SECTION 07 51 00

BUILT-UP BITUMINOUS ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. All requirements for Built-up Roofing.

1.02 RELATED REQUIREMENTS

A. The Contractor for this work is referred to the "Instructions to Bidders", "Form of Proposal", "General Conditions", "Contract Drawings", and all “Amendments and Addenda” thereto, if any, all of which are hereby made part of the Contract Documents.

B. Section 06 10 00 - Rough Carpentry: Wood nailers and curbs.

C. Section 06 10 00 - Rough Carpentry: Wood cant strips.

1.03 REFERENCE STANDARDS

A. Factory Mutual (FM Global) - Approval Guide.

B. Underwriters Laboratories (UL) - Roofing Systems and Materials Guide (TGFU R1306).

C. American Society for Testing and Materials (ASTM) - Annual Book of ASTM Standards.

D. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.

E. Asphalt Roofing Manufacturers Association (ARMA).

F. National Roofing Contractors Association (NRCA).

G. American Society of Civil Engineers (ASCE).

1.04 GENERAL PROVISIONS

A. These Specifications complement and supplement the Contract Drawings. Any variation, discrepancy or conflicting information found by the Contractor on the face of the documents shall be brought to the attention of NYCHA prior to the submission of a bid.

B. All measurements required for proper execution of the work is the Contractor’s responsibility. Before submitting bid examine all existing conditions which may impact on the work and include them in the bid price.

C. **A Complete Manufacturer’s 20 year N.D.L (No Dollar Limit) GUARANTEE ON INSTALLATION and MATERIALS** by Johns Manville, GAF, Certainteed, or equal is required for this roofing installation. As such the Contractor must be certified as an installer by roofing manufacturer providing the guarantee. The certified installer must pre- register the guarantee and submit a copy of that pre registration at the pre start meeting and prior to beginning work. The actual guarantee must be provided to the Authority PRIOR to the close out of the project.

D. The NDL 20 year guarantee must extend for the full 20 years. **All materials, components and installations must be acceptable to and not void the roofing Manufacturer’s 20 year N.D.L. GUARANTEE ON INSTALLATION and MATERIALS.**

E. The contract drawings may rely on existing building and site blueprints for their dimensions and the depiction of existing conditions. It is the Contractor’s responsibility to take field measurements and verify all dimensions and field conditions upon which the new work is in any way dependent for accurate and correct workmanship. The Contractor's Base Bid, as accepted by NYCHA, includes the total cost of all the work required by the Contract Documents. There will be no adjustments of the contract price due to field measurements and conditions differing from those shown on the Contract Drawings.

1. Items of work or construction / installation details not specifically mentioned in the Contract Documents, but necessary for the complete and proper execution of other work specifically called out therein, shall be by inference included in the contractors’ scope of work. The apparent silence of the contract documents with regards to any detail of the specified work or the apparent omission from them of a detailed description of work to be

done or materials furnished shall be regarded as meaning that only the best general practice is to be used and interpretation of these documents shall be made upon that basis. Should any conflict occur in the contract Drawings or Specifications, the contractor shall be deemed to have bid on the most expensive way of doing the work unless he/she has asked for and obtained a written decision from NYCHA resolving the conflict prior to the bid closing date.

F. The contractor shall take whatever precautions are necessary to protect the property of the Housing Authority and their tenants from damage or loss arising out of their execution of this contract. The Contractor shall assume all responsibility for any such damage or loss and shall, at his/her own expense, repair or replace any property that becomes damaged or destroyed. The Contract Inspector shall determine whether affected property has been damaged to such an extent that it can not be restored to its original condition and must be replaced.

G. The Contractor shall start duly authorized work and continue on a full time work program until completed. Failure to maintain a full time work schedule will be considered grounds for the denial of requests for extensions to the time for completion of the contract.

H. The Contractors shall supervise and be responsible for proper location and installation of all items, and coordinate with each other as required or as directed by NYCHA.

I. All work shall be done in a neat and clean manner by experienced and capable mechanics. Workmanship shall be of superior quality. The work will be controlled by NYCHA. Any work poorly made, performed improperly, or involves unauthorized changes in specified material will be rejected and satisfactory corrections shall be made at the Contractor's expense.

J. The Contractor or sub-contractors shall poses the appropriate licenses for all contract work requiring licenses by any Federal, State or Local Law or Agency having jurisdiction there of. All electrical work must be done by a licensed NYC Electrician.

K. All Contractors shall sign the Contractor Log upon arrival each day and before leaving the project grounds. At the start of each day the contractors shall inform NYCHA as to the location and scope of work planned. Any condition, which might adversely affect the tenants whether during the workday or after close of operations, shall be reported to the Project Superintendent promptly.

L. Store materials and equipment in designated areas only. Storage must conform to Environmental Protection Agency Requirements.

M. The Contractor will be fully responsible for the protection of his/her materials, tools and equipment.

N. Protect the buildings, landscaping, trees, shrubs, facilities, etc. from any damage due to the work of this Contract. In case of damage, make all necessary repairs and replacements at no additional costs and with new materials to match the existing work as approved by the Inspector.

O. Do not use the building elevators to transport materials equipment. Submit method of lifting these materials for NYCHA approval prior to start of work.
   1. Submit a detailed working schedule, for approval of NYCHA before start of work.

P. Lower all debris to ground level by mechanical means.

Q. NYCHA and Contractor Coordination: To finalize the scope of work for each roof, a roofing conference must be held prior to beginning any work, between the NYCHA representative, certified roofing installation contractor, contractor, and the field representative of roofing manufacturer providing the 20 Year NDL Guarantee. At that conference the type of replacement roofing system will be confirmed, any field conditions incorporated into the scope of work utilizing the contract unit prices from the Form of Proposal and the roofing manufacturer’s representative will perform the required inspection for registering the 20 year NDL Guarantee.

R. Phasing and Coordination

1. Phasing work in Overall Development: Scheduling groups of buildings to be worked on in phases is required. See Division 1 General Requirements and the Schematic Sidewalk Shed Drawing for details and information.

S. Phasing/Coordinating Work at Each Building
   1. The contractor must provide temporary protection from water infiltration of the exposed roof and brick as well as asbestos abatement, of flashing at bulkheads walls and roofs and flashing at roof penetrations. This protection includes properly secured waterproof tarps at roof edge and bulkhead walls and temporary 2-ply flashing in cold applied flashing cement for roof penetrations.
      a. General roofing removal and replacement shall only commence once asbestos abatement and other brick work completed.
   2. **Criteria which allows the Contractor to remove roofing assembly over an entire roof leaving to existing sound waterproof vapor barrier as temporary waterproofing membrane.**
      a. The ambient temperatures must remain above 45 degrees for the entire period a roofing system will be replaced.
      b. If inspection of the existing vapor barrier by the NYCHA representative/CM finds the existing vapor barrier sound, dry and waterproof the contractor may still under direction of the field representative/CM patch any areas of the exist vapor barrier to assure that the roof is water tight.
      c. Then the contractor may be allowed to do a complete removal of all roofing down to the existing waterproof vapor barrier which will act as temporary waterproofing.
      d. Subsequently, as per this specification, the Contractor must remove only that portion of the existing vapor barrier and provide the new roofing system, as can be completed in a work day. This includes scarify patching and priming the slab after that portion of the existing vapor barrier has been removed and providing the new roofing system (waterstopping, insulation,cover board, roofing membrane and flashing, fascia and cap flashing)
      e. ***If any of these criteria and or conditions can't be met then the contractor may only remove as much roofing as can be replaced within one day(which includes removing existing vapor barrier).***

T. **NOTE:** Also See COLD WEATHER INSTALLATION PROCEDURE for more Information.

1.05 SCOPE OF WORK

A. Without limiting the generality of the foregoing, the following items of work shall be included in this Division:

B. All asphalt is to have the no smell asphalt additive. A tanker truck is required for asphalt application on all roofs under 10 stories.

C. Tapered Insulation Shop Drawing: Provide a survey and tapered insulation Drawing. The Schematic layout of Tapered Insulation on the roof plans is to assist in making Bids. The accepted Contractor shall have Licensed surveyor perform a survey of roof elevations/slopes, door saddle heights, heights of curbs and railing. The Contractor shall send that Survey on a scaled roof plan to the Roofing Manufacturer providing the 20 Year Guarantee to obtain a tapered insulation layout drawing. The Contractor shall then incorporate the Manufacturers tapered insulation drawing into a Shop Drawing showing. This Shop Drawing must be submitted to and approved NYCHA, The Roofing Manufacturer prior to commencement of work.

NOTE:

1. **NYS Energy Code and HUDCF24 R value requirements for roofing insulation:** NYS and HUD require a minimum average R value of 20 for roofing insulation assemblies above the roof deck. If polyiso insulation is used then R20 would translate to and average 2.5" of insulation.

2. **The Manufacturer's Taper Design** is integral to a 20 year NDL guaranteed roofing system. Deviations from their tapered layout may void the guarantee and as such must not be done without be signed pre-approval by the Roofing Manufacturer and the Authority.
3. **42" is required** from the top of railing or parapet to top of finished roofing.

D. Roofing Replacement at Main and Bulkheads Roofs.
1. Remove existing built-up roofing membrane, vapor barriers, roofing insulation, cant strips, water stopping, base and metal cap flashing, gravel stops, curb flashing and metal cap, pitch pockets, fascia and roofing cement and expansion joints down to the roof slab for main and bulkheads roofs, regardless of the number of plies.
   a. NOTE: Removal of base flashing and mastic waterproofing may require areas of underlying masonry where existing base flashing or waterproofing to be repointed or replaced.
2. Preparation of Main and Bulkheads roof slabs (elevator machine rooms and stairwells) and slab edges: Prior to re-roofing, fill depressions and patch damaged main and bulkhead roof slabs and slab edges and replace nailers as required prior to re-roofing.
3. Where directed by NYCHA rake and repoint or replace damaged brick.
4. The bulkhead roofs and most of the main roofs (except at the perimeters) are currently flat. All new roofing shall be tapered to drainage. Patch and repair existing Conc. Cant as required.
5. At all Roofs:
   a. Hot mop 2 ply vapor barrier directly to concrete slabs.
   b. Provide new roofing system with poly-iso insulation, 2 ply water stopping every 400 sq ft., 1/2" hi-density wood fiber overlay board with staggered joints.). At main and bulkheads roofs provide 4 ply felts set up in hot mopped asphalt bitumen for flat roofing systems. Finish with gravel and flood coat.
   c. At bulkhead walls and other masonry above roof level, provide new liquid applied flashing. At other locations, where flashing cannot be carried a minimum 8" above the finished roofing provide low height single ply liquid applied flashing. At all locations where SBS and low height flashing meet overlap the SBS with the low height liquid applied flashing by a minimum of 6".
   d. Provide SBS strip flashing set in flashing cement at all locations shown on drawings.
   e. Provide new stainless steel cap flashing, fascia /gravel stops, and walkway pads, stainless steel diverter boxes at existing downspouts. **All items must be compatible with Roofing Manufacturer's 20 NDL year guarantee.**
   f. Provide blocking and nailers, cant strips and accessories to complete the new roofing installation.
   g. Finish entire roof with gravel, set in a flood coat of hot asphalt.
   h. Remove raggleblock and replace with new brickwork.
   i. Remove existing steel saddles at bulkhead doors, provide new steel saddles.
   j. Provide new walkway pads at all stair doors, diverter boxes, and bulkhead ladders.
   k. Replace existing roof expansion joints, as shown on Drawings.
   l. Provide new sealant and backer rod as noted on Drawings or as required.
   m. Replace wood supports for exposed conduit as shown on Drawings or as required.
6. All Drains, Leaders and Traps:
   a. Prior to commencement of work, the Contractor, Development Superintendent and Contract Inspector shall conduct a joint survey to determine which, if any, of the roof drain leaders are blocked.
   b. Contractor shall provide all tools, equipment, and manpower required to evaluate every roof drain. Development staff shall unclog blocked leaders prior to beginning roofing work.
   c. Attach to the pre-construction meeting minutes three copies of a form listing the condition of each drain line, signed by Development Superintendent and Contractor.

d. No roofing work shall commence until the Contractor and Development Superintendent certify in writing to NYCHA that all roof drain lines are in working order and free of blockages. Any subsequent blockages encountered shall be the responsibility of the Contractor and will be treated as a punch list item.
e. Clean debris and all foreign matter from the drain bodies.
f. Provide wood protection plugs in roof drains during roofing work. Remove them at the end of each work day and once work is completed.
g. Replace all roof drain domes, lead flashing and clamping rings. All hardware to be vandal resistant.
h. Provide diverter boxes on walkway pads where the bulkhead roof drain cast iron leader outlets onto the main roof.

7. Roofing Samples
   a. After installation of roofing, take two (2) roof samples on each building where directed by NYCHA and Roofing Manufacturer.
   b. Repair roof where samples have been taken.

1.06 PERFORMANCE REQUIREMENTS

A. Provide a roofing membrane and base flashing system that does not permit the passage of water, and will withstand the design pressures calculated in accordance with the most current revision of ASCE 7.

B. Johns Manville, GAF, Certainteed or equal roofing system or equal shall provide all primary roofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.

1.07 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures and requirements. Coordinate all submissions with submissions of other portions of this contract.

B. Warranty: Submit manufacturer warranty and ensure forms have been completed in NYCHA's name and registered with manufacturer.

1.08 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Johns Manville, GAF, Certainteed or equal shall provide a roofing system that meets or exceeds all criteria listed in this section.

B. Installers' Qualifications:
   1. Installer shall be classified as a contractor as defined and certified by the roofing manufacturer for installing 20 year NDL roofing systems.
   2. Installer shall be classified as a minimum master contractor as defined and certified by the roofing Manufacturer providing the guarantee.

C. Source Limitations: All components listed in this section shall be provided by a single manufacturer or approved by the primary roofing manufacturer.

1.09 PRE-INSTALLATION CONFERENCE

A. Prior to scheduled commencement of the roofing installation and associated work, conduct a meeting at the project site with the installer, architect, owner, manufacturer's representative and any other persons directly involved with the performance of the work. The installer shall record conference discussions to include decisions and agreements reached, outstanding issues, and furnish copies of recorded discussions to each attending party. The main purpose of this meeting is to review foreseeable methods and procedures related to roofing work.

1.10 REGULATORY REQUIREMENTS

A. All work shall be performed in a safe, professional manner, conforming to all federal, state and local codes, New York Building code for roof assembly fire hazards.

B. Exterior Fire Test Exposure: Provide a roofing system that will achieve a UL Class A rating for roof slopes indicated.

C. Wind storm Classification: Provide a roofing system and accessorie(including fascia and cap flashing)which will achieve a wind uplift rating of FM-I-90, as listed in the current FM Approval Guide.

D. Notification - The Contractor shall give a minimum of five (5) days notice to NYCHA and Manufacturer prior to commencing any work and shall notify both parties of any change in the work schedule.

E. Permits - The Contractor shall obtain all permits required by local agencies and pay for fees, which may be required for the performance of the work.

F. Safety - The Contractor shall familiarize every member of the application crew with all fire and safety regulations recommended by OSHA, NRCA, other industry groups, and governmental agencies having jurisdiction over the work.

G. NYC Fire Department and DOT Requirements:

1. It is assumed that no kettle will be necessary for application of roofing within the scope of work. If use of a kettle would be necessary and approved by NYCHA the Contractor will request and obtain a variance from the New York City Fire Department, with all associated fume recovery systems.
2. Equipment, Fuel and equipment Operators must meet the requirements of the New York City Fire Department and DOT including the Kettle Operators Certificate of Fitness and Certificate for transport of propane
3. ***NO Propane may be stored on site after work hours(no overnight storage)***

H. Protect the buildings, landscaping, trees, etc. from damage due to work of this contract. Should any of the foregoing be damaged due to work of this Contract, report the circumstances to the Inspector and make all necessary repairs and replacements to match the existing work to the satisfaction of the Architect.

I. Remove from the site and legally dispose all materials and debris. Move debris off roofs via chutes or containers; Work shall be left in a clean condition.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Deliver all roofing materials to the site in original containers, with factory seals intact. All products are to carry the approved manufacturer's label.

B. Store all roll goods in their original undamaged containers in a clean, dry location within their specified temperature range.

C. Store rolled goods, including vapor barrier, top and bottom base flashing sheets, on end on pallets in a clean, dry, protected area. Take care to prevent damage to roll ends or edges. Do not double stack modified bitumen products.

D. Do not expose materials to moisture in any form before, during, or after delivery to the site. Reject delivery of materials that show evidence of contact with moisture.

E. Remove manufacturer supplied plastic covers from materials provided with such. Use "breathable" type covers such as canvas tarpaulins to allow venting and protection from weather and moisture. Cover and protect materials at the end of each work day. Do not remove any protective tarpaulins until immediately before the material is to be installed.

F. Materials shall be stored above 55°F (12.6°C) a minimum of 24 hours prior to application.

G.

1.12 PROJECT CONDITIONS - WEATHER

A. Proceed with roofing only when existing and forecasted weather conditions permit.

B. Ambient temperatures must be above 45°F (7.2°C) when applying hot asphalt or water based adhesives.

C. Cold Weather Procedures for Installation of Built-Up Roofing

1. The following are owner Requirements. The individual Roofing manufacturers providing the 20 year NDL guarantee may have additional restrictions or requirements.

a. Outdoor Temperatures
   1) Winter installation guidelines shall be implemented when the outdoor ambient temperature drops below 45° F.
   2) No roofing work shall be installed below 32° F. Wind chill factor shall be considered in determining the actual temperature. (see attached wind chill chart)
   3) The temperature of the substrate receiving new built up roofing shall be 32° F. or greater. This temperature shall be determined by means of a hand held infra red thermometer.

b. Material Storage
   1) All roll goods and adhesives shall be stored in a warm dry location at temperature of 55° F. or greater for a minimum of 24 hours prior to application.

c. Roofing Installation
   1) No more roofing shall be removed in one day than can be replaced with new vapor barrier, insulation, and glazed coated 4 ply membrane in that same day.
   2) The use of vapor barriers, without installing any insulation and 4 ply, as a temporary roof shall be strictly prohibited.
   3) Mopping of hot asphalt shall not precede the roll by more than 4 feet.
   4) All rolls must be set in place using a broom or squeegee immediately after asphalt has been deposited.
   5) A moisture test shall be conducted on each section of roof deck where built up roofing is to be installed. A log shall be maintained identifying each roof area tested. No roofing shall be installed where moisture is found to be present on the roof deck.

2. Asphalt Temperature Control
   a. Asphalt temperature shall be monitored at the point of application (mop cart or mop pail) by means of a hand held infrared thermometer.
   b. For CM jobs, an asphalt temperature log shall be maintained by the CM firms' inspection staff. For conventional contracts, an asphalt temperature log shall be maintained by NYCHA inspection staff. The log shall document asphalt temperatures at 15 minute intervals and shall be made part of the permanent contract file.
   c. Asphalt temperature at the point of application (mop cart or mop pail) shall comply with manufactures published asphalt temperature requirements.
   d. When asphalt temperatures are found to be non compliant work shall be stopped until such time as compliant asphalt temperature can be achieved.
   e. Trade contractors shall not be permitted to monitor or log asphalt temperatures for record purposes.

1.13 ROOFING AND EDGE PROTECTION

A. Protect all partially and fully completed roofing work from other trades until completion. Whenever possible, stage materials in such a manner that foot traffic is minimized over completed roof areas.

B. When it is not possible to stage materials away from locations where partial or complete installation has taken place, temporary walkways and platforms shall be installed in order to protect all completed roof areas from traffic and point loading during the application process.

1.14 GUARANTEES AND WARRANTEES

A. **The Roofing Manufacturer shall guarantee all workmanship and materials described in this Section for a minimum period of 20 years with No Dollar Limit (NDL). The Bond shall be for the entire 20 year period.**

B. The Contractor performing the work of this Section shall furnish proof of his/her ability to obtain the type of bond described above, before the work is started.

C. Defective Work
   1. The following types of failure will be judged as defective work including but not limited to:

a. Using products not from single source system roofing manufacturer including insulation, roof membrane, flashing, fasteners or products not labeled by one Manufacturer.
b. If any work leaks, fails to stay in place, or results in ponding.

2. The Contractor shall make permanent corrective repairs, as recommended by the Manufacturer and as approved by the Owner, within 48 hours of notification. If inclement weather does not permit permanent corrective repairs, the Contractor shall make temporary repairs, as approved, within the aforementioned time frame.

D. Complete roof installation, methods and materials used, shall comply with all requirements for the roofing Manufacturer's Guarantee. Manufacturer's Representative shall make three required inspections and certify approval of all work. All warranty inspections are to be conducted by Manufacturer's technical representative. Guarantee by salesmen are not permitted.

E. Roofing Contractor must be a qualified and authorized installer for the roofing system used and approved on this project.

1.15 SECURITY

A. The Contractor shall properly and completely protect all apparatus included in this Contract against dirt and damage. The Contractor shall be held fully responsible for all damage to apparatus, regardless of whether provided by him/her or belonging to the Authority, until final acceptance. Any equipment furnished under the Contract and any property of the Authority damaged or destroyed by the Contractor or his/her employees shall be restored to its original condition or replaced without additional cost to the Authority.

B. The Contractor shall adequately secure and protect areas where the installation is incomplete at the end of the working day, and shall be responsible for any damage or inconvenience due to his/her failure to do so. Such protection shall be done to the complete satisfaction of the Inspector.

C. The Contractor shall provide all necessary safety equipment, materials and personnel, to protect the public areas, entrances to the buildings, within the work areas of this contract in order that pedestrians, tenants and the public be protected at all times.

D. The Contractor is responsible for the security of the work sites until final acceptance by the Authority.

E. Provide temporary barricades and post signs for safety and provide dust controls as required by the Contract and all agencies and authorities having jurisdiction over the project.

PART 2 PRODUCTS

2.01 GENERAL

A. Acceptable Manufacturer - Johns Manville, GAF, Certain teed or equal.

B. All roofing materials shall be the product of the same Manufacturer shall conform to that MANUFACTURER'S requirement to obtain 20 year NDL guarantee.

C. All materials shall be ASBESTOS FREE.

2.02 SHEET MATERIALS

A. Sheet Roofing Materials:

1. BUR Plies- asphalt saturated fiberglass felts: BUR plies shall meet ASTM D2178, Type VI, by Johns Manville, GAF or Certainteed or equal and be compatible with that required by roof Manufacturer's guarantee.
2. Water stopping (every 400 sq. ft.) shall consist of 2 plies of roof felt extending 10" under and 6" over the top of the insulation. These felt stops shall be first mopped to the roof slab, turned up on the vertical edges of the insulation and then turned over and mopped to the top of the insulation. ASTM D2178, Type IV
3. Vapor Barrier (Bulkhead and Main Roof) consists of 2 plies of asphalt coated fiberglass felts conforming to ASTM D-2178, T type VI.

4. Reinforced Base Flashing shall be compatible with roofing Manufacturer's Guarantee and shall consist of flashing membranes meeting the following characteristics:
    a. Underlying 1 ply Base Flashing shall be of smooth surfaced sheet of asphalt and polymer modifiers of styrene-butadiene-styrene (SBS) type, incorporating a flexible fiber glass/polyester composite mat, ASTM D6162.
    b. Top Cap Ply of Granulated Reinforced Base Flashing shall be of white granulated surfaced sheet of incorporating a flexible fiber glass/polyester composite mat, ASTM D6221.
5. Strip Flashing shall be the same materials and configuration as the roofing plies listed above for the reinforced base flashing.
6. Liquid applied flashing for flashing standard roofing penetrations: Liquid applied flashing shall be the flashing system used at all joints and penetrations except where noted or as approved by the Authority. The low height flashing shall be either a stitch bonded polyester scrim fabric completely saturated /covered and set in place with w/ 2 part flashing cement (JM Perm Flash by Johns Manville, Kemper or approved equivalent). The system requires designated primers prior to flashing application as well as a top coat broadcast surfacing of roofing granules or silica sand. The utilized system must be compatible with and covered under the roofing manufacturer's 20 year guarantee.

2.03 BITUMINOUS MATERIALS

A. Asphalt for Interply moppings of asphalt, hot mopping insulation, roof membrane adhesive shall meet ASTM D312, and be Type III. And be compatible with the roofing Manufacturers 20 year guarantee.

B. No smell Asphalt Additive (for all asphalt):

C. The additive is an odor suppressant that on the molecular level retards the release of specific odor compounds in the asphalt. Encapsulating asphaltines, IT stops the evaporation of lighter petroleum molecules, eliminating fumes. The additive is to be CONTINENTAL NO SMELL ASPHALT by United Asphalts or approved equivalent.

D. Asphalt Primer shall have maximum curing time of 1-1/2 hour, shall meet ASTMD41.

E. Modified Flashing Cement for flashing shall be 2 part Flashing Cement - component, elastomeric adhesive specially formulated to be compatible with SBS modified products and shall be 2 part MBR flashing cement by Johns Manville or approved equivalent.

2.04 INSULATION

A. POLY-ISO Insulation: ASTM C209, poly-isocyanurate rigid board, both faces finished with glass fiber facing.

B. Overlay Boards shall be rigid ½" thick, high density wood fiberboard, compatible with roofing Manufacturer's Guarantee.

2.05 ROOFING GRAVEL

A. Roofing gravel shall be a white surfacing aggregate conforming to ASTM D1863 and be either a low grade white marble chip (Arctic White) or a low grade white limestone (spar) roofing. It should be spread in the flood coat of asphalt at a rate of 400lbs per 100 sq feet with a minimum particle size of 3/8" to a maximum 5/'" with no fines or organic matter.

B. Fasteners
    1. For nailers and blocking: Use power actuated stainless steel pin fasteners with a 36 mm diameter steel washer. Fasteners shall penetrate 1-1/2" into concrete and shall be spaced approximately 16" o.c. except at corners and terminations of nailers and blocking where they shall be installed 4" from end points. Because of galvanic action fasteners must be stainless steel when used for fastening CCA wood blocking. HILTI stainless steel Model DNI72P8536 or equal.
    2. Nails for stainless steel flashing meet National Bureau of Standards R150 and Federal Specification FF-N-105a and shall be long enough to penetrate 1" into the wood. Nails

used for exposed stainless steel fascia shall be 1-1/4" long, stainless steel or monel thread type.

3. Fasteners for wall flashing shall be corrosive resistant No. 9 gauge screw - tite knurled masonry nails, maximum 2" in length with corrosive resistant washers.
4. Roof Drain: New parts shall consist of a cast iron low profile cast iron dome strainer and a combination clamping device/gravel stop ring. New parts shall properly fit the existing drain body. Domes shall be secured in place with brass or stainless steel tamperproof bolts, and vandal proof hardware as Manufactured by Jay R. Smith Manufacturing # 1001 or equal. To assist in flashing roof drains penetrations provide lead flange type flashings at drains.
5. Roof Drain Traps: Shall be cast iron, running trap with double hub vent cleanout (Code 7265) as Manufactured by Tyler Pipe or equal. New trap shall cut into each r

2.06 DIVERTER BOXES

A. The box shall be made of 1/4" thick stainless steel and shall be welded construction. Its base dimensions shall be 2'-0"x 2'-0", and its height - approximately equal to the distance from the top of roofing to bottom end of tank drain pipe. The two side panels and the front panel of the box shall contain 6 vertical rows of four 1" diameter outlet holes, all equally spaced, but the back panel (i.e. the panel nearest and parallel to the bulkhead wall) and the bottom shall be without holes.

2.07 SHEET METAL REQUIREMENTS

A. Gauges for sheet stainless steel shall be U.S. Standard; gauges for non-ferrous metals shall be B and S.

B. Stainless steel shall be Type 304 (2D) dull, non-reflective finish, conforming to Federal Specification QQ-S-766 dead soft fully annealed.
   1. Fascia - gravel stops: 24 gauge
   2. Fascia cleats: 22 gauge
   3. Fascia cover plates: 24 gauge
   4. Base flashing at Bulkhead doors: 26 gauge
   5. Cap flashing: 24 gauge

C. Solder for stainless steel shall be 40 percent lead and 60 percent tin (new materials) and shall conform to ASTM B-32. Flux shall meet Federal Specifications O-F-506.

D. Fascia-Gravel Stop: Shall be 24 gauge stainless steel with a concealed, internal mounting clip and a fascia cover which clamps down the base flashing. The fascia cover shall be 24-gauge stainless steel. The fascia system must be compatible with and covered under the roofing manufacturers 20 guarantee. The Fascia system shall meet SPRI-1-98 Wind Design standards and qualify for a 150 MPH wind speed.

E. Door Saddle shall be ¼" thick checkered plate steel, galvanized in accordance With ASTM A123.

2.08 ACCESSORIES

A. Wood Blocking and Wood Nailers
   1. If required, shall be pressure treated with water borne copper preservatives such as CCA or equal. New wood blocking shall match the thickness of the new roof insulation.
   2. NOTE: All copper preserved wood such as CCA requires isolation from surrounding metals to prevent galvanic action. Further, fasteners and nails shall be stainless steel so as not to be corroded by the copper preservative.

B. Cant Strips: Fhall be high density fiberboard by GAF or equal and compatible with those required by roof Manufacturer's Guarantee.

C. Walkways and Splash Pads: For areas at doors, under ladders, at diverter boxes and as shown on Drawings shall be 1/2" thick, 36" x 72" size as manufactured by the roofing manufacturer providing the 20 year guarantee.

D. Patching Compound: To repair the concrete slab shall be polymer modified cementitious compound like Thoro HB2 Repair mortar by ThoRoc, Degussa Building Systems, Emaco R320 by Master Builders, Deguss a Building Systems, or equal.

E. Precast Concrete Splash Blocks: Shall be light weight 4000 psi concrete with 3/8" Epoxy coated steel reinforcing.

F. Expansion Joint Cover: Roof to Wall Flexible Expansion Joint Cover shall be an exterior type, weatherproof, flexible rubber membrane, supported by closed cell foam to foam flexible bellows with two (2) metal mounting flanges as manufactured by GAF or equal.

G. Brick Replacement and Replacement of Raggle Block with Brick:
   1. Face Bricks shall be type FBS, Grade SW, and shall comply with ASTM C-216. Bricks shall be sound, whole, clean, new clay or shale bricks. No underburnt or overburnt bricks will be permitted. Bricks shall be 'Jamestowne' by Richard Moulded Brick, 1000 Richland Shale Rd. Mannisfield, OH.
   2. Mortar for all masonry shall conform to ASTM C-270 Type N. Mortar shall consist of one (1) part Portland Cement, one (1) part hydrated lime, and five (5) parts damp loose sand. The Compressive strength of the mortar shall be 750 psi at 28 days. Color of mortar shall match existing mortar. No admixtures shall be permitted. Mortar shall be accurately proportioned and machine mixed. The Authority has the option to test mortar at its own expense. Mortar samples will be taken at regular intervals, and tested for compressive strength. In case of substandard mortar, the Contractor shall remove the masonry built with that mortar and replace the same with new mortar at no cost to the Authority. Retempering of mortar is not permitted. Mortar not used within an hour must be discarded.

PART 3 EXECUTION

3.01 INSTALLATION

A. GENERAL
   1. Examine surfaces for inadequate anchorage, foreign material, moisture, and Unevenness, which would hinder proper drainage and proper installation of roof system as specified.
   2. SUBSTRATE PREPARATION
      a. Prior to the installation of the roof assemblies, evaluate the surface moisture and deck's dryness through the use of ASTM D-4263 or hot bitumen test.
      b. The deck must be smooth, level and cannot be wet or frozen. If deck is determined to be wet, it must be allowed to dry.
      c. Sumps for the roof drains shall be provided in the installation of insulation.
      d. When insulation or roofing is to be adhered with hot asphalt, prime the deck with quick drying primer (1 ½ max drying time) concrete at the rate of one gallon per 100 square feet (0.4 L/m2). Allow the primer to dry prior to the application of the roofing system. In all retrofit roof applications, it is required that deck be inspected for defects. Any defects are to be corrected prior to the new roof application.
      e. 5. Scarify the deck to remove vestiges loose or wet vapor barrier and then prime the deck prior to installing new vapor barrier.
   3. Verify deck surfaces are dry, clean and free of snow or ice.
   4. Do not proceed with application of roofing system until defects are corrected.
   5. Verify roof openings, curbs and penetrations through roof are solidly set, and cant strips, wood nailing strips and reglets are in place.

3.02 NEW ROOFING AND ROOFING ACCESSORY INSTALLATION

A. Repairing Roof surface and slab edges by patching any damaged areas and filling depressions.
   1. Repairing Deck: Treat cracks greater than 1/8" (3 mm) in width, fill voids, and depressions in accordance with the concrete patch manufacturer's recommendation.

B. Slab Condition: Surfaces to receive new roofing or flashing materials shall be smooth, clean, firm, frost free and dry. Do not install when ambient temperatures are less than 45°F. Wetness

Test Pour a small amount of hot bitumen on the deck. If it froths or bubbles the deck is too wet or Try to remove it with your fingernails, if you can, the deck is too wet.

C. Preparing Bulkhead and Building Walls for Base and Metal Cap Flashing.
   1. General: Clean existing brickwork to course below cap flashing to permit installation of new base flashing and flashing cement/adhesives.
   2. Replacing Raggle Block: Replace all raggle block with two (2) courses of brickwork under existing through the wall cap flashing.

D. Heating Bitumen
   1. Preparation:
      a. Use separate tankers for heating different types of asphalt.
      b. The heating process shall be strictly regulated by means of an automatic thermostatic control of an approved type for positive temperature control.
   2. Heating Asphalt Bitumen: Heat the asphalt bitumen in accordance with the equiviscous temperature information furnished by the bitumen Manufacturer for that specific run of bitumen.
      a. In no case shall the asphalt be heated to or above the actual COC flash point; or the finished blowing temperature for more than 4 hours.
      b. Maintain the temperature of the bitumen at the point of application within the EVT Range. Use insulated pipes, buckets, luggers and other insulated roofers equipment as required by field conditions

E. INSTALLING VAPOR BARRIER
   1. Apply concrete primer at one gal/square (0.41 liters/m2) and allow drying.
   2. Mop surface with asphalt and embed two plies of roofing felt; l applies 19 inches (483 mm); apply bitumen at 25 lbs / square (1.2 kg/m2) nominal.
   3. Extend vapor barrier under cant strips and blocking.
   4. Extend plies of vapor barrier six inches up and onto insulation, as to envelope.

F. Application of Insulation:
   1. General
      a. Prior to beginning work, survey the roof slabs.
      b. Do not apply more insulation than can be covered with finished roof in the same day.
      c. Embed layers of insulation into flood coat mopping of hot asphalt in accordance with insulation manufacturer’s instructions.
      d. Install high density fiberboard over the ISO in full mopping of hot asphalt. Joints are to be staggered.
      e. Install insulation boards with edges in moderate contact, without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
   2. Installation of Water Stopping:
      a. Install water stops every about 400 square feet of insulation to prevent penetration of moisture from adjacent insulation areas. Water stopping shall consist of 2 plies of asphalt saturated fiberglass roofing felt extending 10" under and 6" over the top of the insulation. These felt stops shall be first mopped to the roof slab, turned up on the vertical edges of the insulation and carry over the top edge and hot mop in place. At walls to supplement existing spandrel flashing, carry water stopping up over existing concrete fill cant and up 8” above the new finished level of the roof assembly.
      b. Protect edges of insulation of the isolated areas and edges adjacent to bulkhead walls, cants or other vertical projections with water stops.
      c. At the end of each day, install a temporary water stop at the edge of new work; remove at the beginning of work the next day.
   3. Insulation at Roof Drains: The rigid insulation around the roof drain shall be shaped and tapered toward the drain body to form a sump and to facilitate water flowing into the drain (8”-0”X 8”- 0” where space permits).

G. INSTALLATION OF OVERLAY BOARD: Hot mop high density fiberboard overlay board to underlying poly-iso insulation. Stagger joints of overlay board with underlying poly-iso joints.

H. INSTALLATION OF ROOFING MEMBRANE:
   1. For all roof areas:
      a. Coat surface of Insulation uniformly with 25 pounds of asphalt bitumen per square.
      b. Equiviscous Temperature at Point of Application: Apply with a tolerance of no more than ± 25 degrees F (14 degrees C) from bitumen rating indicated on bitumen container label.
      c. The roofing membrane sheets must be firmly and uniformly set, without voids into the Hot Asphalt. Apply sheets smooth, free from air pockets, wrinkles, fish mouths, lap joints, or tears
   2. 4 Ply BUR with Flood Coat and gravel Finished Roofing Membrane.

I. INSTALLATION OF ROOFING MEMBRANE: Lay 4-ply built-up roofing membrane on existing prepared concrete surface as follows:
   1. Coat surface of Insulation uniformly with 23 pounds of asphalt bitumen per square.
   2. Over entire surface, lay four (4) plies of asphalt saturated fiberglass felt (36" wide) lapping each sheet 27-1/2" over preceding one. Mop with 23 pounds per square of asphalt bitumen the full 27-1/2" lap on each sheet so that in no place shall felt touch felt. Lap the ends of sheets not less than 10".
   3. Asphalt shall extend beyond each lap a minimum of 1/2". (“Bleed out”). When complete, all laps shall be checked and if any edges found to be loose, they shall be covered with specified flashing cement
   4. Extend plies of membrane felts up 2” above cant strips.

J. INSTALLATION OF BASE FLASHING:
   1. Preparation: Inspect walls, curb heights, counter flashings, etc., and check for conformance with minimum base flashing height of eight (8”). Bring non-conforming areas to the attention of the Owner's Representative for correction.
   2. Primer: Prime all masonry, metal, or concrete surfaces from the top of the roof membrane to the termination of the flashing level with asphalt primer at the rate of one (1) gallon per 100 square feet or as recommended by the manufacturer. Allow the primer to dry thoroughly.
   3. Starting just below the point where the base flashing will terminate, trowel w/ cold applied 2 Part flashing cement and press the backer felt into place, lapping the vertical joints a minimum 3”. Trowel coat the back surface of the base flashing and the exposed face of the just applied backer felt and press the base flashing into place, with 3” end laps offset from those of the backer felt. Mechanically fasten the base flashing on 4” centers along the top edge and at the laps. Fasteners shall have an integral flat cap no less than 1” across.
   4. Install flashing in accordance with roofing manufacturer’s specification.
   5. All vertical laps shall be stripped-in with a two (2) course application of MBR Flashing Cement and fabric.

K. INSTALLATION OF LIQUID APPLIED LOW HEIGHT FLASHING
   1. Clean roof and wall surface and penetrating elements surface as per manufacturers’ instructions and prime.
   2. Apply saturated flashing scrim or fleece as per manufacturer’s instructions (8” up wall or penetrating element and 12” on to roof).
   3. Cover in place scrim or fleece with 2 part flashing cement or Resin as per manufacturer’s requirements.
   4. Apply additional coats of 2 part flashing cement or resin as per manufacturer’s requirements and cover/broadcast reflect roofing granules//silicate grains over entire flashed area.

L. METAL FLASHING, FASCIA-GRAVEL STOPS, FASCIA SUMPS AND OTHER ROOFING ACCESSORIES.
   1. Sheet Metal (general).

a. All sheet metal work, unless otherwise specified, shall have a minimum thickness of 0.018 inches (26 gauges U.S. Standard).
b. Fabricate and install sheet metal with lines, arises and angles sharp and true with exposed surfaces free from objectionable waves, warps or buckles.
c. Fold back exposed edges of sheet metal to form a 1/2" wide hem on the side concealed from view.
d. The finished work shall be leak proof under all weather conditions.
e. Fascia-gravel stops shall have shop-fabricated corners. All corners shall be mitered
f. Fascia-gravel stops, cap flashing and base flashing shall be in lengths not exceeding 10 feet.
g. The joints between the lengths of the base flashing shall be 1" flat locked soldered. The joints between individual lengths of fascia-gravel stops shall be butt type, with a minimum of 1/2" space between the individual lengths.
h. All nails exposed to weather shall be flat head screw-tite spiral threaded stainless steel nails of sufficient length to secure metal in place. Heads of nails shall be soldered over.
i. Between dissimilar metals, provide an insulating layer of roofing felt bitumen to prevent electrolytic action. Prime coat all stainless steel in contact with roofing and flashing felts.
j. Sheet metal work shall be reinforced where required.
k. Secure flanges of sheet metal work fastened to wood nailers with stainless steel wire slating nails or stronghold type at a maximum of 6 inches on center in a line 1" from edge of the flange.
l. Stainless steel sheets to be joined by soldering shall be cleaned and edges roughened, and an acid type stainless steel soldering flux shall be applied. After soldering, remove all flux residues by scrubbing, neutralizing with ammonia or washing soda and rinsing with clean water.
m. All stainless steel and copper work (excluding fascias) shall be given one brush coating of asphalt cement.
n. The horizontal flanges of fascia-gravel stops, base flashings, lead sheets at roof drains and other similar metal work shall be covered with 2 plies of felt strip flashing. The first ply shall be at least 4 inches wider than the horizontal flange; the second ply shall be at least 4 inches wider than the first ply. All plies of felt strip flashing shall be installed in trowel coatings of roof cement prior to flood coat and gravel application.

2. Flashing at Bulkhead Doors
   a. Flashing shall extend under the saddle and cap flashing as shown on Drawings and not less than 4” horizontally on the roof surface.
   b. After all plies of roofing felts are installed, set 1ply of liquid applied low height 8” up the wall 4 “onto the roof. Set at door saddle cover all layers with metal base flashing as shown on Drawings.
   c. Set vertical flange in roof cement and nail to backing with stainless steel nails spaced at a maximum of 4” O.C.
   d. Install horizontal flange over a coating of 2 part roof cement. Cover horizontal flanges with 2 plies of felt strip flashing set in 2part flashing cement.
   e. At bulkhead doors to roofs, metal base flashing shall be brought up not less than 1” under the vertical lip of the existing door saddle and caulked. If new saddle is to be installed, the new base flashing shall be installed under the saddle.
3. Installation of Metal Cap Flashing
   a. Within Bulkhead / Mechanical Room Brick Wall: Cut existing cap flashing. Cut the reglet 2 inches deep under existing cap flashing for the full thickness of the existing mortar joint. The horizontal flange of the new cap flashing shall be not less than 2 1/2" long and shall be turned up approximately 1/4", inserted into the reglet below the existing cap flashing and secured with lead wedges at a maximum of 16 inches on center. The reglet space shall be filled with cement mortar 1/2 inch from the face of the wall and the remaining space filled with caulking.

b. Shape cap flashing to lie flat over base flashing, so that it covers the top of the base flashing not less than 4". Individual lengths of cap flashing shall be lapped 4" and left unsoldered.

4. METAL TERMINATION BARS: shall be a minimum of 1/10" (3 mm) thick x 1" (25 mm) wide with preformed sealant edge lap. Bar should have 1/4" (6 mm) x 3/8" (10 mm) slotted holes on 4" (10.2 cm) centers to facilitate mechanical anchorage.
   a. Note: Termination bars are not suitable in all base flashing and wall flashing conditions. Termination bars may only be used where shown on the drawings and in conjunction with an appropriate counter-flashing extending a minimum of 4" (10.2 cm) below the termination bar. See Contract Drawing A-004.
5. INSTALLATION OF FASCIA/ GRAVEL STOPS
   a. Remove the existing fascia-gravel stops, patch concrete slab edge as required. Install new gravel stops w/ fascia with crimped drip edge for stiffening fascia.
   b. Extend flanges of gravel stops 4" and flanges for continuous gravel stops 5" onto the roof. Securely nail to wood nailers with stainless steel nails at a maximum 4 inches on center, in a row 1" from the edge of the flange. Embed in roof cement and cover with two ply SBS modified bitumen strip flashing before applying the gravel
   c. Fasteners used to secure gravel stops to concrete or to building exteriors shall be 1-1/2" long.
   d. Cleats shall be continuous. Cleat fasteners shall have a minimum penetration of 1-1/2 inches into new wood blocking, and shall be of a type approved by the Authority. All fasteners shall develop minimum pullout strength of 50 lbs for fascia gravel stops and 100lbs for gutter gravel stops.
   e. The blocking to secure fascia flanges and continuous gutter flanges shall match the thickness of the insulation above the concrete slab. Nails shall have minimum penetration of 1", and shall be spaced 16" on center.
   f. Provide a 6" cover plate over all joints; cover plate shall be formed to properly fit the profile of the fascia-gravel stop or gutter- gravel stop.

M. INSTALLATION OF STRIP FLASHING
1. Around roof drains penetrations: All lead flange type flashings at drains shall be primed and set in flashing cement at approximately 1/8" thick. The flange shall then be stripped in with 2 plies of reinforced modified bitumen strip flashing after application of the cap sheet and lead flashing is set in hot bitumen to secure. Upper ply of granulated flashing shall extend minimum 8" past the edge of the metal flange.
2. At gravel stops/fascia: Provide 2 plies of modified, reinforced SBS flashing sheet set in 2 part flashing cement. Top layer of flashing is to be a granulated surfaced. Carry flashing over top of internal/captured fascia cleat.
3. Stainless steel base flashing at bulkhead doors: Strip flashing shall extend minimum 4" and 8" past the edge of the stainless steel base flashing.

N. FLOOD COAT AND GRAVEL FINISH: After complete Installation of the roofing system including roofing membrane, flashing, and sealant pan/curbs, apply asphalt and gravel flood coat. Over the entire surface, pour a uniform coating of asphalt or modified bitumen using about 60 pounds per 100 square feet. Embed 400 pounds of gravel per 100 square feet in the hot bitumen.

O. WALKWAY PADS AND DIVERTER BOXES
1. Cut the walkway pads to fit around door area. Install before the roof has been completely surfaced with slag. Install with the long dimension parallel to the adjoining bulkhead wall.
2. Sweep roof clean and install the pads in a heavy mopping of hot asphalt bitumen applied over bare roofing membrane. Press each pad into the bitumen for positive adhesion.
3. A water diverter box shall be installed under water drainpipes.
   a. The box shall be made of 1/4" thick stainless steel and shall be welded construction. Its base dimensions shall be 2'-0"x 2'-0", and its height - approximately equal to the distance from the top of roofing to bottom end of tank drain pipe. The two side panels and the front panel of the box shall contain 6 vertical rows of four 1" diameter

outlet holes, all equally spaced, but the back panel (i.e. the panel nearest and parallel to the bulkhead wall) and the bottom shall be without holes.

b. The box shall be placed under the water tank drain pipe on top of the new 3'-0" x 3'-0" x 2-1/2" walkway pad embedded in the coal tar bitumen and gravel topping, and at a distance as required from bulkhead wall to clear its flashing, and anchored to the bulkhead wall with 1/2" x 3" expansion bolts. Provide spacers to prevent the box from coming in contact with the bulkhead flashing.

3.03 INSPECTION AND TESTS

A. NYCHA's representatives shall be accommodated on the scaffolds for examining the repairs and shall be provided with safety belts by the Contractor for use on the scaffolds.

B. There will be no additional payment to the Contractor for time, equipment or personnel expended during such inspections.

C. NYCHA's Representatives have, without prior notice, the right to audit all work being performed. Test cuts may be required in areas where quality is in question. The Construction Manager will provide Testing of the sample. The Contractor shall notify and coordinate times and dates with the Manufacturer, in a timely manner to conduct their required inspections.

D. If defects are detected it will be the responsibility of the installing contractor to take corrective procedures. Any corrective procedure must have prior approval of the NYCHA representative and the roof materials manufacturer. If, in the opinion of the NYCHA Representative, or the material Manufacturer, the corrective procedures are not appropriate, the installation in question must be removed and replaced in an acceptable manner.

E. After all roofing system work is completed; an inspection shall be made by the roofing system Manufacturer's representative. The representative shall certify that roofing system has been installed according to the Specifications.

F. The samples shall be as follows:
   1. Take Samples out of roof assembly prior to flood coat and gravel(cut with skill saw prior to flood coat and slag application) 12" x 18" down to (but not to penetrate) the vapor barrier.
   2. Samples out of base flashing -- 4" x 12" down to cant strip.

G. Whenever the tests show that the Contract requirements have not been met, the Contractor may be required to perform corrective work as necessary to meet the Contract requirements.

H. In addition, if the tests indicate that the materials and/or quantities tested are not accordance with the Contract requirements, additional samples to be cut and tested may be ordered by the Authority. The cost of the additional samples and tests shall be borne by the Contract.

I. Promptly repair all spaces from which samples have been cut to the satisfaction of NYCHA's Representative and the roofing manufacturer.

J. In the event the Contractor does not repair these cuts properly and promptly, he/she shall be responsible for any resulting damage.

K. Repairs shall be in accordance with these specifications, the applicable detail drawings and as follows:
   1. Remove the existing gravel from the surrounding area.
   2. The surface to be repaired shall be clean and dry.
   3. Repair plies for the vapor barrier shall consist of 2 plies. The first ply shall overlap the edge of the sample by not less than 1.5" and the second ply shall overlap the first ply by not less than 1.5".
   4. Roof insulation used for repair shall be of the same thickness and type removed from the sample area.
   5. Repair plies for the roofing membrane shall consist of 4 plies. The first ply shall overlap the edge of the sample area by 6" and the remaining plies shall overlap each other by not less than 2". All repairs shall be done using hot bitumen of the same type used in the new roofing assembly.

6. After the repairs are completed, the tested area shall be in the same condition as the surrounding installation.

3.04 FINAL INSPECTION

A. Manufacturer's representative shall provide a comprehensive final inspection after completion of the roof system. All application errors must be addressed and final punch list completed prior to final acceptance of the Work.

B. Other inspections may be required by the roofing manufacturer in order to obtain the manufacturer's twenty (20) year guarantee. The Contractor shall ensure that all such inspections are brought to the attention of the Authority and performed prior to acceptance of the Work.

3.05 CLEANING AND DISPOSAL

A. Remove bituminous materials from all finished surfaces.

B. Repair or replace defaced or disfigured finishes caused by work of this section.

C. It is the Contractor's responsibility to remove from the job site, and as necessary, safely dispose of all excess materials and debris as a result of the work completed under this Section.

D. In areas where finished surfaces are soiled by bitumen or any other source of soiling caused by work of this section, consult Manufacturer of surfaces for cleaning advice and conform to their documented instructions. Remove all debris daily from roof and the grounds.

E. Upon completion of the work and / or at the end of each working day, the Contractor shall remove all hazardous or flammable materials and assume ownership of all debris resulting from the work, remove it from the premises, and legally dispose of it.

F. Upon completion of the work, or when directed by the Inspector, the Contractor shall thoroughly clean all surfaces of all rooms and spaces, including all exterior areas, which have become soiled as a result of the work of the Contract.

G. As the work in various areas is completed, said areas shall be broom cleaned and all rubbish, debris, excess materials, tools and scaffolding shall be removed.

H. The Contractor shall clean all paint sots, oils, plaster and stains from floors, walls, woodwork, glass, hardware metal work and all similar items upon completion. Dust control procedures as hereafter specified shall be employed throughout all work of this contract.

I. Drop cloths and other protective devices shall be kept clean at all times.

J. Leave premises broom clean at end of each day. Keep dirt and debris to a minimum in the construction repair areas. Wet down dust with water spray where necessary.

K. Work Area Preparation: Cover entrances to the work area with a single layer of 6 mil polyethylene sheets taped to the top and weighted at bottom. Place drop cloths of 6 mil polyethylene sheets adjacent to surfaces to be disturbed. The drop cloth shall be at least 5 feet wide.

3.06 PROTECTION AND CLEANING

A. Conduct all work so as to provide complete safety to workers and the public and to provide access to buildings at all times.

B. While removing existing structural components, take all measures necessary to protect and safeguard the facilities and exposed areas from any damage or loss. Use wet methods when demolishing walls or other components that produce dust during demolition. Wet all surfaces to be disturbed with a fine spray of water. Use power tools where possible. Power tools shall be equipped with HEPA vacuum capable of trapping and retaining 99.97% of all particles 0.3 micrometers in diameter or greater. Avoid spreading dust and debris out side the work area. Cover all windows in work areas with 6 mil plastic sheets and duct tape each day. Remove the plastic at the end of each day.

C. Do not work in the vicinity of any entrances before clearing those areas and advising the Inspector accordingly.

D. The Contractor shall take every precaution to minimize noise generated by contract work. Contract noise shall not exceed 50 dB within any occupied apartment space at any time during the work.

E. Protect all existing construction, masonry, windows, TV cables, room air conditioners, roof areas, shrubs, plants and paved areas against damage, concrete or any other material.

F. Certain projects have TV or other cables or conduit installed at the parapet walls or on other areas of the roofs. The name and address of the firm which installed the TV cables cell phone, satellites and other utilities can be obtained from the project management for information and coordination. Coordinate work with these companies so that the firms can remove and re-attach the utilities without interrupting services to the tenants. Notify the firms in writing with copies of all correspondence to the Superintendent.

G. All property of the Authority and/or tenants damaged as a result of the work of this contract shall be restored or repaired by the contractor at no cost to the Authority.

H. Provide Dumpster for disposal of daily debris and cart away the dumpster from the project regularly to dispose of the collected debris. At the end of each day's work, remove all debris and all materials not used during the day from all public areas to a designated storage area. Do not leave used or unused materials or equipment in the public areas after the workers leave.

I. All areas within the range of falling material from the work of this contract but not required for public access shall be barricaded with four (4) ft. high orange vinyl fence. Place warning signs thirty feet apart on all such barricades

J. Remove all stains and spots caused by the work of this Contract.

K. Protect roof areas including those under the scaffold frame by laying 1/2" thick plywood boards.

L. Broom clean all work areas at the end of each working day.

M. The contractor shall be responsible for the removal, salvage, and reinstallation of any structure and/or fixtures on the exterior brickwork, including air conditioning gates at no cost to the Authority.

END OF SECTION