabinet maker to make sure all questions pertaining to the making and installing of the cabinetry are answered before the bids are submitted. No exceptions.

**1114.** Cabinet pulls to be of good quality as recommended by the Owner.

**1115.** Cabinet craftsmanship is very important. All edges, seams, nail holes, screw holes and grommets etc. should be of the best quality. Nothing less will be accepted.

**1116.** The contractor shall coordinate the various trades that may have contact with the cabinetry. This especially goes for the electrical and mechanical sub contractors.

**1117.** All cabinets shall conform to the Kitchen Cabinet Manufacturers Association's Environmental Stewardship Program (EPS) and associated CARB ACTM standards. Submit manufacturer's EPS certificate. **[Green Spec – see Section 15.]**

**1118.** It is recommended that stone be avoided as a countertop if and when it is more cost effective to do so. Similar durable countertops shall be Dupont, "Zodiaq", Dupont Corian "Terra Collection", Caesarstone "Quartz Surfaces", Coveringsetc "Eco-terr", IceStone, Concrete or approved equivalent. Composite materials must contain no added urea-formaldehyde. **[Green Spec - See Section 15.]**

**1119.** For products having recycled content, the contractor shall coordinate with the Owner on the extent of content for a Green Maintenance Guide. **[Green Spec – See Section 15.]**

## 12 MECHANICAL

### HVAC NOTES

**1201.** The HVAC is to be design/build as instructed by Owner. The cost should be listed separately in the bids. This includes equipment as well as installation costs. Contractor, installers, and fabricators shall be appropriately licensed by the local and state governing agencies and shall be experienced in design/build HVAC applications.

**1202.** All work shall be done according to National, State, and local governing codes and most recent industry and manufacturer's standards, and in accordance with Air Conditioning Contractors of America manual, parts, J and S, and ASHRAE.

**1203.** The new equipment should be of excellent quality and shall have a high efficiency rating. Submit all specs for the equipment in the bid. Note efficiency of unit in bid. The new units shall have an ENERGY STAR Rating as directed by the Owner. **[See Section 14.]**

**1204.** All electrical work necessary to HVAC hookup is to be included in the bid and is to be a part of the electrical subcontractors bid.

**1205.** The location of the ducts, condensers, air handlers, returns, and any other necessary parts of the HVAC system is to be done with the utmost sensitivity to the existing house. All locations of all equipment are to be approved by the Owner before installation begins. There will be no exceptions to this note. All new bulkheads, chases, etc. must be approved by Owner.

**1206.** Verify location with Owner for new AC condensing units. Choose location that easily accessible for maintenance. When requested by Owner, provide metal security frame with hinge top frame with lock to prevent theft when located on concrete pad.

**1207.** Whenever possible, provide a programmable thermostat located 5'-0" above the floor near a return air grill. Verify location with Owner.

**1208.** Provide a flue per Code for the furnaces and any other appliance that uses gas. Notify Owner and Architect of chase and exterior venting locations for approval.

**1209.** Contractor installation of high efficiency rated units that vacate use of masonry chimney shared by a gas hot water heater must address "orphaned hot water heater" through use of new chimney sleeve or power-vent to exterior to avoid condensation damage to chimney.

**1210.** Exterior refrigerant lines to be insulated and installed in a manner to protect copper piping.

**1211.** Provide galvanized ductwork for air distribution that meets local codes and sheet metal standards. Return air to be ducted directly back to furnace.

**1212.** Provide insulation on duct per International Energy Conservation Code Section 403 where the duct is installed in unconditioned space. **[See Section 14.]**

- 1213.** Provide Hart & Cooley supply registers, floor registers, and return air grilles or approved equivalent. Wood registers are recommended at new wood flooring applications. **Historic Renovation:** Verify compatibility and use of Historic style registers - Reggio or approved equivalent.
- 1214.** Spray paint insides of all ducts near registers a flat black using low/no VOC paint.
- 1215.** Minimize leaks in new duct work. For existing systems, seal where accessible and as directed by Owner. Use of EPA's Energy Star brochure " Duct Sealing" is recommended.
- 1216.** All ductwork shall be protected from dust and debris during construction.
- 1217.** Check, test, start, and balance HVAC system.
- 1218.** Contractor to provide one year warranty on parts and labor and a minimum four year manufacturer's warranty on the compressor from date of completion.
- 1219.** Provide start - up and commissioning. Contractor shall provide certification of start up and commissioning work. **[See Section 1226.]**
- 1220.** Any changes and/or additions/substitutions to the work shall be approved in writing by the Owner and Healthy Neighborhoods, Inc. with the cost clearly stated in writing to both parties.
- 1221.** The Contractor is responsible for field checking dimensions and existing conditions before beginning work. Verify if gas pipe size is sufficient to handle new requirements with BGE.
- 1222.** All debris associated with the installer/fabricator, installation, and operation shall be removed from the site prior to final payment. **[See Section 15 - Green Standards for Waste Management Plans.]**
- 1223.** Provide disconnect valves/switches etc. and label for each piece of equipment or as stated by code.
- 1224.** When requested by the Owner, the contractor shall submit a supply and return duct diagram for approval, sizes and location of equipment to be specified for new systems. This is to be done before installation.
- 1225.** If the residence burns gas, petroleum products, wood and other fuels, contractor must install a working carbon monoxide alarm installed outside of all sleeping areas in compliance with Baltimore City Law -1211. This alarm may be an integrated smoke detector/CO alarm as mutually required by Code in this location. **[See Section 14.]**
- 1226.** Re-commissioned duct systems shall be inspected, repaired or upgraded and vacuumed in accordance with industry standards and local Code requirements. New filters shall be installed as part of this process. Contractor shall provide certification of re-commissioning work. **[See Section 14.]**
- 1227.** Provide Energy Star bathroom fans in accordance with Baltimore City Code as directed by Owner. Duct to exterior using manufacturer's recommended exterior vent. Verify location with Owner.

## **1228. Model Equipment Schedule**

- **Furnace** Use Carrier or Lennox models or approved equivalent designed to meet load requirements
- **Condensing Unit** Use Carrier or Lennox models or approved equivalent designed to meet load requirements
- **Fan/Light Exhaust system** Broan or approved equivalent.
- **Thermostat** Honeywell T8600 or approved programmable equivalent (eligible for BG&E Peak Rewards Program)
- **Boiler** Columbia models or approved equivalent designed to meet load requirements.

For new HVAC equipment, provide 4" concrete housekeeping pad for all basement units.

**1229.** Hard duct (non-flex) all dryers to the exterior using metal vents and bird guard.

## **PLUMBING NOTES**

**1230.** All work shall be done according to National, State, and local governing codes and most recent industry and manufacturer's standards.

**1231.** The Contractor is responsible for field verifying all conditions before beginning work. Should any unusual conditions exist, notify Owner at once before continuing.

**1232.** All Plumbers shall be appropriately qualified by the local governing agency.

**1233.** All plumbing work shall be installed and operating and premises clean of Plumber's trash before final plumbing payment is made. **[See Section - Green Standards for Waste Management Plans.]**

**1234.** All plumbing in cabinetry requires work in wall and /or floor finish surface to be completed before cabinetry is installed. After cabinetry is installed, work mounted in cabinetry will be installed by plumber. Coordination of Owner's Cabinet maker will be the responsibility of the General Contractor.

**1235.** Check model number's against description for all plumbing fixtures. All fixtures must have all necessary accessories in order to function.

**1236.** Provide shut-off valves and access panels as required for each equipment connection/ plumbing zones / and hose bibs.

**1237.** Residence shall have a minimum of two hose bibs. Frost free with vacuum breaker. Seal exterior wall penetrations.

**1238.** The plumbing contractor by accepting the contract for this work acknowledges that he understands the full intent of the work. If there are any questions regarding the intent they should be raised before the contract is signed.

**1239.** Verify piping material to be used in the bid and verify all details to fixtures and appliances per local Code. Copper piping: Type K for below ground service. Type L for above ground work. Lead free solder. If CPVC piping is used, install minimum 2'-0" of copper at hot water heater.

**1240.** Supply access panels when determined necessary by Code or per fixture manufacturer. Coordinate with Owner about location before installation.

**1241.** Perform pressure test on piping per Baltimore City Code.

**1242. Model Fixture Schedule:** flow rates, fixtures models or equivalents for replacement and rehab

- **Hot water Heater:** AO Smith Energy Star models or approved equivalent; minimum 40 gallon. [See Section 1218]
- **Water Closet:** 1.3 GPF EPA Certified WaterSense compliant toilets
- **Lavatory:** 2.0 GPM Single lever washer-less metal bodied faucet with a 15 year drip free warranty or WaterSense Certified
- **Kitchen Faucet:** 2.0 GPM Single lever washer-less metal bodied faucet with a 15 year drip free warranty or WaterSense certified
- **Shower/ Bath Faucet:** shower head 2.0 GPM, chrome plated brass fixtures with low flow designed
- **Bathtub:** 5' white enameled formed steel tub with lever operated pop up drain and overflow, single lever shower diverter and 2.0 GPM water saving shower head [See Section 1054]
- **Utility Sink:** molded plastic with utility faucet
- **Hose bib:** Bronze, Nibco frost free, hose thread hose bib – house shall a minimum of two - one at front and one at rear.

**1243.** Use conservation measures outlined in Section 14.

**1244.** Contractor shall clear sanitary sewer line from top floor to the street location and provide certification for the work.

**1245.** Contractor shall not place pipes in unconditioned space and shall insulate or re-pipe existing accessible piping in unconditioned space as directed by Owner.

### **13 ELECTRICAL**

**1301.** All work shall be done according to National, State, and local governing codes and most recent industry and manufacturer's standards.

**1302.** The Contractor shall provide cut sheets and/or actual samples for light fixtures, fans, etc. to Owner for approval. Owner shall determine specialty fixtures. Outlets and switches to be Leviton unless otherwise stated and be consistent in color. Verify device and down light baffle colors with the Owner.

**1303.** Changes that do not receive Owner approval will be the responsibility of the Contractor initiating the change. The Contractor shall assume full liability for such changes.

**1304.** All electricians shall be appropriately licensed by local governing agencies.

**1305.** All electrical work shall be installed, operating, and the premises cleaned of the electrician's trash before final electrical payment is made. **[See Section 15 - Green Standards for Waste Management Plans.]**

**1306.** Electrical Contractor shall determine the service capable of handling the new electrical requirements - **including new HVAC work** - and allow for Owner's future planning for site.

**1307.** Any wiring in the cabinetry will require coordination with the general contractor. Lengths will be left, capped and labeled, for the cabinet maker to work around. After cabinetry is installed, work mounted in the cabinetry will then be installed by the electrician. Coordination of the electrical work is the responsibility of the general contractor.

**1308.** New outlets and switches are to be mounted as indicated: Outlets to be mounted at standard 1'-4" height. Notify Owner of any location changes, adjustment, or realignments. All switches are to be located at 4'-0" height unless otherwise indicated. Outlets near windows should be centered under windows unless shown otherwise. Outlets located in blank walls should be centered.

**1309.** All new receptacles in bathrooms, powder rooms, kitchens, wet bars, exterior locations, work counters, and other locations exposed to possible wet (and/or) hazardous locations shall be Ground Fault Interrupted circuits. Exterior fixtures and outlets should be sealed with appropriate sealant or housing to protect outlet boxes from water penetration.

**1310.** Bathroom fans shall discharge directly to the outside. Coordinate with General and Mech. Contractor. Verify location with Owner and Architect in order to minimize visual impact of the vent.

**1311.** The Contractor is responsible for all fees regarding inspections, reconnecting existing lines, and any other fees regarding electrical service necessary to complete the job. These fees should be a part of the bid. The Owner will be responsible for service upgrades when required.

**1312.** Before evaluation of the work begins, the Contractor should contact the appropriate authorities (BGE etc.) and the Owner as to the location of electrical, phone, gas and cable lines.

**1313.** For each property, provide hard wire interlinked with battery backup smoke detectors/carbon monoxide alarms at each floor of the house and at all bedrooms in accordance with Baltimore City Code requirements.

**1314.** Contractor shall coordinate with Owner's security company as required.

**1315.** New recessed fixtures in all insulated ceilings shall be in UL rated ICAT Housing. All newly insulated ceilings at existing construction shall be blocked around existing recessed fixtures in accordance with UL, NEC, NFPA and all other applicable Codes and requirements as well as manufacturer's recommendations.

**1316.** Install daylight sensors or timers on all outdoor lighting. **[Green Spec - see section 15.]**

**1317.** New light fixtures shall be Energy Star rated. Documentation shall be submitted to NSP2 Director. **[Green Spec - see section 15.]** These fixtures have been designed to accommodate CFL and LED light sources. Sources for recommended products that meet this requirement include:

- Energy Star examples of Qualified Light Fixtures  
[http://www.energystar.gov/index.cfm?c=fixture\\_guide.pr\\_fixtures\\_guide\\_index](http://www.energystar.gov/index.cfm?c=fixture_guide.pr_fixtures_guide_index)
- Next Generation Luminaries program: <http://www.ngldc.org/>
- LED Downlight option1  
<http://www.creelighting.com/products/Downlights/6inchdownlights/LR6-DR1000.aspx>
- LED Downlight option 2:  
[http://www.lightolier.com/products/index.jsp?CATREL\\_ID=35047&BLK=N&CAT\\_ID=31360](http://www.lightolier.com/products/index.jsp?CATREL_ID=35047&BLK=N&CAT_ID=31360)
- LED Surface mount:  
<http://www.seagullighting.com/11903/Flush-Mount-Lighting-14101S-14.html>
- LED Track lighting;  
[http://www.brucklighting.com/index.php?page=shop.product\\_details&flypage=flypage\\_bru ck.tpl&product\\_id=790&category\\_id=10&option=com\\_virtuemart&Itemid=462](http://www.brucklighting.com/index.php?page=shop.product_details&flypage=flypage_bru ck.tpl&product_id=790&category_id=10&option=com_virtuemart&Itemid=462)

**1318.** Although recommended when upgrading (optional) of existing lighting equipment, Energy Star rated retrofit lamps installed in non-Energy Star rated fixtures do not meet NSP2 light fixture requirements.

**1319.** High quality color lighting sources shall be specified when using compact fluorescent and LED fixtures. Lamps with 2700K or 3000K sources with 80 CRI or greater are recommended for residential applications. Products in the Sylvania Dulux line or equal are recommended (link to <http://www.sylvania.com/ConsumerProducts/LightingForHome/Products/BulbType/CompactFluorescent/Dulux>) Evaluated on a scale of 1 (worst) to 100 (best), every effort should be made to use high color rendering sources for all lighting applications. **[Green Spec – See section 15.]**

**1320.** Use Energy Star appliances listed below or approved equivalents within price point reference. Information on bulk quotes for Energy Star Appliances can be found at [www.quantityquotes.net](http://www.quantityquotes.net).

- **Refrigerator** Whirlpool W8RXEGMWS Stainless - Energy Star 18 Cu. Ft. Refrigerator /Freezer Contoured doors or approved equivalent. **Price point - \$730.**
- **Dish washer** Whirlpool DU 1055XTVS Stainless – Energy Star 4 Cycle, 6 OPT, 4 in. Console Soak and scour, Quiet partner II, 61 DBA. **Price Point - \$375.**
- **Range** Whirlpool **Gas** Range WFG361LVS WP RGGG Stainless – 5.0 CUFT Self Clean Gas 2-9.5K , 1-13.5 PowerBurner 1-5KACCUSMR, Cast Iron Grates , Accubake. **Price Point - \$530.**  
Whirlpool **Electric** Range WFE3666LVS 5.3 CU FT self clean Ceran, 2-6, 1-12, 1-6/9 Accubake, Hiddenbake. **Price Point - \$580.**
- **Microwave Vent recirculating/ adaptable** - Whirlpool WMH 2175XVS Microwave /vent stainless – 1000 Watts, 1.7 Cu.Ft. Sensor hidden vent SS finish handle. Cooking rack. OTR microwave sensor cooking. **Price point - \$278.** When possible, the Contractor shall hard duct to the exterior.
- **Range Vent** Whirlpool stainless convertible range hood - UXT5230ADS, three speed with two incandescent lights. When possible, the Contractor shall hard duct vent to exterior. **Price Point - \$299.**

- **Washer** Whirlpool Washer WTW57ESVW - 27 in. 4.0 Cu. Ft. White Porcelain Basket Agitator , 24 cycles, 6 temps, Auto load sensing 5 speed combo Top load washer – Energy Star CEE Tier 1. **Price point - \$379.**
- **Dryer** Whirlpool Dryer WED5300 VW white - 29 in. 7.0 Cu. Ft. Hamper door 12 Cycles, 5 temps, Accudry, EOC, On/Off 90, 3 knobs, front load drop down door dryer and dryer cord. **Price Point - \$413.** Hard duct non - flex all dryers to the exterior using metal vents and bird guard.
- **Doorbell** Nutone or approved equivalent as approved by Owner.

Energy Star Appliances qualify for Smart Energy Savers Residential Rebate Program. Current fixture and equipment rebates of between \$50 and \$400 are offered. Visit [www.bgesmartenergy.com](http://www.bgesmartenergy.com) for details.

**1321.** In houses with boilers, provide dedicated outlets at all bedrooms and at a discreet first floor location approved by Owner for future window unit air-conditioners.

#### **14 ENERGY CONSERVATION AND INDOOR ENVIRONMENTAL QUALITY**

**1401.** Weather-strip both sash of existing double hung window with spring zinc or bronze weather stripping.

**1402.** Weather-strip wood all exterior doors with rubber or vinyl tube weather stripping.

**1403.** Install vinyl door sweeps on all wood exterior doors.

**1404.** When accessible, seal all accessible cracks, gaps and holes in the building envelope (the barrier between the indoor conditioned space and the outside) with low-VOC caulk, (if <1/4") or expanding foam (if >1/4"). Seal all wall top and bottom plate penetrations. If the foundation masonry wall is open core concrete block, seal the tops of the blocks with expanding foam. Seal all penetrations in the exterior wall or the sheetrock created by plumbing, gas lines, electrical boxes, and outlets. Seal all accessible gaps around windows and doors between house framing and window/door frame – use low expansion foam specifically designed for windows and doors (i.e. Dow Great Stuff Windows & Doors). Take care to seal all joints without excess sealant. Seal any gaps in the building envelope adjacent to flues with carefully cut to fit sheet metal that is securely fastened to framing sealing all seams and gaps with fire rated caulk. In cold spaces, seal existing IC recessed light fixtures in ceilings with an airtight box made of foam insulation board sealed to the ceiling per manufacturer’s clearances and recommendations. Seal existing IC rated recessed fixtures with caulk. Seal any entries to attic space using weather-stripping on attic doors or hatches. Air sealing work must be done prior to the installation of insulation. **[See Section 1315.]**

#### **1405. WALL INSULATION, DENSE PACK CELLULOSE: FOR RETROFIT OF FINISHED WALLS**

After Air sealing (spec #0903) drill 2 1/8" to 2 9/16" access holes for each stud cavity in the areas specified in interior or exterior locations approved by the CM. Install blow in borax treated (no ammonium sulfate permitted), cellulose insulation per manufacturer’s specifications and dense-packed into all specified wall cavities to a minimum of 3.5lbs per cubic foot for the entire cavity. Use a 1" to 1 1/4" ID vinyl wall tube attached to the standard cellulose blower tubing to place the cellulose deep into the wall cavity. Check each stud cavity for blocking and other obstructions prior to blowing. Carefully seal all drilled holes with wood or foam plugs and patch all holes to match surrounding materials if the

surface is exposed. In balloon framed houses insure that blown cellulose is blocked from entering cavities such as 2<sup>nd</sup> floor floors.

**1406. INSULATE WALL/CEILING/FLOOR CAVITY- CLOSED CELL FOAM**

Install closed cell polyurethane spray foam into the specified building envelope cavity to the R value specified when recommended by Owner. Moisture content of all components of the cavity must be less than 11% at the time of the application of the foam. The contractor must supply the Owner responsible for this project with the ASTM E84 test results or the ICE=ES "ES Report" ([www.ice-es.org](http://www.ice-es.org)) for the foam product being installed in advance of the installation so that the approved maximum thickness of each pass and total approved thickness is understood in advance of the installation. Avoid use at attic /roof framing locations.

**1407. ATTIC – CELLULOSE**

After air sealing blow in borax treated (no ammonium sulfate permitted) cellulose insulation per manufacturer's specifications to R38 minimum or better as recommended by Owner. Maintain ventilation routes from soffit and other vents with baffles. Replace all material removed or cut to gain access to match existing materials. NOTE: if access to attic is via a hatch: insulate the hatch with 3" of foil-faced polyisocyanurate foam and seal edges with compatible foil tape. If access is via a fold down stair: insulate the stair with an air tight 2" thick foil faced polyisocyanurate foam box with seams and seal the edges with a compatible foil tape.

**1408. VAPOR BARRIER, CRAWLSPACE**

When accessible, lay 6-mil poly vapor barrier on ground in crawlspace and 6" up foundation walls. Overlap seams by 12" and completely seal all seams with duct mastic.

**1409. SEAL AND INSULATE, CRAWLSPACE**

When accessible, install a 6-mil poly vapor barrier on ground in crawl space and up foundation walls to the top of the masonry leaving an inspection gap of 3 inches between the lowest wood component and the plastic. Fasten the plastic to the masonry walls with mechanical fasteners and large washers and seal the plastic to the masonry with Low VOC caulking rated to adhere plastic or duct mastic. Overlap seams in the plastic by 2 feet and seal the seams with fiberglass mesh tape and mastic. The end product will provide a water and air tight seal between the interior of the crawl space and the walls and floor of the crawl space and all penetrations including, but not limited to, those created by plumbing, electrical and HVAC equipment, will be sealed tight. After the plastic vapor barrier has been inspected and approved by the responsible for this property, install a minimum of R13 of Dow THERMAX board (or an equivalent product) on the outside walls of the crawlspace sealing the seams between the boards with foil tape approved by Dow for use with THERMAX. The layer of THERMAX shall be without voids and any gap shall be sealed with polyurethane foam sealant.

**1410. INSULATE DOMESTIC WATER SUPPLY PIPE**

Insulate exposed hot water mains with closed cell polyethylene slip-on pipe insulation, sized to fit the pipe's diameter when directed by Owner. Seal seams with either 5-mil pipe insulation sealing tape or Closure Clips designed for pipe insulation placed every 4 inches. Seal all butt joints between sections of pipe with 5-mil Pipe Insulation sealing tape. Neatly miter all angled junctions.

**1411. INSULATE RIM JOIST, FOAM**

After cleaning the area thoroughly, apply expanding foam to the rim joist at the entire perimeter of the basement and/or crawl space exterior walls. Install to R19 at a minimum. Use a foam product that

meets the International Residential Code (IRC), section R314.5.11, and Underwriters Laboratory, Inc. (UL) classification Certificate R7813 such as Dow FROTH-PAK FS Foam or Handi-Foam Two Component E-84 Class 1 Foam as instructed by Owner. Insulate from the subfloor for the first floor to the top of the foundation wall and seal all penetrations and the top of the foundation. Seal all openings within the area of the rim joist created by plumbing, gas lines, electrical boxes or any other penetrations. If any portions of the band joist between the first and second floor become accessible during construction, these areas should be sealed in the same manner. It is recommended that major air sealing work should be performed by a BPI accredited contractor, or overseen by a BPI accredited individual.

#### **1412. DUCT SEALING, DUCT MASTIC**

All accessible ductwork joints, new or existing, should be thoroughly sealed with duct mastic. If there is existing insulation on ductwork, the insulation should be peeled back, duct mastic installed, and then the insulation re-installed as necessary. Do not use tape. **[See Section 12.]**

#### **1413. EXTERIOR DOORS**

New pre-hung exterior doors installed should be, at a minimum, Energy Star labeled unless in a historic district **[See Section -0920.]**

#### **1414. WINDOWS**

All windows installed should be, at a minimum, Energy Star labeled – no exceptions. **[See Sections 0917 thru 0919.]**

#### **1415. INDOOR ENVIRONMENTAL QUALITY**

Mold shall be reported to the Owner for review and for development of a remediation plan in consultation with the Owner.

#### **1416. INDOOR ENVIRONMENTAL QUALITY**

Where openings cannot be caulked or sealed per 1404, use rodent and corrosion proof screens (copper and stainless steel mesh). Protect exposed foundation insulation with moisture resistant, pest proof cover (e.g. fiber cement board, galvanized insect screen).

### **15 GREEN STANDARDS AND RATING SYSTEMS**

#### **MANDATORY GREEN STANDARDS**

**1501.** High efficiency plumbing fixtures shall be used: 1.3 GPF toilet; showerhead 2.0 GPM; kitchen faucet 2.0 GPM; bathroom faucets 2.0 GPM.

**1502.** Install daylight sensors or timers on all outdoor lighting.

**1503.** Low/no VOC (volatile organic compounds) in architectural coatings: VOC Content Limits shall comply with Maryland COMAR 26.11.33.05 **[See Appendix for VOC Content Limits.]** These are regulated standards for the State of Maryland. NSP2 recommends the use of products with lower VOC content when these products are readily available in Maryland.

**1504.** Low/no VOC (volatile organic compounds) in adhesives and sealants: VOC Content Limits shall comply with Maryland COMAR 26.11.35.04. **[See Appendix for VOC Content Limits.]** These are regulated standards for the State of Maryland. NSP2 recommends the use of products with lower VOC

content when these products are readily available in the Maryland.

**1505.** Where providing carpet, install carpet in accordance with Rug Institute's Green Label standards. Certified carpet, pad and adhesives. Submit certification.

**1506.** No carpet shall be placed in basements, entryways, laundry rooms, baths or kitchens. Where used, carpet shall comply with CRI Green Label Plus and all pads shall comply with CRI Green Label.rpet

**1507.** When replacing systems and ductwork, size HVAC systems appropriately in conformance with the Air Conditioning Contractors of America manual, part J and S, or ASHRAE handbooks. Handbook of Fundamentals.

**1508.** Where replacing units, utilize one piece fiberglass or similar enclosure in tub and shower areas or if using tile and grout, use cementitious backing board material or fiberglass reinforced board in compliance with IRC 2009 Section 702.4. **[see Section 1054].**

**1509.** Energy Star window, doors, appliances, water heaters, furnaces, boilers and light fixtures shall be used to the extent applicable to the rehabilitation work undertaken. **[See Sections 9, 12, and 13.]**

**1510.** Use Composite Wood Products with no added urea formaldehyde and with emissions standards in accordance with EPA Indoor AirPlus Specifications. **[See Sections 09 and 11.]**

**1511.** All Green materials, energy and water saving fixtures, and Energy Star components will be properly outlined in the Operations and Training Guide as part of the Green Maintenance Guide assembled by Healthy Neighborhoods, Inc. with the assistance of the Owners.

## **RECOMMENDED GREEN STANDARDS**

**1520.** All storm water falling on the site should be retained on site and either infiltrated or reused for irrigation and other outdoor purposes. Use of rain barrel, cisterns and bio-retention landscaping is highly recommended for storm water retention.

**1521.** Include a waste management plan which documents the salvaging and recycling of non-hazardous waste. Salvage for possible reuse all reusable materials or items including windows and doors including their jambs, glazing, beams, lintels, columns, connectors, lumber, piping, radiators, valves, cabinetry, appliances, outlets, switching, lighting, etc. Revenues and other incentives for recycling will be shared equally by Owner and Contractor.

**1522.** Reduce waste generated or divert waste from landfills and incinerators. Acceptable strategies include: recycling, 3<sup>rd</sup> party scrap reuse, on-site grinding of engineered lumber, untreated cellulosic material and gypsum for use as a local soil amendment. The following strategies are considered to be unacceptable methods of waste diversion: burying material on-site, packing unused material into building cavities, grinding treated or finished wood as a soil amendment, incineration.

**1523.** Use renewable resources: wood based products certified in the following product programs qualify for Green Designation:

- a. American Forest Foundation's "American Tree Farm System" *tm* (ATFS)
- b. Canadian Standards Association's Sustainable Forest Management System Standards

- c. Forest Stewardship Council
- d. Program for endorsement of Forest Certification Systems (PEFC)
- e. Sustainable Forestry Initiative (SFI)
- f. other product programs mutually recognized by PEFC

**1523.** Orient new work to make the greatest use of passive solar heating and cooling.

**1524.** Site, design and wire house to accommodate installation of photovoltaic panels in the future. Specifications are available from Owner upon request.

**1525.** Site work shall be in compliance with the EPA's Best Management Practices for erosion and sedimentation control during construction.

**1526.** If installing an irrigation system, use high efficiency components such as non-spray irrigation system (such as drip irrigation, bubblers or soaker hose).

**1527.** Use materials that are durable and that last longer than conventional counterparts. For example: stone, brick or concrete.

**1528.** Use lay outs and advanced framing techniques that reduce homebuilding material required. Examples include ladder blocking, right-sized headers and 2-stud corners, panelized construction or prefabricated modules.

**1529.** Use materials that that retain heat in winter and remain cool in summer.

**1530.** Use light colored /high albedo ( light reflecting) materials and/or open grid pavement with a minimum Solar reflective index of .06 over at least 30% of the site's hardscape.

**1531.** Use materials from local sources that are close to the job site.

**1532.** Install a Green roof (vegetated) for at least 50% of the roof area or a combination of high albedo and vegetated roof for at least 75% of the roof area). **[See Section 0804.]**

**1533.** Install a whole house vacuum system with high efficiency particulate air filtration. System should exhaust directly to the outdoors and away from any ventilation air intakes.

**1534.** Non toxic termite and pest control:

- a. Use termite resistant materials in areas known to be infested.
- b. Keep all wood 12" above grade.
- c. Seal all external cracks, joints, penetrations, edges, and entry points with caulking. Where openings cannot be caulked or sealed, use rodent and corrosion proof screens (copper and stainless steel mesh). Protect exposed foundation insulation with moisture resistant, pest proof cover (e.g. fiber cement board, galvanized insect screen). **[See Section 14.]**
- d. Include no wood to concrete connections or separate any wood to concrete (e.g. at posts, deck supports, stair stringers) with metal or plastic fasteners or dividers.
- e. Install landscaping such that all parts of mature plants will be 24 inches from the home
- f. Baltimore is in a moderate to heavy termite Infestation Zone; one or more of the following practices should be done:

- Treat all cellulosic material (e.g. wood framing) with borate product to a minimum of three feet above the foundation.
- Install sand or diatomaceous earth barrier.
- Install a steel mesh termite control barrier
- Install a non-toxic termite bait system
- Use non-cellulosic material wall structure (i.e. not wood or straw).
- Use concrete foundation walls or masonry walls with top course of solid block bond beam or concrete filled block

**1535.** Mark storm drains adjacent to or within one block of the property “Chesapeake Bay Drainage”. Contact Kurt Kocher at Baltimore City Department of the Transportation 410-396-3500 for design and location coordination. Signs by das Manufacturing, Inc. 800-549-6024.

**1536.** Exterior lighting shall be located and designed to prevent light trespass and be consistent with The International Dark Skies Association.

### **ENERGY AND GREEN RATING SYSTEMS**

**1541.** Healthy Neighborhoods, Inc. NSP2 shall only require gut rehabilitation (i.e. general replacement of the interior of a building that may or may not include changes to structural elements such as flooring systems, columns or load bearing interior or exterior walls) of residential buildings up to three stories to be designed to meet the standard for **Energy Star Qualified New Homes**. Owner shall submit name of third party Energy Star Building Partner and HERS Rater for each project.

The following definition for gut rehabilitation will be used for this program:

Gut rehabilitation is defined as a project or activity that involves substantial rehabilitation consisting of complete removal and replacement of all interior systems (structural and non-structural), equipment, components and features of the existing structure to be rehabilitated or converted, whereby the existing structure will be reduced to the basic structure or exterior building shell (e.g., the foundation system, exterior masonry walls, roof system). Gut rehabilitation may also include structural and non-structural modifications to the exterior of the structure. Visually, imagine walking into a house and replacing everything except the outside walls & roof, floor, and in some cases, the stair structure.

**1540.** Gut rehabilitations are eligible to pursue a Green Building Certification under the following rating systems: LEED for Homes, National Green Building Standard, and Enterprise Green Communities Standards. If certification is requested by the Owner, a Green Rating System Cost Pro Forma and Cost Benefit Statement for each project must be submitted for the Owner’s review and approval.

## **APPENDIX AND BIBLIOGRAPHY**

David Buckley Construction  
Habitat for Humanity of the Chesapeake, Inc.  
EBL Engineering, Inc.  
Pando Alliance /Janice Romanosky  
Enterprise Community Partners / Green Standards  
Flux Studio  
National Association of Home Builders, NAHB, National Green Building Standards  
NSP Toolkits / U.S. Housing and Urban Development (HUD)  
Richard Truelove P.E., Inc.  
St. Ambrose Housing Aid Center, Inc.  
Skarda Engineers, Inc.  
Smart Building Audits  
SMG Architects  
Southway Builders, Inc.  
USGBC, LEED for Homes

## **RESOURCES**

Maryland Invasive Plants: [http://www.mdinvasivesp.org/list\\_terrestrial\\_plants.html](http://www.mdinvasivesp.org/list_terrestrial_plants.html)  
Maryland Native Plants: <http://www.nps.gov/plants/pubs/nativesmd/info.htm>  
<http://www.hgic.umd.edu/media/documents/NativePlantsofMD.pdf>  
Maryland Drought Tolerant Plants: <http://www.hgic.umd.edu/media/documents/hg25.pdf>  
Rain Garden Design Templates: [http://www.lowimpactdevelopment.org/raingarden\\_design/links.htm](http://www.lowimpactdevelopment.org/raingarden_design/links.htm)  
Water Efficiency: <http://www.epa.gov/watersense>  
Energy Star: [www.energystar.gov](http://www.energystar.gov)

**Maryland Department of the Environment:**  
**Title 26 Subtitle 11 Air Quality Chapter 33 Architectural Coatings**  
**COMAR 26.11.33.05 - VOC Content Limits.**

VOC content limits, expressed as grams per liter, are as follows:

- A. Flat coatings ... 100;
- B. Non-flat coatings ... 150;
- C. Non-flat—high gloss coatings ... 250;
- D. Specialty coatings:
  - Bituminous roof coatings ... 300;
  - Bituminous roof primers ... 350;
  - Bond breakers ... 350;
  - Calcimine recoater ... 475;
  - Clear wood coatings:
    - Clear brushing lacquers ... 680;
    - Lacquers, including clear lacquer sanding sealers ... 550;
    - Sanding sealers, excluding clear lacquer sanding sealers ... 350;
    - Varnishes other than conversion varnishes ... 350;
  - Concrete curing compounds ... 350;
  - Concrete surface retarder ... 780;
  - Conversion varnishes ... 725;
  - Faux finishing coatings ... 350;
  - Fire-resistive coatings ... 350;
  - Fire-retardant coatings:
    - Clear ... 650;
    - Opaque ... 350;
  - Floor coatings ... 250;
  - Flow coatings ... 420;
  - Form-release compounds ... 250;
  - Graphic arts coatings (sign paints) ... 500;
  - High-temperature coatings ... 420;
  - Low-solids coatings ... 120;
  - Mastic texture coatings ... 300;
  - Metallic pigmented coatings ... 500;
  - Multi-color coatings ... 250;
  - Pre-treatment wash primers ... 420;
  - Primers, sealers, and undercoaters ... 200;
  - Quick-dry enamels ... 250;
  - Quick-dry primers, sealers and undercoaters ... 200;
  - Recycled coatings ... 250;
  - Roof coatings ... 250;
  - Rust preventive coatings ... 400;
  - Shellacs:
    - Clear ... 730;
    - Opaque ... 550;
  - Specialty primers, sealers, and undercoaters ... 350;
  - Stains ... 250;
  - Thermoplastic rubber coating and mastic ... 550;
  - Waterproofing sealers ... 250;
  - Waterproofing concrete/masonry sealers ... 400;
  - Wood preservatives ... 350.

**Maryland Department of the Environment:  
 Title 26 Subtitle 11 Air Quality Chapter 35 Adhesives and Sealants  
 COMAR 26.11.35.04 - VOC Content Limits**

Adhesive, sealant, adhesiveprimer, or sealant primer  Category	VOC content limit	
	VOC (grams per liter*)	VOC (pounds per gallon*)
<b>Adhesives</b>		
ABS welding	400	3.33
Ceramic tile installation	130	1.08
Computer diskette jacket manufacturing	850	7.08
Contact bond	250	2.08
Cove base installation	150	1.25
CPVC welding	490	4.08
Indoor floor covering installation	150	1.25
Metal to urethane/rubber molding or casting	850	7.08
Multipurpose construction	200	1.67
Nonmembrane roof installation/repair	300	2.50
Other plastic cement welding	510	4.25
Perimeter bonded sheet vinyl flooring installation	660	5.50
PVC welding	510	4.25
Sheet-applied rubber installation	850	7.08
Single-ply roof membrane installation or repair	250	2.08
Structural glazing	100	0.83
Thin metal laminating	780	6.50
Waterproof resorcinol glue	170	1.42
<b>Sealants</b>		
Architectural	250	2.08
Marine deck	760	6.33
Nonmembrane roof installation/repair	300	2.50
Single-ply roof membrane	450	3.75
Other	420	3.50
<b>Adhesive Primers</b>		
Automotive glass	700	5.83
Plastic cement welding	650	5.42
Single-ply roof membrane	250	2.08
Other	250	2.08
<b>Sealant Primers</b>		
Non-porous architectural	250	2.08
Porous architectural	775	6.46
Other	750	6.25
<b>Adhesives Applied to the Listed Substrate</b>		
Flexible vinyl	250	2.08
Fiberglass	200	1.67
Metal	30	0.25
Porous material	120	1.00
Rubber	250	2.08
Other substrates	250	2.08

\* The VOC content is determined as the weight of volatile compounds, less water and exempt compounds, as specified in Regulation .06 of this chapter.