



CONSTRUCTION QUALITY PROGRAM

SECTION C – TECHNICAL DISCIPLINES PROCEDURES

C.1 DEMOLITION

1.1 Preliminary Requirements-General

1.1.1 The project manager shall submit drawings for approval showing the layout of barricades and proposed staging areas for roll off containers. CNA Enterprises, Inc. shall install construction signage, an OSHA Kit, an ABC type fire extinguisher, a first aid kit and an eye wash station prior to the commencement of any demolition work

1.1.2 PM shall mark and indentify locations of partial removals & modifications to interior partitions

1.1.3 PM shall mark and indentify locations of items to be salvaged

1.2 Gas Water and Electrical Services

1.2.2 Prior to the beginning of demolition activities the PM shall ensure that all gas and water piping has been safely shut down or capped off and all piping components have been properly verified, inspected, and labeled. The long island railroad/MTA electricians shall safe-off all existing electrical work and provide temporary lighting and power in the areas as directed by the project manager 20 minutes before and after each work day.

1.3 Torch cutting

1.3.1 In the event torch cutting is required for removals, CNA shall provide fire watch and smoke eaters with HEPA Filters during any torch cutting activity that takes place within the structure

1.4 Temporary Facilities

1.4.2 Temporary water, electrical and sanitary facilities shall be provided and maintained through-out the entirety of the project.

1.5 Execution-Demolition

1.5.2 All Demolition work shall be executed by skilled professionals with a minimum 5years experience in project of similar size and scope



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1.6 Daily Operations-General

- 1.6.2 The site supervisor shall perform the following on a daily basis during demolition and construction;
- A. Check temporary barricades for sturdiness, cleanliness and potential hazards
 - B. Verify construction signage remains unmolested or vandalized
 - C. Maintain a broom swept site clear from debris and piles of refuse.
 - D. Maintain a Log of the work executed for that work day.
 - E. Verify that portable restrooms are in acceptable condition and have been serviced as needed.

1.7 Demolition-Verification and Inspections

1.7.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification of prerequisites shall be performed and documented immediately Prior to demolition. Refer to **The Demolition Checklist – Exhibit 16 on page 89**

C.2 CUSTOM SHOP FABRICATED WORK

2.1 Preliminary Requirements

2.1.1 The fabrication and installation of custom finish work shall be supervised and controlled by the project manager as the work is engineered and later fabricated. The project manager shall choreograph the shop drawings, material samples, product literature and mock-ups, collectively referred to as “submittals” herein; and act as a liaison between the architect and fabricators to insure all shop drawings are issued to all the trades involved in that particular installation. The project manager in conjunction with the fabricators and installers shall verify all dimensions through this process prior to fabrication establishing the proper sequence of operations required to achieve the most optimum installation and finished product. The architect shall approve in writing these shop drawings which shall be a part of the submittal process prior to the fabrication of these items.



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2.2 Shop Drawings

- 2.2.1 All shop drawings shall be in the scales set forth by the architect- The architect shall provide a schedule stating the scales of elevation, plan and detail sections
- 2.2.2 All Shop drawings shall contain a finish and material key plan; all finishes and proposed materials shall be keyed in detail, plan and elevation sections
- 2.2.3 Where a particular finish, material or component deviates from the specification, it shall be clearly noted and keyed as an addendum and the architect shall be informed through a narrative which shall be provided with all drawings.
- 2.2.4 All shop drawings shall be dated, stamped and legible in all keynotes, plan notes schedules and interpretation.
- 2.2.5 All shop drawings shall be issued with their respective submittals; materials samples, mock-ups, product literature and Manufactures Data sheets (MDS)

2.3 Shop Fabrication

- 2.3.1 All work shall be fabricated in accordance with the shop drawings which shall be based on the plans, specifications and site surveys-utilizing the most current standards which prevail.
- 2.3.2 All custom work shall be fabricated in the sizes, dimensions, finishes and level of quality set forth in the approved shop drawings
- 2.3.3 No custom work shall be fabricated without approved and signed shop drawings.
- 2.3.4 Work Shall only be awarded to Fabricators having work experience for period of at least (5) documented years similar in size, scope and material.
- 2.3.5 No custom work shall be fabricated outside of the United States of America

2.4 Preliminary Requirements-Custom fabricated work

- 2.4.1 Prior to the beginning of fabrication the project manager shall prepare and present to the architect for approval; all relevant shop drawings affecting the work and outlining the proposed methods and materials required to execute the work indicated



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2.5 Custom Fabricated Work- Verification and Inspections

- 2.5.1 Prior to the installation of custom fabricated work the project manager shall perform an inspection at the place of fabrication, at the jobsite or both the shop and the jobsite for the purpose of establishing items are being fabricated in a timely manner and are without obvious or unacceptable flaws, defects, blemishes and substandard workmanship.
- 2.5.2 At the discretion of the architect custom work may be disassembled for inspection purposes and verification that the work conforms to the specifications.
- 2.5.3 Project manager shall inspect installed work for levelness, sturdiness and quality of workmanship. All installed work shall be free from defects, blemishes, stains, delamination, discoloration and substandard assembly and/or installation. The standards shall be as set forth in the specification sections which are relevant to fabricated work.
- 2.5.4 Additional inspections may be performed in accordance with the contract specifications. Verification of prerequisites shall be performed and documented immediately prior to fabrication and after installations. Refer to **Checklists – Exhibits 17 through 19 on pages 90-92**

C.3 CMU - PATCHING, INFILL AND MODIFICATIONS

3.1 General

- 3.1.1 New installations and modifications to CMU partitions shall be supervised and controlled by the project manager as sections are removed and modified. The PM shall assure CMU components conform to the engineering drawings and sketches, specifications, and applicable codes and standards.

3.2 CMU Material Inspection and Verification

- 3.2.1 Verify locations on existing CMU partitions to be in-filled, removed and scar patched with new CMU
- 3.2.2 Concrete and masonry test for each type of unit required
- 3.2.3 Mortar test (property specification): for each mix required
- 3.2.4 Fire resistance rating; where indicated



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- 3.2.5 Grout shall be placed after owners rep/ Architect approves and verifies grout spacing is in compliance with plans and specifications
- 3.2.6 Additional inspections may be performed in accordance with the contract specifications. Verification of prerequisites shall be performed and documented immediately prior to fabrication and after installations. Refer to **Checklists – Exhibit 32 on page 105**

C.4 METAL ROOF DECKING INSTALLATIONS & MODIFICATION

4.1 General

- 4.1.1 New installations and modifications to metal decking and associated structural beams shall be supervised and controlled by the project manager as decking is installed and modified. The project manager shall assure metal roof decking components conform to the engineering drawings and sketches, specifications, and applicable codes and standards.

4.2 Metal decking Material Inspection and Verification

- 4.2.1 Verify locations on existing roof slab to be repaired/in-filled with metal decking (as a substrate) for concrete and roofing installations
- 4.2.2 Decking shall be manufactured by a company specializing in metal decking with a minimum 5 years experience
- 4.2.3 All work shall meet or exceed the regulatory requirements of the NYC building code.
- 4.2.4 All composite metal decking shall have NYC, BSA or MEA approvals with respect to the following,
 - 1. as a component part of a floor construction without a need for sprayed on fire proofing;
 - 2. as a component of a 3 hour fire rated floor construction with use of sprayed on fire proofing to underside of deck;
 - 3. as a component part of a fire resistive roof structure.
- 4.2.5 Structural metal decking and associated components shall conform to Article 7 Chapter1 and subchapter1 tables 10-1 & 10-2 of Building Code (Title 27)
- 4.2.6 CNA shall use only certified welders and welding operators for this work



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- 4.2.7 CNA shall provide fire watch and smoke eaters with HEPA Filters during welding and cutting operations
- 4.2.8 CNA Provide controlled inspections and testing
- 4.3.9 CNA shall use a NYC licensed engineer for inspections

4.4 Preliminary Requirements-Installation

- 4.4.1 Prior to the beginning of installations the PM shall submit shop Drawings showing Decking locations and fastening systems to be utilized.

4.4.2 Additional inspections may be performed in accordance with the contract specifications. Verification of prerequisites shall be performed and documented immediately prior to fabrication and after installations. Refer to **Checklist – Exhibit 33 on page 106**

C.5 NON LOAD BEARING STEEL STUDS

5.1 General requirements

- 4.1.1 Cold rolled metal framing work shall be performed in accordance with the plans, specifications and testing and inspection plan.

5.2 Preliminary Requirements-non load bearing metal framing systems

- 5.2.1 Prior to the beginning of fabrication the project manager shall prepare and present to the architect for approval; all relevant shop drawings affecting the work and outlining the proposed methods and materials required to execute the work indicated in the drawings and called for in the specifications.

5.3 Procurement and Storage

- 5.2.1 All Steel studs and tracks shall be sourced from a single manufacturer; being one of the three listed in specifications section 09100-3.
- 5.2.2 All studs shall be furnished "Trade Ready"
- 5.2.3 All tracks and studs shall be stored in bundles away from main work areas



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5.4 Fabrication

- 5.4.1 Installers shall have no less than five years experience in the fabrication and erection of non load bearing steel stud partitions
- 5.4.2. All partitions shall be fabricated and installed in accordance with the current building codes which prevail in the Township of Merrick, New York; and any MTA/LIRR special requirements set forth in the contract documents.
 - A. Fire ratings; Where fire ratings are required by code they shall conform to ASTM E 119
 - B. Sound Transmissions; Where required shall conform to assemblies indicated in GA No 600-2003 fire resistance design manual
- 5.4.3 CNA shall Coordinate shop drawings and verify finished openings, hold dimensions and locations of in-wall strapping and blocking required for other trades prior to gypsum board installation
- 5.4.4 All loose and excess pieces of tracks and studs shall immediately be discarded during fabrication of wall sections to maintain a safe and uncluttered work environment.

5.5 Non Structural Framing-Verification and Inspections

- 5.5.1 Verify the proper gauges, sizes and types are in accordance with the areas as specified in section 09100 during installations
- 5.2.3 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification of prerequisites shall be performed and documented immediately Prior to installations. Refer to **The non load bearing metal framing Checklist – Exhibit 20 on page 93.**



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C.6 GYSPUM BOARD ASSEMBLIES

6.1 General

6.1.1 All gypsum board assemblies' work shall be performed in accordance with contract specification *and the Inspection and Testing Plan*

6.2 Preliminary Requirements-non load bearing gypsum assemblies

6.2.1 Prior to the beginning of fabrication the project manager shall prepare and present to the architect for approval; all relevant shop drawings affecting the work and outlining the proposed methods and materials required to execute the work indicated in the drawings and called for in the specifications. (these drawings shall be integral to the cold rolled steel framing drawings which shall collectively be referred to as "Drywall & Framing" during the course of the project.

6.3 Shop Drawings

6.3.1 All shop drawings shall be in the scales set forth by the architect- The architect shall provide a schedule stating the scales of elevation, plan and detail sections

6.3.2 All Shop drawings shall key plan Indicating the wall boards to utilized as well as the gauge of the framing.

6.3.3 all gypsum accessories shall be clearly listed and keyed into the shop drawings including access doors, reveals, shadow moldings, etc.

6.3.4 All shop drawings shall be dated, stamped and legible in all keynotes, plan notes schedules and interpretation.

6.3.5 All shop drawings shall be issued with their respective submittals; materials samples, mock-ups(if required), product literature and Manufactures Data sheets (MDS)

6.4 Procurement and Storage

6.4.1 All types of gypsum board shall be sourced from a single North American manufacturer specializing in manufacturing gypsum boards with minimum ten years documented experience

6.4.2 Store products in manufacturer's unopened packaging indicating manufacturer and product name and protect until ready for installation.

6.4.4 Store gypsum in accordance with GA-238 and manufacturer recommendations.



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6.5 Fabrication

- 6.5.1 Company specializing in gypsum assemblies and framing systems with a documented five (5) years experience in this trade
- 6.5.2. All partitions shall be fabricated and installed in accordance with the current building codes which prevail in the Township of Merrick, New York; and any MTA/LIRR special requirements set forth in the contract documents.
 - A. Fire ratings; Where fire ratings are required by code, Conform to ASTM E 119
 - B. Sound Transmissions; Where required shall conform to Assemblies indicated in GA No 600-2003 fire resistance design manual
- 6.5.3 PM shall coordinate shop drawings and verify finished openings, hold dimensions and locations of in-wall strapping/blocking required for other trades prior to gypsum Installations
- 6.5.4 Gypsum boards shall be scribed with a rasp and tightly fitted where Wall board meets floors and masonry partitions.
- 6.5.5 Gypsum board shall be installed with the minimal amount of seams required.
- 6.5.6 All gypsum boards shall be clearly labeled and colored to display the nomenclature of the type of gypsum being used.
- 6.5.7 All installations shall be done in accordance with specifications section 09250
- 6.5.8 Joint compounds as follows;
 - a. Setting type Joint compound shall be job mixed on jobsite
 - b. Drying type Joint compound shall be Vinyl Based factory mixed

6.6 Gypsum-Verification and Inspections

- 6.5.1 Verify the proper sizes and types are in accordance with the areas as specified during installations
- 6.6.2 Installers shall immediately discard any/all loose and leftover pieces of drywall during fabrication of wall sections to maintain a safe and uncluttered work environment.
- 6.6.3 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification of prerequisites shall be



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performed and documented immediately Prior to installations. Refer to *Gypsum Assemblies Checklist – Exhibit 21 on page 94.*

C.7 DOORS AND FINISH HARDWARE

7.2 Shop Drawings:

- 7.2.1 PM shall coordinate shop drawings and verify finished openings, hold dimensions and locations of in-wall strapping/blocking required for other trades prior to gypsum Installations
- 7.2.2 The door and hardware vendor shall show all openings in the door schedule and/or the drawings.
- 7.2.3 The door and hardware vendor shall provide details of door design, door construction details, methods of frame assembly, hardware locations, anchors and fastening methods, door frame types/details, and door and hardware finishes for approval.
- 7.2.4 The door and hardware vendor shall provide a door, frame, and hardware schedule in the shop drawings.

7.3 Guidelines Quality Control

- 7.3.1 The PM shall provide manufacturer qualifications:
- 7.3.2 The PM shall provide all products from a single Vendor who is a member of the Steel Door Institute.
- 7.3.3 The PM shall present Certifications that doors and frames conform to the requirements of ANSI A250.8-1998 (SDI-100) and project specifications

7.4. Specialty Doors

- 7.4.1 Fire Rated Doors and Frames;
 - 1. Shall have ratings as indicated on door schedule, when tested in accordance with NFPA 252, UL 10B or UL 10C.
 - 2. Shall be labeled by UL, WH, or other agency acceptable to the authorities having jurisdiction.



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7.5 Delivery, Storage, and Handling

- 7.5.1 Products shall arrive to jobsite pre-machined, pre-hung, ready to accept final finishes, marked with architect's opening number on all doors, frames, misc. parts and cartons.
- 7.5.2 Doors and Hardware received at the jobsite shall be placed in a holding area pending receiving inspection.
- 7.5.3 The QCR shall examine material against PO. Receiving inspection shall include verification of dimensions, marking, condition, and quantity. The QCR shall record inspection results on the Material Inspection Report (MIR) – *Exhibit 4* and, if acceptable, shall mark the material with the applicable job number, sign and date the Material Inspection Report and forward it to the QCR.
- 7.5.4 CNA Shall Protect products from moisture, construction traffic, and damage.
- 7.5.5 CNA shall Store all doors vertically under cover.
- 7.5.6 CNA Shall Place stored units on 4 inch (102 mm) high wood sills or in a manner that will prevent rust or damage.

7.6 Installation

- 7.5.1 Products shall be installed in accordance to the plans, specifications and most current standards that prevail.

7.7 Preliminary Testing Inspection and Verification

- 7.7.1 PM shall verify that project conditions are suitable before beginning installation of frames.
- 7.7.2. PM shall verify that completed openings to receive frames are of correct size and thickness.
- 7.7.3. PM shall verify that completed concrete or masonry openings to receive butt type frames are of correct size.
- 7.7.4 PM shall verify that drywall construction walls are the correct thickness.



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7.8 Installation

- 7.8.1 PM shall verify frames are installed plumb, level, rigid, and in true alignment in accordance with ANSI A250.11 and DHI A115.1G.
- 7.8.2 PM shall verify fire rated doors and frames are installed in accordance with NFPA 80 and the project specifications
- 7.8.3 PM shall verify frames other than slip-on types are fastened to the adjacent structure so as to retain their position and stability and drywall slip-on frames shall be installed in prepared wall openings in accordance with manufacturer's instructions.
- 7.8.4 PM shall verify that frames installed in masonry are laid-up and welded wrap-around frames in masonry construction are filled solid with grout and braced or fastened in such a way to prevent pressure of the grout from deforming frame.
- 7.8.5 PM shall coordinate frames installed in stucco construction as work progresses and are filled solid with grout and braced or fastened in such a way to prevent pressure of the grout from deforming frame.
- 7.8.6 PM shall verify where frames are installed in masonry construction-grout shall be mixed to provide a 4 inch (102 mm) maximum slump consistency and is hand towed into place.
- 7.8.7 PM shall insure If additives are used in masonry or plaster work during cold weather, the inside of steel frames shall be field coated with a bituminous compound to prevent corrosion.
- 7.8.8 PM shall insure Doors shall be installed and fastened to maintain alignment with frames to achieve maximum operational effectiveness and appearance.
- 7.8.8 The PM shall verify and inspect door for proper operation and are free from binding or other defects.
- 7.8.9 After installation, the general Forman shall insure that doors are cleaned and free from soiled surfaces and any scraps and debris left over are discarded and the jobsite is in a clean condition.

7.9 Installation-Verification and Inspections

7.9.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification of prerequisites shall be performed and documented immediately Prior to installations. Refer to **Doors and Hardware Checklist – Exhibit 26 on page 99.**



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C.8 BUILT UP BITUMINOUS ROOFING

8.1 General

8.1.1 The project Manager shall insure the roofing installer provides a roofing system that meets or exceeds all criteria listed in the specifications and indicated in the contract documents.

8.2 Installer Qualifications:

8.2.1 Installer shall be classified as a "Master Select Contractor" as defined and certified by Manufacturer.

8.2.2 Installer shall be classified as a "Master Contractor" as defined and certified by the Roofing Manufacturer.

8.2.3 Installer shall be classified as an "Approved Contractor" as defined and certified by the "Roofing Manufacturer".

8.3 Source Limitations:

8.3.1 Components listed shall be provided by a single manufacturer or approved by the primary roofing manufacturer.

8.4 Final Inspection:

8.4.1 Manufacturer's representative shall provide a comprehensive final inspection after completion of the roof system. All application errors shall be addressed and final punch list completed.

8.5 Pre-Installation Conference- Roofing

8.5.1 Prior to scheduled commencement of the roofing installation and associated work, CNA shall conduct a meeting at the project site with the installer, architect, owner, Roofing system representative and any other persons directly involved with the performance of the work. The Project manager and roofing contractor shall record conference discussions to include decisions, agreements, and open issues and furnish copies of recorded discussions to each attending party. The primary purpose of the meeting is to review foreseeable methods and procedures related to roofing work.

8.6 Regulatory Requirements

8.6.1 Work shall be performed in a safe, professional manner, conforming to all federal, state and local codes.



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8.6.2 CNA shall provide a roofing system achieving a UL Class rating as indicated in the specifications.

8.7 Windstorm Classification:

8.7.1 Installed roofing system will achieve the required uplift resistance as calculated in accordance with ASCE 7-05 or as listed in the current FM Approval Guide. Corners and perimeter areas shall be calculated in accordance with ASCE 7-05.

8.8 Delivery, Storage, And Handling of Roofing Materials

8.8.1 Roofing materials shall be delivered to the site in original containers, with factory seals intact

8.8.2 Pail goods shall be stored in their original undamaged containers in a clean, dry location within their specified temperature range.

8.8.3 Roll goods shall be stored 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.

8.8.4 Materials shall not be exposed to moisture in any form before, during or after delivery to the site.

8.8.5 CNA shall reject delivery of materials that show evidence of contact with moisture.

8.8.6 Manufacturer supplied plastic covers shall be removed and replaced with "breathable" type covers such as canvas tarpaulins to allow venting and protection from weather and moisture.

8.8.7 Roofing Contractor shall cover and protect materials at the end of each work day.

8.8.8 Roofing contractor shall not remove any protective tarpaulins until immediately before the material will be installed.

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

8.8.10 Roofing contractor shall store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

8.9 Installation

8.9.1 PM shall schedule roofing installations only when existing and forecasted weather conditions permit.



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- 8.9.2 Installation shall not take place during adverse weather or without precautionary measures in temperatures below 45 degree F (7.2 degree C).
- 8.9.3 All substrates shall be clean and free from debris, dust, oil dirt and grime prior to installation of New roofing system
- 8.9.4 Areas of concrete patch would have cured for 30 days prior to installation of new roof system

8.10 Verification and inspection

- 8.10.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification shall be performed and documented immediately Prior to installations. Refer to **Built Up Bituminous Roofing Checklist– Exhibit 22 on page 95.**

C.9 FLASHING AND SHEET METAL

9.1 Shop Drawings

- 9.1.1 Shop Drawings shall be issued showing weights, gauges, or thickness of sheet metal; type of material; joining, expansion-joint spacing, and fabrication details; and installation procedures. Materials shall not be delivered to the site until after the approved detail drawings have been returned to CNA enterprises..

9.2 Delivery, Storage, And Handling

- 9.2.1 Materials shall be adequately packaged and protected during shipment and inspected for damage, dampness, and wet-storage stains upon delivery to the jobsite.
- 9.2.2 Materials shall be clearly labeled as to type and manufacturer.
- 9.2.3 Sheet metal items shall be carefully handled to avoid damage.
- 9.2.3 Materials shall be stored in dry, weather tight, ventilated areas until installation.



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9.3 Materials

9.3.1 Provide materials conforming to the requirements specified below, and those given in TABLE 1. Materials exposed to weather shall be furnished in accordance with the plans and specifications.

9.4 Installation

9.4.1 All types of Flashing and coping shall be installed in its proper sequence and of the materials shown, specified and approved in the shop drawings.

9.4.2 All installers shall have a documented history of executing projects of similar size and scope for a period of no less than five (5) years

9.5 Verification and inspection

9.5.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification shall be performed and documented immediately Prior to installations. Refer to **Flashing Checklist – Exhibit 23 on page 96.**

C.10 FIREPROOFING

10.1 Preliminary Requirements- Fire Proofing

10.1.1 Prior to the beginning of fabrication the project manager shall prepare and present to the architect for approval; all relevant shop drawings, submittals and MDS for the work indicated in the drawings and called for in the specifications.

10.1.2 The PM, fireproofing subcontractor and independent testing laboratory shall attend a pre-installation conference to review the substrates for acceptability, method of application, applied thicknesses, inspection procedures and other issues.

10.2 Delivery Storage and Handling

10.2.1 Material shall be delivered in original unopened packages, fully identified as to manufacturer, brand or other identifying data and bearing the proper underwriters laboratories labels for “Surface Burning Characteristic” and “Fire Resistance” classifications.



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10.2.2 Material shall be stored off the ground, under cover, and in a dry location until ready for use.

10.2.3 All bags that have been exposed to water before use shall be found unsuitable and discarded.

10.2.4 Stock of material is shall be rotated and used prior to its expiration date.

10.3 Installation

10.3.1 Fireproofing work shall be performed by a certified installer acceptable to the fireproofing material manufacturer.

10.3.2 The execution, and fireproofing thicknesses shall conform to the applicable code requirements for the required fire-resistance ratings

10.3.3 Prior to scheduling the application of fire proofing, the PM shall log and verify the following;

1. A minimum air and substrate temperature of 4.4°C (40°F) shall be present 24hrs before application and maintained for 24 hours after spray applied fireproofing applications

10.3.4 CNA shall provide ventilated areas to achieve a minimum total air exchange rate of 4 times per hour until the material is substantially dry.

10.3.5 PM shall sequence and coordinate application of fireproofing with work by other trades which would interfere with efficient fireproofing application.

10.3.5 PM Shall receive in writing Certification that the equipment and application procedures shall conform to the material manufacturer's application instructions.

10.3.6 Prior to installation Fireproofing contractor shall post appropriate cautionary signage in all areas in that come into contact with wet fireproofing material.

10.4 Verification and inspection

10.4.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification shall be performed and documented immediately Prior to installations. Refer to **Fire Proofing Checklist – Exhibit 24 on page 97**



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C.11 JOINT SEALANTS

11.1 General

11.1.1 The PM shall verify and instruct all trades to include in their shop drawings all Joint sealants information including manufacturer, manufacturers recommended usage, MDS, color samples and any other pertinent information as a part of their submittals for approval by the architect.

11.2 Joint Location, Spacing, and Condition

11.2.1 PM in conjunction with installer shall verify the location of joint openings permit applicator access to install joint components and to properly tool the sealant

11.2.2 The PM shall verify with the installer the substrate(s) for sealant adhesion are sound and free of deleterious materials that would compromise adhesion

11.2.3 PM shall verify with installer that every termination detail has adequate access and sufficient bonding area for sealant application

11.2.4. Where installation occurs at existing surfaces, PM shall verify that weak material is removed from the sealant adhesion surface of porous substrates including any form release agents

11.2.5 PM shall verify that the colors, types and method of installation of sealants are as specified and approved during the submittal process

11.3 Verification and inspection

10.4.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification shall be performed and documented immediately Prior to installations. Refer to **Joint Sealants Checklist – Exhibit 25 on page 98**



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C.12 CERAMIC TILE

12.1 General

12.1.1 Ceramic tile installations shall be supervised and controlled by the project manager as tile is installed and modified. The project manager shall assure all tile and components conform to the engineered drawings, specifications, and applicable codes and standards.

12.1.2 PM shall verify ceramic tile installations are installed with a static coefficient of friction that shall meet or exceed the following values as determined by testing in conformance with ASTM C 1028 which is as follows;

1. Level Surfaces: Minimum of 0.6 (Wet).
2. Step Treads: Minimum of 0.6 (Wet).
3. Ramp Surfaces: Minimum of 0.8 (Wet).

12.2 Shop Drawings & Submittals:

12.2.1 Shop drawings shall clearly indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.

12.2.2 PM shall submit with shop drawings; full-size samples of actual tiles specified.

12.2.3 PM shall provide to architect for approval the following; for tile 8 by 8 inches (203 by 203 mm) and smaller, actual units mounted on a minimum 12 by 12 inch (305 by 305 mm) plywood panel grouted with selected grout. For larger tile, two units of each type shall be submitted and grouted as specified.

12.2.4 PM shall submit a manufacturer's certificate signed by the manufacturer and the installer certifying that products meet or exceed the specified requirements and ANSI A137.1.

12.2.5 PM shall include in these submittals recommended cleaning methods, cleaning materials, and maintenance coatings.

12.2.6 PM shall obtain approvals of submittals prior to delivering products to the jobsite.

12.2.7 PM shall provide manufacturer's data sheets on each product to be used, including the following;



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1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

12.3 Installation

12.3.1 Ceramic tiles shall be installed as shown, specified and as approved in the patterns, sizes, types and methods of installation indicated in the shop drawings and submittals

12.3.2 PM shall obtain each type and color of tile from a one (1) single source including each type and color of mortar, adhesive, grout and other accessories.

12.3.3 QCR Shall verify that all tiles installations are flat and level, True and square and without blemish, chips, discoloration or irregularities.

12.3.4 QCR shall verify that tiles are properly grouted and grout lines are equal in thickness depth and appearance.

12.4 Delivery, Storage, And Handling

12.4.1 Tiles and accessories shall be delivered and stored in manufacturer's unopened packaging until ready for installation.

12.4.2 Tile and setting materials shall be stored on elevated pallets, under cover and in a dry location protected from contamination, dampness, freezing or overheating.

12.5

12.5.1 PM shall verify areas of where mastic type adhesives are to be utilized are properly ventilated

12.5.2 PM shall insure an ambient and substrate temperature of 50 degrees F (10 degrees C) is maintained during tiling and for a minimum of 7 days after completion.

12.5.3 Tile contractor shall provide for owner's use one (1) box of each primary size and color of tile specified.

12.6 Verification and inspection

12.6.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification shall be performed and



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documented immediately Prior to installations. Refer to *Ceramic Tile Checklist – Exhibit 27 page 100*

C.13 ACOUSTIC PANEL CEILINGS

13.1 General Requirements

13.1.1 The fabrication and installation of acoustic ceilings and their respective suspension systems shall be supervised and controlled by the project manager as the work is engineered and later installed. The project manager shall choreograph the shop drawings, material samples, product literature and mock-ups, collectively referred to as “submittals”; and act as a liaison between the trades to insure all shop drawings are issued to all the trades affected by the installation of the acoustic ceiling systems. The project manager in conjunction with the ceiling, mechanical, electrical and plumbing installers shall verify all dimensions, wire ways, raceways, ductwork and piping clearances through this process prior to installations establishing the proper sequence of operations required to achieve the most optimum installation and finished product. The architect shall approve in writing these shop drawings which shall be a part of the submittal process prior to the installation of this work.

13.2 Shop Drawings and submittals

13.2.1 The PM shall submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

13.2.2 The PM shall submit samples as specified

13.2.3 The PM shall submit shop drawings for the work of this trade clearly showing the layout and details of the acoustical ceilings and calling out locations of items which are to be coordinated with, or supported by the ceilings.

13.2.4 The PM shall submit manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

13.3 Ordering Materials

13.3.1 Acoustical panel units and grid components shall be ordered from a single manufacturer in accordance with the plans and specifications.



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13.3.2 Acoustical ceiling components that require special ratings Shall clearly bear the appropriate markings of applicable testing and inspecting organization.

13.4 Delivery, Storage, And Handling

13.4.1 Acoustical ceiling units shall be delivered to project site in original, unopened packages and stored in fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

13.5 Installation

13.5.1 Ceilings shall not be installed until space is enclosed and weatherproof; wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are continuously maintained at values near those intended for final occupancy.

13.5.2 Ceiling tiles shall be installed centered to room

13.5.3 Ceiling grid systems shall be mechanically fastened to roof structure

13.6 Verification and inspection

10.4.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification shall be performed and documented immediately Prior to installations. Refer to **Acoustic Ceilings Checklist – Exhibit 28 page 101**

C.14 RESILIENT FLOORING

14.1 General

14.1.1 Resilient flooring installations shall be supervised and controlled by the project manager. The project manager shall assure all flooring and components conform to the engineered drawings, specifications, and applicable codes and standards.

14.1.2 PM shall verify substrates are not telegraphing through flooring installations.



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14.2 Shop Drawings & Submittals:

14.2.1 Shop drawings shall clearly indicate layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, resilient flooring accessories, and installation details.

14.2.2 PM shall submit with shop drawings and submittals in accordance to the plans and specifications

14.3 Installation

14.3.1 Resilient floorings shall be installed as shown, specified and as approved in the patterns, sizes, types and methods of installation indicated in the shop drawings and submittals

14.3.2 PM shall obtain each type and color of flooring from a one (1) single source

14.3.3 QCR Shall verify that all tile installations are flat and level, True and square and without blemish, chips, discoloration or irregularities.

14.3.4 QCR shall verify that tiles are properly installed with seams which are minimal in appearance.

14.4 Delivery, Storage, And Handling

14.4.1 Flooring and accessories shall be delivered and stored in manufacturer's unopened packaging until ready for installation.

14.4.2 Flooring and adhesives shall be stored on elevated pallets, under cover and in a dry location protected from contamination, dampness, freezing or overheating.

14.5

14.5.1 PM shall verify areas of where mastic type adhesives are to be utilized are properly ventilated

14.6 Verification and inspection

14.6.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification shall be performed and documented immediately Prior to installations. Refer to **Resilient/Rubber flooring Checklist – Exhibit 29 page 102**



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C.15 CARPET

15.1 General

15.1.1 Carpet installations shall be supervised and controlled by the project manager. The project manager shall assure all carpet and components conform to the engineered drawings, specifications, and applicable codes and standards.

15.1.2 PM shall verify substrates are ready to accept final carpet installations.

15.2 Shop Drawings & Submittals:

15.2.1 Shop drawings shall clearly indicate layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, Carpet accessories, and installation details.

15.2.2 PM shall submit with shop drawings and submittals in accordance to the plans and specifications

15.3 Installation

15.3.1 Carpets shall be installed as shown, specified and as approved in the patterns, sizes, types and methods of installation indicated in the shop drawings and submittals

15.3.2 PM shall obtain each type and color of flooring from a one (1) single source

15.3.3 QCR Shall verify that all carpet installations are flat and level, true and square and without blemish, chips, discoloration or irregularities.

15.3.4 QCR shall verify that carpets are installed with invisible seams which are minimal in appearance.

15.4 Delivery, Storage, and Handling

15.4.1 Flooring and accessories shall be delivered and stored in manufacturer's unopened packaging until ready for installation.

15.4.2 Flooring and adhesives shall be stored on elevated pallets, under cover and in a dry location protected from contamination, dampness, freezing or overheating.

15.5

15.5.1 PM shall verify areas of where mastic type adhesives are to be utilized are properly ventilated



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15.6 Verification and inspection

15.6.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification shall be performed and documented immediately Prior to installations. Refer to **Carpet Checklist – Exhibit 30 on page 103**

C.16 PAINTS AND COATINGS

16.1 General

16.1.1 Painting and coating shall be performed in accordance with contract specification *and the Inspection and Testing Plan*

16.2 Procurement and Storage

16.2.1 Paint shall be purchased from approved supplier and preferably from one source. Upon delivery paint shall be checked to ensure that the material is in accordance with PO.

16.2.1 Accepted paint shall be stored in accordance with manufacturer recommendation.

16.3 Surface Preparation

16.3.1 Prior to the application, the surface to be painted or coated shall be checked for acceptable cleanliness. Any grease, dirt and other contaminants shall be removed using suitable procedure. Sandblasting shall be performed when required by the contract specifications. Paint manufacturer recommendations for surface preparation shall be followed.

16.4 Painting and Coating

16.4.1 The application and curing/drying time shall be in accordance with contract requirements and manufacturer recommendations.

16.4.2 The dry mill thickness of finished paint shall be checked using digital or magnetic gauge. Inspection results shall be documented by the QCR using **Paint Inspection Checklist-Exhibit 15 on page 88**



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C.17 BIRD DETERANT SYSTEM

17.1 Preliminary Requirements-General

17.1.1 The project manager shall submit drawings for approval showing the design, layout, location and means of installing a non-audible, non electrified bird deterrent system

17.1.2 PM shall verify the means of installation and fastening shall not void roofing the new warranty-Installer shall provide a detailed plan of the method, materials and resources to be used in the installation of the bird netting system.

17.2 Submittals

17.2.1 Prior to installation the contractor shall submit samples of all materials to be installed but not limited to:

- A: Netting 12" x 12"
- B: Anchors to support framework
- C: Stainless steel cable
- D: Netting to framework attachments

17.3 Installation

17.3.1 The installer must provide evidence of at least 3 similar projects in size and complexity which have been performed by the contractor within the previous five years.

17.3.2 The installer must provide individual qualifications and past projects history of each installer who will work on this project.

17.3.3 The PM and General Forman shall verify Netting shall be installed as per the manufacturers recommendations which shall be verified as follows;

- A. Stainless Steel Cable framework is used and is taut and flat within 1/16" diameter
- B. That all fittings, fasteners and hardware are stainless steel.
- A. That the stainless steel cable framework shall be supported by stainless steel reversible screw eyes with a maximum inside eye diameter of 3/16".
- B. That all netting to framework connections are stainless steel crimps with a maximum closed inside diameter of 3/16".
- C. No holes are drilled in mortar joints unless absolutely necessary



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17.3.4 CNA shall provide protection and maintain conditions in a manner acceptable to the owner which ensures protection of masonry from damage, discoloration, or deterioration during installation of the bird netting system.

17.3.5 CNA shall protect work from damage until final acceptance of the project, protect all adjacent construction and finishes from damage due to work performed under this contract.

17.4 Warranty

17.4.1 CNA Enterprises Shall obtain from the installer; A guarantee workmanship, materials and effectiveness of installation for a period of not less than five years from the completion of the contract or in accordance to the period specified-whichever is the longer period

17.5 Verification and inspection

14.6.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification shall be performed and documented immediately Prior to installations. Refer to **Bird Deterrent System Checklist – Exhibit -31on page 104**

C.18 TOILET ACCESSORIES/ PARTITIONS

18.1 Preliminary Requirements-General

18.1.1 The project manager shall submit drawings for approval showing the layout and locations of all Toilet accessories/ Partitions and specialties prior to the commencement delivering and installing these work items

18.1.2 The PM shall verify and indentify locations Toilet accessories/ Partitions and specialties at the jobsite as work progresses prior to the installation of these items

18.1.3 The PM shall Coordinate locations of required blocking and support systems required for all division10 specialties weather furnished by owner or contractor.

18.2 Verification and inspection

18.2.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification shall be performed and documented immediately Prior to installations. Refer to **Toilet Accessories / Partitions Checklist – Exhibit 32 Page 105**



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C.19 PIPING INSTALATION

19.6 Examination and Inspections

19.6.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Inspection of completed welds shall be performed and documented immediately after completion of welding. The QCR at his discretion may establish inspection hold points. *The Aboveground Piping Checklist – Exhibit 14 or Underground Piping Checklist – Exhibit 15 shall be used to document installation.*

19.6.2 Under no circumstances shall work proceed beyond the QCR designated hold points. A direct communication between QC and field must be established and maintained throughout the project.

19.6.3 Rejected welds shall be identified and repaired as soon as possible. Repaired welds shall be re-inspected using the same inspection method as for original weld.

19.6.4 NDE examination shall be performed in accordance with contract documents. Radiographic films and other NDE records, except visual reports, shall be turned over to the customer for review and acceptance as soon as possible. Customer acceptance of NDE examinations shall be requested in writing.

19.6.6 Completed weld documents shall be kept in QCR file and, if required by the project specifications, turned over to the customer.

19.6.7 Welding and post weld heat treatment (PWHT) of piping shall be performed in accordance with contract specification, applicable codes and standards.

19.6.8 Nonconformance of work shall be processed per CQP Procedure B.4 – *Control of Non-conformances*.

19.7 Other Tests

19.7.1 Wrapped or coated underground piping shall be tested as required by the contract specification. "Holiday tests" shall be appropriately documented.

19.8 Pressure Test-Preparatory Phase

19.8.1 Prior to pressure test installed piping and piping components shall be verified for conformance to the drawing and specifications. Aboveground Piping Checklist or



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Underground Piping Checklist shall be used to document this activity. The responsibility for verification of installed piping shall be jointly assigned to the PM and the QCR.

19.9 Pressure Testing

19.9.1 Pressure testing of installed piping shall be performed in accordance with contract specification, applicable construction Code, *and the Inspection and Testing Plan – See piping checklists exhibit 12 & 13 on pages 85 & 86*

C.20 PLUMBING FIXTURES

20.1 General Requirements

20.1.1 The furnishing and installation of plumbing fixtures and their respective accessories shall be supervised and controlled by the project manager as the work is engineered and later installed. The project manager shall choreograph the shop drawings, material samples, product literature and mock-ups, collectively referred to as "submittals"; and act as a liaison between the trades to insure all shop drawings are issued to all the trades affected by the installation of the plumbing fixtures. The project manager in conjunction with the drywall, mechanical, electrical and plumbing installers shall verify all dimensions, wire ways, raceways, ductwork and piping, and required clearances through this process prior to installations establishing the proper sequence of operations required to achieve the most optimum installation and finished product. The architect shall approve in writing these shop drawings which shall be a part of the submittal process prior to the installation of this work.

20.2 Shop Drawings and submittals

20.2.1 PM shall submit manufacturer's technical data for each type of Plumbing fixture and associate accessories, mounting systems required.

20.2.2 PM shall submit samples, Product literature, etc as specified and/or requested by the architect.

20.2.3 PM shall submit shop drawings for the work of this trade clearly showing a Plan section with keyed in locations of plumbing fixtures and the affiliated fixture schedule.

20.2.4 PM shall submit manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.



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20.3 Ordering Materials

20.3.1 Plumbing fixtures shall be ordered from a single supplier if feasible.

20.4 Delivery, Storage, And Handling

20.4.1 Plumbing fixtures shall be delivered to project site in original, unopened packages and stored in fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

20.4.2 Plumbing fixtures shall not be stored stacked or leaned up against.

20.5 Installation

20.5.1 Plumbing fixtures shall not be installed out of sequence; space shall be fully enclosed and weatherproofed; ceramic tile work shall be complete, ceilings shall be complete; and ambient conditions of temperature and humidity shall be continuously maintained at values near those intended for final occupancy.

20.5.2 Plumbing fixtures shall be installed centered to stalls where required

20.5.3 Mounting systems shall be properly fastened to structure and blocking shall be provided in locations where required.

20.6 Verification and inspection

20.1.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification shall be performed and documented immediately Prior to installations. Refer to **Plumbing fixtures Checklist – Exhibit 35 on page 108**



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C.21 HVAC EQUIPMENT

21.1 General

21.21.1 Installation of mechanical equipment shall be in accordance with the contract documents *and the Inspection and Testing Plan*. The PM shall be responsible to insure that mechanical equipment (supplied by the customer or purchased) has been inspected, adequately stored, and maintained in accordance with job requirements and manufacturer recommendations. The QCR shall be responsible to monitor that mechanical equipment is being properly stored and maintained.

21.2 Receiving, Storage and Maintenance

21.2.1 Received mechanical equipment shall be checked for and/or inspected against applicable contract documents and/or purchase orders. Inspections shall be performed by the PM in cooperation with the QCR. Customer supplied equipment documentation shall be reviewed to verify that the correct equipment has been supplied. The Equipment Installation Checklist shall be used to document inspection.

21.2.2 Any deviation from specification, drawing, PO, or documentation shall be promptly reported to the customer or equipment supplier, as applicable. Non-conforming equipment shall be marked "Do Not Use" to prevent its use until resolution, and adequately protected against damage. In certain cases, depending upon the deviation, equipment may be released for installation under "Conditional Release" provided the customer gives a written approval.

21.2.3 Accepted equipment shall be adequately stored and protected against damage. Equipment manufacturer recommendation for storage shall be strictly followed. Periodical check of equipment protection and condition shall be performed by the PM.

21.2.4 When required by the contract specification, and/or equipment manufacturer, proper preventive maintenance shall be implemented and maintained until turnover. The QCR shall be responsible to perform quality surveillance to verify that the preventive maintenance is being performed and properly documented.

21.3 Installation

21.3.1 Installation of the equipment activities and progress shall be documented using Equipment Installation Checklist – *Exhibit 13*. Additional applicable documents (equipment data forms and etc) may be attached to the checklist upon completion of installation. *Equipment Alignment Record – Exhibit 12 shall be used to document alignment.*



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21.3.2 Non-Conformances shall be documented and handled in accordance with CQP Procedure B.4

21.4 Flange Bolting

21.4.1 Flange bolting shall be performed in accordance with the contract specification, drawings, and/or applicable standards.

21.4.2 Prior to installation, gasket and bolt material shall be checked to assure conformance to the contract drawings and specifications, and to ensure that it is free from contaminants. Proper bolt lubrication shall be also verified.

21.4.3 Bolts, washers and nuts shall be installed to a loose fit initially and then tightened to a snug fit without applying torque or compressing the gasket seating surface.

21.4.4 Tensioning shall be performed in sequences and in a diametric direction opposite the last bolt tightened. The first tensioning shall result in no more than 30% of the required bolt stress. The second tensioning shall be performed in the same manner by repeating the first sequence.

21.4.5 After the second tensioning sequence has been completed, the final bolt-to-bolt torque shall be performed in a clockwise direction until all bolts have been tightened.

21.4.6 Upon completion of final sequence, verification that there is no damage, warping or distortion of the gasket shall be performed.

21.4.7 The QCR shall be responsible for random inspections of flange bolting. The frequency of inspections shall be increased if discrepant bolting is observed.

21.5 Alignment of Rotating Equipment

21.5.1 Rotating equipment shall be aligned in accordance with contract specification and/or equipment manufacturer procedures.

21.5.2 Alignment of the rotating equipment shall be documented on Equipment Alignment Report - Exhibit 12.

21.5.3 When required by the contract specification, the Lubrication Record - Exhibit C-11 shall be used to document contract compliance.



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21.6 Verification and inspection

21.1.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification shall be performed and documented immediately Prior to installations. Refer to ***HVAC Equipment Checklist – Exhibit 11 on page 84***

C.22 AIR DISTRIBUTION

22.1 General

22.1.1 The PM shall manage the fabrication installation, sketching and engineering of a the metal air distribution system (ductwork) and its associated components. All items shall conform to the engineering drawings, field sketches, specifications, and applicable codes and standards which prevail

22.1.2 Shop Drawings shall be issued showing weights, gauges and thickness of sheet metal; type of material; joining, expansion-joint spacing, and fabrication details; and installation procedures. Materials shall not be delivered to the site until after the approved detail drawings have been returned to the Contractor.

22.1.3 Sheet metal fabricators/Installers shall be limited to those with a minimum of 5-years documented manufacturing experience and who are dedicated to producing high quality, uniform, air tight products that are in strict accordance with all current SMACNA standards for metal and flexible ductwork.

22.2 Submittals

22.2.1 CNA enterprise shall submit all manufacturers technical product data for the ductwork specified including duct and fitting gauges, configurations, dimensions of reducers, radius of elbows, and methods of sealing prior to the fabrication and installation of the work

22.3 Delivery, Storage And Handling:

22.3.1 CNA shall protect ductwork and fittings in such a manner as to avoid dents, scratches, and visual impairments.

22.3.2 Duct shall be delivered stored and handled in such a way as to minimize damage to ends and prevent dirt and moisture from entering duct.

22.3.3 Where stored outside, duct and fittings shall be covered with waterproof material.



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22.4 Materials

- 22.4.1 All ductwork shall be furnished and installed in the gauges and materials specified; Gauges of Metal shall be as specified for the operating class of systems, Gauges for fittings to be as specified, or up to 1 gauge heavier than the ductwork.
- 22.4.2 CNA shall verify fittings conform to the plans and specifications; elbows shall be a minimum of 1-1/2 times diameter to centerline. Branch fittings shall be "Shoe T" configurations with 45 degree throat entrances
- 22.4.3 CNA shall verify Installer uses only non-hardening, non-migrating, mastic or liquid elastic sealant types; applicable for fabrication/installation detail, as compounded and recommended by manufacturer specifically for sealing joints and seams in ductwork- Refer to the Joist sealants section of this QCM.

22.5 Fabrication:

- 22.5.1 CNA shall verify that duct is fabricated only in lengths that can be safely handled while minimizing the number of connections required.
- 22.5.2 Where continuous welded fittings specified, all welds shall be done offsite by electric arc process, wire wheeled and prime coated.

22.6 Installation:

- 22.6.1 All duct work shall be assembled and install in accordance with the latest recognized industry practices which will achieve a virtually airtight and noiseless system capable of performing each indicated service.
- 22.6.2 All duct runs shall be installed with a minimum of joints. straight and true, rigidly supported with suitable ties, braces, hangers and anchors of type which will hold ducts true to shape and will prevent buckling with hanger gauges, reinforcing and spacing as specified.
- 22.6.3 The PM shall verify ducts shall be sketched and engineered to provide sufficient amount of space around equipment to allow normal operating and maintenance activities.
- 22.6.4 Ductwork shall be engineered and installed as close to walls, overhead construction, columns, and other structural elements of building as possible.
- 22.6.5 CNA verify that temporary closures of metal or taped polyethylene on open ductwork is provided during installations until installation of diffusers and grills to prevent dust and dirt from entering ductwork system.



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22.7 Cleaning:

22.7.1 Prior to the installation of grills and diffusers CNA shall instruct HVAC contractor to force air at high velocity through duct to remove any accumulated dust. CNA shall protect any equipment which may be harmed by excessive dirt with temporary filters, or bypass during cleaning.

22.8 Air inlets/Outlets

22.8.1 The PM shall schedule the installation of air diffusers and grills so as not be installed out of sequence. Prior to the installation of diffusers and grills all walls and ceilings shall be completely installed, spackled and painted to achieve the most optimum finished look attainable for the job as a whole.

22.8.2 All air diffusers and grills shall be installed squared to nearest corner, ceiling of grid.

22.9 Verification and inspection

22.9.1 Inspections shall be performed in accordance with the contract specifications, *drawings and the Inspection and Test Plan*. Verification shall be performed and documented immediately Prior to installations. Refer to ***Air distribution Checklist – Exhibit 36 on page 109***

C.23 ELECTRICAL ITEMS- FURNISHED BY CNA AND INSTALLED BY OWNER

23.1 General

23.1.1 Electrical installations shall be supervised BY CNA but controlled by the MTA/LIRR CNA shall furnish the electrical items as scheduled on the drawings;

23.1.2 PM shall verify, log and take inventory of the electrical items furnished and delivered to the jobsite for installations by the owner.

23.2 Shop Drawings & Submittals:

23.2.1 Shop drawings shall be provided by Owner for the electrical work being executed by its own workforce.

23.2.2 Owner shall be responsible for submitting shop drawings and submittals for the work executed by its own workforces in accordance to the plans and specifications for distribution to CNA, Architect, Engineer and Its installers.

23.3 Installation



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Shall be performed by owner

23.4 Delivery, Storage, and Handling

23.4.1 All Items shall be delivered and stored in manufacturer's unopened packaging until ready for installation.

23.4.2 Light fixtures shall be stored on elevated pallets, under cover and in a dry location protected from contamination, dampness, freezing or overheating.

23.5 Delivery, Verification and inspection

23.5.1 in addition to any verifications and inspection By the MTA CNA shall perform the following checklist for electrical items furnished to the owner for installation by its own workforces- **Refer to exhibit 37 on page 110**

C.24 FIRE ALARM SYSTEM

24.1 Purpose

301.1 This Section establishes the Quality Control plan of CNA to provide the necessary supervision, inspections and tests of the fire alarm work, including that of suppliers and subcontractors, that will insure the compliance with the applicable quality standards, contract drawings and specifications.

24.2 Organization

24.2.1 The QCR and PM working closely with the General Forman shall produce overall surveillance of the production activities of The fire alarm installer. They will perform, or have performed, tests and inspections as required to insure that the workmanship and materials are in accordance with the referenced quality standards, contract drawings and specifications.

24.3 General

24.3.1 The contractor QCR will provide surveillance over and perform tests as required of the installation activities of CNA suppliers and subcontractors to insure compliance with the quality standards, contract drawings and specification. Personnel will be provided or designated as required to perform various inspections, sampling and testing. The QCR will coordinate with the Owner / Owner's Representative to achieve the highest quality standards at the most efficient, effective and economical level. The QCR has the authority



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and responsibility to accept or reject all phases of workmanship and materials or products, which do not meet the requirements of the quality standards, contract drawings and specifications. The QCM is responsible for the quality control functions of all phases of procurement, receiving inspection, fabrication, installation, testing and final acceptance of the project. To achieve this end, the QCR will utilize the quality control inspection procedures included in this plan.

- 24.3.2 All quality control functions will be planned and coordinated by the QCM with the owner/owner's representative. Inspections will be based upon complexity of design, installation techniques, quality standards, contract drawings and specifications.
- 24.3.3 The QCR will receive and review all submittals from subcontractors and suppliers. A submittal may take the form of shop drawings, a certificate of compliance from a manufacturer, supplier or subcontractor, a sample catalog cut or brochure. Submittal will be submitted as required by the specification and submittal log.
- 24.3.4 During the term of the contract, it may be necessary, due to material shortages, product line discontinuation or other reasons for the contractor, subcontractor or supplier to submit for approval, by the Owner/Owner's Representative, items which are not in compliance with approved final design documents. Should this occur, the following duties would be performed by the QCR.
- a. The Contractor will notify the Owner/Owner's Representative of the specific material that will be submitted for his approval including the circumstances requiring the material substitution. Each item will be tagged and/or marked for identification and forwarded to the Contracting Officer for review and approval.
 - b. The submittal of this nature and those submittals submitted to the Owner/Owner's representative for record will be made on a transmittal form. The Contracting Officer has determined that the Contractor can use the same transmittal form for material substitutions, but should clearly indicate that it is a substitution request.
- 24.3.5 A list will be prepared from the final approved plans and specifications that summarize all the required submittals. This list will be grouped by specifications division on the QC log of submittal. The Fire Alarm vendor and installer shall be notified of the submittal requirement and due date at the start of the contract.



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- 24.3.6 Any submittal that is a change to the contract requirements will be forwarded to the Owner/Owner's representative as required, for approval prior to final action.
- 24.3.7 QCR will utilize the consultants and the test laboratory as necessary to assist him to effectively establish quality control of the work.
- 24.3.8 The QCR will review all engineering drawings, procurement documents and subcontracts to insure that the technical information provided and all work performed is in accordance with the latest revision of the contract drawings and specifications. All changes made during construction will be recorded on these plans and specifications to indicate "as-built drawings" for the Owner/Owner's representative. All obsolete information that is not required for reference will be discarded as soon as revisions are received. Records of all revisions will be maintained by the QCR. The quality control files will be open and available to the Owner/Owner's representative for inspection.
- 24.3.9 All permanent material, equipment and supplies, including owner furnished equipment, delivered to the project site will be subject to a receiving inspection by the QCR as outlined in this document.
- 24.3.10 The QCR will utilize a three point inspection plan for each feature of the work (see footnote at the end of Section D3). This plan consists of the following:

I. Preparatory Inspection

Prior to commencing Fire alarm work, the following items will be checked for compliance.

- a. Approval of shop drawings and submittals.
- b. Approval of inspection and test reports of materials and equipment to be utilized.
- c. Completion of the previous operation.
- d. Availability of materials and equipment required.
- e. Notification of the client's representative.
- f. Any other preparatory steps dependent upon the particular operation.
- g. Quality standards.

II. Initial Inspection

Upon initial completion of a representative sample of the given feature of work the following items at a minimum will be checked for compliance.

- a. Workmanship to established quality standards.