

Greenville County Redevelopment Authority



General Construction Specifications

Latest Revision: May 23, 2019



GCRA

GENERAL CONSTRUCTION SPECIFICATIONS

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GENERAL CONSTRUCTION SPECIFICATIONS

SECTION I – OPERATIONAL PROCEDURES

As the administrating agency for Greenville County's Community Development Block Grant, HOME Grant and other funds from the U.S. Department of Housing and Urban Development, the Greenville County Redevelopment Authority shall establish a list of approved contractors. The property owner or the Authority, acting as the property owner's agent, may select from said list of contractors to bid on individual jobs. The qualification and recommendation of contractors shall be performed by GCRA's Operations Division, in accordance with the following procedures and rules:

CONTRACTOR REQUIREMENTS FOR THE APPROVED BIDDERS LIST

In order to be listed on the Approved Bidders List the contractor must provide sufficient information to meet the following requirements:

Contractor Approval – All contractors to be included on the GCRA Approved Bidders List or allowed to perform work financed by GCRA shall meet the following requirements:

- Make application to GCRA by completing a Residential Contractor Application and supplying other information as it shall require.
- Show evidence, acceptable to GCRA, of financial stability.
- Show evidence, acceptable to GCRA, of technical and contracting skills sufficient to perform quality residential construction and repair work.
- Successfully complete a background check which may include, at GCRA's option, a check of the HUD Debarred Contractors List, criminal records, a credit report, the records of any state or local agency or office relating to licensing, consumer protection, corporate registration, liens, judgments, litigation or other activities which may affect acceptance of the contractor.
- Have current General Liability and Worker's Compensation insurance.

Licensing Requirement – GCRA shall not accept an application to bid from a contractor who does not have as a minimum either a valid South Carolina Residential Builder's License or General Contractor's License or an out of state license that South Carolina State Law requires to be accepted (by reciprocal agreement or by statute).

EXCEPTION – contracts under \$5,000 do not require a residential contractor's license but the contractor shall be certified by the South Carolina Labor and Licensing Regulation (SCDLLR) and be qualified to complete the work on the contract. This exception is for maintenance work only, to include painting, pressure washing etc. GCRA at its discretion may contract directly with licensed plumbers, electricians and mechanical contractors to provide repair and maintenance services. These tradesmen must maintain the same level of insurance as required by GCRA for Residential Builders and General Contractors.

Once approved to bid, the contractor must maintain at all times, a minimum valid South Carolina license and certifications to remain on the Approved Bidders List.

Each contractor shall meet the standards of the local jurisdictions in regard to the issuance of building permits, utility services or any other legal requirements of said jurisdictions. All permits are to be signed off by the local jurisdiction. It shall also be the responsibility of the contractor to obtain local business licenses, parking permits or any other certifications required to work in any jurisdictions.

Certificate of Insurance – Before being allowed to bid, there must be on file, in the office of the Greenville County Redevelopment Authority, a Certificate of Insurance as follows: general aggregate: \$1,000,000; products, completed operations aggregate: \$1,000,000; personal and advertising injury: \$500,000; each occurrence: \$500,000; fire damage (any one fire): \$500,000; medical expenses (any one person): \$10,000; automobile liability, combined single limit: \$300,000.

Worker's Compensation Insurance – It is the policy of the Greenville County Redevelopment Authority that all contractors and builders shall carry Workers Compensation insurance and the contractual obligation of each contractor to be responsible for any injury to its employees, workers, subcontractors and subcontractors' employees. All contractors shall meet the requirements of South Carolina law regarding the need to carry Worker's Compensation and Employer's Liability Insurance. Any job with four (4) or more paid employees and/or subcontractors requires the contractor to carry Worker's Compensation Insurance on all employees or subcontractors or certify that their subcontractors carry appropriate Worker's Compensation

Insurance. In addition, all contractors shall execute and deliver an Indemnification Agreement holding the Authority and the property owners harmless for any injury to its employees, workers, subcontractors or their workers which may occur while working on a job financed or contracted by the Authority. Any injuries to personnel on GCRA jobs are to be reported, in writing, to the agency within 24 hours of their occurrence.

Retainage Agreement – Each contractor shall sign a retainage agreement to allow the GCRA to retain three hundred fifty dollars (\$350.00) from each of the first four jobs completed until the GCRA has a total of one thousand, four hundred dollars (\$1,400.00) in retainage on deposit. These retained funds will be used to repair faulty, defective, or inappropriate work or materials from any of the jobs completed by the contractor which are under the warranty period when said defect is found by the homeowner or the GCRA. The retained funds will also be used to perform work contained in the Work Write-Up which was overlooked or not completed as specified. The contractor will be notified of the above problems in writing and will have five to seven days, depending upon the severity of the defect, from the date the notice was mailed to correct such problems before the retainage funds are used.

Should the GCRA be forced to use any of the retainage to correct deficiencies, the contractor will be invoiced for the deficient funds and agree to replace the amount of money used within 30 days so as to maintain a balance of one thousand, four hundred dollars (\$1,400) as long as the contractor has any houses under warranty. If the cost of repairs exceeds the amount in the contractor's retainage account, he will be expected to pay the difference, or GCRA at its discretion may collect the money through legal means.

Subcontractor Approval – Contractors will complete and submit a list of subcontractors, stating specialty and minority status with each bid package. The Redevelopment Authority reserves the right to reject the services of any and all subcontractors who continuously fail to perform according to the Work Write-Up, General and Construction Specifications, Codes, and Federal Regulations as interpreted by the appropriate authority. If a contractor changes or uses other subcontractors not included on the original list he will have to amend the list before the job is completed.

Note: Final approval of contractors shall be with the Operations Director.

CONTRACTOR REMOVAL FROM THE APPROVED BIDDERS LIST

The Operations Division shall maintain an Approved Bidders List which includes contractors who meet the requirements above. However, a contractor (person, firm or corporation) may be removed from the Approved Bidders List for one of the following reasons:

- The contractor has had a construction contract terminated under Section 17(a), (c), and/or (d) of a Newly Constructed House Contract or Replacement Home Contract or Section 18(a), (c), and/or (d) of an Owner Occupied Repair Construction Contract.
- A valid unresolved claim or recorded mechanic's lien has been brought against the contractor for materials, labor, or equipment provided by the contractor or his subcontractor on a GCRA project for which the contractor was paid in full.
- The contractor has been sent three (3) invitations to bid on repair cases at the last known business address and has not responded in compliance with the Invitation to Bid.
- The contractor has, on at least two (2) occasions, been notified that a contract is ready to be signed or negotiated but failed to appear within seven (7) days to execute the contract.
- The contractor has started work on a project prior to receiving a proceed order and/or the holding of a preconstruction conference.
- The contractor has, on at least three (3) occasions, begun work on a change order prior to receiving an executed change order or notice to proceed from the Construction Specialist.
- The contractor has shown a clear pattern of disregard for workmanship, quality of materials, specifications, Work Write-Up procedures, harmonious relations with the homeowner (safety, comfort, and feelings of residents) or GCRA staff, or if work is not completed in a timely manner.
- The contractor has not responded to a five- or ten-day notice on time.
- The contractor has failed to submit bids for owner-occupied repair without prior notification to the GCRA.
- The contractor has been found to employ undocumented workers.
- The contractor has been convicted of a crime (minor traffic offenses excepted).
- The contractor has filed for bankruptcy, receivership, or other protection from creditors by a court of appropriate jurisdiction.
- The contractor has failed to maintain a drug-free workplace.

The following situations indicate such disregard:

- The contractor has accumulated callbacks without resolving the problems.
- The contractor has conducted himself improperly with the residents, owner, or GCRA staff.
- The contractor has shown poor quality of workmanship or construction management.
- The contractor has left the residence without water, lights, heat, or power without adequate arrangements in advance and/or has left a residence unsecured.
- The contractor has covered up discrepancies, or has located them in such a manner as to go unnoticed until they cause problems or damage.
- There is valid evidence that the contractor has been involved in bribery or collusion.

Any one of the above can be sufficient reason to remove the contractor from the Approved Bidders List. However, no contractor shall be removed from the Approved Bidders List unless he has been made aware in advance of the possibility of such removal. When it comes to the attention of the Operations Director that any approved contractor has accumulated a sufficient number of deficiencies to warrant possible removal from the Approved Bidders List, the Operations Director will send a certified letter to the contractor. The letter will explain the seriousness of the problems that have occurred and will warn the contractor of the possible consequences (removal from bidders list). In the letter, the Operations Director will offer to meet with the contractor to consider a possible solution to the problems. If there is no response from the contractor, or if the problems cannot be resolved satisfactorily, the contractor will be removed from the Approved Bidders List.

BID PROCESS

Invitation To Bid – It is understood that the Operations Division of the Greenville County Redevelopment Authority will invite and require three contractors from the Approved Bidders List to submit bids for each owner-owned repair job, emergency repair job or resale job. All new construction and Public Works jobs will be posted on the Authority's website. The contractors will be rotated at the discretion of the Operations Director, who will rotate those contractors who have not been successful bidders ahead of those contractors who have adequate contracts with the Authority to utilize their work force and time. However, it is understood that any qualified contractor wishing to submit a bid on any proposal may submit a written request to the Operations Director. A contractor may not be allowed to bid if:

- He will have more than three incomplete contracts as of the first or fifteenth day of the current month.
- He has incomplete contracts which have been executed for more than 15 days past the Proceed Order.
- He has not responded to discrepancies in his work within the required 10 days.
- There are unresolved claims against the contractor for labor, equipment or materials provided by subcontractors, laborers, or material suppliers which were used on a GCRA project for which the contractor has been paid in full for such a project.
- He has recently been added to the Approved Bidders List and has not proven his ability to satisfy the requirements of the GCRA and the contract.

Any contractor who, after receiving an Invitation to Bid, fails to submit a bid without notifying the GCRA office within three (3) working days from the date on the Invitation to Bid will be bypassed in the bid process and after due notice may be removed from the Approved Bidders List.

All contractors on the approved list may be invited to bid GCRA jobs. However, it is at the discretion of the contractor to accept the invitation. In order to bid a job, the contractor must attend the mandatory on site pre-bid conference.

Submission of Bid – Bids or proposals will be submitted at the bidder's risk and the owner and/or the Redevelopment Authority reserves the right to reject any and all bids or proposals.

All of the following forms contained in the bid package shall be completed, dated, and signed by each bidder: Bid Form, Non-Collusion Affidavit, List of Subcontractors form, and Work Write-Up with each item priced and a grand total for all items on the final sheet. All entries shall be made in pen. Any changes, erasures, or crossed out pricing must be initialed by the contractor prior to submitting the bid. Scope of the work shall include all labor, materials, equipment, permits, drawings, and services necessary for the proper completion of the repair of the property identified in the Work Write-Up. No alternative bids will be considered unless alternative bids are specifically requested by the Greenville County Redevelopment Authority.

All bids must be submitted on forms supplied by the Greenville County Redevelopment Authority and shall be subject to all requirements stated herein. All bids must be regular in every respect and no inserts, exclusions, or special conditions shall be made or included in the bid form or Work Write-Up by the bidder. The Authority may consider as irregular any bid on which there is an alteration to or departure from the bid package and form as described herein and provided to each bidder, and the Authority reserves the right to reject any such bid.

The contractor shall submit with his bid the names, addresses, trades, and minority status of all the subcontractors who are to perform work on the project for which the bid is submitted. This shall be done on forms furnished by the GCRA and shall be dated and signed by the contractor. The inclusion on this form of the name of a subcontractor whose services have been rejected by the GCRA may result in the rejection of the contractor's bid.

Neither the contractor nor his/her agents shall have further contact with the owner until a pre-construction conference is held.

AWARDING THE CONTRACT

The contract is awarded on the basis of the lowest acceptable bid by an approved contractor, provided that the bid is within ten (10) percent of the GCRA cost estimate and has been approved by the Operations Committee or the Operations Director. Emergency repair jobs may be awarded to the lowest bidder outside of the (10) percent range at the discretion of the Operations Director. The Construction Assistant will notify the successful bidder that a contract is ready to be signed or negotiated. A contract may be negotiated with the Construction Specialist with the approval of the Operations Director. When a Construction Specialist feels a contract is negotiable, the lowest bidder of all contractors who have submitted bids will be given an opportunity to negotiate or decline in writing that they do not wish to negotiate. Any contractor failing to appear to sign or negotiate a contract within one week of such a notice may be passed over in the bid process until the matter is resolved. A contract is not valid until duly executed by the contractor, the homeowner and the Executive Director of the GCRA. (Exception: The Operations Director may sign contracts less than \$5,000.00) After a contract has been properly executed, a pre-construction conference must be held before the contractor is to have further contact with the homeowner.

Upon awarding of the contract the contractor will receive the following: A Proceed Order with starting and finishing dates for the job, and a proposed payment schedule for Page 1, Section 4 of the construction contract based on the criteria shown below:

\$0 - \$10,000:	30 Days - Lump sum upon 100 percent completion
\$10,001 - \$27,500:	45 Days - Lump sum or maximum of two payments
\$27,500 plus:	45 to 60 Days - Lump sum or maximum two payments
Multi-family repair:	60 to 90 Days - Lump sum or maximum two payments
Modular Construction:	60 Days - Lump sum upon 100 percent completion
New Construction (stick-built):	120 Days (excluding documented delays due to weather) 180 Days maximum allowance Lump sum or maximum of four payments

The draw schedule is specified in the New Construction section of these guidelines.

PRE-CONSTRUCTION CONFERENCE

Neither the contractor, nor his/her agents shall have any contact with the homeowner, deliver materials to the job, or start work under the contract until a pre-construction conference (PCC) has been held. The contractor, the homeowner and the Construction Specialist are to be present at the PCC. At the PCC, the contractor will be given a copy of the fully executed contract and proceed order signed by the owner. Preconstruction conferences will be held for all contracted projects including construction on GCRA repair and newly-constructed houses.

The contractor is required to bring to the PCC the following: roof samples, exterior paint chart, and samples of exterior siding so the owner and the Construction Specialist may agree on the exterior décor of the house. No exterior colors of such items as paint, siding, and roofing shall be applied until the contractor has received approval of the selection of the exterior colors of the house from the Construction Specialist.

Color or colors of paint, floor and wall coverings, roofing, and siding are to be selected by the owner from samples of materials agreed upon for use in this contract. The Greenville County Redevelopment Authority reserves the right of approval and final selection of colors and décor of the exterior of any building financed in whole or in part through the Authority.

At conferences held for GCRA properties the contractor shall bring samples of all finish materials to be used on the interior and exterior of the property to the GCRA offices for selection. At the PCC the Construction Specialist and one of the Operations staff shall choose colors. The Operations Director will have final decision on all décor.

CHANGE ORDERS

Changes in the work, including substitutions of materials (even if of equal value) and changes in the scope of workmanship required by the specifications, which may be proposed by the Construction Specialist, contractor or property owner, because such provisions have been found necessary or desirable as the work progresses, shall be in writing and signed by the homeowner, the contractor, and the Construction Specialist on forms furnished by the Redevelopment Authority for this purpose. If such work is to result in an increase or decrease to the original contract amount, such changes are to be itemized. The execution shall be completed and approved by Redevelopment Authority staff and the owner prior to commencement of work involved in the change. A cost estimate by the Construction Specialist along with an explanation for the change will be submitted on the change order for approval. The explanation should be as detailed as possible.

If such work is to result in a reasonable exchange of work which shall not alter the original contract amount, such changes are to be itemized in a change order. The execution of such a change order must be completed prior to commencement of work involved in such change.

No private contract or agreements shall be made between the contractor and the owner while a job is in progress that is being supervised by the Greenville County Redevelopment Authority unless such work is brought under the terms of the construction contract in the following manner: The owner and the contractor shall agree on the work and the cost of such work with the concurrence of the Construction Specialist. The Construction Specialist shall write a change order and it is to be signed by all parties and submitted for approval to the Operations Director for Redevelopment Authority approval.

The Construction Specialist shall collect the funds for the full amount of the changes from the owner and give the owner a receipt. Such funds shall be deposited in the GCRA Escrow Account and shall be dispensed at the same time as the contract funds.

No work on any type of change order shall start until a copy of the executed change order is in the hands of the contractor and homeowner. The Redevelopment Authority will not accept the responsibility for any oral agreement concerning the contract or any part thereof. Any contractor who violates this provision may be subject to disciplinary action.

CONTRACTOR RESPONSIBILITIES DURING REPAIR PROCESS

Superintendence by Contractor – Except where the contractor is a sole proprietorship and gives his personal superintendence to the work, the contractor shall provide a competent superintendent, satisfactory to the Greenville County Redevelopment Authority, on the job at all times during work hours with full authority to act for him. It is the contractor's responsibility to determine that all work is done in accordance with the standard of the several trades known as a "workmanlike" manner.

Responsibility for Subcontractors – Subcontractors shall be bound by the terms and conditions of contracts insofar as the terms apply to their work, but this shall not relieve the General Contractor, if one is awarded the contract, from the full responsibility to the owner for the proper completion of all work to be executed under this agreement, and he shall not be released from this responsibility by any subcontractor agreement he may make with others.

It is the contractor's responsibility to notify the GCRA if there is any change in subcontractors after the contract is awarded. Any subcontractor whose services have been rejected by the GCRA shall not be allowed to perform any work on a GCRA project. The use of the services of any subcontractor whose services have been rejected by the GCRA may result in the cancellation of the contract at the discretion of the GCRA.

Work Write-Up/Drawings – The Work Write-Up, drawing(s), and any attachments let in the bid package are to be part of the contract. **The Work Write-Up shall take precedence over the *General Construction Specifications*.** When in conflict, the material, equipment, or workmanship called for in the drawings take precedence. The drawings (if any) of the floor plans on repair jobs only illustrate the general intention of the Construction Specialist; they do not show all of the work required, exact dimensions, construction details, or quantity of material. They may contain clearly marked construction notes, methods or materials that are to be considered part of the Work Write-Up and take precedence over the *General Construction Specifications*. All dimensions, quantity of materials, and construction details shall be the responsibility of the contractor. Locations of windows, doors, and swing of doors will be approved by the Construction Specialist prior to installation. When materials/products are called for in the Work Write-Up, they should be in compliance with the *General Construction Specifications*. Any substitutions must be approved by the Construction Specialist prior to installation.

Materials shall be new (unless otherwise stated), in good condition and of the grade specified herein or of a standard grade unless otherwise agreed to in writing before their delivery to the job. Trade names are used in the General and Construction Specifications to establish quality and type of materials required; exact materials (or equivalents approved by the owner and the Greenville County Redevelopment Authority) to be used on a specific property will be described in the Work Write-Up for the particular property.

Utilities – No utilities shall be disconnected overnight without prior arrangements with the owner and the Construction Specialist, and such arrangements shall be made in adequate time for the owner to make adjustments to such arrangements.

PROTECTION OF PROPERTY

Personal Property – It shall be the responsibility of the contractor to protect the homeowner's personal property by covering all floors, carpets, furniture, etc. Any damages that may occur as the result of negligent acts by him or his workers shall result in the replacement of or repair to personal property to the owner's satisfaction.

Adjacent or Public Property – When adjacent or public property is affected or endangered by any work done under the contract, it shall be the responsibility of the contractor to take whatever steps are necessary for the protection of the adjacent or public property and to notify the owner thereof of such hazard. The GCRA will request an executed Hold Harmless Agreement from the party in question before work is to be carried out and will record before and after pictures of areas affected. It shall be the contractor's responsibility to verify property boundaries and that all repair or new construction shall not encroach into setbacks or adjacent properties without permission.

Vacant or Vacated Residences – When a house is vacant or the resident(s) has been removed from the property while the repair work is being performed, the contractor shall be responsible for keeping the house secure at all times.

Repairs shall be made to all surfaces damaged by the contractor resulting from his work under this contract at no additional cost to the owner. Where "repairs of existing work" is called for by the contract, the feature is to be placed in "good" condition either by patching or replacement; all damaged, loose, or rotted parts shall be removed and replaced and the finish work shall match adjacent work in design and dimension as close as practical, which shall be determined by the Construction Specialist.

Removal of Trash and Debris – The contractor will be responsible for the clean-up and removal from the site of all debris and waste materials resulting from his work, and will, upon completion of work, leave the premises in a broom-clean condition. He shall remove all trash, rubbish, and debris from the premises and dispose of them in a legal manner. Unless the Work Write-Up states otherwise, all fixtures, equipment, building units (such as doors, windows, etc.) to be replaced or removed shall become the property of the contractor to dispose of in a legal manner. However, the contractor does not have the right to remove appliances such as space heaters or the fuel in oil tanks unless specified in the Work Write-Up.

Street Work – The contractor will be responsible for replacing the street surfaces as required to carry out the Scope of Work and to comply with requirements of the jurisdiction. The contractor shall, however, be responsible for performing the work as described in these specifications.

Completion of Work – The contractor will be given access to the property during the daylight hours on usual working days until all work is completed. The contractor is not to perform any work at unusual hours, on Sundays, or on legal holidays unless the homeowner or residents give him permission to work on these days.

The contractor may be declared delinquent in his work and may be disqualified for future bidding if at any time either (1) the actual percentage of work completed for any contract is not within a reasonable percentage of the dollar volume which should have been performed, or (2) the percentage of the value of the contract completed is not within a reasonable percentage of the contract time expired. The Construction Specialist will determine any delinquency and the contractor will be notified by certified mail.

The Greenville County Redevelopment Authority cannot ignore the legal aspects of the completion date of a contract without taking appropriate action to prevent the abuse of the completion date being ignored or taken lightly. GCRA reserves the right to require the contractor to be liable for liquidated damages in the amount set forth on page 1, section 2 of the construction contract.

If the contractor finds it absolutely essential to pull off of a job prior to its completion, he shall notify the Construction Specialist in writing as to the length of time the job will be delayed.

Extension of Time – Time of completion being of the essence, if the contractor during the course of the construction job determines he needs an extension of time for completion, he must request in writing an amendment extending the time of completion. **Such request must be in the Operations office at least seven (7) days prior to the original completion date.** Failure to give proper notice to the Construction Specialist could result in the contractor's removal from the Approved Bidders List. All such amendments must be justified and approved by the contractor, property owner, and the Greenville County Redevelopment Authority. **No check request will be processed beyond the expiration date of the Proceed Order without a properly executed contract extension in the file.**

The Greenville County Redevelopment Authority may extend the time for completion (with or without the owners' consent) when the job cannot be completed on schedule for the following reasons:

- Days lost due to inclement weather;
- Inaccessibility to the property;
- Verifiable days lost due to sickness or accidents;
- Additional days needed due to an executed change order or an executed addendum;
- Days lost because of unforeseen structural or property related conditions;
- Days lost due to theft or vandalism.

INSPECTIONS

It shall be the responsibility of the contractor to make sure that every item on the Work Write-Up and Change Order(s) is fulfilled in accordance with the provision of that item, the *General Construction Specifications* and all applicable laws and rules pertaining thereunto despite what understanding he might have with any participating party. The code officials in each jurisdiction shall sign off on all inspections and issue occupancy certificates as required.

The contractor shall abide by all local, state, and federal laws, rules, and regulations pertaining to the work and shall be subject to their inspections and approval. Inspection of the work during normal working hours by authorized inspectors shall be facilitated by the contractor.

The Construction Specialist assigned to a case will make periodic inspections during the construction process, but it shall be the responsibility of the contractor to give a 24-hour notice for a walk-through, final, code inspection of any trade that could be covered (i.e. plumbing), or for any other desired inspection.

The walk-through inspection is to be made when the job is virtually completed. The GCRA staff shall inspect all GCRA owned properties without the contractor or subcontractors on site. An owner-occupied repair project will be inspected with the Construction Specialist, the contractor, and the homeowner present at the walk-through inspection. At this time, the contractor shall deliver to the Construction Specialist all guarantees, certifications and warranties for material and equipment pertaining thereunto and shall guarantee the owner or GCRA against faulty workmanship or materials for a minimum period of one year from the completion of a owner-occupied repair job or one year from the time of occupancy by a new homeowner for a GCRA house sold to a homeowner.

The Construction Specialist shall check each and every item on the Work Write-Up and any Change Orders and deliver to the contractor a Punch List stating what items must be completed by the time of the final inspection. The home owner is to sign off on the Punch List.

The final inspection shall be made after the contractor has notified the Construction Specialist that all the items on the Punch List have been completed. The contractor, the Construction Specialist, and the homeowner, if applicable, are to be present at the final inspection. If all items on the Punch List have been completed in compliance with all rules and regulations pertaining thereto to the satisfaction of the Construction Specialist, he may proceed with the closing.

All closing papers shall be signed by the appropriate parties at the final inspection. The check is to be signed by GCRA and presented to the contractor. The closing papers include the GCRA Certification of Final Inspection & Acceptance form and Release of Liens & Warranty form. The homeowner will receive all guarantees and warranties.

BILLING PROCEDURES

All invoices shall be made bearing the owner's name, address, and tax map number. The invoice shall be sent to the Operations Division of the Greenville County Redevelopment Authority. Checks should not be requested if work will not be complete. All invoices shall be signed by the contractor.

Payment with Item Incomplete – **All items on the Work Write-Up, Change Orders, and Punch List are to be completed prior to the delivery of the check to the contractor.** Under no circumstance will a check be released before the work listed on the invoice has been completed and inspected.

Non-Payment of Bills by Contractor – When a complaint is received by a GCRA staff member that a contractor has not paid his bills, the complainant should be instructed to write a letter to the Operations Director which includes the following:

- The name, address, and location of the construction job involved;
- The name and address of the contractor who is being accused of non-payment;
- The name and address and owner of the firm which is making the complaint;
- The details as to the time and circumstances surrounding the non-payment and the amount of the non-payment;
- Signature of the complainant and date.

When the Operations Director receives a letter of complaint, he/she will first discuss the situation with the Executive Director. If appropriate, the Operations Director will then draft a letter to the accused contractor, which will be approved by the Executive Director and GCRA attorney. The letter will inform the contractor of the complaint that has been received and will notify him that the following steps are being taken immediately:

- No further bids will be sent to the contractor until the complaint is satisfactorily resolved.
- No contracts or proceed orders will be executed with the contractor until the complaint is satisfactorily resolved.

The contractor has ten days from the date of the letter to pay the unpaid bills or the case will be referred to the GCRA attorney. If the contractor does not pay the bills within 10 days, he will be removed from the GCRA list of approved contractors and any contracts he has in progress with GCRA will be canceled.

If there is no satisfactory response from the contractor within 10 days, the GCRA attorney will be requested to take appropriate legal action. A second letter will be sent to the contractor informing him that his contracts are canceled and that he has been removed from the GCRA list of approved contractors.

CALLBACKS

At the final inspection a post-construction subcontractor form, which lists the contractor and all subcontractors who worked on the job, will be given to the homeowner. The homeowner will be encouraged to call the appropriate contractor or subcontractor if a problem arises. It is the responsibility of the contractor or subcontractor to respond with all haste to an owner's complaint concerning the workmanship or material of his work in accordance with his 12 month guarantee. Emergencies affecting the safety and health of the homeowner, HVAC, electrical, or leaks shall be addressed within 24 hours. All other problems shall be addressed within 5 working days. In emergency situations where a contractor cannot be reached before 4:00 p.m. on the day of the event, the GCRA will solicit an appropriate contractor or tradesman to address the emergency in due haste. The contractor of record will be responsible for paying the bill directly or reimbursing GCRA within 5 working days. If a contractor fails to accept his responsibility for fulfilling his obligations under his 12 month guarantee, he shall be removed from the approved contractors' list after due notice from the Operations Director. The SC Department of Labor, Licensing, and Regulation (SC LLR) will be notified on an as needed basis to rule on any deficiencies encountered after the 12 month guarantee period but within the State-required 8 year liability policy.

The Construction Specialist will respond to any complaint from an owner if the owner states the contractor will not respond and if, in his opinion, the problem is the responsibility of the contractor he will notify the contractor promptly. If the contractor fails to respond efficiently and expeditiously, the Construction Specialist will send out a 5 day letter and notify the Operations Director who will cause such a contractor to be bypassed in the bid process until such matter is resolved.

DISPUTES AND DISAGREEMENTS

It is desirable that all disputes and disagreements be settled between the owner and contractor. GCRA will maintain a file on contractors and subcontractors who have had serious problems on any jobs. This file will include documentation on each problem and how the problem was resolved. In the event of unresolved disputes or disagreements, the Greenville County Redevelopment Authority reserves the right to resolve such dispute or disagreement and its decision shall be final except for what legal remedies an aggrieved party may have in a court of equity. GCRA has a grievance policy, which is shown below.

GRIEVANCE POLICY

Purpose – The purpose of the grievance policy is to allow an aggrieved party to secure a hearing without delay and to be assured prompt, orderly, and fair response to a grievance or appeal. This policy will be used in the following situations:

- When a party feels that he/she has been subjected to unfair treatment during the construction process, or
- When a party has a strong difference of opinion with the manner in which work is performed during the construction process and this disagreement cannot be resolved satisfactorily.

Statement of Policy – It is the policy of the Greenville County Redevelopment Authority that all parties shall be treated fairly and consistently in all matters related to the agency's work. When a party feels that he/she has not been treated fairly and consistently, or when a party has a strong difference of opinion with work performed during the construction process, he/she shall have the right to present a grievance or appeal free from interference, restraint, coercion, discrimination, or reprisal.

Procedure:

- An aggrieved party may personally present his grievance to the Construction Specialist involved within three (3) consecutive workdays of its occurrence to the party's knowledge of its occurrence. The Construction Specialist shall then attempt to adjust the matter and shall respond to the aggrieved party within five (5) consecutive workdays.
- If the grievance has not been settled by the Construction Specialist within five (5) consecutive workdays it shall be presented in writing by the aggrieved party to the Operations Director.
- If the grievance has not been settled, within six (6) days after the Operations Director receives the grievance, the written grievance and all pertinent correspondence shall be presented to the Executive Director. The Executive Director shall respond to the aggrieved party within five (5) consecutive workdays after receiving the written grievance.
- The Executive Director, at his discretion, may present the case to the Greenville County Redevelopment Authority Board for final dispensation.

JOB SAFETY

These guidelines apply to contractors' activities on and during repair and new construction of GCRA and partner projects. They should be used as a reference source for basic safety issues that are typically encountered during construction projects. First and foremost is the protection of all persons working on the job or occupying the premises. These guidelines are not to take the place of OSHA industrial safety guidelines.

- The contractor will be held liable for damages to personal and real property as a result of the contractor's negligence to provide appropriate protective measures.
- The job site will be kept clean and orderly daily. Careful attention should be paid to storage and placement of tools and materials as they are a major source of tripping hazards.
- Electrical hazards will be avoided by insuring that no open source of power is left unattended, service wires are secured to the structure, hazardous drop cords or electrical tools are not used until repaired or replaced, and non-GFCI power sources are turned off before beginning work in damp areas.
- Only State-certified workers will be allowed to construct or repair roofs, and prior to the start of any roof construction, repairs or maintenance to the work area below the roof will be isolated against entry in and around the work area. When workers are performing duties on a roof more than 20 feet above the ground with a slope greater in pitch than 4:12, they should be secured by a lifeline or safety belts and should use appropriate personal protective equipment including hard hats, eye protection and leather gloves.
- Smoking inside a construction project for GCRA or a partner is not allowed. Smoking is permitted only in outside areas of the project and only if the homeowner gives permission to do so. Any and all discarded smoking debris shall be removed from the job site on a daily basis.
- Open burning is not permitted on any job sites for GCRA or partner projects for any discarded materials or debris.
- All hazardous waste such as lead-based paint and asbestos-containing materials shall be placed in closed containers and labeled to identify the contents. Contractors shall become familiar with the guidelines for appropriate removal of hazardous waste by calling (301) 405-3163 for state regulations.

Safe Mindsets

- The safety of all workers is the primary concern on all job sites, and it should begin with the way one approaches all tasks on site.

Safety Equipment

- Safety glasses shall be worn when working with any power tool.
- Dust masks shall be worn when installing insulation; sanding or tearing out old walls, ceilings, and framing; or painting with an air compressor.
- Contractors shall always keep a first aid kit on the job site to stabilize any injury as much as possible until medical personnel arrive.

Power Tools

- All tools shall be inspected before use.
- A power tool should not be used without proper instructions. Safety devices shall not be removed from any power tool, and properly grounded three-pronged plugs shall be used to avoid electric shock.

Circular Saw

- Workers shall not stand directly behind a saw when cutting;
- Shall allow the blade to reach full speed before cutting material; and
- Shall not tie a blade guard back.

Nail Gun

- Nail guns shall be pointed away from people at all times.
- Safety glasses shall be worn during use.
- The nail gun trigger shall not be depressed until a worker is ready to drive a nail.

Ladders

- All ladders shall be inspected for loose rungs, steps, and cross braces before use.
- Ladders shall be used on level ground to prevent them from falling and shall be tied down or be steadied by another worker during use.
- Metal ladders are not to be used when working near power lines because they could conduct electricity.

Trenching or Excavation

- All holes or trenches should be covered or secured overnight on any job site.
- Security tape should always be used to identify any danger spots on the job site.

Insurance

- All contractors and sub-contractors shall carry or provide workers' compensation insurance and shall report any injury immediately to a construction supervisor or GCRA Construction Specialist.

SECTION II – HOUSING REPAIR SPECIFICATIONS

CONCRETE WORK

Concrete shall be ready-mixed or pre-batched and approved for use as recommended by the American Concrete Institute.

No concrete shall be poured when the temperature of the surrounding air is below forty degrees Fahrenheit (40° F) and falling unless proper additives are incorporated at the batching plant and are so certified.

Floors shall be a minimum 4" thick, 2500 PSI and properly scored in accordance with the Universal Codes with a float and steel trowel finish.

All slabs on grade shall be finished level and true resting on 95 percent compacted soil or crushed stone. The concrete is to be fiber-reinforced, have a 6 mill polyurethane moisture barrier, and be pre-treated prior to pouring.

MASONRY - GENERAL REQUIREMENTS

- Mortar shall consist of a mixture manufactured especially for the use and combined with proper proportions of sand and water as per manufacturer's specifications. All work is to be carried out in accordance with ASTM International Masonry Standards.
- No masonry work shall be completed when the temperature of the surrounding air is below forty degrees F (40° F) and falling.
- All joints shall be completely filled with mortar.
- All brick, stone, or block used shall match adjacent work, and samples shall be approved by the owner or his agents before starting the work, unless the work is to be painted or covered.
- Soft type brick shall not be used.
- Tuck pointing shall be done only after the joints have been raked out to a minimum depth of ½" and wetted.
- All damaged, loose, or soft brick in area to be rebuilt must be removed until sound brick is encountered.
- New brick patches shall be toothed into and matched in size, joints, and bond to the existing work.
- Face brick work shall be tied to the back-up work with headers let into an existing back-up wall as required by code.
- Mortar shall be made to match existing color as closely as possible after it has cured. GCRA reserves the right to make the final decisions in this matter.

DEMOLITION, CLEARANCE, & EXCAVATION FOR STRUCTURES TO BE REPAIRED

Demolition of all parts to be removed shall be done in a safe, orderly fashion taking care to avoid damage to parts which are to be left in place. Contractors should have all utilities marked before putting equipment on site. Lead-based paint and asbestos removal/demolition shall be performed in accordance with Federal regulations. All debris shall be removed from the premises as it is generated and shall not be allowed to accumulate.

Scope of Work

- Work includes demolition of the structures and/or lot clearances as described in the bid documents.
- Included in this work is the removal of all debris from the demolition or clearance sites which is to be disposed of in a legal manner at an approved landfill.
- For all properties to have debris removed, areas of work are to be back-dragged, grassed, and strawed (unless otherwise specified) with the following mix depending on date of application:

August 16 - April 15

Winter Rye	100 lb./acre
KY 31 Fescue	150 lb./acre
Straw Mulch	4000 lb./acre

April 16 - August 15

Hulled Bermuda	50 lb./acre
KY 31 Fescue	200 lb./acre
Straw Mulch	4000 lb./acre

Method of Demolition – Any standard method of demolition currently in use EXCEPT burning or blasting shall be acceptable.

Hazardous Material – If at any time prior to or during the demolition or excavation, it appears that there is asbestos (or any other hazardous material) located within or on a structure to be demolished, or such materials are found on the demolition site, the contractor shall:

- Acknowledge the presence of said materials in writing to the Greenville County Redevelopment Authority and other proper officials;
- Follow all removal and disposal procedures and regulations of the South Carolina Departments of Health and Environmental Control (SCDHEC), the United States Environmental Protection Agency (EPA), the County of Greenville, and any other governmental organizations.
- Certify to the Greenville County Redevelopment Authority that all necessary and legally required precautions, rules, regulations and procedures have been met during the demolition, excavation and disposal of materials, with such documentation as he may have to support said certification.

Protection of Adjacent Buildings and Existing Structures – Excavations shall not be carried below existing foundations until underpinning and shoring to be performed by the contractor have been completed. All existing structures, pipes, and foundations which are to remain shall be adequately protected by the contractor without cost to the owner.

Protection of Roofs and Skylights of Adjoining Buildings – Protection for the skylights and roof of adjoining buildings shall be provided at the contractor's expense. If the owner, lessee or tenant of the adjoining building should refuse permission to have the roofs and skylights protected, the responsibility and expense for the necessary protection shall fall upon the person refusing such permission.

Waste – Excess material from the excavation not suitable or required for backfill or filling shall be removed.

Disposal of Materials – Salvaged materials from the structure may be stored on the site temporarily but not beyond the date specified for completion of the contract. All other materials shall be promptly removed as the demolition or clearance progresses.

Existing utilities such as gas, water and sewer lines shall be properly disconnected and/or capped by a method approved by the Engineer. Sewer services shall be disconnected as close as feasible to the road right-of-way or property line, sealed with concrete, and marked with a flagged stake. The contractor will arrange for termination of service to the above and any electrical connections. Any expense or damage to utilities shall be the responsibility of the contractor.

Clean-Up – All trash and debris shall be removed and disposed of in a legal manner at an approved landfill.

Permits – The contractor shall obtain and pay for all permits and licenses necessary for the completion and execution of the work and labor to be performed in conformance with the applicable Federal, State and local codes, regulations and requirements whether or not covered herein by the specifications and drawings for the work.

Safeguards During Demolition – The contractor shall be responsible for the safety of all individuals and those performing the work under this contract and for any damages to the owner's property that may occur as the result of negligent acts by him or his workers, and shall indemnify the owner and the Greenville County Redevelopment Authority through insurance as stipulated in the contract documents.

Grading/Existing Dwelling – Any exposed earth will be graded smooth. In the event that low areas remain which will cause water to stand, the contractor will be responsible for grading to eliminate such low areas. The contractor is also responsible for maintaining minimum slopes to prevent erosion and the installation of other erosion control measures, including grassing, as required by Greenville County.

When grading is called for around an existing dwelling, the following minimum standards shall apply:

- Fill material may be clay or fill dirt and shall be free of roots, trash, rocks, other debris and lead based paint contamination.
- All fill dirt shall be covered with a minimum of two inches of top soil and raked smooth.
- Where fill is called for around the house, the foundation footing shall be fully covered and the grade from the house shall be five percent.
- Where the foundation vents are lower than the finish grade, the contractor shall erect a waterproof vent well at least four inches deeper and four inches wider than the vent opening and shall be at least eight inches from the foundation wall. It shall extend at least four inches above the finish grade. All measurements shall be independent of the well.
- No building debris shall be buried on the site unless it is in accordance with the rules and regulations of the South Carolina Department of Health and Environmental Control.

When the Work Write-Up calls for filling a septic tank, the following specifications shall apply:

- All liquid residues in the tank shall be removed and disposed of by the contractor according to the applicable laws and regulations.
- The tank shall be filled with sand screenings, gravel dust, river sand, or asphalt screenings within six inches of the grade. The remaining six inches shall be filled with top soil.
- The contractor shall assure that all sewer or drainage lines are disconnected from the tank before the tank is filled.

Backfilling Around Foundations – All timber shall be removed and all trash shall be cleared out from the excavation. Backfill shall be excavated material. Backfill shall be placed in eight-inch layers and compacted by mechanical tamping. Surface of backfill shall be left six inches above final grade to allow for settling. All basement areas are to be cleaned out and, when specified, filled to street level with red clay compacted up to 95 percent compaction. Machinery treads, wheels or outriggers should not be used within six feet of the foundation.

Excavations – When excavating for buildings or near adjacent properties, such excavations shall be properly assured against any danger to life and property. Permanent excavations shall have retaining walls of sufficient strength made of steel, masonry, or reinforced concrete to retain embankments, together with any surcharged loads. Excavations for any purpose shall not extend within 1' of the angle of repose or natural slopes of the soil under any footing or foundations, unless such footing or foundations are first properly underpinned or protected against settlement.

FOOTINGS

Footings, unless specifically designed otherwise, shall be constructed of 2500-lb. concrete eight inches in thickness and shall extend a minimum of four inches each side of brick, foundation wall, or piers. All footings shall extend at least twelve inches below the finish grade and be approved by building codes prior to pouring.

Footings shall be so designed that the allowable bearing capacity of the soil is not exceeded. If structural plain concrete or masonry footings are used, they shall rest on undisturbed or minimum ninety percent (90%) compacted soil of uniform density and thickness.

FOUNDATIONS

Foundation walls shall be brick or concrete blocks on concrete footing unless otherwise specified.

Piers are to be sized and constructed in accordance with the local building codes and International Masonry Standards.

Sub-Sills – No stiff knees are permitted on load bearing sub-sills. On non-load bearing sub-sills, stiff knees may be used. Stiff knees are not to exceed 32" above ground, using pressure-treated lumber. All sub-sills, as a minimum, shall be two 2" x 6" spiked 16" O.C. staggered. Spacing of all stiff knees shall be a maximum of 7'0" O.C. resting on solid masonry a minimum of four inches above the ground. Adjustable steel supports may be used on non-load bearing sills when over 32 inches high when properly spaced and secured.

Crawl Space Ventilation – Crawl space ventilation under buildings without basement shall be 16" x 8" black automatic type. When vents are level with or lower than the finish grade, the contractor shall erect wells four inches deeper and four inches wider and eight inches from the wall. Pre-fabricated wells may be used with approval of the Construction Specialist. Spacing per IBC.

Access Door – An access door under a building, where called for in Work Write-Up, shall be constructed of a minimum of ½" exterior grade plywood bound with ¾" boards and with diagonal braces. The door is to be complete with galvanized hinges and hasp. Opening size shall be a minimum of 18" x 24". The frame is to be constructed of pressure-treated 2" x 4" lumber and the edges are to be caulked and free from voids. A stop is to be installed on all four sides of the frame. The frame shall be pressure-treated stock with ¾" stops on all sides. The door shall not be out of alignment by more than ¼".

Curtain Walls – All curtain walls around the perimeter must be tied to adjoining columns or piers with wall ties every two courses of block or every 16 inches of brick. Footings for such wall may be solid masonry or concrete, extended a minimum of four inches each side of the wall, provided that the walls do not exceed 48 inches in height. Concrete footings shall be used for walls that exceed 48 inches.

All hollow masonry walls thicker than four inches shall bear on a minimum six-inch thick concrete footing a minimum of twelve inches below the lowest grade adjacent to the footings. All hollow masonry bearing weight shall be capped with solid masonry units a minimum of the thickness of a patio block or pressure-treated sill plate installed in accordance with local codes.

PORCHES & DECKS

Concrete Porches – When the Work Write-Up calls for the removal of wooden porches to be replaced with concrete porches, the following shall apply:

- The old flooring joists and sill shall be removed, leaving the headers and roofing temporarily supported. No debris is to be left in the crawl space. This includes filling the foundation space with earth and/or masonry debris.
- When pier supports are removed, a new continuous concrete footer and masonry foundation shall be built around the perimeter of the porch. The foundation is to be constructed out of masonry or brick matching the adjacent foundation as closely as possible.
- The slab shall be supported on masonry piers and steel decking adequately spaced to bear the intended load and shall be appropriately reinforced to bear the intended load. No concrete slab shall be bearing on wood support.
- The design of the slab shall be such as to have 1½ inches of protrusion beyond the foundation wall and the post under the porch header sill shall be plumb with the roof load resting over the supporting foundation walls. All concrete floors shall be reinforced with 6" x 6-10" gauge wire mesh. No concrete shall be poured against a wood structure without first covering the wood for the depth and length of the concrete with aluminum flashing. The finish shall be floated and trowel-finished. The edge shall be properly edged, finished, and free of honey combs or other voids. The joints between the house and the slab shall be neatly caulked with butyl caulking or silicone. When the porch is completed, no forms or any wood shall be left under the crawl space. No slabs are to be poured on a soil or debris fill base. If fill is encountered after an old slab is removed, the Construction Specialist will generate a change order to remove as much fill as he deems necessary.
- When the porch slab is completed the top of the slab shall be at least two inches below but not more than seven inches lower than the exterior door sill and shall have a pitch from the house to outer edge of ⅛" to ¼" to one foot. The porch shall be in true alignment and level from side to side.

Wooden Porch/Deck Repair & Replacement – Remove and dispose of all defective flooring joists and sills as called for in the Work Write-Up. No debris is to be left in the crawl space.

All wood in contact with the foundation walls/piers or within 18 inches of the ground shall be #2 pressure-treated Southern Yellow Pine (SYP).

Decking shall be 5/4 pressure-treated stock, properly cupped, crowned and secured with galvanized, properly-sized decking nails or appropriate screws. The decking is to be run parallel to the front of the house and is not to be spaced. It is to be drawn up tight when being fastened. On porches longer than 16 feet, the decking runs may be in two pieces but the smallest piece shall not be less than 48 inches with no more than two adjacent joints on a side. Boards shall extend past the sills 1½ inches. Decking should be adjusted so no overhang is 50 percent of the width of the board.

When the Work Write-Up calls for replacement of all structurally unsound lumber, the Construction Specialist shall determine which members are not structurally sound enough to support the loads they were originally designed to bear.

Railings and Posts – Lumber is to be #2 common or pressure-treated stock. If lumber is to be in contact with the ground/concrete or will not be painted, it MUST be pressure-treated. Pressure-treated lumber shall not be painted within 6 months of installation.

Wrought Iron General Requirements – All wrought iron installations shall be in compliance with the local building codes.

Wrought Iron Hand Railing – When the Work Write-Up calls for wrought iron railing, it shall have a 1⅞" Dixie Cap top railing, ½" x 1 x ½" - ⅛" thick channel bottom rail, ½" x ½" tubular balusters securely welded to top and bottom railings. The baluster spacing is not to exceed 4 inches O.C. The railing is not to exceed a span of more than 8' 0" without support in center securely anchored to floor. No railing shall span a distance of more than 10'-0" without a wrought iron corner or wrought iron flat column. All railings shall have one coat of Rustoleum primer and one coat of good quality exterior enamel. Railings shall be securely welded to all corners and flats.

Wrought Iron Step Railing – When the Work Write-Up calls for installation of a railing around the perimeter of the porch and down the steps, the step's railing shall comply with the above and the newel post shall be 1" x 1" anchored in concrete, a minimum of 12 inches in the ground (minimum 6-inch diameter hole) in front of the bottom step.

Single Wrought Iron Step Railing – When the Work Write-Up calls for a single wrought iron step railing, it shall consist of a Dixie Cap top railing with 1" x 1" newel post. The newel post is to be anchored in concrete a minimum of 12 inches in the ground (minimum 6-inch diameter hole). The top railing shall be welded to the newel post and the wrought iron corner post or wrought iron flat. Railing shall have one coat of Rustoleum primer and one coat of good quality exterior enamel.

Wrought Iron Columns – When the Work Write-Up calls for wrought iron corners, they shall be a minimum of 9 inches each side and made of a 1" x 1" material with cross braces at top and bottom. The design shall be the "S" type scroll unless otherwise specified. Flat columns shall be a minimum of 9 inches in width with 1" x 1" material and cross braces at the top and bottom. The design shall be the "S" type scroll unless otherwise specified. All corners and flats shall have one coat of Rustoleum © primer and one coat of good quality exterior enamel.

Wood Railing General Requirements – The contractor shall be responsible for priming and painting all non-pressure-treated rails and columns. Railing design is to conform to Section III: New Construction Specifications.

All railings are to be constructed of #2 pressure-treated SYP or paint grade SYP, Douglas fir or spruce dimensioned lumber.

When the Work Write-Up calls for wood railing, it shall have a 2" x 4" top and bottom rail and 2" x 2" nominal pickets or lattice as specified by the Work Write-Up. Spacing is not to exceed four inches between pickets. Railings are not to exceed eight feet without support. No railing is to exceed ten feet without a vertical support column.

Wood step railings shall terminate at the base of the steps on a 4" x 4" nominal newel post. The post is to be pressure-treated and anchored with gravel or concrete 12 inches in the ground (minimum 8-inch diameter hole). The top of the newel is to be a manufactured cap or contain a beveled top and beveled channel 4 inches lower than the top of the post.

Wood Columns – When the Work Write-Up calls for wood columns they should be supported on aluminum plinths or manufacturer's designed base. Unless stated in the Work Write-Up, all wooden porch posts shall consist of the following types:

- 4" x 4" or 4" x 6" pressure-treated posts.
- 6-inch turned or half turned posts – no 4-inch turned posts are to be used.

Vinyl Posts and Columns shall be manufactured of solid PVC and installed in accordance with the manufacturer's specifications and the international codes. Vinyl shall be Color Guard Railing Systems (Classic) or equivalent.

CONCRETE DRIVES AND WALKS

General Requirements

- The exact location of drives and walks is to be approved by the Construction Specialist prior to pouring.
- All concrete drives and walks are to be a minimum of 4 inches in depth.
- All walks are to be a minimum of 42 inches wide. Drives shall be 10 feet wide unless otherwise specified in the Work Write-Up or the construction drawings.
- All concrete shall be 3000 PSI, maximum 5 inches slump. Concrete should be placed on original soil or compacted fill and against straight solid forms when the temperature is between 40 and 100 degrees Fahrenheit. All concrete is to be free of voids and shall be protected from the weather while curing. Pitch concrete away from dwelling and float and brush finish.
- All concrete is to be properly edged and jointed (z-strips are **NOT** acceptable) every 8-10 feet, uniformly spaced.
- All forms are to be stripped and concrete is to be back filled to 1 inch below slab, seeded, fertilized and strawed.

CHIMNEYS

Chimney Repairs/Reconstruction – General Requirements

- Chimney crickets of metal or other roofing materials shall be laid or installed on solid roof decking consistent with the construction of the roof. There shall be a 2-inch minimum clearance between brick work and wood framing. Install metal flashing and counter-flashing around chimney where roof meets chimney. Chimneys are to be fire stopped at the floor and ceiling with an approved fire stop.

- When the Work Write-Up requires the removal of existing flues suspended to ceiling, all brick, mortar, and metal flue hangers or plates are to be removed. Ceiling joists, rafters, ceiling, and roof sheathing are to be patched to match existing as close as possible.

Chimney Repairs – All chimneys to be repaired must be torn down to solid mortar and brick work. No deteriorated mortar or brick will be permitted. All unsafe or dangerous chimneys shall be made safe or taken down completely. The contractor shall be responsible to keep the roof clean and spotless.

Chimney Removal – when removing chimneys proper precautions shall be taken to minimize the spread of soot and dust throughout the dwelling. All voids shall be filled with materials matching the adjacent framing and finish. All old masonry and mortar are to be removed from the building site and properly disposed of.

When called for in the Work Write-Up, chimneys to be removed below the roof line shall be taken below the roof and demolished until solid masonry is encountered or the ceiling height is reached.

When called for in the Work Write-Up, chimneys to be removed below the floor level shall be removed to below the bottom of the adjacent floor joists.

ROOF AND CEILING FRAMING

Roofing – General Requirements

- All material is to be new first quality and match in color throughout lot. All transitions and penetrations shall be properly flashed and caulked. The house and its contents shall be protected from the elements at all times.
- All old shingles and waste are to be removed from yard, and the yard is to be raked and gone over with a magnet to remove debris and nails.
- The contractor is to take reasonable care in protecting landscaping.
- Fences may be temporarily removed to gain access but must be reinstalled and returned to their original condition.

All repairs, installations and replacements of roof and ceiling framing members shall be done in accordance with sizing, nailing and spacing of the local building codes.

When repairing framing by sistering, the new component shall extend the length of the old material and shall be nailed in a triangular pattern.

Where ceiling joists are not parallel to rafters, metal straps or hangers designed for the purpose attached to the ends of the rafters shall be installed in a manner to provide a continuous tie across the building.

Collar ties of 2" x 6" boards shall be installed in the upper third of the roof height to every third pair of rafters.

Cornices – Exterior cornices shall be repaired, removed, or replaced as called for in the Work Write-Up.

- Repaired Cornices: Cornices to be repaired shall have all rotted or deteriorated parts removed and replaced with new parts matching original work as nearly as possible.
- Removal of Cornices: Where cornices are to be removed, the Work Write-Up will describe the treatment, materials and methods to be followed.

Roof Sheathing – When the Work Write-Up calls for installing sheathing, all layers of old shingles, shakes and roofing shall be removed down to the slats. New 7/16 OSB sheathing or sheathing sized accordingly to the span shall be installed perpendicular to the rafters. All top and bottom edges shall break in the middle of the rafter. Plywood clips shall be utilized when necessary. Exposed edges are to be capped with a shingle strip, aluminum, or other suitable covering. Existing shingle strips shall be modified or removed to allow for the difference of the finish roofing.

Access to Attic Space – Attic spaces shall be provided with an interior access opening not less than 22" x 36." An access opening shall be readily accessible and provided with a lid that may be easily removed. The lid shall be 3/8" AC plywood. The ceiling frame is to be butt-jointed 2" x 6" nominal #2 SYP or SPF free from defects and splinters or equivalent stock. A rolled R-30 fiberglass batt insulation shall be secured to the top of the lid. When a ceiling joist is severed to install the access opening, a double header shall be installed to support the joist on each end of the opening.

Attic Stairs – When called for in the Work Write-Up attic stairs shall be of the folding variety. They shall be properly blocked, shimmed and installed according to all manufacturers' specifications. When an existing dropped ceiling is encountered, a second rough access in the upper ceiling is to be made to the same size and alignment of the finish ceiling access. If the lower ceiling level contains insulation there shall be a framed and covered shaft between the ceilings. The shaft may be sheetrock, plywood or other solid sheeting. All corners and edges are to be sealed to prevent drafts. Above the disappearing attic stairway, provide a box constructed of 1" x 10"s with a plywood lid attached to the 1" x 10"s with a piano hinge and fitted with weather stripping where the lid comes into contact with the box to insure an air tight seal. The box's sides and lid's top side must be carefully insulated to R-30. A hook and eye shall be installed so that the lid can be temporarily secured in an open position when the stairway is in use. Compressed batt insulation in stairway is not acceptable.

Ventilation of Attic Space – All attics are to be ventilated in accordance with the code standards for new construction. Attic space shall be ventilated in accordance with the following:

- For gabled roofs, ventilation shall be provided to furnish cross-ventilation of each separate space with weather-protected vents. Gable vents or ridge and soffit vents may be used for this purpose (but not both – do *not* combine gable vents with ridge vents). Areas that are not connected by breaks in sheeting to allow air flow will need to be sawn to appropriate sizes.
- For hipped and boxed roofs, roof vents as well as vent holes for air flow in the boxing will need to be installed with hip type vents, ridge type vents, or both.
- The contractor is responsible for determining the amount of venting required by code to properly vent attic.

Roofing Build-Up – Built up roofing, when called for, shall be installed in exact accordance with manufacturer's specifications and be a 15 year bondable type roof. The contractor shall state in writing that such installation has been made. Existing raised seams of metal roofs shall be knocked down prior to the application of any new roofing. Materials are to be Johns-Manville or equivalent.

Where "recoating of existing roof" is called for in the Work Write-Up, all flashings shall be checked and made water-tight. All bubbles in existing roof shall be cut out, secured, and at least one coat of tar and one ply of saturated felt shall be applied.

Repairs to sheeting shall be done matching the existing materials as close as possible.

Asphalt Shingles – Unless otherwise stated composition shingles shall be the architectural variety and carry a minimum 25 year warranty, Owens – Corning Prominence or equivalent.

Unless otherwise stated in the Work Write-Up, composition shingles shall be applied only to solidly-sheathed roofs. When the spacing between existing sheathing boards is more than $\frac{3}{4}$ ", gaps shall be filled with wood strips. 15# felt shall be used on roofs with gaps over $\frac{1}{2}$ ".

Composition shingles shall not be installed on a roof having a slope of less than 4:12 unless approved by the building inspector or Construction Specialist. All applications under 3:12 shall have a four-inch exposure and utilize Weather Lock rolled roofing in lieu of felt paper.

Composition shingles shall be fastened according to manufacturer's printed instructions but not less than two nails for a shingle that is up to 18 inches wide, and not less than four nails for a shingle that is 24 to 36 inches wide.

The valley can be covered in one layer of Owens-Corning Weather Lock or equivalent rolled roofing.

All roof transitions that butt a wall surface shall be flashed with aluminum step flashing unless the siding is asbestos and installation will damage the siding, in which case the roofing shall be turned up on the existing wall a minimum of 4 inches and secured with fibered roof cement and properly caulked.

When the Work Write-Up calls for reroofing of house, wind seal shingles shall be used meeting all above specifications.

When the Work Write-Up calls for reroofing a house, all protrusions through the roof shall be flashed unless otherwise stated in the Work Write-Up. All plumbing vents shall have new appropriately sized collars.

Single-Ply Roofing – The installation of single ply roofing shall conform to the standards of the National Roofing Contractors Association (NRCA) and the manufacturer's specifications.

A minimum single ply 55mm roof, Owens-Corning, Flex, Carlile, or equivalent brand, shall be installed, and fully adhered and secured per manufacturer's specifications. All flashing shall be replaced with material recommended by the manufacturer. A minimum 10-year warranty shall be provided.

GUTTERS

All gutters are to be pre-finished aluminum with the color chosen by the Operations staff.

Gutters shall be 5 inches wide and of .027 prefinished aluminum and shall be hung 4 feet on center. Gutters shall be seamless in all runs.

Downspouts are to be a minimum of 3" x 4" in size. Material is to be prefinished aluminum. The drop inlets shall be 3" x 4" fitting tightly to the downspout. They shall be strapped to the structure near the top, off-set to the structure, and strapped near the bottom. Each down spout is to have a fiberglass splash block or empty onto a paved surface.

FLOORING

Finish flooring may be wood, vinyl square resilient or any other material specifically called for in the Work Write-Up. All flooring is to be installed in accordance with manufacturer's and ASTM guidelines.

General Requirements – All materials shall be new and match in color, texture and method of installation. All subfloors and underlayments shall be well secured, dry, clean, level and free of bumps, cracks, squeaks and voids before installation of finish flooring.

Contractor is to clean up all scuffs, trademarks, and glue, and dispose of all scraps from the job site. All installations are to include metal edge strips and either existing shoe moulding or new shoe moulding. The shoe moulding shall be stained or painted to match the baseboard. No work shall be started until samples have been approved by GCRA and the homeowner.

Wood Flooring – When the Work Write-Up calls for repairing existing wood flooring the contractor is to match the material and width of the boards as close as possible. The repair work is to be stained, sealed and varnished to match the existing décor as close as possible.

The Work Write-Up will specify any other types of wood, composite, laminate or Bamboo flooring and the contractor will install these according to manufacturer's guidelines.

Ceramic Tile Flooring – Floors shall be 12 x 12" ceramic tile with 3/8" grout joints. Underlayment shall be a minimum 1/2" concrete board installed and secured in accordance with ASTM standards. Nail underlayment with cement coated, resin coated, or ring grooved nails or staples placed on 4" center on all edges and over the face of each piece.

Waterproof Flooring – Floors shall be installed in exact accordance to the manufacturer's recommendations. Product to be installed with new 3/4" quarter-round, stained to match flooring, with two coats of polyurethane. Happy Feet "Enduring Elegance" or equivalent. Underlayment shall be 3/8 B.C. plywood free of voids or 1/4 Luan plywood free of voids, installed in accordance with codes. It is recommended that the Construction Specialist inspect the underlayment prior to the installation of the flooring. Nail underlayment with cement coated, resin coated, or ring grooved nails or staples placed on 4" center on all edges and over the face of each piece.

CARPET

The contractor shall be responsible for the delivery of carpet and the safe transport thereof throughout the building, as well as the installation thereof without damage to the owner's property.

Prior to installation, carpet and related material storage shall be the responsibility of the contractor, if necessary. A designated installation time during the day and/or week shall be coordinated between the contractor and owner. The contractor will use the following guidelines:

The carpet is to be installed in accordance with ASTM standards. The carpet is to be wall to wall, 100 percent polyester cut pile carpet 25-oz. minimum, Dalton Mills Premier Series or equivalent. The carpet is to be installed by a state certified installer.

All carpet shall be of first quality, free of visual blemishes and physical defects, uniform in color and pile height and consistent throughout with the specifications. Only current running line stock patterns in construction and color will be accepted. No special weight variations will be allowed. Should a mill discontinue an item which has been contracted, a substitute, equal or better than, may be used upon approval from the GCRA. The installer must furnish samples, including all the colors of the brand that is awarded, upon request, to the owner.

Padding – Carpet padding is to be bonded urethane foam with a minimum 6# density. It is to be installed and secured according to ASTM standards.

Preparation of Floors – The contractor shall assure that the floors to receive carpet are in satisfactory condition. All lumps should be removed and ridges and faults filled level with acceptable type filler complying with the manufacturer's instructions. All unusual conformities in the floor are to be reviewed with the specialist. The contractor shall vacuum the floor immediately prior to carpet installation and remove all substances which would interfere with the installation or be harmful to the work. The contractor shall accept all responsibility for unacceptable work due to improper floor conditions. If old floor covering is removed and the flooring is unacceptable the contractor is to notify the Construction Specialist.

Installation of Carpet – Carpet shall be laid securely in place by using the tackless method (using Roberts Smoothedge Carpet Gripper and adhesives as recommended by the manufacturer. The methods must comply with the manufacturer's instructions and recommendations. Actual measurements shall be the responsibility of the contractor.

Carpet must be installed on a sequential roll basis and vendor will be responsible for providing an acceptable level of side by side color matching. This level of acceptability will be determined by the GCRA. Large open area installations shall be of the same manufactured lot or as agreed upon between the purchaser and the supplier to ensure color match throughout. Carpet shall be stretched with a power stretcher. It shall be installed with tack strips around the base. There shall be installed in all openings and doorways carpet grip metal at the edge. The seams shall be jointed with heat melt tape. The minimum pad shall be 3/8" thick 6 lb. gauge.

Seams – Carpet shall be laid out and seamed in the longest lengths practical to eliminate as many seams as possible. Seams at doorways shall be parallel to the center directly under the door(s). All seams shall be made in accordance with the manufacturer's recommendations. The number of pieces of carpet shall be held to the minimum number necessary, utilizing the widest material available from the manufacturer. All carpet shall be installed with the matching patterns at the seams. Seams in the same room must match in grain and direction.

When requested, the contractor shall submit to the agency or owner, a seam diagram showing the location of all seams as they will be in actual installation. The direction of carpet shall also be indicated. Installation will not begin until the requested diagram is approved.

Cushion-Attached Carpet – All cushion attached carpet shall be installed by the direct glue-down method unless otherwise indicated in the Work Write-Up. The carpet shall be glued directly to the floor with a good quality of synthetic glue. All seams shall be fused with carpet seam adhesive to prevent raveling. All glued-down carpet shall be rolled with a minimum 80# roller to remove wrinkles. There shall be installed at all doors and openings, gripless threshold metal carpet strips of a good quality.

Commercial Grade, Indoor/Outdoor – When called for in the Work Write-Up, commercial grade and indoor/outdoor type carpets are to be installed with adhesives per manufacturer specifications. When installing outside, the temperature shall be 70 degrees or greater.

Protection of Property – All walls, furniture, and doors shall be protected from damage at all times. The contractor shall be responsible for all door swings - that the door does not drag the carpet. Any damage to walls, baseboards, doors, and furniture shall be the responsibility of the contractor.

Completion – All waste, excess materials of new carpet, tools, etc., shall be removed from the area. A representative from the agency shall view all scraps and retain any desired. The carpet shall be vacuumed after the installation.

Warranty – Any carpet warranty by the manufacturer shall be filled out and presented to the owner.

CARPENTRY STANDARDS

- Lumber Standard: American Softwood Lumber Standard PS 20 (US Department Comm.) SAS 19 percent moisture content.
- Plywood Standard: Softwood plywood - Construction and Industrial PS 1 (US Department Comm.) type and grade as indicated.
- Woodwork and Trim Standard: Architectural Woodwork Institute.
- All installations shall conform to the nailing, sizing and spacing requirements of the locally adopted codes.
- All installations to be done in a quality manner, plumb, square, and with minimal hammer marks.

Framing – General Requirements:

- Framing lumber shall be air or kiln dried #2 standard dimensional SPF construction grade or SYP #2 or pressure-treated pine. Installation is to conform to codes and local practices.
- All installations are to be plumb, square and/or flush with adjacent materials.
- Stud size and spacing – Studs shall not be less than nominal two inches (2") by four inches (4") with the wide face perpendicular to wall. All studs shall be spaced not more than sixteen inches (16") O.C.
- GCRA encourages the use of green framing methods when constructing corners and tees to minimize waste.

Openings in Exterior Walls and Interior Walls – When window and door openings are being relocated, enlarged, or added, the ceiling and roof loads shall be transferred as needed by the addition of properly-sized and supported headers.

Finished Lumber – Trim and Millwork – All stain-grade finished lumber, trim and millwork shall be of a species or type suitable for its intended use, kiln-dried B or better SYP, poplar, fir, spruce, or MDF shall be free from tool marks and other objectionable defects. Knots may be present but must be secure, free from sap pockets, and less than ¼ the width of the material.

All paint grade trim and millwork, unless otherwise specifically called for, can be finger jointed, composite, or manufactured materials. Miratech or equivalent.

All installation is to be properly nailed and free from splits, chips, and tool marks. All nails are to be countersunk and puttied.

Interior and Exterior Trim – When replacing interior or exterior trim, the new trim shall match the existing trim in design except when stated otherwise in the Work Write-Up. All new door and window casings shall match the existing door and window facings as close as possible.

All new items installed in the interior or exterior of the house shall have its trim work matching the existing in design, size, and color as close as practical.

DOORS

When replacement of existing doors is required by the Work Write-Up they shall be complete with all new hardware, which shall include but not be limited to: hinges, locksets, weather-stripping, thresholds and Observ-O-Scope.

Exterior Doors – All exterior doors shall be a minimum of 1 ¾" in thickness, solid core (wood or particle board), exterior panel doors or six-panel insulated steel doors (18 gauge skins); Reliabuilt or equivalent. Exterior doors must be energy star rated.

Interior Doors – All interior doors shall match existing unless otherwise specified. Flush Luan or 6-panel Masonite, or equivalent as stated in the Work Write-Up complete with hardware and door stop

All doors are to be of stock sizes and design unless Work Write-Up calls for them to match existing doors or openings as nearly as possible.

All exterior shall be equipped with a wide angle Baldwin Observ-O-Scope or equivalent, mounted at a convenient height from the floor. The home owner will determine the height.

Dead Bolts – Dead bolts are to be single-keyed Kwikset Series 600 or equivalent. Weiser bolts may be used in lieu of a separate dead bolt and entry lock. No double keyed dead bolts are to be used.

All bi-folds are to be un-louvered type unless otherwise specified. They are to be blocked ¾" when installed in carpeted areas.

Door Units:

- Exterior Door Units are to include door, jambs, headers, trim two (2) sides, sills (if needed), Observ-O-Scope, metal threshold, stops, hinges, and a Quickset or equivalent entrance lockset. Doors shall be completely weather-stripped with spring type, aluminum and vinyl, magnetic, or foam rubber.
- Interior Door Units are to include jambs, headers, trim on two (2) sides of door, hinges, and lockset as per Work Write-Up. Jambs to be blocked or wedged at bottom, middle and top and set plumb and true. Gaps in joints shall not be over 1/16".

Any required repairs to the adjoining surfaces, which are necessary for the proper installation of door units, shall be the responsibility of the contractor. Repairs are to match the existing décor in material and color as close as practical.

Door & Trim Finishing – Prime and paint all new work or seal, stain and varnish according to Work Write-Up. All new wood shall be coated with a protective material matching existing finishes whether or not provided for the Work Write-Up. Note: Wooden thresholds shall be stained and sealed within 30 days of installation.

HARDWARE

When called for in the Work Write-Up, door hardware shall be put in operable condition or provided as follows:

- Interior doors shall be installed with two butt hinges 3 1/2" x 3 1/2", passage lock sets and door stops.
- Bedroom, bathroom or toilet compartment shall be provided with privacy lock sets.
- Hang all new exterior doors on three 4" x 4" butt hinges. Provide exterior doors with a Quickset #500 or equivalent lock set. Weather-strip with aluminum spring type, aluminum and vinyl weather-stripping, wide angle Observ-O-Scope, and deadbolt (no double-keyed).
- When installing locksets and deadbolts all are to be keyed alike. On GCRA properties, the contractor shall give GCRA all but two keys at the first draw. **All keys will be turned in before final payment is made.**

WINDOWS

When repairs or replacements of windows or window components is called for in the Work Write-Up the following shall apply:

- Remove existing window and replace with complete window units, which include frame, exterior, and interior trim, center-rail sashes, screens, horizontal, and vertical weather-stripping, stops and jimmy-proof sash locks. Prime and paint outside and inside. Clean all glass.
- Repair the existing windows by breaking paint free, re-glazing and installing new jimmy proof locks.
- Remove existing window sashes and replace with center-rail sashes, horizontal and vertical weather-stripping, jimmy-proof sash locks. Prime and paint sash only outside and inside. Clean window glass.
- Replace sash only to match existing sash. Prime, paint, and clean glass on new sash only.
- Weather-strip window with aluminum full jamb weather-stripping, aluminum, vinyl, or bronze spring type.

Double-Hung Insulated Vinyl Insert Replacement Windows – When called for in the Work Write-Up, all vinyl replacement inserts shall be double insulated and energy efficient. All units shall have color to be consistent throughout, welded corners and joints, 7/8" hermetically sealed insulated glass, with a minimum U-Factor .35 and SHGC of 0.30, built-in safety latches, with screens. All windows used must have a minimum 5-year warranty that shall be given to the owner. The exterior trim is to be covered in prefinished aluminum even when not stated in Work Write-Up.

CLOSETS

Each clothes closet shall extend from floor to ceiling. Shelving shall be PVC-coated steel. All closets will be sized and located on the plan. The plan will show the swing of the door.

Linen Closet or Pantry Minimum Requirements:

- Depth - 14" minimum.
- Number of shelves - five (5), spaced 12" O.C. The bottom shelf shall be between 18" to 24" above the floor and the top shelf shall not be over 74" above the floor.
- Construction - 2" x 4" studs (3 1/2" way) 16" O.C. and 1/2" sheetrock both sides applied, as specified.
- Door & Hardware – Size and location are to be shown on the plan.

Clothes Closets Minimum Requirements:

- Depth - 24" clear inside dimension
- Width - 36" clear inside dimension
- Construction - 2" x 4" studs (3½" way) 16" O.C. and ½" sheetrock both sides applied as specified under wall board.
- Doors (Hinged) up to 4' closet width, minimum width 2', 6'8" height, 1⅜" thick. **NOTE:** closets 4-5 feet in width shall have a minimum 3' framed opening; closets over 5' closet width minimum 4' framed opening. Location and door swing to be indicated on the plans **NOTE:** Folding doors subject to approval by the Operations Division. Shelves to be 64" from floor.
- The closet size, location, and door swing shall be shown on the plan.

Shelving – Steel wire mesh shelving with PVC plastic coating may be used. All supports and fasteners are to bear in framing members.

Shelf and Rod – Vinyl coated wire shelves shall have diagonal bracing at ends and centers and all bearing on studs.

KITCHEN/BATH CABINETS AND VANITIES

The minimum construction and performance standards for shop made kitchen or bath cabinets shall be as follows:

- Face frames shall be ¾" hardwood oak, alder, or maple. Stiles and rails shall be glued, corrugated, and blocked where possible.
- Wall cabinets shall be 42" tall and set to the ceiling where there is 8' from floor to ceiling. In any case, there should be 18" between countertop and bottom of wall cabinets.
- When there is a window present over the sink, there should be an 11" tall valance complete with soffit to mount a covered LED light fixture.
- If there is no window above the sink, the wall cabinet should step up 16" from bottom of standard wall cabinet. The bottom rail shall be 5¾" wide to cover LED light over sink.
- All base cabinets shall have ¾" plywood or Luan shelves. Where Luan is used all raw edged shelves shall be edge-banded with hardwood of the same as the face frame. There shall be no wall or base cabinets with particleboard, melamine, or MDF veneer as part of the boxes.
- Drawers shall be constructed as a box with a separate front attached. All drawers shall have side-mount drawer runners that meet or exceed BHMA Grade 1 requirements (75 pounds dynamic load capacity and 100 pounds static load capacity).
- In lieu of self-closing hinges, each swing door shall have a catch or other device to hold doors closed. Where installed, adjacent cabinets and doors shall be in proper alignment with each other. Doors are to be of balanced construction, operate freely, and be warp-resistant. Miscellaneous hardware such as shelf standards must support the design loads and operation functions.
- All units, except sink, oven, refrigerator, and drawer cabinets shall be enclosed with sides, backs, and bottoms. The countertop must provide enclosure for the top on base, but wall cabinets shall be provided with an individual top.
- All base cabinets shall be installed level, plumb, and true. Cabinets shall be attached with screws (not nails) to studs or other framing members. To assure a plumb and level installation high spots shall be removed, or low spots shimmed. Wall base and chair rail shall be removed behind cabinets to assure flush fit. All wall cabinets shall be secured to the studs or other framing members with screws (not nails). They shall be plumb, level, and in true alignment.

Cabinet Finish – All the cabinet surfaces, inside and outside, shall be smooth and free of defects.

The exterior of all cabinets, including the inside of the doors and the underside of top cabinets shall be stained, sealed, and varnished to a smooth finish, free of holes and spots, or painted with a minimum one coat of oil base enamel undercoat and one coat of semi-gloss enamel paint. The owner shall have the choice between paint and varnish finish and painting. The color shall be the choice of the owner in either event. All coats to be applied using a sprayer or roller.

The interior of all cabinets shall be as a minimum two coats of sealer, sanded between coats.

COUNTERTOPS

Countertops – All countertops shall be laminated with plastic laminate, 0.042" thick, Wilsonart or equivalent. Working surface shall be one piece post form type. When specified in the Work Write-Up, square edge construction may be utilized with the edge laminate applied prior to the top laminate. All back and side splashes shall be caulked with paintable siliconized latex caulk.

INTERIOR WALL COVERINGS

Preparation of Surfaces – Enameled hardboard and wall paneling are to be installed on 1/2" gypsum board, 1/2" five-ply BC plywood, or existing wall finish with prior approval of Construction Specialist.

Enameled Hardboard – Prefinished, enameled hardboard equivalent to Marlite, ABITIBI or equivalent tile board, manufactured by ABITIBI Corp., or fiberglass reinforced panel (FRP).

Edge and joint mouldings expanded from aluminum alloy shall be provided. Plastic trim may be used with prior approval of Construction Specialist.

Joint and edge sealant shall be provided as recommended by manufacturers of enameled hardboard.

Interior Wall Paneling – Interior wall paneling shall be plywood backed, a minimum thickness of 5/32" or 1/4" and all interior or exterior corners shall have a moulding installed matching the paneling in color and design. Any exception to these standards shall be set forth in the Work Write-Up or received in writing by the contractor from the GCRA. Paneling may be run to or behind the existing trim work.

Plastering – When the Work Write-Up calls for repairing cracks in plaster, walls, or ceilings the following procedure shall be followed:

- Remove all loose and scaled plaster from the surface.
- Fill the cracks with sheetrock mud or spackling paste.
- Sand smoothly and apply strips of pre-pasted fiberglass mesh over the cracks and allow to dry.
- Apply appropriate coats of sheetrock mud over the mesh and sand smoothly to receive paint.

Wallboard (Drywall) – All work is to be done in accordance with ASTM Standards and manufacturer's directions. If wall board is to be installed over deteriorated plaster the loose plaster shall be removed and the ceilings slatted before installing new drywall.

Wallboard shall be manufactured by a U.S. Gypsum Company. The following types are to be used:

- "Regular" for general use where exposed.
- "Fire code" where fire rating is required.
- "W/R Wallboard" is required for use on all bathroom walls and ceilings.

See Work Write-Up for thickness.

Edges shall be tapered except where otherwise specified.

If Work Write-Up calls for Perf-A-Tape joint, it shall be carefully sized and fitted prior to nailing in place.

Nails shall be driven with their shanks perpendicular to the face of the board and seated below the surface of the board without breaking the paper.

When screws are used, they shall be 12" O.C. and penetrate one inch into the framing.

Perf-A-Tape mix shall comply with the recommendations of the manufacturer.

A minimum temperature of 55 degrees Fahrenheit shall be maintained in the room where the work is done until the cement is completely dry.

Perf-A-Tape Application – Manufacturer's directions shall be followed.

Over joints – The tape shall be embedded in cement and covered with a layer of cement. Second and third coats shall be applied. Each coat shall be dry before applying the next coat.

Each coat shall be feather edged and extended beyond the previous coat, approximately two inches.

The finish coat shall be sanded lightly and any imperfections filled in prior to any painting or decorating.

Over nail – All nails shall be driven so that their heads are below the surface of the board, leaving a dimple in the surface without breaking the paper.

Nails shall be covered with three applications of cement, allowing time to dry between each coat.

The final coat shall be sanded lightly before application of paint or other decoration.

Inside corners shall be reinforced with a quarter round wood moulding or with tape embedded in cement, as selected by the owner or as indicated in the Work Write-Up.

Outside corners shall be protected by metal corner reinforcement. The metal corner shall be finished as specified in "over joints" paragraph, with two coats of sheetrock mud and sanded smooth to receive paint.

Patching of stucco or plaster, when called for in the Work Write-Up, shall be meant to include the removal of all loose material encountered until sound construction is reached, including the removal of rotted or deteriorated lath.

Preparation and Cleanup – Prior to applying plaster or sheetrock compound, all furniture, carpets, and personal belongings shall be secured and covered to prevent damage and dust.

Prior to sanding of plaster, the room and the house shall be kept as free of dust as possible by isolating the room being worked on with a polyurethane draper curtain on the doorways.

Between and after each sanding, the area affected shall be kept as clean as possible by vacuuming up the accumulated dust and debris on a daily basis.

EXTERIOR WALL COVERINGS

Vinyl Siding – Horizontal and vertical vinyl siding to be used on GCRA projects shall be solid vinyl siding: Kaycan or approved equivalent. All vinyl siding installation as a minimum shall conform to the International Residential Code.

All installations shall be installed in accordance with ASTM D4756 or an approved equal installation instruction document.

All horizontal vinyl siding shall be 4" or 5" ended siding unless stated otherwise in the Work Write-Up. All siding as a minimum shall be .044" +/- .004" thick.

All vinyl siding shall be installed with a starter strip at the base; under-sill trim under windows, door, and soffits that are not to be covered. The contractor shall be responsible for furring low places on the exterior wall so as to have a uniform surface to apply siding. No cardboard shall be used for this purpose. All windows and doors not having a drip cap shall have a vinyl drip cap installed over them. The top courses are to be nailed with aluminum siding nails matching the siding in color.

When soffits and porch ceilings and like items are covered with vinyl it shall be run the short distance. When a soffit turns a corner an H dividing bar or doubled J-channel shall be used. Where the window sill protrudes beyond the vertical facing, the sill may be cut even with the facing.

A J-channel is required at the end of the vinyl siding of all offsets, windows, doors, transitions including porches, steps, etc.

Any exception to these specifications or material used as equivalent shall be waived by the GCRA in writing prior to any installation.

When called for in the Work Write-Up, install insulated backer board and house wrap (see the GCRA requirements listed under Framing in the New Construction Specifications section for Tyvek).

Prefinished Aluminum – When the Work Write-Up calls for covering window and door casing with prefinished aluminum with striated PVC finish the following specifications shall apply in all cases:

- Prefinished aluminum shall be a minimum of .019-gauge and all aluminum shall be nailed with aluminum or stainless-steel nails.
- The window sill shall be covered first with the aluminum extending through the window to the stool. The sill shall be completely covered including the outer end and the sill covering shall fold up a minimum of 1/2" on the vertical casing.

The vertical casing shall be covered after the sill. All the exposed covering shall extend a minimum of 1/2" over the top header casing. Where storm windows are installed or to be installed the blind stop shall be covered on the outside.

- When the Work Write-Up calls for prefinished aluminum to be installed on the overhang of the house the following specification shall apply: Fascia aluminum shall be a minimum of .019 gauge prefinished aluminum. All fascias shall be smooth and free of wrinkles. All tops of fascia shall be broken and creased with a 3/4" margin to add strength and stability. No sections are to be less than 6" in length unless substrate prevents longer pieces from being used.
- When the Work Write-Up calls for prefinished aluminum or aluminum on the boxing of the house or the porch ceiling, it shall be understood that all three sides of the porch header sills shall be covered except in situations where the porch is screened. When the porch is screened, both sides and the bottom, if the header is oversized, shall be covered.

Stucco – All stucco mix and installation shall conform to the American Plaster Institute's requirements.

The finish is to match the existing material in texture as close as possible.

Stucco is to be applied in two or three coats; the final coat shall not be applied sooner than seven days after the preceding coats. Before applying the final coat, the surface shall be dampened evenly to obtain uniform suction.

SUSPENDED CEILING

The quality, design, fabrication, and erection of metal suspension systems for acoustical tile and lay-in panel ceiling in buildings or structures shall conform to good engineering practice, the provisions of this chapter, and other applicable requirements of these specifications. All grid work is to be level and free from sagging, and the panel pattern shall be centered in the room. All light fixtures suspended from the ceiling shall be supported on hardware designed for that purpose.

Preparation – All loose plaster and ceiling finish above lower ceilings shall be removed to make secure in order to prevent debris from falling on suspended ceilings.

Suspension System (Exposed metal grid supporting ceiling panels) – Metal grid shall be aluminum or bonded galvanized steel, with baked white enamel on exposed fascia. Arrangement to accommodate ceiling panels required.

Hanger wires of not less than No. 12 gauge galvanized steel wire shall be spaced so that suspension system, including wall mould and with ceiling panels in place, shall be level to within 1/8" in any 12' length.

Ceiling Panels:

- Acoustical Panels – Non-combustible, felted mineral wool panels, 5/8" thick, 23 3/4" x 23 3/4" for nominal 2'0" x 2'0" exposed grid system. Panels shall be equivalent to U.S. Gypsum's "Auratone Fissured" 23 3/4" x 47 3/4" panels.
- Gypsum Panels – Non-combustible, vinyl coated gypsum panels 1/2" thick 23 3/4" x 23 3/4" for nominal 2'0" x 2'0" exposed grid system. Panels shall be equivalent to U.S. Gypsum ceiling paneling.

PAINTING AND DECORATING

Preparation of Surfaces – Paint shall be latex, water based and recommended for the purpose it is being used for. The contractor is responsible for identifying the substrate before applying paint. If oil-based enamel is found, all new paint will need to be changed from latex to oil-based paint.

Wood surfaces to be painted shall be cleaned by best means possible to remove loose and flaky paint, rough spots, dirt and grease. Lead-Based Paint (LBP) guidelines are to be followed on LBP areas.

All surfaces to be painted or papered shall be sound, smooth, and free from holes, cracks, or irregularities. All old wallpaper shall be entirely removed unless otherwise specifically noted in the Work Write-Up. All surfaces shall be properly prepared to receive paint. All stained and/or dirty surfaces shall be primed and sealed with KILZ, pigmented shellac or other approved preparation. The primer shall be allowed to cure in accordance with manufacturers' recommendations prior to installing the paint.

The finish coat shall be free from brush/roller marks, runs, and holes caused by improper installation.

Material (Paint):

- No lead-based paint will be used.
- Before proceeding with painting, color samples shall be shown to the owner for their selection.
- All paint and other finished materials shall be of good quality, such as Sherwin-Williams.
- All paint shall be delivered to site in manufacturers' sealed containers. Each container shall be labeled, giving manufacturer's name, type of paint, color, and instructions.
- The finish coat in kitchens and bathrooms shall provide a durable and washable surface and shall be a semi-gloss finish unless noted otherwise in the Work Write-Up.
- Finish coats on remaining painted walls or ceilings shall be a flat, washable paint.
- Varnished, lacquered or polyurethane finishes on natural wood finish shall be as follows: One wash coat of sanding sealer; one coat of stain as desired; two coats of satin finish. Surfaces to be lightly sanded between coats.

Painting Application:

- Do not apply exterior paint in damp, rainy weather or until the surface has been thoroughly dried from the effects of such weather.
- Do not apply paint when temperature is below 40 degrees F. Temperature shall be at least 40 degrees and rising.
- Finished work shall be uniform, of approved color, smooth and free from runs, sags, defective brushing and rolling. Make edges of paint adjoining other materials or colors sharp and clean.
- Paint application shall be per Work Write-Up and shall be a minimum of one coat on old work and two coats on new work to all surfaces and visible edges. All paint applications shall be in exact accordance with the manufacturer's directions. All painting must provide full coverage and hiding.
- No paint shall be applied until all nail holes have been puttied with glazing compound or other approved filler. Stained material shall have nails set and puttied with colored putty applied between sealer and finish coat.
- Joints and seams shall be caulked with a latex caulk and the application shall be free from smears, holes or shrinkage.
- All cracks, seams, joints, and holes shall be checked, re-caulked, re-puttied, or filled as needed before applying final coat of paint.
- All exterior caulking shall be butyl or equivalent.
- All closets, unless specified in the Work Write-Up or stated at the pre-construction conference, shall not be painted unless listed in the Work Write-Up and if the homeowner agrees to remove and be responsible for their personal belongings.

Windows and Trim – When painting windows, paint the center meeting rail when either interior or exterior painting is called for.

All old paint shall be removed from the glass panes in all windows and doors prior to painting when the Work Write-Up calls for re-glazing. All loose putty shall be removed and all missing putty shall be replaced. All new paint shall be removed from all glass flush with the edge of the putty, ribs, or sashes.

All exterior doors shall have their edges, tops, and bottoms treated in the same manner as the face of the door. The front edge of all doors shall be painted matching the side of the door in the direction of its swing. The rear edge of the door shall be painted matching the side of the door in the opposite side of the swing. The outside surface of all exterior doors shall be treated as follows: Sand the surface, removing all paint or surface defects. Apply one coat of latex enamel primer. Apply two coats of latex enamel exterior paint. Minor dents in steel doors shall be repaired with Bondo before the finish coat is applied.

The edge of all casings, interior and exterior, and all other trim shall be painted matching the face of the trim.

All new trim shall have the nails set and puttied, and cracks in joints shall be puttied. Cracks and joints on new work shall not exceed 1/16 of an inch.

All stickers on glass shall be removed to include all traces of adhesive.

All new items, such as windows and doors, installed in areas not requiring painting shall have all their exposed surfaces primed and painted matching the older components as close as possible.

Windows, doors, attached woodwork and trim, unless otherwise stated in the Work Write-Up or against manufacturer's recommendations, shall have a finish coat of exterior latex semi-gloss enamel.

When the Work Write-Up calls for painting exterior trim, exterior trim shall include, but not be limited to the following components:

- All woodwork in window and door units including frames, casings, sills, aprons and mullions.
- All access doors, frames, attic vents, eave bracings, wood shutters and exposed decorative woodwork.
- All porch ceilings, headers, wooden posts, wooden columns and wooden railings.
- All fascias and soffits.

Interior trim shall include, but not be limited to, baseboards, corner ceiling, picture and shoe molds, all casings, aprons, headers, window, and door units. Kitchen cabinets are not included.

The following building materials and/or components shall not be considered trim and will be called for by line item: all concrete, masonry, ferrous and non-ferrous metals, vinyl, and ceramic.

Caulking – All doors and window frames, window panes, or other locations where painting is called for shall be caulked as needed to make a watertight job.

Material and Application – Use standard commercial brands of silicone or butyl caulking compound applied in exact accordance with the manufacturer's directions. Use gun application for gun grade or knife application for knife grade.

Clean-Up – When the Work Write-Up calls for the painting of the window, it shall be understood that the panes of the side of the window being painted shall be cleaned and free from any smears, paint, and dirt. Windows containing storm windows shall have the windows units removed before painting. The storm windows are to be cleaned prior to reinstallation.

PLUMBING

These specifications are applied to all additions or renovations of the plumbing system:

- All plumbing installations shall be in conformance with Greenville County Codes, the International Plumbing Code, and the local water and sewer district requirements.
- All house sewers shall be connected to the sewer main in accordance with the rules and regulations of the applicable sewer district.
- All water supply lines shall be connected to the water main in accordance with the rules and regulations of the appropriate water district.

Water Lines – All water supply lines from the main to the house shall be plastic, Crosslink Polyethylene (PEX) or equivalent rated for direct burial. Exterior water lines shall be a minimum of 18" in the ground from the finish grade and at least 5' horizontally from any sewer line. The water lines shall be undiminished in size to the last branch of three fixtures. All houses with a new water supply line or new water lines under the house shall be equipped with a stop and waste valve at least 6" above the ground and keyed through the foundation wall.

All hot and cold-water lines not underground shall be minimum Crosslink Polyethylene (PEX) poly-vinyl chloride (PVC) or chlorinated poly-vinyl chloride (CPVC). Joints, connections, and supports shall conform to the latest edition of the International Plumbing Code.

All appropriate plumbing fixtures shall be equipped with a stop on both hot and cold water supply lines. All pipes entering a room through the floor or wall shall be supplied with a proper fitting escutcheon plate.

All water lines are to be insulated for their full exposed length with a split polystyrene pipe installation. Insulation is to be installed after the rough plumbing inspection.

Drain Wastes and Vents – All drain waste and vent lines shall be installed in accordance with the international plumbing code. All work is to be inspected and approved by the local building official.

All turns from the horizontal to the vertical shall be accompanied with Y and 1/8 bend.

All exposed vent or drain lines within the house shall be neatly encased, if not in the wall.

All sinks, lavatories, washing machine connections, and bathtubs or showers shall be connected to their waste line with a "P" trap unless otherwise provided in the Work Write-Up.

All washing machine connections shall be a minimum 2" waste with vent and be installed in the wall except when otherwise specified in the Work Write-Up or change order. All washing machines shall be equipped with an individual vent. Each washing machine connection shall be provided with a washer connection box in the wall. The faucets shall be boiler drains or substituted at discretion of the Construction Specialist.

Air admittance valve (Studor) type vents may be used on lavatories and kitchen sinks when the house has a separate 3" vent pipe exiting to the exterior as provided in IPC.

Fixtures will comply or exceed the brand, stock, and models listed below.

When new fixtures are called for in the Work Write-Up they shall be complete with all accessories unless otherwise stated in the Write-Up.

All fixtures shall have the joint between the fixture and the mounting caulked with silicone caulk sealant.

Bathtubs shall be enameled steel, American Standard, New Solar #0134,130 or equivalent. The bathtub drain shall be Union Trip lever #77, or equivalent. Faucets (without shower) shall be American Standard Heritage 1101.203, or equivalent. Tub fillers (gooseneck faucets) shall be minimum 12" above the tub. The base of the shower head shall be a minimum 72" from the floor. The faucet measurement shall be from the tub to the center line of the faucet handle. Cast iron tubs shall be American Standard Bildor #2265.379. Fiberglass tub/shower units shall be a 5' Aquaglass tub/shower unit or equivalent with scald guard Chrome Delta 1348, or equivalent faucets.

When the Work Write-Up calls for the installation of a multi-piece tub/shower unit, the Work Write-Up will contain the model and specifications.

The commodes (toilets) shall be American Standard right height Elongated Champion, an American Standard Space Saver, or round front Champion or equivalents. All seats shall be of wood Westport Premium or equivalent. Variations must be approved by Construction Specialist.

All wall-hung lavatories shall be American Standard Declyn #0321.026. All lavatory faucets shall be single lever Moen #4621, or equivalent. Drain lines and p-traps are to be good quality PVC plastic. Round drop-in lavatories shall be 19 inch china ovals, American Standard Colony with Moen single handle chrome lavatory faucets or equivalents.

The kitchen sink shall be double compartment 8"-deep 20 gauge nickel bearing stainless steel Elkay Celebrity model CR-3322 single lever Moen Traditional Model #87430 or equivalent. The baskets shall be stainless steel chrome cup drain American Standard or equivalent; no plastic baskets are to be used. The waste line and traps shall be PVC plastic.

Shower Doors – Shower doors are to be chrome finished. Doors are to have tempered safety glass with nylon bearings. The door model number will be on the Work Write-Up.

Marble Tops – Tops are to be heat- and stain-resistant, one-piece cultured marble. Top is to meet the standards of the Cultured Marble Institute and display a label certifying compliance with their standards. All tops are to have side and rear splashes properly caulked and sealed to the adjacent surfaces.

Tub Kits – When called for in the Work Write-Up all tub kits shall be 4-piece, high impact copolymer plastic; Plaskolite Tempo or equivalent.

WATER HEATERS

All electric water heaters shall be a minimum 40 gallon electric water heater with a minimum energy factor (EF) of 0.93 (0.92 for 50 gallon) with built-in heat traps, unless specified otherwise in the Work Write-Up. Each heater shall be a quick recovery type. Each heater shall have a cut-off accessible from the top of the heater. The TP valve is to be piped through the floor and out of the foundation wall with a ¾" PVC or PEX pipe. All pipes connecting a water heater shall be a minimum ¾". Both the cold and hot water lines connecting a water heater shall be as a minimum ¾" ID pipe to the first branch line to which it connects. No water heaters shall be installed in a bathroom or closet except by permission of the GCRA. All heaters within the dwelling shall be with pan, which shall be piped out the foundation wall on minimum ¾ ID PVC pipe.

All gas water heaters shall be 40 gallon with a minimum EF of 0.61, unless specified otherwise in the Work Write-Up. All pipes connected to water heater shall be ¾" to the first branch line to which the water heater is connected and all TP valve pipes shall be through the foundation wall and terminated to within 6" of the ground. All water heaters shall have a water-cut off accessible from the top of the heater. No gas water heater flue pipe shall be installed and exposed on the outside of the house. All pipe penetrations through floors and/or ceilings are to be fire-stopped with metal at the floor and ceiling. No flue shall be seen exposed inside the house except from the top of a round heater to the ceiling. All water heaters shall have a positive gas cut-off visible from the heater. All gas water heaters shall have metal pans within the dwelling.

All water heaters shall be top fed and have a TP valve in the top 25 percent of the tank.

All water heater TP valves and/or pans shall be piped full-size to the outside of the building so that any discharge can cause no personal injury and can be readily observed by the occupants. The pan and TP must be piped on separate lines. Expansion tanks must be included with all water heater installations. Expansion tanks to be supported by copper or strapped to structural member.

GRAB BARS

When required in Work Write-Up:

- All grab bars shall be stainless steel, a minimum 1" in diameter, mounted with a minimum of 1½" clearance from the wall. All grab bars shall be secured to a stud or a minimum of 1½" backing sufficient to support the imposed weight.
- Tub grab bars shall meet the standards above except that the length of the bar shall be a minimum of 30". There shall be two grab bars mounted over a tub as follows: One on the rear wall mounted diagonally as approved by the Construction Specialist and one mounted vertically at the faucet end of the tub near the outer edge of the tub.
- Toilet grab bars shall meet the standards above and as follows: A bar shall be mounted on the adjacent wall which is approximately 18" from the centerline of the toilet. If the wall is not within 18" from the center line of the toilet, the contractor shall install a floor-to-wall "L" shaped grab bar with an outrigger (two legs). The grab bar shall be 30" high and installed 18" from the center line of the toilet.

ELECTRICAL INSTALLATIONS

Note: All projects for which 50 percent or more of the framing is to be exposed shall be wired in accordance with the N.E.C. requirement for new houses. All other repairs shall conform to the requirements of the international existing building code. The national electrical code and the codes and regulations of the governing body have jurisdiction for code enforcement in the area where the particular property is located.

All installations must be inspected and approved by the local building code official.

All electrical installations shall be subject to the approval of the local, state, and federal officials, and Redevelopment Authority's staff.

Electrical Panels – Each building shall be equipped with a main disconnect with a minimum of 200 amps, unless stated otherwise, located in accordance with local building code requirements, the Construction Specialist, the owner's, and utility's approval.

The service entrance, the electrical house panels, the main disconnect, and main breakers shall be sized as a minimum of 200 amps.

Wall Receptacles – Receptacles not to be reused shall have their wires deactivated, pulled, and a solid face plate put on the box. If no box exists the contractor shall install one just to hold a solid face plate.

Light Switches

- All light switches shall be installed in the wall, unless otherwise stated in the Work Write-Up.
- All ceiling, wall, attic, crawlspace, and porch lights shall be controlled by a wall switch.
- Receptacles shall not be on a wall switch unless preexisting.
- In the rare instance that a new switch leg cannot be pulled, the old leg can remain in place with the approval of the Construction Specialist.

Electrical Boxes on Walls and Ceilings: Either use air-tight outlet and switch boxes or seal standard boxes. Seal standard plastic electrical box at face of drywall with joint compound or cover the plate gasket with caulked foam and seal all wire penetrations into the box.

Light Fixtures – When the Work Write-Up requires a house to be wired according to NEC, all fixtures shall be Energy Star qualified when replaced.

Exposed Wires – Where rewiring is required, there shall be no exposed wires or exposed conduits, unless otherwise specified in the Work Write-Up or change order. Wire mould may be used upon approval.

Water Heater – All exposed wires connecting a new or existing water heater shall be encased in flexible conduit for the full length of its exposure and secured at both ends. All cables connected to a water heater shall be secured with a clamp to the opening provided for this purpose. All water heaters shall have a disconnect at the appliance or within the panel box if within visual sight of the water heater.

Flexible Cord – When rewiring is specified in the Work Write-Up, all movable appliances, new or existing, shall be connected to their electrical supply by an appropriate receptacle and flexible cord.

Under-Floor Wires – When rewiring or additional wiring is required, all under the house, new or old, shall be stapled as near as possible to where the wire comes through the wall or floor and a maximum of 4½' along the wire.

All wires through foundation wall shall be in conduit through the wall.

If the contractor encounters improperly secured wiring, open junction boxes, or other pronounced defect while working on a house but not rewiring it, the contractor is to notify the Construction Specialist.

Mounting – All panels, boxes, and recessed fixtures shall be flush with the surface if the wall framing is standard.

Smoke Detector – Each bedroom and adjacent room, as well as each living area level, shall be provided with a minimum of one (1) approved, listed, and labeled smoke detector sensing visible or invisible particles of combustion installed in a manner consistent with its listing. In the case of a complete rewiring or upgrade to current NEC, smoke detectors shall be wired into electrical panel with a battery backup. Otherwise, battery-powered detectors may be used.

When activated, the detector shall provide an alarm suitable to warn the occupants within the dwelling and activate all other alarms in the house.

Carbon Monoxide Detector – Shall be required if gas-fired appliances exist. In the case of a complete rewiring or upgrade to current NEC, carbon monoxide detectors shall be wired into electrical panel with a battery backup. Otherwise, battery-powered detectors may be used.

Exterior Wire – All wire on the exterior of the house shall be in conduit.

Out-buildings shall not be rewired unless specified in the Work Write-Up. Wire to out-building is to be in conduit or UF for the whole length of the connection.

Wall Heaters – All electrical wall heaters shall be permanently mounted and in a safe location in accordance with the Work Write-Up.

Houses that are heated by ductless circulating or radiant heaters shall have the bathroom supplied with a minimum 1,000 watt electrical heater equipped with a circulating fan. The heater shall be installed in the wall or ceiling and as far as practical from any plumbing fixtures or pipes. An electrical heater shall never be located over or near a bathtub or shower stall. All bathroom heaters shall have an adequate protective guard. All such heaters shall be thermostatically controlled with a positive cut off and a separate circuit.

Boxes and Plates – All fixture boxes shall be a minimum size of 4" x 1¼", octagon or round. Where rewiring of light fixtures is accomplished, the switch leg shall be made up in the fixture box. All junction boxes shall be equipped with cover plates.

Where any cover plate fails to cover the opening or defect, a jumbo plate shall be used or the wall shall be repaired neatly. Any holes left by unused electrical openings shall be repaired or appropriately covered.

Existing Wiring, Boxes, etc. – Any existing wiring to be reused shall be first approved by the Construction Specialist. When the stove wiring is to be replaced, the replacement wire and outlet shall correspond to the current NEC.

Door Bells – When called for in the Work Write-Up, door bells should be installed at both entrance doors. Wireless systems can be used.

Disconnect – All permanently affixed electrical appliances, such as water heaters, ranges and ovens, shall have a disconnecting means readily accessible to the unit. Circuit breaker lock-clips may be used with the approval of the Construction Specialist when the panel box is within 10' of the appliance and must be within sight of the appliance.

MECHANICAL VENTILATION

Where the Work Write-Up calls for mechanical ventilation, bathrooms shall be provided with at least two (2) cubic feet of exhaust air per minute per square foot of floor area. Vents are to be vented through the soffit using a termination trim cap using U.L. approved flex duct. Vent/light combinations can be used and be on the same switch if there is a separately switched fixture in the bathroom.

Range hood mechanical ventilation may use unvented range hood when installed in accordance with the terms of their listings. G.E. hood and fan 30" Model IN420, or equivalent.

Range hoods are to be vented to the exterior when called for in the Work Write-Up. In this case the vent shall be vented through the roof or exterior wall and have a proper weather head and flashing.

HEATING AND AIR CONDITIONING

Heating Types – The type of heating systems shall be natural gas, propane, electric, electric heat pump or oil-fired, unless otherwise specified in the Work Write-Up.

When requested, a heat loss-heat gain sheet shall be provided to the Construction Specialist at the time of the mechanical inspection.

Heating Equipment – Furnaces or heaters shall be installed according to the manufacturer's recommendation and meet the provision of the International Mechanical Code. All heating equipment and their appurtenances shall be U.L. approved and labeled as such.

All furnaces and heaters of any type and kind shall be equipped with a positive cut off at the source of fuel and near the controls of the equipment. All oil-fired heating equipment shall be provided with an in-line fuel filter near the connection to the tank.

All heating appurtenances of the oil- or gas-fired type shall be connected to an approved flue through U.L.-approved pipe or a minimum 26-gauge galvanized steel pipe or according to manufacturer's specifications. Oil furnaces may be vented through chimneys or triple wall pipe rated for that purpose. Flue pipes penetrating the roof shall be properly flashed and capped.

All under-the-floor furnaces shall be located where the highest or adequate clearance is available and mounted on solid masonry piers, leveled, plumb, and in true alignment with the building. The warm air shall be piped to the exterior walls with adequate ducts and floor registers.

The register boots shall be nailed and caulked using mastic to the floor. The cold air return pipes shall be standard gauge and sized to meet the demands of heat supply to keep the room at 72° F, three feet from the floor in the coldest weather.

The heating equipment and design shall be as follows:

- Gas flow units shall be Carrier, Goodman, Trane, GMC up-flow Series, or equivalent.
- Oil-fired up-flow units shall be Carrier, GMC, Trane up-flow Series, or equivalent.
- Gas-fired horizontal units shall be Carrier 58RAV Series or equivalent.
- Oil-fired horizontal unit shall be Carrier 58HS Series or equivalent.
- Gas-fired circulating wall units shall be Williams #465FA, Warm Morning LSC 65,000, or equivalent.
- Gas-fired counter-flow units shall be Carrier, Goodman, Trane, or equivalent.

- Any gas- or oil-fired circulating heater described in the Work Write-Up shall be of the forced-air type installed in accordance with the manufacturer's recommendation.
- Energy Conservation Standards - When the Work Write-Up calls for heating equipment replacement or the installation of a new heating system, the contractor shall be responsible for meeting the following standards as a minimum requirement. All new fuel burning heating systems, burners, and air-conditioning systems shall be of the high efficiency design and shall be carefully sized to be no greater than 15 percent oversized for critical design heating or cooling except to satisfy the manufacturer's next closest normal size. All systems shall be equipped with hot surface igniter. The air handler and duct system are required to be sealed with UL181-approved water-based mastic.
- Some tapes perform adequately for sealing duct; however, good performing tapes may be difficult to identify and traditional duct tape (cloth-backed rubber adhesive tapes) should never be used to seal ducts, even if it meets UL ratings; these ratings test for initial adhesion but do not address how well sealants seal typical duct leaks or how well they stay sealed under normal conditions.
- Do not use sealing tapes for structural purposes. Tapes have low tensile strength and should not be used to mechanically support ducts. Mastic can last the life of the system while conventional duct tape can fail within a year.
- Ductwork must be composed of rigid ductwork or all flex duct. If flex is used it must be pulled tight with lines run straight using metal elbows at bends and corners. All supply and return systems shall be securely fastened in place with sheet metal screws. The main trunk lines shall be metal or duct board. Branch runs, maximum 12', can be flexible duct. All flex ducts must be supported by 1" straps. Return lines can be all flex.
- Seal boots to sheet goods with caulk, mastic, or spray foam. Never puncture the inner lining of flex. If repair is needed, install a coupling and seal properly.

The contractor shall be responsible for insulating all ductwork with R-8 insulation in unconditioned attics and R-8 in crawl spaces as part of the heating and cooling system.

Exposed pipes or ducts within the house shall be of neat solid construction free from sharp edges, screws, or dents. If deemed necessary by the Construction Specialist, components may be required to be framed and covered with painted sheetrock or plywood. When closets and such locations are utilized for cold air returns and like uses, they shall be located as near to the end of the closet and as flat against the wall as possible. All penetrations through floors and ceilings shall be fire-stopped and trimmed if applicable. All penetrations through the roof shall be flashed, counter-flashed, and properly capped.

All exterior natural gas pipe shall be Schedule 40, black, steel pipe with threaded and screwed joints (no copper), unless otherwise stated in the Work Write-Up. Piping on the interior of the unit may be steel or type R copper installed in accordance with the code.

Furnace in Attic – When a furnace is located in an attic space, the cold air return shall be in the ceiling near the center of the house. Furnaces shall be equipped with an 18-gauge metal pan.

Air Conditioning and Gas Pac Units – Air conditioning equipment shall be installed according to the manufacturer's recommendation and meet the provisions of the Standard Mechanical Code. All air conditioning equipment and their appurtenances shall be U.L. approved and labeled and have a 15 SEER rating. Heat pumps will have a minimum rating of 8.2 HSPF.

The air conditioning equipment shall be high energy-efficiency design and shall be carefully sized to suit conditions for this area and to maintain an inside temperature of 72 degrees F. The system shall be balanced to insure proper air distribution throughout the house.

When called for in the Work Write-Up, load calculations are to be done in accordance with the latest version of ACCA Manual J, and such that the following inputs be used for Manual J:

- Maximum allowable duct leakage is 4 CFM to outdoors per 100 square feet (4 percent) of conditioned floor area. If software allows for grades of duct tightness, choose "tight" or the equivalent term.
- Outdoor temperatures shall be the 99.0 percent design temperatures published in the ASHRAE Handbook of Fundamentals for the home's location or most representative city for which design temperature data are available. In Greenville, the temperatures are 23 degrees F in winter and 91 degrees F in summer.
- House infiltration shall be a maximum of 0.5 CFM/SFBE or shall use the software choice of "tight" or the equivalent term.
- Actual house orientation and location shall be used.
- Actual window, insulation, and door specifications shall be used.
- Indoor temperatures shall be 75 degrees F for cooling and 70 degrees for heating.

- The results of the Manual J must be used when sizing and installing equipment. Energy Star requires the following sizing guidelines:
 - Maximum over sizing limit for air conditioners and heat pumps is 15 percent.
 - In specifying equipment, the next available size may be used.
 - Sensible and latent heat loads must be used.
 - The indoor and outdoor coils shall be matched in accordance with ARI standards. Provide the ARI "Certificate of ARI-Certified Performance" (from www.aridirectory.org) or manufacturer's performance data to GCRA.
 - A copy of the load calculations must be provided to GCRA for approval prior to installation.

The equipment shall be Carrier, Trane, GMC, or equivalent. Any deviations must be approved by GCRA staff.

All plenums shall be insulated for their entire length. Where a plenum goes through the foundation wall to an exterior unit, the exposed section shall be insulated on the inside so as not to be exposed to the elements. There shall be a break noise barrier between the furnace and the main trunk lines.

TERMITE PREVENTION CONTROL

Termite Treatment – Where the Work Write-Up calls for termite treatment, such treatment shall be in compliance with the following:

- Only professional pest control firms duly licensed by the State of South Carolina and all applicable local governing bodies shall perform this service. Each firm shall be bonded in compliance with all laws, codes, and regulations pertaining thereunto.
- All pest control firms performing services under this section shall comply with the "Rules and Regulations of the South Carolina Pesticide Control Act" (Section 46-13-30 of 1976 Code as amended, 27-1085) as furnished by the South Carolina Division of Regulatory & Public Services Programs.

All forms and letters required by the South Carolina Division of Regulatory and Public Service Programs shall be properly executed and issued to GCRA and the homeowner.

All debris is to be cleaned from crawl space. No wood, paper, or cellulose items to be left after treatment.

If the pest control agent or the contractor encounters wood in direct contact with the ground, the Construction Specialist shall be notified and the condition corrected.

Roach Treatment – Exterminate for roaches using UFDA approved household pest eradication chemicals. Treatment to be applied in 2 separate applications spaced a minimum of 14 days apart. Areas to be treated include all living areas, cracks, wall cavities, cabinets, and baseboards. The homeowner shall be responsible for emptying cabinets; the contractor does not warranty the pest treatment beyond the length of the job.

Extermination of Rodents – Bait for rodents in areas inaccessible to children and pets. Seal visible voids to living areas to prevent future infestations. The contractor shall certify to the owner and to GCRA the type of treatments the house has received and the dates applied.

THERMAL/MOISTURE PROTECTION

Insulation – All insulation where specified in Work Write-Up shall be R38 rating for ceilings, R13 rating for side walls, and R19 rating for floors. Insulation materials are to be high-density fiberglass, Rockwool or cellulose, and shall be delivered, stored, and protected from abuse after installation.

When called for in the Work Write-Up additional attic insulation will be blown-in sufficient to cover the tops of ceiling joists to reduce convective heat loss/gain and the installation of dams or baffles at the eaves to maintain air flow and obtain a full R38 rating at the rafter heels.

The contractor shall certify to the owner and the Greenville County Redevelopment Authority as to the R rating of each installation as stated above.

The contractor shall plug or securely cover all openings made for insertion of insulation in the walls, ceilings, or other portions of the building or shall securely cover all holes with duct tape, or equal, prior to the application of the finish covering to the surface.

All penetrations leading to unconditioned spaces must be sealed with foam or caulk.

- All recessed can lights in insulated ceilings must be airtight and IC-rated.
- Attic knee-wall door and scuttle holes weather stripped.
- Chases sealed and insulated.
- Stud cavities blocked at change in ceiling height.
- Attic knee wall sealed attic-side and rigid sheathing.
- Joist cavities under attic knee wall blocked.

Window and doors – When replacing door and window headers they are to be built out of two 2" x 10" lumber with ½" rigid foam sandwiched between.

- The ½" foam will provide a thermal break and help stop heat transfer through the header.
- Because fiberglass insulation is not an air barrier, the gap around the rough opening for windows and doors should not be stuffed with fiberglass but should be sealed using a urethane foam gun or with backer rod and caulk.
- If foam is used, it must be low-expansion foam that will not distort the frame and pinch the window sash or door slab.
- All hot water pipes shall be insulated for their full exposed length to a rating of R2.
- R8 insulation for supply ducts in unconditioned attics and R8 in crawl spaces.

Moisture Barrier – Install 6-mil polyethylene across the entire ground surface. Overlay and tape all seams by 12 inches. Seal the polyethylene at least 6 inches up the walls and piers or to a height equal to ground level. Pressure-treated wood strapping can be used to fasten the polyethylene to the wall and piers 6-mil plastic moisture barrier over the entire crawlspace in accordance with local codes.

CHAIN LINK FENCE

All residential chain link fences shall meet the following specifications:

- All line posts are to be 1⅝" O.D. thickness.
- All terminal posts shall be 2½" O.D. thickness.
- The top rails shall be 1⅜" O.D. thickness.
- The fabric shall be 11½".

The fence shall be erected in the following manner:

- All posts are to be spaced a maximum of 10' O.C. in post holes a minimum of 2' in the ground. All posts are to be plumb and in true alignment and the holes filled with concrete.
- All fabric is to be hung with the barbs down and the knuckles up.
- All fabric is to be stretched according to the manufacturer's recommendations and secured at each end with clamps and bolts. The fabric is to be secured to the posts and top rail a minimum of 2' O.C.

Property Line Assurance – It shall be the responsibility of the contractor to assure that the fence is within the property boundaries of the property on which the fence is to be erected. The owner shall be responsible for providing pins at every corner and angle and the fence shall be set within these boundaries. No fence shall be erected on the property line without written approval from the GCRA.

STREET REPAIR

All entrances into the street connected to the work under the auspices of the Greenville County Redevelopment Authority shall be repaired in accordance with the specifications described herein and/or to the specifications of Greenville County or the State Highway Department, local municipality, or whichever has jurisdiction and shall be inspected and approved by the Jurisdiction.

The street surface shall be cut or scored in such a manner that the total width of the surface shall not be more than two feet at its widest point.

The dirt shall be removed so as to allow the pipes to lay on solid clay. Any low place shall be backfilled with sand, sand screenings or crusher run, so as to permit a solid bearing for the pipe.

Backfill the ditch in 6" to 8" lifts and pack by mechanical tamp to within 8" of the surface. Fill the remainder of the opening to an oval mound above the surface and compact.

The compaction as stated above shall be performed on the pipe trench for the full length of the trench in the street, the shoulder, the drainage ditch, and past the bank on the house side of the drainage ditch adjacent to the street.

Notify the Local Jurisdiction or SCDOT as required before the street is to be cut so that an in-progress inspection may be made.

The contractor shall be responsible to keep the street cut in safe and usable condition for 10 days after the receipt of the final payment of the contract under which the street was originally disturbed.

All permits and fees shall be the responsibility of the contractor.

LEAD-BASED PAINT

Presence of Lead-Based Paint – GCRA contracts for inspection of each qualified work site to determine if any Lead Based Paint, herein LBP, or materials containing LBP are present. If such material is found, the contractor will be notified and the removal or handling of said materials shall be specified in the Work Write-Up.

If the GCRA does not find any LBP or materials containing LBP but said materials are later discovered, the contractor shall immediately notify the GCRA; handling or removal procedures shall be established prior to any disruption of materials.

Any LBP or materials containing lead which are in a deteriorating condition shall be removed in strict accordance with all applicable Federal, State and Local Government Regulations, Standards and Codes governing LBP removal and any other trade work done in conjunction with this abatement.

Any LBP or materials containing lead which are not deteriorating, but which will be altered, cut, sanded, removed or in any way disturbed during repair must either be encapsulated, removed or dealt with in such a way as to abate any hazard of lead contaminating the work area in accordance with all applicable Federal, State and Local Government Regulations, Standards and Codes governing LBP abatement and any other trade work done in conjunction with this abatement.

Any LBP or materials containing lead which are not deteriorating and will not be disturbed during repair must be encapsulated or in some way covered to insure that they will not be accidentally impacted or disturbed during construction. Further, steps must then be taken to reduce any chance of contamination in the future by use of an abatement procedure approved by the GCRA in accordance with Federal, State, and Local Government Regulations, Standards and Codes governing LBP abatement.

Any LBP and materials containing lead removed from a work site shall be disposed of in accordance with all Federal, State, and Local Regulations, Standards and Codes governing the removal and disposal of lead material.

The following methods are prohibited in the removal of LBP, either because of unacceptably high worker exposures to lead or release of lead into the environment through production of dust or fumes or both: open flame burning or torching, machine sanding or grinding without a HEPA exhaust tool, uncontained hydro blasting or high-pressure water wash, abrasive blasting or sandblasting, dry scraping, chemical paint removers containing methylene chloride, or other method that is not recommended in accordance with all Federal, State and Local Regulations, Standards and Codes governing the removal and disposal of lead material.

Workers' Safety – All workers, helpers, inspectors, residents, property owners and other associated with any work site shall be issued proper safety equipment as prescribed by the Occupational Safety and Health Administration (OSHA) regulations governing the handling and disposal of lead. In addition, all procedures specified by said rules and regulations shall be carried out at the work site to insure workers' safety. The contractor shall keep complete and full documentation of all medical examinations, incidents of contaminations, procedures used in abatement and methods of disposal as related to any activity in connection with LBP abatement. Said records shall comply with all Federal, State and Local Regulations, Standards and Codes governing LBP abatement and disposal.

PASSIVE RADON CONTROL METHODS

Crawl Space – When called for in the Work Write-Up a radon vent pipe shall be installed as follows:

- A three inch PVC vent pipe is to extend from the crawl space floor to 12" above the roof line, not within 10' of any opening to the house. The vent pipe shall be located at least 6' from any exterior wall. Vent pipes shall be installed so that any rainwater or condensation drains downward into the ground beneath the slab or soil-gas-retarder membrane. The pipe shall rest on a T-fitting where it comes in contact with the ground. On each side of the T-fitting, a 4' extension shall be installed running parallel to the long dimension of the house. The 4' extension pipe is to be comprised of a perforated drain pipe or approved equivalent. Where exposed, the vent pipe shall be labeled with proper tags labeling it as a radon gas vent pipe. Where the pipe is in a concealed wall or chase, the pipe need not be labeled.
- Install 6-mil polyethylene across the entire ground surface. Overlay and tape all seams by 12 inches. Seal the polyethylene at least 6 inches up the walls and piers or to a height equal to ground level. Pressure-treated wood strapping can be used to fasten the polyethylene to the wall and piers and in accordance with local codes. Ensure that 100 percent of all ground space is covered (i.e. include under any mechanical equipment and or water heater). Where the vapor barrier comes in contact with the radon vent pipe, the membrane around the pipe should be sealed with the use of duct tape.
- On all hollow block foundation walls or piers, the top course shall consist of either a cap block or other seal. A wood seal is an unacceptable cap for the block wall. All penetrations through the floor levels shall be sealed with an approved flame spread rated foam or other equivalent material.
- On the interior of the house, preferably near a smoke detector, provide and install an electrical junction box for the future installation of a warning device. A second junction box shall be installed at such a position that in the future, a vent fan can easily be installed. Both circuits should be a minimum 15 amp. 115 volt.

Slab/Basement Construction – When dealing with radon in a slab situation: Install 4" of gas permeable material (crushed stone), a 6 mil. Polyethylene sheeting overlapped 12" at all seams, and then the concrete slab. Seal all openings in slab and around penetrations with a material that will provide a permanent air-tight seal. Seal large openings with non-shrinking mortar, grouts, or expanding foam materials. Fill smaller gaps with an elastomeric joint sealant. Ensure that the T-fitting and 4' extensions are located within the 4" of gas permeable material.

The remaining installation of a vent pipe through the slab shall be installed according to all specifications listed above in dealing with crawl space.

Interior Footings – In the event that the house is divided by a continuous interior footing, you will be required to install one vent pipe on each side of the footing. This is to allow air to escape from both portions of the crawl space.

WOODEN DECKS, RAMPS AND PLATFORMS

Construction – All decks, ramps and platforms are to be constructed in accordance with the IRC.

Unless otherwise stated in the Work Write-Up, all wood construction shall be pressure-treated wood.

All nails, bolts, screws or other metal fasteners shall be appropriate for use in pressure-treated wood.

All lumber to be sized in accordance with local codes and IRC.

Required Dimensions:

- All ramps shall be a minimum 4' wide with 36" I.D. clearance.
- All ramps are required to be constructed as 5' x 5' platforms or landings where interfacing with a doorway, gate or steps or where there is a change in direction or the length of the ramp is over 20' long.
- Decking planks shall be perpendicular to the direction of wheelchair travel.
- Slope of the ramp shall not exceed 1:12.

Posts:

- Posts are to be set 12-18" in ground, on solid masonry or concrete and be back filled with gravel or concrete.
- Posts shall not be more than 6-0" between centers.

Railings:

- Ramps under 36" high:
 - Handrails shall consist of the following:
 - Top rail - 32" above the traffic surface.
 - Mid rail - 18" to 24" above the traffic surface.
 - Toe rails - 9" from the top of toe rail to traffic surface.
- Ramps over 36" high:
 - Handrails shall be 2 x 2 pickets 6" O.C. with a 2 x 4 upper rail capped with a minimum 2 x 6. Pickets shall be screwed directly to the joists.
 - All other designs are to be approved by the Construction Specialist prior to construction.

LIGHTING AND APPLIANCES

When the Work Write-Up calls for replacement of an item(s) the following is required:

- Install Energy Star qualified LED bulbs instead of incandescent or fluorescent bulbs. Use LEDs labeled as equivalent to the incandescent bulb you are replacing. If a light fixture is connected to a dimmer or three-way switch, make sure to look for LEDs that specify use with dimmers or three-way fixtures.
- 7W LED replaces a 40W standard bulb.
- 9W LED replaces a 60W standard bulb.
- 14W LED replaces a 100W standard bulb.
- Install Energy Star qualified bath fans, light fixtures indoor and/or outdoors, and ceiling fans with light kits. Either check to see that the item has the Energy Star label or see list at: www.eere.energy.gov/consumerinfo/energy_savers/appliances.html.
- Install Energy Star qualified appliances; i.e., dishwasher, refrigerator, etc.

MISCELLANEOUS

Dryer Vents – When the Work Write-Up calls for venting the dryer, the dryer shall be vented on minimum 4" diameter 26 gauge metal ducts and fittings, properly supported with joints taped with approved duct tape and no screws. All openings in walls, floors or foundations shall be properly caulked and weatherized. All exhaust covers shall have a one-way damper built in. A flexible hose is to be included and clamped on duct.

Bath Accessories – When called for in the Work Write-Up, bath hardware shall consist of two towel bars, Franklin Brass or equivalent. One 30" bar is to be adjacent to the tub and one 24" bar is to be adjacent to the lavatory. One paper holder, Franklin Brass or equivalent, mounted adjacent to and within 18 inches of the front of the commode.

Medicine Cabinets – Unless stated otherwise in the Work Write-Up, all medicine cabinets are to be 24" RSI or equivalent medicine cabinets. If there are no vent pipes or wiring in the way, the cabinet is to be recessed into the wall.

Shower curtain rods are to be installed on all tub shower units. The rods shall be Zenith Brand or equivalent.

SECTION III – NEW CONSTRUCTION SPECIFICATIONS

The contractor can apply for up to 4 draws on a project.

- **The first draw should include but not be limited to:** Permits, site preparation, foundation, and proof of builders risk insurance shall be issued to GCRA.
- **The second draw should include but not be limited to:** A dried-in house complete with building wrap, windows, doors, and roofing. Properly executed and certified treatment certificates (forms HUD-NPCA-99A, Subterranean Termite Soil Treatment Builders Guarantee and HUD-NPCA-99-B New Construction Subterranean Termite Soil Treatment Record) shall be furnished to GCRA. GCRA is to receive all but two (2) keys before the check is released.
- **The third draw should include but not be limited to:** Exterior finish, rough-in plumbing, electric and HVAC.
- **The final draw should include:** All outstanding requests for payment for 100 percent completion of the house and contract requirements.

FINAL PAYMENT – final payment will be released when:

- The punch list is complete and the contractor has executed a Release of Liens & Warranty form and submitted a final invoice.
- The Construction Specialist has inspected and signed off on the work (Certification of Final Inspection & Acceptance form), and all utilities have been put in GCRA's name.
- The contractor acknowledges and agrees to the terms of the homeowner's warranty issued by GCRA.
- The contractor gives the Construction Specialist a warranty package including the following manufacturers' warranties and information packages:
 - Roofing
 - Siding
 - Windows
 - Resilient flooring
 - Carpeting
 - Hardwood
 - HVAC
 - Water heater
 - Faucets/plumbing fixtures
 - Kitchen appliances
 - Smoke detectors
 - Lighting fixtures/ceiling fans/bath exhaust fans
 - Termite letter (Forms 99A & 99B)
 - Energy Star Certificate
 - List of subcontractors with current subcontractors
 - Signed off building card
 - Certificate of Occupancy
 - A current contractor's escrow account
 - Miscellaneous property certifications

The contractor is to leave touch-up paint for the homeowner. One-pint samples shall be left for the interior walls, trim work, ceilings, and the exterior. A list containing the names and numbers of all paints and stains shall be presented to the Construction Specialist at the final inspection.

CONTRACTOR REQUIREMENTS

General: The drawings shall be considered part of the plans and part of the contract documents. The contractor is responsible for review of plans. The contractor is responsible for visiting the site prior to bidding the job. It is the contractor's responsibility to verify and locate sewer and water service to the site. Any discrepancies in the plans, drawings, or specifications shall be brought to the attention of the Construction Specialist as soon as they become apparent. Any changes to the plans or drawings shall be done with an executed change order prior to work being done. All work is to be done in accordance with these General Construction Specifications for New Construction and/or the Work Write-Up, or the local building codes, whichever is stricter.

FIELD ENGINEERING/SURVEYING

The GCRA will survey and delineate the property pins of the lot. Our surveyor will mark the corners of the house for placement on the lot. The contractor will be responsible for constructing the house, decks, porches, drives, walks, patios, and drainage systems without encroaching on adjacent properties or rights-of-way.

ENERGY STAR CERTIFICATION

The builder/contractor will provide to GCRA a Home Energy Rating System (HERS) report, which will provide a rating of the energy-efficiency of the home. HERS is a nationally recognized method of evaluating a home's energy performance. A pre-drywall inspection by a HERS rater will be scheduled prior to drywall installation. This is to insure that insulation and draft-stopping have been properly installed before they get permanently enclosed. The HERS rater will also conduct duct leakage and whole-house pressure tests at this time. If the ductwork fails to meet the pressure criteria, a smoke test will reveal the worst leaks and the HVAC subcontractor should be on-site for this inspection. A second HERS rater inspection will be scheduled after completion of the home and the **house must receive a HERS score of 85 or less to qualify for an Energy Star certificate**. GCRA will pay for the HERS report and the tests required by Energy Star, but if the house fails any test, the builder/contractor will be required, at his/her expense, to correct the problem(s) and pay for any re-testing.

ROUGH GRADING/SITE PREPARATION

The builder/contractor is to clear and grade the lot as needed to place house, drives, and walks on the lot and divert all water away from the house. All vegetation, debris, or excess material are to be taken off the lot and properly disposed of. All top soil is to be stored and reused on the lot. The sub-grade for footings is to be undisturbed and free from fill, vegetation, or top soil. When digging the footers, the builder/contractor will be responsible for up to a 2' (average) excavation. GCRA will be responsible for any costs incurred, due to poor soil, past 2', provided the builder/contractor has stepped the footings.

The lot is to be graded to divert water away from the foundation, away from adjacent properties, and to be taken to the street when possible. **There will be six inches of fall away from the house for at least ten feet (5 percent slope)**. The construction of berms or swales to divert water must be approved by the Construction Specialist prior to installation. Any trees located within 20 feet of the house are to be removed unless otherwise stated in the Work Write-Up. All branches within ten feet of the house are to be trimmed to a distance of 10' from the house unless otherwise stated in the Work Write-Up.

The builder/contractor shall be responsible for maintaining all erosion controls required by Greenville County until the job is complete. The builder/contractor should include any and all costs incurred for erosion controls in the bid. The sidewalks and street shall be kept free of excess dirt and mud during the entire construction process. All infrastructure shall be photographed at the beginning of the job. Any damage, i.e. cracked sidewalks and curbing, shall be repaired by the builder/contractor by making square cuts and matching the existing materials close as possible.

The builder/contractor will be responsible for sanitary facilities for construction personnel during construction. Facilities shall comply with authorities having jurisdiction. The builder/contractor shall install a construction entrance on the location of the future driveway. Construction entrance to include stone: surge stone or equivalent.

FOUNDATION

The foundation is to be constructed of the materials stated in the Work Write-Up and construction shall conform to the International Codes. The minimum foundation height shall be established by the GCRA and identified in the Work Write-Up with reference to a bench mark on or adjacent to the site, **but at no time is the foundation to be lower than 2' high at its lowest point**. Colors and styles of brick need to be approved by the Construction Specialist prior to construction. Mortar joints are to be tooled and green mortar is to be removed from brick and block surfaces. Excessive mortar on foundation or steps shall be removed by pressure-washing and/or acid-washing. All masonry work is to comply with ASTM International Masonry Standards. All footings to be 24" minimum width and 8" minimum thickness. All pier footings to be 24"x24"x8".

Moisture Barrier – In crawlspaces, 6-mil polyethylene is to be installed across the entire ground surface. All seams are to be overlaid by 12 inches and taped.

Access Door – The access door shall be constructed of pressure-treated 5/4" deck boards using 2"x3" minimum pressure treated wood for cross bracing and framing on the interior surface. Door to be mounted on 2 galvanized hinges. The frame is to be constructed of 2 x 4 pressure-treated stock and the edges are to be caulked where contacting masonry and free from voids. A stop is to be installed on all four sides of the frame. The hasp shall be big enough to accept a 3/8" diameter lock. Builder/contractor to install padlock and provide key to Construction Specialist. Door should not be out of alignment by more than 1/4".

Vents – Foundation vents are to be installed in locations as dictated by the building code. The type shall be automatically-operating and screwed in place. They shall be set in a bed of liquid Styrofoam or exterior grade adhesive. Flanges that are trimmed to fit under siding are not acceptable. All vents at or under the finished ground level are to have wells. Wells may be manufactured of galvanized steel or constructed on-site with brick or block. They shall extend a minimum 4" wider and 4 inches deeper than the vent and flange. Measurements are to be to the interior of the well.

Slab – When a slab is called for, the elevation shall be designated in the Work Write-Up. Slabs shall have masonry foundation walls, a minimum of 5 courses high, to give appearance of a crawl space. Slab foundations require 6-mil polyethylene sheeting directly beneath the concrete that accomplishes vapor control and capillary control for the slab. The polyethylene sheeting must continuously wrap the slab as well as any grade beam(s). Slab floor drainage must include a gravel capillary break beneath the slab sheeting. This layer of gravel must be a minimum of four inches thick and just below the 6-mil polyethylene moisture barrier. Concrete is to contain fibrous reinforcing, have a slick finish, and be scored as required by code to control cracking. All soils within the perimeter of the foundation shall be suitable for load-bearing or shall be removed and undercut until suitable soil is encountered. If undercutting is deeper than 2 feet below original grade, the builder/contractor shall notify the Construction Specialist and negotiate a cost prior to work proceeding.

Termite Treatment – All foundations shall be pre-treated for termites in accordance with the Department of Pesticide Regulations and the South Carolina Standards for the control of termites and other wood-destroying pests. Properly executed and certified treatment certificates (forms HUD-NPCA-99A, Subterranean Termite Soil Treatment Builders Guarantee, and HUD-NPCA-99-B New Construction Subterranean Termite Soil Treatment Record) shall be issued to GCRA prior to second draw payment being dispersed. Just prior to the final walk-through, properly executed HUD-92544 Warranty of Completion of Construction form and HUD-92541 Builders Certification of Plans, Specifications, & Site may be required (these last two forms will be provided by GCRA).

WATER-PROOFING

Foundation drains (French drains) shall be installed on all foundations below finish grade. The footer and adjacent trench shall be cleaned of excess concrete, mud, and debris. All below-grade portions of the exterior foundation wall shall be damp-proofed to hinder the absorption of ground water. The below-grade portions of the exterior foundation wall are to be waterproofed with [MasterSeal 581](#) foundation sealant with optional acryl 60 latex additive or equivalent waterproofing agent up to the anticipated ground level after back-filling. A 4" corrugated plastic drain tile with holes on the bottom side shall be installed the length of the foundation and terminate at least 6 feet from the foundation. A continuous drainage plane shall be placed over the damp-proofing to channel water to the foundation drain and relieve hydrostatic pressure. The drain tile is to be buried in washed #57 stone for the length of the foundation wall with a continuous paper or straw barrier put in place prior to backfilling to prevent dirt from clogging the drainage channels. Foundation back-fill is to be compacted and tapered from the foundation wall at a 1-in-10 pitch for a minimum of 6' around the house.

EXTERIOR FINISH

GCRA will furnish colors of finish materials at the pre-construction conference. The exterior of the house shall be finished in solid vinyl siding materials or fiber cement board as specified in the Work Write-Up.

Vinyl Siding shall be installed in accordance with ASTM D4756 standards. All horizontal siding shall be 4" or 5" ended, Kaycan Timberlake Brand, Certainteed, Georgia Pacific, or equivalent, minimum .044 +/- .004 vinyl siding. All changes in siding will be called for in the bid documents.

Fiber Cement Siding and accessories shall comply with ASTM C1185-96, ASTM E72-95 and ASTM E 84.

Soffits shall be finished with vented and/or non-vented vinyl run the short distance.

Fascias are to be covered in prefinished, 0.19-gauge aluminum with no sections under six feet in length on the front gables of the house. Any deviations in exterior finish products will be detailed in the Work Write-Up and project drawings. Special attention should be given to these details as GCRA may call for specific architectural details and changes in exterior finish that must be incorporated with the vinyl siding.

Architectural Components – The plans for each house will detail architectural components and finishes such as frieze boards, cornices, brackets, special vents, etc. When called for in the Work Write-Up or plans all trim is to be covered in prefinished aluminum, shall be 0.19 gauge, and have a striated PVC finish. All porch beams to be wrapped in fiber cement siding (Hardie Trim or equivalent) with a minimum 3/4-inch thickness, or MiraTEC composite trim with a minimum 5/8-inch thickness.

PORCHES

All finished porch levels shall be a minimum 2 inches below the home's finished floor level. All steps on front porches are to be a minimum of 60" wide. Concrete shall fall 1/4" per foot nominal away from the house and be level side-to-side.

Concrete Porches (General) – Concrete porch slabs shall be bearing on metal decking, properly supported, unless porch slab is solidly supported by back-fill. Gauge of metal to be sized to span. All porch foundations shall be accessible from the house foundation if not poured on grade. All porch slabs to be surrounded on open sides by a brick rowlock, with solid brick to be used on exposed ends. All concrete is to be reinforced with fiber additives. No concrete shall be poured against wooden framing members without covering the wood with flashing first. The concrete is to have a trowel finish and be free from honeycombs or other voids. All edges are to be properly tooled and finished.

Porch Trim (General) – The type and design of the columns and railings are to be specified in the plans and/or drawings.

Screened Porches are to be framed with pressure-treated lumber. Screening shall be fiberglass or aluminum mesh, stretched and properly secured, free from wrinkles or sags. Edges and joints are to be covered with treated lattice or screen bead. The screen door shall be aluminum- or vinyl-clad wood at a minimum of 32" wide. Doors shall be solid vinyl tee-type, screen tight, or equivalent. The gap at the bottom of the door shall not exceed 1/4 inch. All doors are to be mounted on self-closing hinges and the door is to have an operational and lockable knob and latch.

COLUMNS AND RAILINGS

Wooden columns shall be constructed and scaled in accordance with the design shown in the elevation. All wooden columns are to rest on aluminum plinths properly sized to support the column being used. Manufactured columns are to be installed in accordance with manufacturer's specifications. Pre-manufactured wood, vinyl, or aluminum columns may be used if approved by the Construction Specialist at the pre-construction meeting prior to installation.

Brick columns/pedestals shall be of the same brick and lot as those used in the foundation. The size and design shall be shown in the drawings.

Vinyl – Vinyl posts and railings shall be manufactured of PVC and installed in accordance with manufacturer's specifications and the building codes. Color Guard Railing Systems (Classic) or equivalent.

RAILINGS AND POSTS

Square Wood Railings – The top rail is to be constructed of 2 x 4" stock, beveled or routed along the top edges. The bottom rail is to be a plain 2 x 4", nominal. Wooden pickets are to be 2 x 2", nominal, square pickets free from saw marks and other defects. They are to be nailed through the top and bottom rails with a minimum of 3 each 10-penny galvanized finish nails total. Railings are to be primed and painted with exterior semi-gloss latex paint. Other details such as cap rails may be specified in the Work Write-Up and/or drawings. Cap rails to be composite decking 1"x 5.5" (Trex or equivalent). Unless called for in the Work Write-Up or drawings, the newel posts are to be 4 x 4", nominal pressure-treated stock with a manufactured cap or a decorative cap cut on site and approved by Construction Specialist prior to installation. Posts are to be secured a minimum 16" in the ground using concrete.

Headers – All columns shall be centered or line up with the front of the beam it is supporting. Unless stated otherwise all houses shall have minimum 5x13 inch header beams supported and tied into adjacent walls or supported by full or half posts. All porch beams to be wrapped in Fiber cement Siding (Hardie Trim or equivalent) min ¾ inch thickness. The porch ceiling is to be covered in non-vented vinyl soffit material run the short way. Joists are to be furred as needed.

Exterior Trim and Woodwork – All exterior wood work must be either covered in pre-finished aluminum or primed and painted with exterior paint. When called for in the Work Write-Up, wooden window and door trim shall be covered with pre-finished aluminum and GCRA is to pick the color.

Decks – When the Work Write-Up calls for a deck, the deck shall be constructed of pressure-treated lumber sized and designed to conform to the international codes. All nails/screws are to be galvanized or hot dipped. Stairs shall be minimum 48" wide and have a center stringer. Doubled 2 x 6" treads may be used in lieu of single boards. Risers are mandatory. The stringers shall rest on a concrete pad or 16 x 8 x 4 inch solid blocks. All posts shall be set a minimum 18" in the ground and are to be encased in concrete. The pickets shall be a minimum 2 x 2", nominal, 42" long and be nailed securely on the band boards. The top rail is to be 2 x 4" secured on edge to the top of the pickets and covered with a 1"x 5.5" composite railing (Trex or equivalent). All joints are to be butt joints or mitered joints. The handrails shall be attached to the walls of the house but not be bearing on un-reinforced vinyl siding.

FRAMING

All framing is to be done in accordance with local codes and the local building inspector is to inspect and sign off on the framing inspection prior to receiving payment for the framing. Stick-built or truss systems may be used as long as they meet code requirements. Carpentry is to be assembled level, square, and plumb. The builder/contractor is to locate furring, blocking, and nailers as needed to attach other construction.

GCRA Requirements – Houses are to be solid sheathed in 7/16" OSB or ½" CDX plywood. Roof sheathing will be determined by the span between rafters. **Note: If attic will contain mechanical devices, (i.e. HVAC unit or water heater) or more than 10 linear feet of ductwork, the roof must be sheathed with Georgia Pacific Thermostat® OSB Radiant Barrier Sheathing or equivalent ENERGY STAR product.** The roof is to be covered in #15 felt paper. The exterior of the house is to be wrapped in Tyvek or other equivalent house wrap. Seams are to be sealed with tape recommended for this purpose and approved by the manufacturer. All framing members should be crowned in the same direction. All walls are to be 3½ inches thick or in the case of a plumbing wall up to 5½ inches thick. All studs and wall framing are to be 16 inches on center. Decking is to be nailed and glued with decking adhesive to floor joists and sills to reduce squeaks. Roof and wall assemblies must contain elements that, individually and in combination, permit drying of spaces inside of walls and other assemblies.

- Install Tyvek or equivalent house wrap on the exterior of the sheathing using button-top fasteners and tape.
- Use either DuPont contractor tape (Dupont Tyvek, 800-448-9835, www.tyvek.com) or 3M Builder's Sealing Tape (3M, 888-364-3577, www.3m.com), or both.
- Drainage plane installed per the manufacturer's instructions; i.e. all house-wrap seams taped, top and bottom edges sealed past the plates, and the house wrap appropriately lapped (shingle-style: the top portion of the flashing slipped under the house wrap and taped) at the window and door flashing.
- Flashing must be installed for all windows and doors. Flashing systems should be designed in accordance with the ASTM entitled Standard Practice for Installation of Exterior Windows, Doors, and Skylights (ASTM 2002), or contact Construction Specialist for details.
- With exterior finishes such as brick or stone, an air space is required. An air space stops the capillary movement of moisture and allows for better drying.

Building Envelope - The envelope must pass a HERS rater blower-door test. Infiltration at 50 Pascal cannot exceed 6 air changes per hour, the completion of a Thermal Bypass Inspection Checklist, and a Grade I insulation installation is required.

Air leaks – The building envelope must be sealed both inside and out. All penetrations leading to unconditioned spaces must be sealed with foam or caulk.

- All recessed can lights in insulated ceilings must be airtight and IC-rated.
- Attic knee-wall door and scuttle holes weather-stripped.
- Chases sealed and insulated.
- Stud cavities blocked at change in ceiling height.
- Attic knee-wall sealed attic-side and rigid sheathing.
- Joist cavities under attic knee-wall blocked.

Electrical Boxes on Walls and Ceilings: Either use air-tight outlet boxes or seal standard boxes. Seal standard plastic electrical box at face of drywall with joint compound or cover the plate gasket with caulked foam and seal all wire penetrations into the box.

Window and Doors: Build door and window headers out of two 2" x 10" lumber and ½" rigid foam sandwiched between.

- The ½" foam will provide a thermal break and help stop heat transfer through the header.
- Because fiberglass insulation is not an air barrier, the gap around the rough opening for windows and doors should not be stuffed with fiberglass but should be sealed using a urethane foam gun or with backer rod and caulk.
- If foam is used, it must be low-expansion foam that will not distort the frame and pinch the window sash or door slab.

Tight Sills: Use either a rubber (EPDM) gasket between the foundation and mudsill or use regular polyethylene sill seal.

- If using the polyethylene sill seal, it must be doubled. Use two layers or one piece can be doubled length-wise.
- Any gaps too large to be sealed with the sill seal must be filled later with urethane foam.

Band Joists: After setting, stringing, and squaring the rim joists, run a bead of construction adhesive over the joint between the rim and mudsill. Seal all seams in band joist.

- It is important to take this step before putting the joists into position; otherwise rim sealing becomes a more difficult and tedious task.
- Do not rely on the weight of the walls to hold the subfloor down at the edges. This is a common point of air entry which can be stopped easily with a continuous bead of adhesive.
- The bottom plate must be sealed to floor or foundation. Either install regular polyethylene sill seal under the bottom plate or use a rubber (EPDM) gasket. Either one can be hammer-tacked around the perimeter of the deck before standing the walls.
- On concrete slabs, the gasket can be tacked to the bottom of the plate before you stand-up the walls. To make the sill seal go twice as far, cut it in half length-wise.
- An alternative is to use sticky-back weather stripping in this location.

ROOFING

General – Shingles shall not be installed during times of extreme temperatures. The shingles shall overhang the edge of the fascia a minimum ¾" and they shall be trimmed square and true.

Shingles shall be Owens Corning Prominence AR, Tamko, Certainteed, or equivalent.

Valleys to have two layers of 36" wide roll roofing or one layer of Owens-Corning Weather Lock or equivalent asphalt roll roofing. Flashing along the rake of a house shall be stepped every 5 inches and properly counter-flashed and sealed. Valleys are to be woven with joints no closer than 12 inches to the center of the valley. Shingles shall be installed in accordance with the manufacturer's instructions. Unless called for in the Work Write-Up, all attic vents are to be ridge vents, sure-rigid roll venting, or equivalent.

All pipes protruding through the roof shall have tightly fitting thermo-plastic flashing.

The ridge shall be capped with 12-inch wide shingles and/or covered in ridge vent. All exposed nails and flashing joints shall be sealed with fibrous asphalt cement.

Roof Overhangs: Roof eaves must overhang 12 inches.

GUTTERS AND DOWNSPOUTS

All houses are to have pre-finished aluminum .027 gauge gutters and down spouts. The gutters are to be seamless in all runs over 10 feet. The gutters are to be 5 inches wide and supported on hangers, 4-foot on center, set out of level and pitched to the nearest downspout. The down spouts are to be 3" x 4" secured top and bottom and terminated within 6 inches of finish grade.

The builder/contractor is to leave fiberglass or vinyl splash blocks in the house at the final inspection. At no time are the downspouts to discharge towards a below-grade foundation vent or discharge into an area that holds water.

INTERIOR FINISH

All finishes are to be installed in a workman-like manner by craftsmen certified for their installation.

Drywall (General): Drywall is to be regular 1/2" thick gypsum board. Areas near or exposed to water or exterior shall be MR grade gypsum board (green board). Fire-rated sheet rock must be used where required by code. Drywall is to be installed and finished in accordance with ASTM standards. Installation and finish are to be done by state-certified installer.

Fasteners – Drywall may be installed using nails, clips, or screws. Glue installations are not acceptable.

Drywall shall be thoroughly sanded prior to priming of wall surfaces. After priming, the drywall shall be inspected by the builder/contractor and defects shall be repaired prior to the final coat of paint. All ceiling perimeters are to be taped even if being covered by trim.

Trim and Millwork – All mouldings are to be primed composite colonial type mouldings, finger-jointed wood, equivalent or better, unless otherwise stated in the Work Write-Up. All rooms, closets and entries are to have baseboard. All doors are to be properly trimmed on both sides. Shoe moulding is mandatory where there is more than 1/16-inch gap between the finish floor and the base board and/or cabinetry. Standard materials are as follows:

- Base Board – Standard baseboard is 3 1/4" unless the Work Write-Up calls for larger baseboard. The corners are to be coped, and butt joints are to be beveled (scarf joint). All joints shall break at a stud or other wall framing member. When wall height is over 8 feet, the gaps at the bottom of the sheetrock will be blocked at nailing points.
- Crown Moulding – The standard crown moulding is 3 1/16" bedded crown moulding. Corners are to be coped, and butt joints are to be beveled (scarf joint).
- Bed Moulding – The standard is 2 5/8" bed moulding and the corners are to be coped, and butt joints are to be beveled (scarf joint).
- Shoe Moulding – The standard is to be 1/2" x 3/4" installed by coping joints and beveling end cuts at a 30-degree angle. Three-quarter round moulding may be used in lieu of shoe moulding, and ends shall be back cut at an angle.

CLOSETS

Closets are to be constructed in accordance with the floor plans. All closets are to have doors and passage locksets. Each closet shall have a shelf set at 64 inches high from the floor capable of supporting a 50 pound dead load.

Shelving will be constructed of vinyl-coated wire shelving.

The shelving will have a built-in clothes bar. The shelves are to be installed with all hardware approved by the manufacturer. The ends of the shelving are to be supported with end brackets as well as 45-degree braces. All spans over 48 inches shall have an additional bracket in the center. The sides and rear of the shelves shall be supported on clips 16 inches on center. All supports, clips, and brackets are to be installed with screws and shall be screwed to studs, blocking, or other framing members.

The location of the shelving will be indicated on the plans.

All closets constructed in kitchens and baths shall be pantry style with four shelves. The shelves shall be set at 24, 40, 52 and 64 inches from the floor. The bottom two shelves shall be 16 inches deep and the tops can be 12 inches deep.

WINDOWS

The minimum requirement is a high-performance window with a U-factor of 0.35 and a solar heat gain coefficient (SHGC) of 0.30. These minimums are required to meet Energy Star for our region of the country.

Unless called for in the Work Write-Up, all windows shall be double-hung, with tilt sashes, and solid vinyl with welded corners on the frame and sashes. They are to be 7/8 Loe2 thermal panes with screens or equivalent. Screens are to be removed from the windows and stored by the contractor until the construction is complete. Optional grids or casings may be called for in the bid documents.

Casings to be trimmed with a stool and apron. Design is to be approved by the Construction Specialist before installation. Moulding is to be 2¼" colonial, installed with mitered corners, set true and square. Caulking of open joints is to be neat and clean. Reveal is to be 1/4" and be consistent on each unit.

Window Jambs shall be of minimal 3/4" inch stock free from defects after prime and painting. Jambs are to be installed with a maximum 1/8" caulked gap between the window unit and the edge of the jamb.

Stools – Standard manufacturer's stool or 1" x 4" stock with routed front edge is to be installed. Stool is to extend 1½" past the outside edge of the window casings. The top edge of the end cuts are to be beveled.

Aprons shall be of minimal 2¼" trim with the end cuts sawn at a 15-degree angle.

DOORS

Six-panel Masonite or equivalent or as specified in the bid documents, pre-hung, split-jamb door units are to be installed square and plumb with a uniform reveal around the edge of the door. Casings are to be properly shimmed and nailed. All doors are to be complete with hinges, locksets and bumpers.

Entry doors are to be steel-clad, Reliablit or equivalent (.21 U-Value), insulated six-panel (or as specified in the bid documents) with magnetic or urethane weather-stripping complete with threshold and Kwikset or equivalent lockset and deadbolt. No dual-keyed deadbolts are to be installed on any doors. Locksets on all entry and exterior utility room doors shall be keyed alike.

When doors containing glass or lites are called for in the Work Write-Up they shall have dual-glazed thermal panes.

All entry doors which are solid to a minimum height of 5' 6" are to have wide-angle Observ-O-Scopes installed at 5' 4" from the floor.

Door alignment to the stops shall be within 3/16" or less. Twin doors shall be set and adjusted so the matching edges of the doors are in alignment from the top to the bottom when closed +/- 3/16". All door jambs and casings shall rest within 1/4" of vinyl, wood or ceramic floor finishes. Magnetic catches to be used on all twin doors.

Unless called for in the Work Write-Up, all storm doors are to be full-pane, heavy-duty, with optional screen inserts; Falcon 400 series or equivalent. Doors must include closer, chain, and spring to prevent wind damage. The colors shall be chosen from standard stock.

KITCHEN/BATH CABINETS AND VANITIES

The minimum construction and performance standards for shop-made kitchen or bath cabinets shall be as follows:

- Face frames shall be ¾" hardwood oak, alder, or maple. Stiles and rails shall be glued, corrugated, and blocked where possible.
- Wall cabinets shall be 42 inches tall and set to the ceiling where there are 8 feet from floor to ceiling. In any case, there should be 18 inches between the countertop and the bottom of wall cabinets.
- When there is a window present over the sink, there should be an 11" tall valance complete with soffit to mount a LED light fixture.
- If there is no window above the sink, the wall cabinet should step up 16 inches from the bottom of a standard wall cabinet. The bottom rail shall be 5¾" wide to cover an LED light over the sink.

- In the case there is an open side to a refrigerator, there shall be a full-length leg from floor to top of wall cabinet.
- All base cabinets shall have ¾" plywood or Luan shelves. Where Luan is used all raw edged shelves shall be edge-banded with hardwood of the same as the face frame. There shall be no wall or base cabinets with particleboard, melamine, or MDF veneer as part of the boxes. Base cabinet floor to be flush with front rail.
- Drawers shall be constructed as a box with a separate front attached. All drawers shall have side-mount drawer runners that meet or exceed BHMA Grade 1 requirements (75 pounds dynamic load capacity and 100 pounds static load capacity).
- In lieu of self-closing hinges, each swing door shall have a catch or other device to hold doors closed. Where installed, adjacent cabinets and doors shall be in proper alignment with each other. Doors are to be of balanced construction, operate freely and be warp-resistant. Miscellaneous hardware such as shelf standards must support the design loads and operation functions.
- All units, except sink, oven, refrigerator, and drawer cabinets shall be enclosed with side, backs, and bottoms. The countertop must provide enclosure for the top on base, but wall cabinets shall be provided with an individual top.
- All base cabinets shall be installed level, plumb and true. Cabinets shall be attached with screws (not nails) to studs or other framing members. To assure a plumb and level installation, high spots shall be removed, or low spots shimmed. Wall base and chair rail mouldings shall be removed behind cabinets to assure a flush fit. All wall cabinets shall be secured to the studs or other framing members with screws (not nails). They shall be plumb, level and in true alignment.
- Tops of Kitchen wall cabinets to be flush with ceiling and trimmed out with bed moulding min 3 5/8 width.
- If range is on outside wall, there is to be no vent chase in over range cabinet. If range is on an interior wall, vent chase size is to be minimized to provide maximum storage.
- Cabinet Finish – All the cabinet surfaces, inside and outside, shall be smooth and free of defects.
- The exterior of all cabinets, including the inside of the doors and the underside of top cabinets shall be stained, sealed and varnished to a smooth finish, free of holes and spots, or painted with a minimum one coat of oil-based enamel undercoat and one coat of semi-gloss enamel paint. The owner shall have the choice between paint and varnish finish and painting. The color shall be the choice of the owner in either event.
- The interior of all cabinets shall be as a minimum two coats of sealer, sanded between coats.

COUNTERTOPS

All countertops shall be laminated with plastic laminate, 0.042" thick; Wilsonart or equivalent. Working surface shall be one piece post form type. When specified in the Work Write-Up, square edge construction may be utilized with the edge laminate applied prior to the top laminate. All back and side splashes shall be caulked with paintable siliconized latex caulk. Mitered and joints shall be properly clamped and sealed and the sides of the joints shall not vary more than 1/16" in height. Joints should never be within 18 inches of the kitchen sink. All backsplashes are to be caulked to the adjacent surfaces.

FLOOR COVERING

Floor Conditions – All floor coverings with angular or straight edge patterns are to be installed parallel to the longest adjacent wall.

Carpet is to be installed wall to wall. Installation is to be in accordance with ASTM standards. Carpet is to be power stretched and held in place with tack strips and other appropriate fasteners. All seams shall be laid out and seamed in the longest dimension possible. Seams at doorways shall be parallel to the center directly under the doors. All seams are to be installed in accordance with the manufacturer's instructions. All transitions from carpet to other floor coverings are to have proper trim and reducer strips. All installations are to be done with by State-certified installers. Carpet and pad warranty information is to be provided to the Greenville County Redevelopment Authority before final payment is made. Carpet is to be 100 percent polyester cut pile carpet, 25-oz. minimum, Mohawk or equivalent. The contractor is to inspect after the carpet is installed and stretched and repair any nail pops, dings, cracked baseboard or caulking prior to final inspection. The contractor shall trim all doors as needed to assure a ¾" air space at the bottom of the door. When possible, the contractor should deliver and let the carpet acclimate to the site before installation.

Padding – Carpet padding is to be bonded urethane foam cushion with a minimum density of 6 pounds. It is to be installed and secured according to manufacturer's recommendations.

Vinyl Inlay – Prior to the installation of resilient vinyl inlay, OSB floors shall be covered with a minimum ¼” underlayment that is free from knots, voids or other defects. The underlayment is to be secured 4” O.C. with ring shank nails or staples. All joints and nail heads shall be filled, troweled and sanded to a smooth surface prior to installation of the vinyl. On plywood decking, the T&G joints shall be prepped in accordance with manufacturer’s instructions. The floor must be clean, dry and free from dirt or debris. The vinyl should not be installed when the temperature of the floor or flooring is less than 65 degrees Fahrenheit 48 hours before and during installation and 48 hours after installation. The vinyl shall be Armstrong Memory or equivalent. Vinyl inlay shall be installed in solid sheets with minimal seams. The edges and seams as well as around the vents shall be glued. In spans over 12 feet wide, the vinyl shall be seamed in areas of the least amount of traffic. All seams are to be welded. Patterns are to match and line up at transitions between rooms or floor levels.

Wood Flooring – When called for in the bid documents, wood flooring shall be pre-finished solid wood or natural wood laminate, Armstrong, Bruce or equivalent, with a minimum thickness of 8mm and a 25-year warranty on the finish. The flooring will be interlocking technology. The style can be strip. Moisture barrier must be installed according to manufacturer’s specifications in order to not void warranty. The contractor will submit proposals for flooring at the pre-construction conference. The perimeter shall be trimmed with matching transition strips and/or mouldings. All exposed nails shall be counter-sunk and filled with matching putty. Shoe moulding shall be loosely set to allow the floor to expand and move. The contractor shall be responsible for the safety and integrity of the floor finish until final payment has been made.

Ceramic tile may be installed directly on concrete slabs or a minimum ½” layer of cement board underlayment; Perma Base or equivalent. Unless otherwise stated in the bid documents, the tile is to be minimum ¼” thick 9” x 9” or 12” x 12” tiles with a glazed finish. The contractor will submit samples of proposed tile for approval. The color, texture and style of the tiles and the grout are to be approved by the Greenville County Redevelopment Authority prior to installation. Grout shall be applied in beds no greater than ½” wide and beds shall not vary more than 3/16”. Grout shall be cleaned off of the tile surface and surrounding trim. In no instances shall paint be applied to the grout. Grout should not be applied to the baseboard or tub above floor level. The transition from the floor to the tub wall shall be caulked with a neatly applied small bead of caulking. The tile shall be laid in a pattern that allows the tiles under the commode to be laid with minimal compound cuts. No tiles shall be laid with crack joints. The height of the tile shall not vary more than +/- 1/16” from the adjacent tiles. Doorways that act as transitions to other types of floor coverings shall have marble thresholds or other transition strips designed for this purpose. Ceramic base tile to be used in lieu of MDF base trim in bathrooms and laundry areas.

LVT – Luxury vinyl tile shall be Marathon II distributed by Happy Feet or equivalent. 2mm vinyl plank flooring 6.3” x 48” plank. All tile to be installed according to manufacturer’s specifications. Subfloor must be clean and dry to ensure proper adhesion. Adhesive recommended by manufacturer to be used.

PAINTING

Paint shall be Sherwin Williams or equivalent. All paint is to be applied in accordance with the manufacturer’s instructions. All paint grade surfaces are to be clean and primed in accordance with the manufacturer’s instructions. All nails and other fasteners are to be counter-sunk and filled with glazing compound prior to finish coat of paint.

Interior – All cracks and open joints are to be caulked with latex caulking before the final coat is applied. Caulking shall be free from smears or excessive application. Special precaution shall be taken to keep paint off of hardware, hinges, vents and electrical components. All finish coats shall have full coverage and an even application free from holes, roller tracking, brush marks, runs, dust and debris.

Walls are to be primed and painted with interior latex paint with a flat finish.

Ceilings are to be slick finished and primed and finished with two coats of ceiling paint.

Interior Trim – Doors, windows, and all mill work are to be primed and painted with interior latex with a satin finish. All six edges of the doors shall be sealed and painted. Stain grade wood is to be stained, sealed with sanding sealer, and finished in satin finish polyurethane. Wood is to be lightly sanded between applications. Nails, staples and other fasteners are to be countersunk and filled with matching putty before the finish coat is applied. Shoe moulding shall be stained or painted and should match the base and/or toe kicks it is being attached to.

Exterior trim is to be prepped, primed and painted with exterior paint in accordance with the manufacturer's instructions. The type paint is to be applicable to the specific substrate and comply with recommendations of the "MPI Architectural Painting Specification Manual."

PLUMBING

The contractor shall run water and sewer lines from the road to the house and have the installations inspected by the proper authority before covering. **The contractor is responsible for all permitting fees.**

Water Line – The builder/contractor is responsible for verifying water service to the lot. GCRA will assist in this process. Water service will be in the builder's account/name until completion of the house. GCRA will transfer account into its name upon completion of the house, i.e. Certificate of Occupancy issued. The potable water lines shall be designed, sized, and installed according to the International Plumbing Code. The contractor is to have all installations inspected and approved by the appropriate code official. Water lines shall be constructed of PVC, CPVC, PEX or other approved material. Water lines shall not protrude more than two inches from the wall or back of the cabinet to the cutoffs. No plumbing to be run through flooring. At **all supply locations** transition from PEX to a copper stubout and sweat on a BrassCraft (Home Depot) or Keeney Manufacturing (Lowe's) straight or angled ¼ turn ball valve shutoff (1/2" inlet and 3/8 " outlet). Supplies are to be reinforced fiberglass. Washing machine connection and built in dryer box type connection – both to be trimmed out. Wall behind washer and dryer to be 2x6. Dishwasher supply to have cut off valve. Invoices for roughed-in plumbing will not be approved until the building inspector has signed off on them. The rough-in shall include setting of tub/shower unit, water heater, washing machine and refrigerator connection, exterior spigots, and tying the house to the meter.

Drain Waste and Vent Lines – The contractor is responsible for verifying sanitary sewer availability to the site. The contractor will have to tie into the line and install a permanent cleanout within five (5) feet of the foundation. The contractor is responsible for designing, sizing and installing the drain waste and vent lines in accordance with the international plumbing codes and the requirements of the local jurisdictions. All vent pipes should exit the roof on the rear of the house if possible. The rough-in shall include properly flashed vents protruding through the roof and the house being tied into the tap.

Fixtures – Fixtures will comply with or exceed brand, stock and models as indicated in these specifications. All fixtures to be Moen or Delta ADA compliant single lever valves. Kitchen sink valves must have sprayer. All fixtures to be Water Sense labeled. All faucets and drains are to be chrome. All drain pipes are to be PVC. The contractor shall be responsible for supplying the warranty and parts information to the Construction Specialist prior to final payment being made.

Lavatories – The lavatories are to be cultured marble. They must conform to the standards of the American Cultured Marble Association. They are to be approved by the Construction Specialist prior to installation. All lavatory tops are to have back and side splashes properly caulked to adjacent surfaces.

Commodes are designated in the Work Write-Up and are to be: American Standard ADA approved Elongated or equivalent, completely functional with molded wood Westport Premium or equivalent seat.

Tub/Shower units are to be one piece fiberglass, nominal 5' wide Aquaglass or equivalent tub shower unit. Delta or Moen tub/shower mixing valve with ADA compliant lever handle to be used. Builder to install blocking for four future grab bars (to be installed by others). Tub/shower installed an exterior wall- requires the installation of ¼ luan (or approved alternate) between the tub/shower unit and the insulation. Take photo of the installation to document for HERS rater.

Kitchen Sinks – The sink is to be a minimum 8-inch deep double-bowl stainless steel 33x22x8 min size. All kitchen sinks shall be installed with a bead of polyseam or equivalent waterproof caulking around the inside and perimeter of the flange. The baskets shall be stainless steel chrome cup drain American Standard or equivalent. No plastic baskets shall be used.

Plumbing Energy Conservation Items – When the Work Write-Up calls for a tub/shower faucet to be replaced or installed, the new faucet shall be equipped on the hot water supply with flow restrictors.

- When shower heads are called for replacement or installation in the Work Write-Up, the shower head shall be a TWI International Water Saver or equivalent.
- Anti-scald valves will be set at manufacturer's specifications.

Water Heater shall be a 50-gallon electric type with a minimum Energy Factor (EF) of 0.92. Whirlpool 50 gal Energysmart (available at Lowes item #188412, Model EE2H50RD045V or equivalent. Builder/contractor to provide Water heater energy factor documentation to HERS rater. The water heater to have an insulation blanket and pipe insulation. The water heater should have built-in heat traps. After the unit is installed, the outlet pipe must be insulated wherever it is exposed. Any hot water pipe that will be covered by the slab must be insulated. Water temperature to be set at 120 degrees. Expansion tanks are to be installed and supported as code specified.

MECHANICAL

The contractor may install GMC, Trane, Heil, Carrier, or other nationally recognized brand if pre-approved by the Construction Specialist prior to installation. The size and design of the system is the responsibility of the contractor and his HVAC subcontractor. The Greenville County Redevelopment Authority may require mechanical takeoffs from a certified heating and air specialist when constructing homes. The rough-in shall include the installation and insulation of the plenums, trunk lines and laterals. The trunk lines are to be metal and the plenum and trunk line should be separated by a noise barrier. Lateral lines may be flex ducts if they do not exceed 12 feet in length. All boots and returns shall be cut in and sealed. The cold air return shall be centrally located in the house. The returns may be installed in the ceilings when a furnace/AC unit is to be installed in the attic. When returns are being set close to the floor the exterior is to be free from visible dents, sharp metal and protruding screws or they will be encased and trimmed with a suitable material. Wall returns shall be located in chases and/or closets. Returns located in closets shall be placed as to obtain the maximum use of the closet. All furnaces are to be fired and burnt off. Since the air conditioning cannot be checked in the winter months, the contractor is responsible for making sure the air conditioning works properly as temperatures allow. Contractor is responsible for securing the outside unit and pad to the ground. The warranties for the HVAC units are to be given to the Greenville County Redevelopment Authority and fresh filters are to be installed before the final check is released. Unless otherwise stated or when being installed in houses with slabs, the HVAC units are to be electric heat pumps with exterior cabinets.

Heating and cooling equipment must be a right-sized Energy Star qualified heat pump (14.5 SEER/12.0 EER/8.2 HSPF). Energy Star requires that a load calculation be performed in accordance with the latest version of ACCA Manual J (currently version 8) and that the following inputs be used for Manual J:

- Maximum allowable duct leakage is 4 CFM to outdoors per 100 square feet (4 percent) of conditioned floor area. If software allows for grades of duct tightness, choose "tight" or the equivalent term.
- Outdoor temperatures shall be the 99.0 percent design temperatures published in the ASHRAE Handbook of Fundamentals for the home's location or most representative city for which design temperature data are available. In Greenville, the temperatures are 23 degrees Fahrenheit in winter and 91 degrees Fahrenheit in summer.
- House infiltration shall be a maximum of 0.5 CFM/SFBE or shall use the software choice of "tight" or the equivalent term.
- Actual house orientation and location must be used.
- Actual window, insulation, and door specifications must be used.
- Indoor temperatures shall be 75 degrees Fahrenheit for cooling and 70 degrees Fahrenheit for heating.

The results of the Manual J must be used when sizing and installing equipment. Energy Star requires the following sizing guidelines:

- Maximum over sizing limit for air conditioners and heat pumps is 15 percent.
- In specifying equipment, the next available size may be used.

Sensible and latent heat loads must be met.

The indoor and outdoor coils shall be matched in accordance with ARI standards. ARI "Certificate of ARI-Certified Performance" (from www.aridirectory.org) or manufacturer's performance data must be provided to GCRA and HERS rater.

HERS rater must receive copies of the Manual J and D calculations prior to equipment installation for review and approval.

Documentation must show that all above requirements have been met.

Thermostat must be an Energy Star qualified thermostat with an Adaptive Recovery feature.

If the ductwork is installed in an unconditioned space, the HERS rater will perform a duct blaster test. The tested leakage must be less than or equal to 4 CFM to outdoors per 100 square feet. R-8 insulation shall be used for supply ducts in unconditioned attics and R-8 insulation shall be used in crawl spaces.

The air handler and duct system are required to be sealed with UL181-approved water-based mastic.

Some tapes perform adequately for sealing duct; however, good performing tapes may be difficult to identify and traditional duct tape (cloth-backed rubber adhesive tapes) should never be used to seal ducts, even if they meet UL ratings. These ratings test for initial adhesion but do not address how well sealants seal typical duct leaks or how well they stay sealed under normal conditions.

Sealing tapes are not to be used for structural purposes. Tapes have low tensile strength and should not be used to mechanically support ducts. Mastic can last the life of the system while conventional duct tape can fail within a year.

Ductwork must be composed of rigid ductwork or all flex duct, pulled tight with lines run straight using metal elbows at bends and corners.

Mastic shall be applied to boot seams and female end before flex duct is attached. Boots shall be sealed to sheet goods with caulk, mastic or spray foam. The inner lining of flex shall never be punctured. If repair is needed, a coupling shall be installed and sealed properly.

All rooms must have return air capability by using jump ducts to maintain balanced pressure in rooms that are often isolated from the rest of the house by a closed door, such as a bedroom.

The American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) standard 62.2 requires controlled mechanical ventilation at a base rate or 15 CFM for the master bedroom, 7.5 CFM for each additional bedroom plus one percent of the total square feet. For example, a 3 bedroom, 1,200 square foot house would require: $15 + (2 \times 7.5) + (.01 \times 1200) = 42$ CFM, which can be satisfied with a six-inch insulated flex duct with a manual damper to adjust the flow rate and a motorized damper to control open time.

Outside air must be filtered by providing and installing a Minimum Efficiency Reporting Value (MERV) of 6 or higher air filter. The air filter is to be installed on the return side of the air handler to filter both the outside air supply and the return air from the living space. This will use the existing HVAC delivery system to provide even distribution and mixing of the filtered outside air.

Mechanically assisted fresh-air ventilation can be accomplished by using one of the following quiet fans: Aledes, Fantech, Panasonic, or equivalent. The fan must be quiet, with a sound rating of less than 1.5 sones, designed for continuous operation, and controlled by an Airetrak timer/fan-speed control system (Tamarack Technologies, 800-222-5932, www.tamtech.com or equivalent).

The bath and kitchen range hood (not the re-circulating type range hood) exhaust fans must be vented to the exterior of the building envelope.

ELECTRICAL

The contractor shall be responsible for contacting the local electric company as to the location of the temporary power pole and the permanent meter base. The contractor is to supply, install and maintain a temporary power pole until the permanent power is installed. Once permanent power is in place, the contractor can ask the Redevelopment Authority to put it in GCRA's name. All houses are to be wired in accordance with local codes, inspected and signed off on by the local Building Inspector. To receive a rough draw on the electrical system, all wiring and panel boxes must be permanently installed in the dwelling and permanent power must be on and operational. All meter bases are to be rated 200 AMP.

Minimum Standards – Installation – All boxes and panels are to be set plumb, level and flush with the adjacent décor. Panels are to have a minimum of four unused circuits at the completion of the job. All plates, covers and trim shall seat flush to wall and ceiling surfaces. Plates are to cover rough openings entirely. Switch, receptacle and panel covers shall not be painted. Each room and hall shall have a switch-controlled ceiling-mounted lighting fixture. The living room and master bedroom are to have mounted a 52" ceiling fan with light fixture centered in the room; Harbor Breeze model # LKD52bb6 or equivalent. The fan and light may be on one switch. All lights and fans shall have a minimum 2-bulb 120

watt or equal candle power bulbs. All kitchens shall have an LED light fixture located as shown on the plans. Each kitchen shall have an LED light over the kitchen sink in addition to the ceiling-mounted fixture. The sink fixture is to be mounted on a board behind and/or under a cabinet or valance. The switch is to be adjacent to the sink and in the same box as the garbage disposal. Each dining room is to have a hanging light fixture (5-bulb Portfolio chandelier model # lp1457bs) located as shown on the plans. The chain should be adjusted so the bottom of the fixture is 5'6" from the floor.

Exterior Lighting – Exterior wall-mounted lights are to be set at a height of 72" to the center of the box. The front door light shall be a 2-bulb lantern type fixture; Portfolio model # 5120rob or 2 separate (2-pack) 1-bulb lanterns; Portfolio model # fa06-116 or equivalent. Ceiling-mounted porch lights are to be single-light Portfolio model # 4558 or equivalent. All other wall-mounted lights are to be simple Portfolio one light model #8110 (can) or equivalent.

LIGHTING AND APPLIANCES

Energy Star qualified LED bulbs shall be installed (bulbs in appliances are excluded). If a light fixture is connected to a dimmer or three-way switch, CFLs that specify use with dimmers or three-way fixtures shall be used. Energy Star qualified bath fans, light fixtures indoor and/or outdoors, and ceiling fans with light kits shall be installed. Either check to see that the item has the Energy Star label or see list at:

www.eere.energy.gov/consumerinfo/energy_savers/appliances.html.

An Energy Star qualified dishwasher shall be installed. If installed, all refrigerators to the Energy Star approved.

All houses are to have Insinkerator ½-horsepower garbage disposal; BADGER 5 model or equivalent, unless stated otherwise. When called for in the Work Write-up the sump pump shall be installed as follows: Water Ace ½-horsepower, 115 volt pedestal, model # R3P/PM360 in an 18" deep perforated vessel set in a 6 cubic foot gravel bed.

INSULATION

Any interior insulation type that has vapor permeability is acceptable. This includes cellulose, high-density fiberglass, and Icynene foam.

- Icynene foam can also serve as an air retarder, but air sealing must be accomplished by a separate component or system when cellulose or high-density fiberglass is used.
- Any insulation material can work well as long as it is installed carefully. No matter which method is used, the **installation must be inspected by a HERS rater before drywall** and it must get a minimum installation quality "Grade I" based on RESNET standard to pass.
- Grade I requires that the insulation material uniformly fills each cavity side-to-side and top-to-bottom, without gaps or voids around obstructions (such as blocking or bridging), and is split, installed, and/or fitted tightly around wiring and other services in the cavity.
- Because it is difficult to properly insulate around obstacles like wiring, plumbing, and electrical boxes, Icynene foam or blown-in cellulose provide good solutions to these problems, but Icynene foams is more expensive.

Houses are to be insulated to the following minimal standards. The minimum requirements are R19 in the crawl space, R13 in the walls, R38 in the attic (requires baffles and blocking in vented attics), and R38 in vaulted and tray ceilings. The contractor should carefully check to make sure the insulation contractor has properly filled all cavities and voids without compressing the insulation or preventing window sashes from operating properly. Ceilings are to be blown with a fiberglass or cellulose insulation. Green Built houses will require the installation of recycled paper insulation.

Wall cavities are to be filled with Kraft paper-backed high-density fiberglass insulation. The minimal R-rating shall be R13. The gaps between the windows and the rough openings are to be insulated with neoprene gasket material, low expansion urethane foam, or backer rod and caulk.

Floors are to be insulated with fiberglass insulation with a minimal R-rating of R19.

Crawlspace insulation – Insulate the underside of the building floor and provide outside air vents in the foundation walls.

Tubs and Showers – If located on an exterior wall, either carefully insulate the area with high-density fiberglass batts before the tub goes in or sheath the area behind the tub with plywood. After the tub is installed, the stud bays can be filled with blown-in cellulose or Icynene foam.

A cantilevered floor must be sealed above the supporting wall (blocking between joists is required).

If the ceiling is vaulted, blocking must be installed with baffles to prevent air washing through the insulation (or foam insulation may be used).

Insulating Rafter Heels – Where adequate space for insulation is lacking, this “thin” insulation around the perimeter of the attic leaves the drywall cold along the ceiling edges and in the corners, encouraging condensation and mildew.

If the roof is framed with trusses, use raised-heel trusses.

Hand-framed rafters may require the addition of a band joist to provide adequate space for insulation. Or, rigid foam may be installed at the rafter heels. First, ¾-inch strips of plywood shall be installed against the top of the rafter faces to maintain a ventilation channel; then a snugly-fit piece of rigid foam shall be cut and installed between each rafter cavity and sealed with foam. The rigid foam and air channel is installed from the plate to a height several inches above where the blown-in attic insulation will be installed.

Icynene Foam Insulation (when specified in Work Write-Up): The Contractor will use a licensed Icynene insulation dealer with at least a five-year history installing Icynene foam. The Icynene foam is to be spray-applied:

- At a thickness of 3.5 inches nominal under the exposed floor.
- At a thickness of 3.5 inches nominal in the framed exterior heated walls, rims, and gables.
- At a thickness of 5.5 inches nominal under the (non-vented) roof deck.
- At a thickness of 3.5 inches nominal in the porch ceiling return as needed.
- Caulking and/or sealing of all exterior wall double-face framing, doors and windows.
- Icynene subcontractor must give proper attention to clean the work site and to remove all excess materials from the job site.
- NOTE: Manual J calculations are required. HVAC equipment is typically downsized when Icynene foam is installed – do not rely on the Rule of Thumb of one ton per 600 square feet to determine the size of the unit. GCRA will require a copy of the load calculations prior to the unit being installed for review and approval.

Blown-in Cellulose Insulation (when specified in Work Write-Up): Cellulose is a recycled product (newspaper) and is considered a Green building product.

- Cellulose insulation must be installed at a minimum density of 3.5 pounds per cubic foot (PCF). Installed at this 3.5 PCF, cellulose is installed at a density greater than its own natural settled density, which eliminates future voids.
- Walls and ceilings are treated differently. Ceilings are best blown after the drywall has been hung. Drywall provides containment, a built-in air barrier, and unyielding support for a 16-inch-deep layer of cellulose.
- For walls, to retain the cellulose prior to installing drywall, a vapor-permeable membrane such as 100 percent polypropylene InsulWeb (Hanes Industries, 828-464-4673, www.hanesindustries.com) or MemBrain (CertainTeed, 800-233-8990, www.certainteed.com) is to be used; this is a polyamide film whose permeability changes with ambient humidity conditions. Or par/PAC (par/PAC, 877-937-3257, www.parpac.com) reinforced poly membrane may be used.
- The membrane is tacked up, then stretched taut over the edges of each stud and stapled to its inner face. Stapling the membrane like this prevents the cellulose from “migrating” across the stud face when blown, trapping lumps that will interfere with drywall installation.
- A slit is cut into the poly at each stud bay to insert the blowing hose. It should be the subcontractor’s responsibility to patch each hole with 3M tape.
- When the insulation job is complete, the contractor shall check that all slits have been taped and check the density by feel, especially near the top of the stud bays. Well-insulated cellulose should feel as firm as a car seat, not soft like a down pillow. The poly air barrier should be taut.

DRIVES AND WALKS

All drives and walks shall be four inches thick and the concrete is to be rated 3,000 PSI and be fiber-reinforced. The standard walk is 48 inches wide and the drive width is 10 feet unless otherwise stated in the bid documents or changed with an executed change order. The concrete is to be floated, troweled, edges to be tooled and have a light broom finish. Excess water should not be added on site to help the mix flow easier. In times of freezing weather, the contractor is responsible for making sure the concrete does not freeze. In times of extreme heat, the contractor shall be responsible for keeping the concrete cool to prevent improper curing. Expansion joints/control joints to be saw cut. All form work is to be stripped from the concrete. The walks and drives shall be back-filled at a minimum 4:18 pitch. The contractor will be responsible for maintaining the integrity of all existing curbing, sidewalks and grassing in the street rights-of-way. The contractor will be required to repair any damaged infrastructure prior to the final check being released. The contractor shall be responsible for replacing any scaling or bubbled concrete for two full years from the date of closing.

EXTERIOR UTILITY ROOM

The hot water heaters and electrical panels should be placed inside the building. The floor is to be a concrete slab. It will have a 3'0" x 6'8" exterior door unit. The door's threshold shall be 8 inches higher than finished grade. The door shall be an exterior steel clad unit with a keyed-alike Kwikset lockset and deadbolt. The interior of the shed is to be finished. The roof is to have a minimal 4:12 pitch with a minimum four-inch overhang. The exterior is to be finished in the same materials as on the main body of the house. There shall be a single-bulb switch-operated exterior light fixture in the utility room.

BATH ACCESSORIES

Medicine Cabinets/Mirrors –The master bath and hall bath shall have a RSI tri-view medicine cabinet or equivalent. The size should match the corresponding vanity.

Bath Hardware – Each bath shall have two towel bars; Franklin Brass chrome or equivalent. One 30" bar shall be installed on the wall adjacent to the tub. A hand towel ring shall be installed within two feet of the vanity. Bars are to be mounted on wood framing members or blocking installed by the contractor prior to drywall installation.

Toilet paper holders are to be Franklin Brass chrome toilet paper holders or equivalent and they are to be installed within 18 inches of the front of the toilet on an adjacent wall or cabinet. Recessed toilet paper holders may be substituted when clearance is a problem. Toilet paper holders are to be mounted on wall framing members, blocking or a wood cabinet.

Shower curtain rods shall be installed on all shower/bath fixtures. The rods shall be a Zenith brand or equivalent adjustable white or chrome rod.

PERMITS/FEES/INSURANCE

The contractor shall be responsible for obtaining and purchasing all permits, licenses and/or approvals necessary to construct the house.

The contractor must maintain general liability insurance in the amount of \$1,000,000.00. The house is to be covered under a contractor's Builders Risk policy until the final payment is made to the contractor.

Regardless of the number of employees the contractor has, he/she or the sub-contractors shall maintain Workers Compensation Insurance in appropriate levels to insure all workmen on the site. The contractor shall post building cards on site, including Parker Sewer Sub-district approvals.

CLEAN-UP

The interior of the house shall be cleaned prior to the final inspection of the unit. All mouldings shall be dusted, all floors vacuumed and all windows and fixtures cleaned inside and out. The exterior shall be pressure-washed. All labels, stickers and protective coverings shall be removed from all components of the house. House to be in move in condition upon final approval.

FINISH GRADING AND LANDSCAPING

The contractor is responsible for grading the yard to direct surface water away from the house and property. The backfill shall slope at least 10 inches in the first 6 feet away from the foundation wall. Water may not be turned onto adjacent properties, but can be taken down the property lines to the street or an outfall as identified by the Construction Specialist. The contractor shall be responsible for removing any and all debris he has created from the property and properly disposing of it. The contractor will remove and dispose of any debris or trash uncovered on the site, up to ½ of a cubic yard at no charge to the Greenville County Redevelopment Authority.

LANDSCAPE/PLANTING

- **Scope of work:** The work consists of furnishing all labor, equipment, and materials required for the installation of plant materials in accordance with the plans and specifications.
- **Substitutions:** No substitutions of any material may be made without the approval of Greenville County Redevelopment Authority (GCRA). If an approved substitution provides a cost savings, the contract will be adjusted by change order.
- **Clean-Up:** During the course of planting, waste materials shall be promptly removed, lawn areas kept clear, and all reasonable precautions taken to avoid damage to existing structures (walks, driveways, foundations, etc.). When planting has been completed, the area shall be thoroughly cleaned up.
- **Inspections:**
 - **Inspection of Plant Material:** Plants will be subject to inspection and approval as determined by GCRA for quality, size and variety.
 - **Inspection for Acceptance of Work:** After completion of all work, GCRA shall inspect to determine satisfactory completion of work.
 - **Final Inspection:** At the completion of any punch list items, a final inspection of all work will be made by GCRA.
- **Guarantee:** As maintenance of plantings is to be undertaken by GCRA, there is no guarantee required by contractor due to drought, flood or other acts of God.

Site Preparation – Planting beds do not need to be fully excavated; however, any sod or existing plant growth must be removed from the bed area. Dig planting pits in accordance with generally accepted planting procedures 2x the depth and 3x the width of the pot or ball. Ground surface between and around all plants, including isolated trees, shall be loosened, packed smooth and topped with a four-inch layer of shredded pine bark mulch. Bark shall not be installed on any ground surface that does not have the proper grade away from the building.

Materials (Plants) – All plants will conform to the measurements specified in the plant list. All plants will be nursery grown, freshly dug, found healthy, vigorous, well branched and free of disease or injury. All materials will be subject to approval by GCRA.

Plants will be pruned prior to delivery only upon approval of GCRA. Caliper of tree trunks is measured one foot above the ground. All plants shall be properly identified by weatherproof labels before delivery to project site.

Topsoil – Topsoil shall be fertile, friable, natural topsoil of loamy character without mixture of subsoil material. It shall contain a normal amount of decomposed organic matter and shall be free from heavy clay, coarse sand, stones, lumps, plants, roots or other foreign materials or noxious grasses and weeds.

Fertilizer – Commercial fertilizer shall be formula 6-8-6 or 10-10-5. It shall be uniform in composition, dry and free flowing, and shall be delivered to the site in the original, unopened containers.

Mulch – Mulch shall be shredded pine bark mulch. Pine bark chips or nuggets will not be accepted.

Materials for Staking – Stakes for supporting trees shall be treated against rot. Wire for guys for fastening trees to stakes shall be No. 12 gauge double strand twisted wire. Hose shall be new or used reinforced rubber garden hose.

Installation

- **Layout:** Planting shall be located where shown on the plan. Any necessary adjustments shall be made only after approval by GCRA.
- **Planting:** Install plant material using generally accepted planting procedures.
- **Soil Preparation:** Soil used in planting shall be two-thirds topsoil mixed with one-third existing subsoil, and five pounds fertilizer per cubic yard of soil mix.

- **Staking:** Trees shall be staked immediately after planting if they are susceptible to overturning.
- **Mulching:** Shredded pine bark mulch shall be applied to a depth of four inches soon after planting and placement of fiber weed barrier. Keep mulch from direct contact with tree trunks and bases of shrubs.

Lawns, General

- **Scope of Work:** The work consists of furnishing all labor, equipment and materials required for the installation of lawns in accordance with the plans and specifications.
- **Substitutions:** No substitutions of any material may be made without the approval of GCRA. If an approved substitution provides cost savings, the contract price will be adjusted by change order, with GCRA receiving the benefit of the net savings.
- **Clean-Up:** During the course of lawn installation, waste materials shall be promptly removed, and all reasonable precautions taken to avoid damage to existing structures (walks, driveways, foundations, etc.). When planting has been completed, the area shall be thoroughly cleaned up.
- **Inspection and Acceptance:** The lawn bed shall be free from high spots or depressions and drain properly. Visual inspection of the project is sufficient to verify satisfactory completion of work items in accordance with these specifications.
- **Guarantee:** Contractor agrees to water lawn as necessary to ensure germination and continued growth. If, however, germination does not occur within 30 days, contractor agrees to take whatever corrective action may be necessary.

Site Preparation – contractor shall grade as necessary to eliminate depressions or mounds, and rake smooth, disposing of all debris, stones, roots, etc. Any eroded areas must be filled with topsoil to finished grade. Soil must be loosened with a Harley rake, tiller, or other suitable means. Site must have at a minimum 1" of topsoil.

Alternatively, contractor may elect to thoroughly aerate the ground to be seeded with a mechanical aerator, instead of tilling. Care must be taken to ensure positive drainage away from structures, walks and driveways.

Materials – Soil Conditioning Materials: The following materials must be thoroughly and uniformly spread and raked into the ground to be seeded:

- **6-12-12 Fertilizer:** Apply fertilizer at 800 pounds per acre, or 18 pounds per 1,000 square feet.
- **Agricultural Limestone:** Apply lime at 4,000 pounds per acre, or 90 pounds per 1,000 square feet.

Seed – Grass is to be sown in accordance with the demolition grassing schedule.

Sod shall be nursery grown, containing at least 85 percent permanent grass. Sod shall be of good texture, free from weeds and undesirable grasses. GCRA is to approve the type of sod to be used prior to installation. Dormant sod is to be top dressed with seasonal rye grass and starter fertilizer.

Straw Mulch shall be applied at the rate of 4,000 pounds per acre.

Installation

- **Seeding:** After soil is prepared as above, seed shall be mechanically broadcast at the rate specified, rolled lightly, and covered with straw. Straw must be watered sufficiently to hold on surface.
- **Sodding:** Sod shall be cut and laid on the same day. Sod shall be installed evenly with staggered joints on soil prepared as above. Sod shall be lightly rolled or tamped to a true and even surface, well set into the underlying soil.

ENERGY EFFICIENCY INSPECTION CHECKLISTS

Spot-Check Inspection Checklist:

- ✓ Grading is sloped at five percent (six inches) away from the house for at least ten feet. Roof drainage is directed at least three feet beyond the building.
- ✓ A 6-mil polyethylene sheet is installed directly beneath the concrete slab, continuously wrapping the slab and any grade beam(s), or completely covering the crawl space soil.
- ✓ Roof materials are installed to provide a continuous drainage plane over the entire surface of the roof. Wall/roof junctures should be appropriately flashed, including kick-out flashing at the bottom.
- ✓ HVAC system is appropriately sized and installed according to plans and calculations.
- ✓ A mechanical fresh-air ventilation system is installed.
- ✓ Each bedroom has a separate HVAC return duct, a transfer grille, or a jump duct.

Pre-Drywall Inspection Checklist:

- ✓ Bathtubs on exterior walls have insulation behind them.
- ✓ Windows and doors are sealed to framing using caulks, foams, backer rod, and/or similar.
- ✓ Window flashing is properly installed to shed water.
- ✓ All electrical and plumbing penetrations between conditioned and unconditioned spaces are caulked or otherwise sealed.
- ✓ All kitchen and bathroom fans are appropriately rated (capacity and sound) and exhausted to the outside.
- ✓ All exterior penetrations (exterior light fixtures, phone and other service cables, etc.) are sealed with caulk, gaskets, or similar.
- ✓ All house wrap seams are overlapped and taped; top and bottom edges are sealed past the plates; house wrap is appropriately lapped at door and window flashings.
- ✓ High-density batt insulation is kraft-faced or blown-in-cellulose insulation or Icynene foam is used.
- ✓ Ductwork is sufficiently air-sealed as verified by a duct pressure test conducted by a HERS rater.

Pre-Occupancy Inspection Checklist:

- ✓ Entry of main supply/return ducts are appropriately sealed with foam, caulk, or similar materials (not with drywall mud).
- ✓ Plumbing penetrations are air-sealed.
- ✓ Electrical switch and outlet boxes are sealed to drywall with caulk or gaskets.
- ✓ Light fixture boxes are sealed to drywall with caulk or gaskets.
- ✓ Bathroom and kitchen fans are sealed to drywall with caulk or gaskets.
- ✓ Bathroom and kitchen fans are drawing-air-tested with a small piece of tissue; the fan should hold the paper against the grille.
- ✓ Duct boots/registers are sealed to the floor or drywall with caulk or gaskets.
- ✓ The attic stairway is weather-stripped and insulated.
- ✓ Refrigerant charge on air-conditioning/heat pump is verified in writing by the installer to be within specifications.
- ✓ The whole-house envelope is sufficiently air-sealed as verified by a whole-house pressure test.

MISCELLANEOUS

Attic Access and Storage – All attic spaces shall be accessible from a 22½" x 54" attic access stairway. The unit shall be of the disappearing self-storage type. Attic flooring is to be suspended or elevated above the top of the attic insulation. There is to be a light in the attic with a switch at ground level. Above the disappearing attic stairway, a box is to be provided, constructed of 1 x 10s with a plywood lid attached to the 1x10s with a piano hinge and fitted with weather stripping where the lid comes into contact with the box to insure an air tight seal. The box's sides and lid's top side must be carefully insulated to R-38. A hook and eye shall be installed so that the lid can be temporarily secured in an open position when the stairway is in use. Compressed batt insulation in the stairway is not acceptable.

Door Bells – When called for in the Work Write-Up, door bells should be installed at both entrance doors. Wireless systems can be used.

Telephone and Cable – Each house is to be prewired for cable TV, both coax and CAT-5 (NC/ANSI/TIA/EIA-568-A) network cable, and telephone. Combine coax and CAT-5 in one box); include in living room and all bedrooms. The wires for the telephone and cable connections shall be connected under the house in a junction box and the feeder run outside the foundation wall in the proximity of the meter base.

Dryer Connection – Each house will have a dryer connection and a dryer vent. The connection shall be installed to the right of the washing machine. The vent shall be centered at the rear of the dryer. The dryer vent hookup will be wall mounted in a pre-manufactured kit. The connection shall be trimmed or caulked to prevent air or vermin from entering the house. The vents shall terminate on the exterior of the house. The dryer vent kit shall include a damper vent and rigid pipe.

Mail Box – The contractor is to supply and install a white vinyl mailbox post, model Postmaster Deluxe Manor post kit or equivalent, and a standard sized black mailbox properly addressed in white in accordance with USPS requirements. The post is to be attached to a 4" x 4" treated post core. The post is to be installed a minimum 15 inches in the ground and secured with concrete.

House Numbers – Each house is to have the street number permanently displayed on the front of the house in accordance with 911 requirements. The numbers are to be minimum 4" solid zinc, antique brass or black powder-coated numbers, held in place with screws or nails; Gatehouse brand or equivalent.

SECTION IV – DEMOLITION, CLEARANCE, & EXCAVATION

SCOPE OF WORK

Work Includes: Demolition of the structures and/or lot clearances as described in the bid documents.

Included in this work is the removal of all debris from the demolition or clearance of sites which is to be disposed of in a legal manner at an approved landfill.

All properties are to have debris removed, areas of work back-dragged, grassed, and strawed (unless otherwise specified) with the following mix depending on date of application.

August 16 – April 14

Winter Rye 100 lbs/acre
KY 31 Fescue 150 lbs/acre
Straw Mulch 4000lbs/acre

April 15 – August 15

Hulled Bermuda 50 lbs/acre
KY 31 Fescue 200lbs/acre
Straw Mulch 4000 lbs/acre

Protected trees: Mature and signature trees must be avoided. Trucks and heavy equipment must not drive or park within their driplines. Do not tear or break branches. Branches which must be removed for access or because they are dead or diseased must be cut using the 3-cut method. Do not sow grass within dripline, but mulch heavily.

METHOD OF DEMOLITION

Any standard method of demolition currently in use except burning or blasting shall be acceptable.

ASBESTOS AND HAZARDOUS MATERIAL

GCRA will contract with an approved environmental testing firm to identify any ACM at a property prior to demolition. If testing identifies asbestos (or any other hazardous material) located within or on a structure to be demolished, or such materials are found on the demolition site, the Contractor shall:

1. Acknowledge the presence of said materials in writing to the Greenville County Redevelopment Authority and other proper officials;
2. Follow all removal and disposal procedure and regulations of the South Carolina Departments of Health and Environmental Control (SCDHEC), the United States Environmental Protection Agency (EPA), the County of Greenville, and any other Governmental organizations. Certify to the Greenville County Redevelopment Authority that all necessary and legally required precautions, rules, regulations and procedures have been taken during the demolition, excavation and disposal of materials; and supply the Greenville County Redevelopment Authority with such documentation as it may have to support said certification.

EXCAVATION

1. Protection of Adjacent Buildings and Existing Structures.
Excavations shall not be carried below existing foundations until underpinning and shoring to be performed by the contractor have been completed. All existing structures, pipes, and foundations which are to remain shall be adequately protected by the Contractor without cost to the Owner.
2. Protection of Roofs and Skylights of Adjoining Buildings.
Protection for the skylights and roof of adjoining buildings shall be provided, at the Contractor's expense, provided that if the owner, lessee or tenant of the adjoining building should refuse permission to have the roofs and skylights protected, the responsibility and expense for the necessary protection shall devolve on the person refusing such permission.

3. Waste

Excess material from the excavation not suitable or required for backfill or filling shall be removed.

4. Disposal of Materials

Salvaged materials from the structure may be stored on the site temporarily but not beyond the date specified for completion of the Contract. All other materials shall be promptly removed as the demolition or clearance progresses.

EXISTING UTILITIES

1. The disconnection of all utilities shall be the responsibility of the contractor (gas, water, telephone, power, sewer, cable).
2. Sewer services shall be disconnected as close as possible to the road right of way of property line. Sewer services shall be terminated in accordance with local codes. Contractor shall verify with local municipalities or ReWa prior to terminating service.
3. Any expense or damage to utilities shall be the responsibility of the contractor.

GRADING

Any exposed earth uncovered by demolition will be graded smooth. In the event low areas remain which will cause water to stand, the Contractor shall be responsible for grading or filling and grading to eliminate. All rubble is to be removed. The area must be smooth enough to mow with a landscaper's mower. Contractor is also responsible for maintaining minimum slopes to prevent erosion.

BACKFILLING AROUND FOUNDATIONS

All timber shall be removed and all trash shall be cleared from excavation. Backfill shall be excavated material. Backfill shall be placed in 8" layers and compacted by mechanical tamping. Surface of backfill shall be left 6" above grade to allow for settling. All basement areas are to be cleaned and, when specified, filled to street level with red clay compacted up to 95%.

CLEAN-UP

All trash and debris shall be removed and disposed of in a legal manner at an approved landfill. Dump tickets shall be provided to GCRA with final invoice.

PERMITS

1. The Contractor shall obtain and pay for all permits and licenses necessary for the completion and execution of the work and labor to be performed.

2. The Contractor shall perform all work in conformance with the applicable Federal, State, and local codes, regulations, and requirements whether or not covered herein by the specifications and drawings for the work.

SAFEGUARDS DURING DEMOLITION

The Contractor shall be responsible for the safety of all individuals and those performing the work under this contract and for any damages to the property that may occur as the result of negligent acts by him or his workers and shall indemnify the Owner and/or the Greenville County Redevelopment Authority through insurance as stipulated in the contract documents.

SECTION V – APPENDIX: CODES & AMENDMENTS

Reference is hereby made to the current editions and amendments in effect, for the following Codes:

1. I.C.C. (International Code Congress).
2. I.R.C. (International Residential Code).
3. IPMC (International Property Maintenance Code).
4. HUD, 24 CFR, Sect. 882.109, Housing Quality Standards.

These referenced Codes and Amendments shall be a part of these specifications as though they were printed complete here in their entirety. In case of conflicting requirements, those that are more stringent shall prevail.