CITY OF HOUSTON

INVITATION TO BID

Issued: April 29, 2009

Bid Opening:
Sealed bids, in duplicate, will be received by the City Secretary of the City of Houston, in the City Hall Annex, Public Level, 900 Bagby, Houston, Texas 77002 until **10:30 A.M.** Thursday, **May 14, 200,** and all bids will be opened and publicly read in the City Council Chamber, City Hall Annex, Public Level, 900 Bagby at 11:00 A.M. on that date for the purchase of:

FIRE STATION No. 20 STRUCTURAL BRACING AND EXTERIOR WALL CONSTRUCTION
FOR THE GENERAL SERVICES DEPARTMENT
Bid No. S50-C23242
NIGP Code: 910-51

Buyer:
Questions regarding this solicitation should be addressed to Arturo Lopez, Senior Procurement Specialist**, at 832-393-8731or e-mail to arturo.lopez@cityofhouston.net**

Electronic Bidding:
In order to submit a bid for the items associated with this procurement, you must fill in the pricing information on the "**PLACE BID"** page.

Prebid Conference:
A Pre-Bid Conference will be held for all Prospective Bidders in the Strategic Purchasing Division, Concourse Level (Basement), Conference Room, #1 City Hall, 901 Bagby, at **10:00 a.m. on Wednesday, May 6, 2009**. **The site visit will be scheduled at the pre-bid conference.**

All Prospective Bidders are urged to be present. It is the bidder's responsibility to ensure that they have secured and thoroughly reviewed all aspects of the solicitation documents prior to the Pre-Bid Conference. Any revisions to be incorporated into this solicitation document arising from discussions before, during and subsequent to the Pre-Bid Conference will be confirmed in writing by Letter(s) of Clarification prior to the bid due date. Verbal responses will not otherwise alter the specifications, terms and conditions as stated herein.

Bidding forms, specifications, and all necessary information should be downloaded from the Internet at www.houstontx.gov/purchasing/index.html. By registering and downloading this solicitation document, all updates to this solicitation document will be automatically forwarded via e-mail to any registered bidders. This information may also be obtained from the Supplier Assistance Desk, Strategic Purchasing Division, 901 Bagby, Concourse Level, Houston, Texas 77002.

The place of the bid opening may be transferred in accordance with Paragraph (b), (5) of Section 15-3 of The Code of Ordinances, Houston, Texas. The bid-opening meeting may be rescheduled in accordance with Paragraph (b), (6) of said Section 15-3.

The City reserves the right to reject any or all bids, or to accept any bid or combination of bids deemed advantageous to it.
City employees are prohibited from bidding on this solicitation in accordance with the Code of Ordinances Section 15-1.

*__CONTENTS__:

A. OFFER
B. SCOPE OF WORK/SPECIFICATIONS
C. GENERAL, SUPPLEMENTARY CONDITIONS AND BOND FORMS

*NOTE 1: Actual page numbers for each section may change when the solicitation document is downloaded from the Internet or because of letters of clarification. Therefore, bidders must read the solicitation document in its entirety and comply with all the requirements set forth therein.
***NOTE 2: To be considered for award please submit the electronic bid form and the forms listed in section A, including the signature page, which must be signed by a company official authorized to bind the company and a 10% Bid Bond.**

SECTION A

FORMAL ONE-TIME BID
FIRE STATION No. 20 STRUCTURAL BRACING AND EXTERIOR WALL CONSTRUCTION
FOR THE GENERAL SERVICES DEPARTMENT
Bid No. S50-C23242
NIGP Code: 910-51

To The Honorable Mayor
and City Council Members
of the City of Houston, Texas (the "City"):

The undersigned hereby offers to provide services necessary for the **Fire Station No. 20 Structural Bracing and Exterior Wall Construction, located at 6902 Navigation @ Macario Garcia,** F.O.B. destination point Houston, Texas, in accordance with the City's Specifications and General Terms & Conditions and/or samples/drawings provided herein. When issued by the City of Houston, Letters of Clarification shall automatically become part of this bid document and shall supersede any previous specifications or provisions in conflict with Letters of Clarification. It is the responsibility of the bidder to ensure that it has obtained all such letters. By submitting a bid on this project, bidder shall be deemed to have received all Letters of Clarification and to have incorporated them into the bid.

The City may accept this bid offer by issuance of a Notice of Award Letter and/or a Purchase Order at any time on or before the 120th day following the day this Official Bid Form is opened by the City. This offer shall be irrevocable for 120 days after bid opening or for 90 days after City Council awards the bid, whichever comes last, but this period may be extended by written agreement of the parties.

The City reserves the right to INCREASE quantities during the twelve-month period following the issuance of the first purchase order subject to agreement in writing by the Prime Contractor/Supplier to honor the same bid price.

The City reserves the option, after bids are opened, to adjust the quantities listed on the electronic bid form upward or downward, subject to the availability of funds, and/or make award (s) on a line item basis.

SECTION A

Documents/forms must be downloaded from the City's Website
http://www.houstontx.gov/purchasing/index.html

Additional Required Forms to be Included with this bid:

In addition to the electronic Bid Form and the Official Signature Page, the Forms listed in Table 1 **must be completed and submitted to the Office of the City Secretary on or before the date and time the bid is due:**

Table 1
Affidavit of Ownership
Fair Campaign Ordinance
Statement of Residence
Conflict of Interest Questionnaire
Pay or Play Contract Compliance Acknowledgement Form
Pay or Play Certification of Agreement to Comply with Program
10% Bid Bond
Contractor References

Table 2 lists other documents and forms that should be viewed/downloaded from the City's website, but are not required to be submitted with the bid. The City will request these forms, as applicable, to be completed and submitted to the City by the recommended/successful bidder:

Table 2
Drug Forms
Insurance Certificates Over $50,000.00
OCP Insurance Certificate Over $100,000.00
Performance, Maintenance and Statutory Payment Bonds
2006 Building Construction Wage Rate

Questions concerning the Bid should be submitted in writing to: City of Houston, Strategic Purchasing Division, 901 Bagby, Room B506, Houston, TX 77002, Attn: Arturo Lopez or via fax: 832-393-8759 or via email (preferred method) to arturo.lopez@cityofhouston.net no later than 4:00 PM, Friday, May 8, 2009.

PERMITS:
Successful Contractor shall be responsible for securing any and all permits for proposed work. Any fee charged for these permits should be the responsibility of the Contractor and not the City of Houston.

CITY BUILDING CODES:

All work performed or equipment installed shall be in strict accordance with the City of Houston Building Codes. The Contractor will immediately correct any deficiencies discovered during work or after completion. Failure to correct deficiencies will result in the City having corrections made at the Contractor's expense.

BID BOND:

The Contractor shall be required to provide and submit with the bid a Bid Bond in the amount of 10% of the total amount bid by the Contractor. The Bid Bond shall be in the same form as that distributed by the City, and attached hereto, all duly executed by this Bidder (as "Principal") and by a corporate surety company licensed to do business in the State of Texas, and if the amount of the bond is greater than $100,000.00 the surety must hold a certificate of authority from the United States Secretary of the Treasury, or a Cashier's or a Certified check in a like amount. Company or personal checks are not acceptable.

PERFORMANCE BOND and PAYMENT BOND:

The successful Contractor(s) shall be required to provide a Performance and Payment Bond in the total amount (100%) of the Contract if the award is in excess of $25,000.00.

The Performance and/or Payment Bond shall be in the same form as that distributed by the City, and attached hereto, all duly executed by this bidder (as "Principal") and by an incorporated surety company licensed to do business in the State of Texas. If the amount of the bond is greater than $100,000.00 the surety must hold a certificate of authority from the United States Secretary of the Treasury.

The Contractor(s) shall be required to provide a Performance and/or Payment Bond as outlined above, which will be delivered to the City Purchasing Agent of the City, on or before the tenth (10th) day following the day the bidder receives notice from the City.

MAINTENANCE BOND:

The Contractor shall furnish a maintenance bond in the total (100%) bid amount in the form required by the City (samples attached). One bond, also referred to as the One Year Maintenance Bond, will be conditioned upon Contractor's repair, replacement or restoration of any work or any portion of the work which is found to be defective or fails in any way to comply strictly with this contract or the plans and specifications for such work within a period of one (1) year from the date of acceptance of such work by the City Council or after the date that the "CO", or his designee in writing, determines, in a written notice to the Contractor, to be the date upon which the project is both substantially complete and available for the full and beneficial occupancy or use of the City.

QUALITY AND WORKMANSHIP:

The bidder must be able to demonstrate upon request that it has performed satisfactorily, services similar to the services specified herein. The bidder will provide records of warranty and repair services performed for others upon request. The City of Houston shall be the sole judge whether the services performed are similar to the scope of services specified herein.

CONTRACTOR'S QUESTIONNAIRE

In order to receive bid award consideration, the bidder must be able to demonstrate that they are currently providing or have had at least one contract, for **Structural Bracing and Exterior Wall Construction** that is similar in size and scope to this contract. **Bidder must have references documenting that it has performed Structural Bracing and Exterior Wall Construction.** The reference(s) should be included in the space provided below. Please attach another piece of paper if necessary. If references are not included with the bid, the bidder shall be required to provide such references to the City of Houston within five working days from receipt of a written request from the City of Houston to do so. **Bidder's capability and experience shall be a factor in determining the Contractor's responsibility.**

1. Business Name: _____

Business Address:_____

City, State, Zip: _____

Name of Owner/Contact Person: _____

Phone: _____ Fax: _____Email:_____

No. of Years providing Service to this business:_____

2. Business Name: _____

Business Address:_____

City, State, Zip:_____

Name of Owner/Contact Person: _____

Phone: _____ Fax: _____ Email:_____

No. of Years providing Service to this business:_____

3. Business Name: _____

Business Address:_____

City, State, Zip:_____

Name of Owner/Contact Person: _____

Phone: _____ Fax: _____ Email:_____

No. of Years providing Service to this business:_____

SITE INSPECTION

The City of Houston reserves the right to inspect the bidder's current place of business to evaluate equipment condition and capabilities, staff experience, training and capabilities, and storage capabilities as they relate to the performance of this contract.

SECTION B
SCOPE OF WORK

1.0 SUMMARY OF WORK

1.1 Contractor shall provide supervision, labor, materials, equipment, machinery and items necessary to complete the work as per specifications and drawings. Work consists of the structural bracing, exterior wall concrete masonry unit (CMU) and metal frame construction with brick veneer and stucco finishes. The structural bracing renovations include the following components but are not limited to:

1.1.1 Technical Specifications as per the Public Works and Engineering Department Division I Sections.

1.1.2 Drawings

1.1.3 Structural Specifications

2.0 TECHNICAL SPECIFICATIONS

Section 01610
BASIC PRODUCT REQUIREMENTS

PART 1 G E N E R A L

1.1 SECTION INCLUDES

1.1.1 Requirements for transportation, delivery, handling, and storage of Products.

1.2 PRODUCTS

1.2.1 Products: Defined in Document 00700 – General Conditions. Does not include machinery and equipment used for preparation, fabrication, conveying, and erection of the work. Products may also include existing materials or components designated for reuse.

1.2.2 Do not reuse materials and equipment, designated for removal, except as specified by the Contract.

1.2.3 Provide Products from the fewest number of manufacturers as practical, in order to simplify spare parts inventory and to allow for maximum interchangeability of components. For multiple components of the same size, type or application, use the same make and model of component throughout the Work.

1.3 TRANSPORATION

1.3.1 Make arrangements for transportation, delivery, and handling of Products required for timely completion of the Work.

1.3.2 Transport and handle Products in accordance with manufacturer's instructions.

1.3.3 Consign and address shipping documents to proper party giving name of the Project and its complete street address. Shipments shall be delivered to Contractor.

1.4 DELIVERY

1.4.1 Arrange deliveries of Products to accommodate short-term site completion schedules and in ample time to facilitate inspection prior to installation. Avoid deliveries that cause lengthy storage or overburden of limited storage space.

1.4.2 Coordinates deliveries to avoid conflict with the Work and conditions at the site and to accommodate the following:

1.4.2.1 Work of other contractors or the City.

1.4.2.2 Limitations of storage space.

1.4.2.3 Availability of equipment and personnel for handling Products.

1.4.2.4 The City's use of premises.

1.4.3 Have Products delivered to the site in manufacturer's original, unopened, labeled containers.

1.4.4 Immediately upon delivery, inspect shipment to assure:

1.4.4.1 Product complies with requirements of the Contract.

1.4.4.2 Quantities are correct.

1.4.4.3 Containers and packages are intact; labels are legible.

1.4.4.4 Products are property protected and undamaged.

1.5 PRODUCT HANDLING

1.5.1 Coordinate off-loading of Products delivered to the site. If necessary during construction, move and relocate stored Products at no additional cost to the City.

1.5.2 Provide equipment and personnel necessary to handle Products, including those provided by the City, by methods to prevent damage to Products or packaging.

1.5.3 Provide additional protection during handling as necessary to prevent breaking, scraping, marring, or otherwise damaging Products or surrounding areas.

1.5.4 Handle Products by methods to prevent over-bending or overstressing.

1.5.5 Lift heavy components only at designated lifting points.

1.5.6 Handle Products in accordance with manufacturer's recommendations.

1.5.7 Do not drop, roll, or skid Products off delivery vehicles. Hand-carry or use suitable materials handling equipment.

1.6 STORAGE OF PRODUCTS

1.6.1 Store and protect Products in accordance with manufacturer's recommendations and requirements of these Specifications.

1.6.2 Make necessary provisions for safe storage of Products. Place Products so as to prevent damage to any part of the Work of existing facilities and to maintain free access at all times to all parts of the Work and to utility service company installations in the vicinity of the Work. Keep Products neatly and compactly stored in locations that will cause minimum inconvenience to other contractors, public travel, adjoining owners, tenants, and occupants. Arrange storage in a manner so as to provide easy access for inspection.

1.6.3 Restrict storage to areas available on the site for storage of Products as shown on Drawings or approved by Project Manager.

1.6.4 Provide off-site storage and protection when on-site storage is not adequate. Provide addresses of, and access to, off-site storage locations for inspection by Project Manager.

1.6.5 Do not use lawns, grass plots, or other private property for storage purposes without written permission of owner or other person in possession or control of premises.

1.6.6 Protect stored Products against loss or damage.

1.6.7 Store in manufacturers' unopened containers.

1.6.8 Neatly, safely, and compactly stack Products delivered and stored along the line of the Work to avoid inconvenience and damage to property owners and general public, and maintain at least 3 feet clearance around fire hydrants. Keep public, private driveways and street crossings open.

1.6.9 Repair or replace damaged lawns, sidewalks, streets or other improvements to satisfaction of Project Manager. Total length that Products may be distributed along route of construction at one time is 1000 linear feet, unless otherwise approved in writing by Project Manager.

PART 2 ***PRODUCTS*** – Not Used

PART 3 ***EXECUTION*** – Not Used

Section 01330

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.1.1 Submittal procedures for:

1.1.1.1 Schedule of Values

1.1.1.2 Construction Schedules and Cash Flow Curve (billing forecast).

1.1.1.3 Shop Drawings, Product Data and Samples

1.1.1.4 Operations and Maintenance (O&M) Data

1.1.1.5 Manufacturer's Certificates

1.1.1.6 Construction Photographs

1.1.1.7 Project Record Documents and monthly certification.

1.1.1.8 Video Tapes

1.1.1.9 Design Mixes

1.2 SUBMITTAL PROCEDURES

1.2.1 Scheduling and

Handling:

1.2.1.1 Submit Shop Drawings, data and Samples for related components as required by Specifications and Project Manager.

1.2.1.2 Schedule submittals well in advance of need for construction Products.
Allow time for delivery of Products after submittal approval.

1.2.1.3 Develop submittal schedule that allows sufficient time for initial review, correction, resubmission and final review of all submittals. Allow a minimum of 30 days for initial review. Project Manager will review and return submittals to Contractor as expeditiously as possible but time required for review will vary depending on

complexity and quantity of data submitted.

1.2.1.4 Project Manager's review of submittals covers only general conformity to Drawings, Specifications and dimensions that affect layout. Contractor is responsible for quantity determination. No quantities will be verified by Project Manager. Contractor is responsible for errors, omissions or deviations from Contract requirements; review of submittals does not relieve Contractor from the obligation to furnish required items in accordance with Drawings and Specifications.

1.2.1.5 Submit five copies of documents unless otherwise specified.

1.2.1.6 Revise and resubmit submittals as required. Identify all changes made since previous submittal.

1.2.1.7 Assume risk for fabricated Products delivered prior to approval. Do
not incorporate Products into the Work, or include payment for Products in periodic progress payments, until approved by Project Manager.

1.2.2 Transmittal Form and Numbering:

1.2.2.1 Transmit each submittal to Project Manager with Transmittal letter which includes:

1.2.2.1.1 Date and submittal number
1.2.2.1.2 Project title and number
1.2.2.1.3 Names of Contractor, Subcontractor, Supplier and manufacturer
1.2.2.1.4 Identification of Product being supplied
1.2.2.1.5 Location of where Product is to be installed
1.2.2.1.6 Applicable Specification section number

1.2.3 Identify deviations from Contract documents clouding submittal drawings. Itemize and detail on separate 8-1/2 by 11-inch sheets entitled "DEVIATIONS FOR _____." When no deviations exist; submit a sheet stating no deviations exist.

1.2.3.1 Have design deviations signed and sealed by an appropriate design professional, registered in the State of Texas.

1.2.3.2 Sequentially number transmittal letters beginning with number one. Use original number for resubmittals with an alphabetic suffix (i.e., 2A for the first resubmittal of submittal 2, or 15C for third resubmittal of submittal 15, etc.). Show only one type of work or Product on each submittal. Mixed submittals will not be accepted.

1.2.4 Contractor's Stamp:

1.2.4.1 Apply Contractor's Stamp certifying that the items have been reviewed in detail by Contractor and that they comply with Contract
requirements, except as noted by requested variances.

1.2.4.2 As a minimum, Contractor's Stamp shall include:

1.2.4.2.1 Contractor's name
1.2.4.2.2 Job number
1.2. 4.2. 3 Submittal number
1.2. 4. 2 .4 Certification statement Contractor has reviewed submittal and it is in compliance with the Contract
1.2.4.2.5 Signature line for Contractor

1.2.5 Submittals will be returned with one of the following Responses:

1.2.5.1 "ACKNOWLEDGE RECEIPT" when no response and resubmittal is required.

1.2.5.2 "NO EXCEPTION" when sufficient information has supplied to determine that item described is accepted and that no resubmittal is required.

1.2.5.3 "EXCEPTIONS AS NOTED" when sufficient information has been supplied to determine that item will be acceptable subject to changes, or exceptions, which will be clearly stated. When exceptions require additional changes, the changes must be submitted for approval. Resubmittal is not required when exceptions require no further changes.

1.2.5.4 "REJECTED-RESUBMIT" when submittal does not contain sufficient information, or when information provided does not meet Contract requirements. Additional data or details requested by Project Manager must be submitted to obtain approval.

1.3 MANUFACTURER'S CERTIFICATES

1.3.1 When required by Specification sections, submit manufacturers' certificate of compliance for review by Project Manager.

1.3.2 Place Contractor's Stamp on front of certification.

1.3.3 Submit supporting reference data, affidavits, and certifications as appropriate.

1.3.4 Product certificates may be recent or from previous test results, but must be acceptable to Project Manager.

1.4 DESIGN MIXES

1.4.1 When required by Specification sections, submit design mixes for review.

1.4.2 Place Contractor's Stamp, as specified in this section, on the front of each design mix.

1.4.3 Mark each mix to identify proportions, gradations, and additives for each class and type of mix submitted. Include applicable test results from samples for each mix. Perform tests and certifications within 12 months of the date of the submittal.

1.4.4 Maintain copies of approved mixes at mixing plant.

1.5 CHANGES TO CONTRACT

1.5.1 Changes to Contract may be initiated by completing a Request for Information form. Project Manager will provide a response to Contractor by completing the form and returning it to Contractor.

1.5.1.1 If Contractor agrees that the response will result in no increase in cost or time, a Minor Change in the Work will be issued by City Engineer.

1.5.1.2 If Contractor and Project Manager agree that an increase in time or Cost is warranted, Project Manager will forward the Request for Proposal for negotiation of a Change Order.

PART 2 - P R O D U C T S - Not Used

PART 3 E X E C U T I O N - Not Used

Section 01454
TESTING LABORATORY SERVICES

PART 1 G E N E R A L

1.1 SECTION INCLUDES

1.1.1 Testing laboratory services and Contractor responsibilities related to those services.

1.2 REFERENCES

1.2.1 ASTM C 1077 – Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

1.2.2 ASTM D 3666 – Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials.

1.2.3 ASTM D 3740 – Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

1.2.4 ASTM E 329 – Standard Specification for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

1.2.5 ISO/TEC Guide 25 – General Requirements for the Competence of Calibration and Testing Laboratories.

1.3 SELECTION AND PAYMENT

1.3.1 The City will select, employ, and pay for services of an independent testing laboratory to perform inspection and testing identified in Part 3 of individual Specification sections.

1.3.2 Contractor shall employ and pay for services of an independent testing laboratory or laboratories to perform inspection and testing identified in Part 2 of individual Specification sections.

1.3.3 Employment of a testing laboratory by the City shall not relieve Contractor of its obligation to perform work in accordance with requirements of Contract documents.

1.3.4 The City will deduct a minimum two-hour charge for testing laboratory time from periodic progress payment when operations requiring testing or inspection are canceled without prior notification.

1.3.5 The City will deduct cost of retesting from periodic progress payment whenever failed work is removed, replaced and retested.

1.4 QUALIFICATION OF LABORATORY

1.4.1 Meet laboratory requirements of ASTM E 329 and applicable requirements of ASTM C 1077, ASTM D 3666, and ASTM D 3740.

1.4.2 Meet ISO/TEC Guide 17025 conditions for accreditation by the American Association for Laboratory Accreditation (A2LA) in specific fields of testing required in individual Specification sections.

1.4.3 If laboratory subcontracts are part of the testing services, such work will be placed with laboratory complying with the requirements of this section.

1.5 LABORATORY REPORTS

1.5.1 Testing laboratory shall provide and distribute copies of laboratory reports to the distribution list Project Manager provides at the pre-construction conference.

1.5.2 Keep one copy of each laboratory report distributed or faxed at the site field office for duration of the work.

1.5.3 Laboratory will fax material supplier, Contractor and Project Manager reports that indicate failing test results by no later than close of business on the working day following test completion and review.

1.6 LIMITS ON TESTING LABORATORY AUTHORITY

1.6.1 Laboratory may not release, revoke, alter, or enlarge requirements of the Contract.

1.6.2 Laboratory may not approve or accept any portion of the Work.

1.6.3 Laboratory may not assume Contractor duties.

1.6.4 Laboratory has no authority to stop the Work.

1.7 CONTRACTOR RESPONSIBILTIES

1.7.1 Provide safe access to the Work and to manufacturer's facilities for Project Manager and for testing laboratory personnel.

1.7.2 Provide testing laboratory with a copy of the Construction Scheduled and a copy of each update to Construction Schedule.

1.7.3 Notify Project Manager and testing laboratory during normal working hours of the day previous to expected time for operations requiring inspection and testing services. When Contractor fails to make timely prior notification, do not proceed with the operations requiring inspection and testing services.

1.7.4 Notify Design Consultant 24 hours in advance when Specifications requires presence of Design Consultant for sampling or testing.

1.7.5 Request and monitor testing as required to provide timely results and to avoid delays to the Work. Provide samples to laboratory in sufficient time to allow required test to be performed in accordance with specified test methods before intended use of the Product.

1.7.6 Cooperate with laboratory personnel in collecting samples on site. Provide incidental labor and facilities for safe access to the Work to be tested, to obtain and handle samples at site or at source of Products to be tested, and to facilitate tests and inspections including storage and curing of test samples.

1.7.7 Make arrangements with laboratory through Project Manager. Payment for additional testing will be made in accordance with Document 00700 – General Conditions:

1.7.7.1 Re-testing required for failed tests.

1.7.7.2 Re-testing for nonconforming work.

1.7.7.3 Additional sampling and tests requested beyond specified requirements.

1.7.7.4 Insufficient notification of cancellation of tests for work scheduled but not performed.

PART 2 P R O D U C T S – Not Used

PART 3 E X E C U T I O N

3.1 CONDUCTING TESTING

3.1.1 Conform to laboratory sampling and testing methods specified in individual Specification sections to the latest issues of ASTM standards, TxDot methods, or other recognized test standards as approved by Project Manager.

3.1.2 Requirements of this Section shall also apply to those tests for approval of materials, for mix designs, and for quality control of materials as performed by employed testing laboratories.

Section 04810
UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 Section includes furnishing and installing unit masonry assemblies, including:

1.2.1.1 Face brick, masonry flashings, and related work.

1.2.1.2 Concrete masonry units, including masonry lintels, bond beams, flashings, and related work.

1.2.1.3 Portland cement-lime mortar.

1.2.1.4 Grouted reinforced masonry work as indicated.

1.2.1.5 Cleaning masonry work.

1.3 RELATED WORK

1.3.1 Related Work of Other Sections

1.3.1.1 Section 01454 - Testing Laboratory Services.

1.3.1.2 Section 05500 - Miscellaneous Metal Fabrications: Loose lintels, glass block frames.

1.3.1.3 Section 07110 - Bituminous Dampproofing.

1.3.1.4 Section 07900 - Joint Sealants.

1.3.1.5 Section 08110 - Steel Doors and Frames.

1.3.1.6 Section 08400 - Aluminum Storefront Construction: Storefront and window framing.

1.3.1.7 Section 10200 - Aluminum Louvers.

1.3.1.8 Structural specifications on drawings

1.4 DESIGN/PERFORMANCE REQUIREMENTS:

1.4.1 Engineered Masonry: Provide unit masonry that develops the following net-area compressive strengths (f'm) at 28-days. Determine compressive strength of masonry by testing masonry prisms according to ASTM C 1314UBC Standard 21-17.

1.4.1.1 For Concrete Masonry: f'm = 2500 psi (17.2 Mpa) as indicated.

1.4.1.2 For Brick Masonry: f'm = psi (17.2 Mpa) as indicated.

1.4.1.3 For Structural Clay Masonry: f'm = 2500 psi (17.2 Mpa) as indicated.

1.5 SUBMITTALS

1.5.1 Masonry Unit Samples: Prior to placing orders for face brick, submit at least 3 samples of each type of brick required showing full range of size, color, texture, and defects to be expected in the completed work. Submit test results, performed by an independent testing laboratory, for each type and color of brick, and indicating compliance with specified requirements.

1.5.2 Prior to placing orders for Portland cement, provide certified test results showing compliance with requirements, including compliance with the low-alkali requirements.

1.5.3 Submit product data and samples of each type of masonry work accessory.

1.6 QUALITY ASSURANCE

1.6.1 Materials:

1.6.1.1 Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.

1.6.1.2 Mortar: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.

1.6.2 In Place Mock-Up: Build an in place mock-up of approximately 100 face bricks to establish a standard for materials and workmanship for the remainder of the work. Upon acceptance, approved mock-up may be included as part of the Work.

1.6.3 Pre-Installation Conference: Prior to start of masonry work, meet at Project Site with installer ("Mason"), and representatives of other entities directly concerned with performance of masonry work including test agencies, governing authorities, product manufacturers, and the City.

1.6.3.1 Review requirements (Contract Documents), submittals, status of coordinating work, availability of materials and installation facilities, proposed installation schedule, requirements for inspections and testing, forecasted weather conditions, and proposed installation procedures.

1.6.3.2 Record discussion including agreement or disagreement on matters of significance; furnish copy of recorded discussions to each participant.

1.6.3.3 Discuss masonry protection requirements for construction period extending beyond masonry completion.

1.6.3.4 If meeting ends with substantial disagreements, determine how disagreements will be resolved and set date for reconvened meeting.

1.7 DELIVERY, STORAGE AND HANDLING

1.7.1 Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.

1.7.2 Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

1.7.3 Store aggregates where grading can be maintained and contamination avoided.

1.8 PROJECT CONDITIONS

1.8.1 Protection of Masonry: During construction, cover tops of walls, projections and sills with waterproof sheeting at end of each days work. Cover partially completed masonry when construction is not in progress.

1.8.1.1 Extend covers minimum 24" (600-mm) down both sides of wall and hold securely in place. Where one wythe of multi-wythe masonry is completed in advance of other wythes, secure cover a minimum 24" (600-mm) down face next to unconstructed wythe and hold cover in place.

1.8.1.2 Stain Prevention: Prevent grout, mortar, and soil from staining masonry surfaces exposed to view. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1.8.1.3 Cold-Weather Protection Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace masonry damaged by frost or freezing conditions. Comply with cold-weather construction requirements contained in Section 2104.3 of the Uniform Building Code ACI 530.1/ASCE 6/TMS 602.

1.8.1.4 Hot-Weather Protection Requirements: Protect unit masonry when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade, wind breaks, and use cooled materials as required. When ambient temperature exceeds 100ºF. (38ºC.) or 90ºF. (32ºC.) with a wind greater than 8 mph (12.8-Km/hr), do not spread mortar bed greater than 48" (1200-mm) ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Face Brick No. 1 (Field): Provide modular brick, color to be selected from standard colors produced by Acme Brick , complying with ASTM C 216, Grade SW, and Type FBS, Provide modular units, size 3-5/8" (92-mm) wide x 7-5/8" (194-mm) long x 2-1/4" (57-mm) high.

2.1.2 Face Brick No. 2 (Accent #1): Provide “Garnet” produced by Acme Brick, complying with ASTM C 216, Grade SW, and Type FBS. Provide modular units, size3-5/8" (92-mm) wide x 7-5/8" (194-mm) long x 2-1/4" (57-mm) high.

2.1.3 Special Brick Shapes: Provide special shapes for conditions indicated on the Drawings.

2.1.4 Masonry Units:

2.1.4.1 Concrete Masonry Units (CMU): ASTM C 90, Lightweight, Type I, moisture controlled units. Conform to UL requirements at all fire-rated masonry construction. Provide sash block units at control joints and continuous control joint filler.

2.1.4.2 Special Shapes (CMU): Provide lintels, corners, jambs, bullnose pre-finished blocks at all corner, control joints, and other conditions indicated. Provide U-shaped lintel blocks with solid bottoms over window and door openings. Provide open bottom bond beam blocks at top of walls and mid-height of walls when noted on the Drawings. Do not use lintel blocks in place of bond beam blocks.

2.1.5 Mortar and Grout:

2.1.5.1 Low-Alkali Portland Cement: ASTM C 150, low alkali type with not more than 0.60% water-soluble alkali. Provide Type I, except Type III may be used for setting masonry during cold weather. Subject to compliance with requirements, provide TXI Cement Company, New Braunfels, TX, (Tel) 512-396-4244, Type I low alkali Portland cement, or approved equivalent. Do not use masonry cement.

2.1.5.2 Mortar Mix: Provide Portland cement-lime mortar complying with ASTM C 270, Type S mortar mix for reinforced masonry and exterior work and Type N mortar mix for interior work. Provide mortar mix consisting of low alkali Portland cement (ASTM C 150, Type I) as specified, lime (ASTM C 207, Type S), clean sand (ASTM C 144, with not less than 100% passing a No. 8 sieve), coloring and water for workable mix. Do not use masonry cement. Provide selection of standard color Portland cement-lime mortar to match approved sample as selected by Architect.

2.1.5.3 Grout: Provide grout complying with ASTM C 476, Type PL, with a minimum 28-day compressive strength of 2,500 psi (17.2-MPa). Grout shall consist of low alkali Portland cement, aggregates (fine or coarse as follows) and water to produce a consistency at time of placement that will completely fill all spaces intended to receive grout.

2.1.5.3.1 Do not use masonry cement. Use fine grout in grout spaces less than 2" (50-mm) in least horizontal dimension and coarse grout in spaces 2" (50-mm) or more in least horizontal dimension.

2.1.5.3.2 Do not use mortar in place of grout.

2.1.6 Accessories: Provide standard hot-dipped galvanized anchors and accessories for exterior locations and mill galvanized anchors and accessories at interior locations.

2.1.6.1 Horizontal Joint Reinforcing (CMU): ASTM A 951; Dur-O-Wal, Inc., "Ladur-Standard" or Hohmann & Barnard No. 220 continuous 0.149-inch (3.8-mm) diameter horizontal ladder-type reinforcing spaced not more than 16" o.c., vertically. Provide additional joint reinforcement in two courses immediately above lintels and two courses immediately below sills extending 24" (600-mm) beyond jambs of openings, except across control joints. Provide factory fabricated "L's" and "T's" of joint reinforcement at all intersecting walls. Do not continue joint reinforcement through control joints.

2.1.6.2 Horizontal Joint Reinforcing (Brick Veneer - CMU): ASTM A 951; Dur-O-Wal, Inc., "Ladur-Eye Standard" or Hohmann & Barnard No. 270 continuous 0.149-inch (3.8-mm) diameter horizontal ladder-type reinforcing with adjustable 2-piece rectangular box type cross-ties spaced not more than 16" (400-mm) o.c. along ladder reinforcing. Size adjustable brick ties to extend to within 1/2" (13-mm) of face of brick veneer. Place horizontal joint reinforcing not more than 16" (400-mm) o.c., vertically, and arranged to stagger brick ties in alternate courses. Provide additional joint reinforcement in two courses immediately above lintels and two courses immediately below sills extending 24" (600-mm) beyond jambs of openings, except across control joints. Provide factory fabricated "L's" and "T's" of joint reinforcement at all intersecting walls. Do not continue joint reinforcement through control joints.

2.1.6.3 Horizontal Joint Reinforcing (Single Wythe Brick Fence): ASTM A 951; Dur-O-Wal, Inc., "Dur-O-Wal Truss - Extra Heavy" or Hohmann & Barnard No. 120 Extra Heavy continuous 3/16 (4-mm) diameter horizontal truss-type reinforcing spaced not more than every other course vertically.

2.1.6.4 Brick Ties (Cold-Formed Metal Framing Back-Up): Hohmann & Barnard, Inc., "DW-10 Vee Tie", 0.0635-inch (1.6-mm) thick hot- dipped galvanized steel anchors spaced 16" o.c. horizontally and 16" o.c. vertically, and arranged to stagger ties in alternate courses, or equivalent by Dur-O-Wal, Inc..

2.1.6.5 Anchors to Steel Frame: ASTM A 82; Provide Hohmann & Barnard VWT triangular-shaped hot-dip galvanized 3/16" (4-mm) diameter wire tie of length to extent to within 3/4" (19-mm) of exposed masonry face and No. 359 hot-dip galvanized 1/4" (13-mm) steel rod anchor welded to steel frame and arranged for 4" (100-mm) vertical adjustment and 1/16" (1-mm) maximum clearance between ties and restraint. Space anchors not more than 16" (400-mm) on center vertically. Equivalent units produced by Dur-O-Wal or Heckmann Building Products will be acceptable.

2.1.6.6 Drill Screw Fasteners for Screw Attached Masonry Veneer Anchors and Ties: ASTM C 954, except with hex washer head and neoprene washer, No. 10 by length require to penetrate steel stud flange by not less than three exposed threads, and with organic polymer coating complying with ASTM B 117; "Traxx" by ITW-Buildex or "Dril-Flex" by Elco Industries.

2.1.6.7 Concealed Masonry Flashing: Sandell Manufacturing Co., 7-oz. (2.1-Kg/m^2) "Copper Fabric", or equivalent by AFCO Products, Hohmann & Barnard, Inc., Polytite Manufacturing Corp., or York Manufacturing, Inc.

2.1.6.8 Reinforcing Bars: Deformed steel, ASTM A 615, Grade 60.

2.1.6.9 Compressible Filler: Hohmann & Barnard "No. NS", 3/8" (10-mm) thick, or equivalent by Dur-O-Wal.

2.1.6.10 Asphalt Saturated Organic Felt: ASTM D 226, Type I, No. 15.

2.1.6.11 Weep Hole Vents: Dur-O-Wal “Cell Vent” cellular weep hole ventilator or equivalent.

2.1.6.12 Masonry Cleaners: ProSoCo, Inc., Kansas City, MO, "Sure Klean 600" general purpose detergent cleaner, "Sure Klean 101 Lime Solvent" for removal of excess mortar and job stains, and "White Scum Remover" for removal of insoluble salt scums from brick and mortar, or equivalent cleaners formulated to be safe on masonry and non-masonry surfaces such as anodized aluminum, painted surfaces and similar finishes.

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1 Examine conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Verify that brick sills are at the correct plan location and elevation that reinforcing dowels are properly placed, and that foundations are within tolerances specified. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 LAYOUT OF MASONRY WORK

3.2.1 Layout walls in advance for accurate spacing of surface bond patterns, to provide uniform joint widths and to properly locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half size units at corner, jambs, and wherever possible at other locations.

3.3 MASONRY INSTALLATION

3.3.1 Lay-up masonry work in one-third running bond (field brick and CMU) with vertical joint in each course spaced one third in from end of units in courses above and below. Lay-up masonry work in herringbone pattern where indicated in the drawings**.**

3.3.1.1 Cut masonry units with motor-drive saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3.1.2 Laying Masonry, General: Select and arrange units for exposed masonry to produce a uniform blend of colors and textures; unit units from several pallets or cubes as they are placed. Lay-up walls plumb and true with courses level, accurately spaced and coordinated with other work. Use mortar and grout within 2-1/2 hours of initial mixing. Do not use mortar held on mortarboard more than 45 minutes on days not exceeding 75°F (24°C) and with humidity range of between 55% and 70%. On warmer days reduce time mortar is held on mortarboards to not more than 30 minutes.

3.3.1.3 Laying Concrete Masonry: Lay hollow concrete masonry units in running bond with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with concrete or grout.

3.3.1.4 Grouted Reinforced Masonry: Install masonry units to ensure continuous, non-obstructed vertical cores. Place continuous vertical bars of size and spacing indicated and tied to reinforcing at floor and structure above. Where multiple bars are indicated within a single core, arrange bars equally in the core, 1/2" (13-mm) clear of each outside core face. Place single bars in the center of the core.

3.3.1.4.1 Grout cells with reinforcing bars solid.
3.3.1.4.2 Grout cells with drilled expansion anchors solid.
3.3.1.4.3 Grout cells with embedded headed studs or other embedded anchors solid.
3.3.1.4.4 Grout steel door frames built into masonry solid. Rake out perimeter joints 3/4" (19-mm) deep for sealant and back-up rod.

3.3.1.5 Masonry Wall Intersections: Except where control joints are indicated, bond intersecting walls with 50 percent of units overlapping units below by not less than 3" (75-mm).

3.3.1.6 Laying Brick: Lay brick with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove in place. Do not slush head joints.

3.3.1.7 Cleaning Cells and Cavities: Keep cells and cavities free of mortar droppings.

3.3.1.8 Horizontal Wall Reinforcement: Provide continuous horizontal joint reinforcing. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" (16-mm) on exterior side of walls and 1/2" (13-mm) at other locations. Lap reinforcement a minimum of 6" (150-mm). Do not bridge control and expansion joints with reinforcing. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions. Space continuous horizontal reinforcing as follows:

3.3.1.8.1 Single-Wythe Walls: Space horizontal reinforcing at 16" (400-mm) o.c. vertically.

3.3.1.8.2 Brick Veneer Over Concrete Masonry Unit Back-Up: Space continuous horizontal reinforcing as required by Code, but not more than 16" o.c. (400-mm) vertically, and arranged so that brick veneer ties are staggered from course to course.

3.3.1.8.3 Multi-Wythe Walls (Solid or Cavity) Where Continuous Horizontal Reinforcing Acts as Structural Tie Between Wythes: Space reinforcing as required by code but not more than 16" (400-mm) o.c. vertically and arranged so that brick veneer ties are staggered from course to course.

3.3.1.9 Reinforcement at Masonry Openings: Reinforce masonry openings greater than 1'-0" (300-mm) wide, with horizontal joint reinforcing placed in 2 horizontal joints approximately 8" (200-mm) apart, both immediately above lintels and below sills. Extend reinforcing a minimum of 2'-0" (600-mm) beyond jambs of the opening, bridging control joints where provided.

3.3.1.10 Masonry Flashing: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, and other obstructions to downward flow of water in wall, and where indicated. Prepare masonry surfaces by eliminating projections that could puncture flashing. Unless otherwise indicated, place through-wall flashing on a sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

3.3.1.10.1 Multi-Wythe Masonry Walls: Extend flashing from exterior face of outer wythe of masonry, through outer wythe, turned up a minimum of 4 inches (100-mm), and turned into inner wythe to within 1/2 inch (13-mm) of interior face of masonry wall in exposed masonry. Where interior surface of inner wythe is concealed by furring, carry flashing completely through inner wythe and turn flashing up approximately 2-inches (100-mm).

3.3.1.10.2 Masonry Veneer Walls: Extend flashing from exterior face of veneer, through veneer, turned up face of sheathing a minimum of 8 inches (200-mm), and behind air infiltration barrier, building paper, or flashed into bituminous dampproofing.

3.3.1.10.3 Lintels and Shelf Angles: Extend flashing a minimum of 4 inches (100-mm) into masonry at each end. At heads and sills, extend flashing 4 inches (100-mm) at ends and turn flashing up at ends not less than 2 (50-mm) inches to form a pan.

3.3.1.10.4 Weeps: Install weep holes in head joints in exterior wythe of the first course of masonry immediately above embedded flashing using wicking material or open head joints spaced not more than 24 (600-mm) inches on center. Place pea gravel in cavities immediately above flashing to a height not less than 2" (50-mm)

3.3.1.11 Vertical Reinforcing:

3.3.1.11.1 Provide continuous vertical reinforcing as indicated on the Drawings, including additional reinforcing bars at corners, around openings, attachments of other work, and similar work as indicated.

3.3.1.11.2 Install bars to provide proper embedment and laps where indicated as "continuous reinforcing".

3.3.1.11.3 Lap all continuous reinforcement a minimum of 36 bar diameters.

3.3.1.11.4 See Structural General Criteria for additional requirements.

3.3.1.12 Cleanouts for Grouting: Provide clean-outs in cells to be grouted at maximum 5-foot (1.5-m) centers, vertically. Remove excess mortar by "rodding" and with compressed air. After cleaning cells to be grouted, close clean-outs with masonry to match adjacent construction. Do not place grout until entire height of masonry has attained sufficient strength to resist grout pressure. Place grout in such a way as to prevent segregation of materials. Pour grout fluid enough to flow into all crevices of grout spaces leaving no voids.

3.3.1.13 Cutting and Patching: Provide full size units matching existing adjacent construction for size, texture, bond, and joint profile. Make repairs relatively imperceptible in the completed Work.

3.3.1.14 Wet brick with absorption rates greater than 20 g./30 sq. in./min. as determined by ASTM C 67, so that rate of absorption when laid is less than this amount. Use Brick Institute of America recommended procedure of placing a hose stream on a pile of brick until water runs from the pile one-day before brick are to be used. In very warm weather, place hose stream on pile several hours before brick are used.

3.3.1.15 Masonry Joints: Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not otherwise indicated, lay walls with 3/8" (10-mm) joints. Cut joints flush for masonry walls that are to be concealed or to be covered by other materials. When mortar is thumbprint hard, tool exposed joints slightly concave. Rake out mortar in preparation for application of caulking or sealants where shown.

3.3.1.16 Stopping and Resuming Work: In each course, rack back 1/2 unit length for running bond or 1/3 unit length for one-third running bond; do not tooth except at repairs in existing construction. Clean exposed surfaces of set masonry, wet clay masonry units lightly (if required), and remove loose masonry units and mortar prior to laying fresh masonry.

3.3.1.17 Correction of Damaged Masonry: Remove and replace masonry units that are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as required. Provide new units to match adjoining units and install fresh mortar or grout, pointed to eliminate evidence of replacement.

3.4 CLEANING AND PROTECTION

3.4.1 Cleaning Brick Masonry: Clean exposed brick masonry surfaces by the bucket and brush method or by high-pressure water method, and as recommended by BIA Technical Notes 20 "Cleaning Brick Masonry". Use general-purpose detergent cleaner specified to clean all exposed brick masonry. Use specialty cleaners specified when general-purpose detergent cleaner fails to remove persistent stains, to achieve a uniform appearance to match approved mock-up. Do not use acid. Provide exposed surfaces that are clean and free of mortar, dirt, stains, and discoloration.

3.4.2 Cleaning Concrete Masonry Units: Clean exposed concrete masonry units by dry brushing at the end of each days work and after final pointing to remove mortar spots and droppings. Comply with NCMA Bulletin No. 28.

3.4.3 Protection of Masonry Work: Protect partially completed masonry against weather at end of each day's work and when work is not in progress, by covering top of walls with strong, waterproof, non staining membrane. Extend membrane at least 24" (600-mm) down both sides of walls and hold cover securely in place. Protect bases of walls from mud, mortar and other stains. Where cutting, forming, welding and similar operations must be performed near or above masonry work, provide substantial protection against damage.

3.5 FIELD QUALITY CONTROL

3.5.1 Test and evaluate each 5,000 sq. ft. (465-m^2) masonry work, or fraction thereof, as follows:

3.5.1.1 Mortar Compressive Strength: Provide sampling and testing in accordance with ASTM C 780.

3.5.1.2 Grout Compressive Strength: Provide sampling and testing in accordance with ASTM C 1019.

3.5.1.3 Prism Test Method: Provide sampling and testing in accordance with ASTM E 447-92b, with one sample for testing at 7 days and one set of three samples for testing at 28 days.

3.51.4 Evaluation of Quality Control Tests: In the absence of other indications of noncompliance, masonry will be considered satisfactory if results from construction quality control tests comply with minimum requirements indicated.

Section 05165
COLD-FORMED METAL RETROFIT ROOF FRAMING SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

1.1.1 General

1.1.1.1 The structural retrofit roof framing system will provide support for a new metal roofing system constructed over the existing building roof. It shall be engineered in accordance with the specified code and design loading and shall transfer positive acting loads at each attachment location into an existing structural member. In no case shall the framing be supported by or attached to the existing roof decking. The framing shall accommodate inconsistencies in the roof's topography and perimeter geometry to develop a new roof slope plane and will minimize irregularities that could produce oil-canning in the new metal roof system.

1.1.1.2 Furnish labor, material, tools, equipment and services for the retrofit roof framing as indicated, in accordance with provisions of the Contract Documents.

1.1.1.3 Completely coordinate with work of other trades.

1.1.1.4 Although such work is not specifically indicated, furnish and install supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

1.1.1.5 See the Public Works and Engineering Department Division 1 Specifications for General Requirements.

1.2 Related work specified elsewhere:

1.2.1 Structural Steel and Steel Joists as per structural drawings and specs on drawings.
1.2.2 Metal Roofing - Section 07411

1.2.3 Flashing and Sheet Metal Trim - Section 07600

1.2 QUALITY ASSURANCE

1.2.1 Applicable Standards: All following referenced publications shall be the most current edition in effect on the date of solicitation.

1.2.1.1 American Institute of Steel Construction (AISC)

1.2.1.1.1 AISC - Specification for Structural Steel for Buildings
1.2.1.1.2 AISC: ""2001 North American Specification for the Design of Cold Formed Structural Members," American Iron and Steel Institute.

1.2.1.2 American Iron and Steel Institute (AISI)

1.2.1.2.1 AISI "Cold Form Steel Design Manual"

1.2.1.3 American Society of Civil Engineers (ASCE)

1.2.1.3.1 ASCE-7 - Minimum Design Loads for Buildings and other Structures

1.2.1.4 American Society for Testing and Materials (ASTM) (As Applicable)

1.2.1.4.1 ASTM A 36/A 36M - Structural Steel
1.2.1.4.2 ASTM A 307 - Steel Bolts and Studs
1.2.1.4.3 ASTM A 529/A 529M – Structural Steel with 42 KSI Minimum Yield Point
1.2.1.4.4 ASTM A 1011/A 1011M – Steel Sheet and Strip, Carbon, Hot-Roll

1.2.1.4.5 ASTM A 792/A 792M AZ50 (Bare Galvalume Plus®) Steel Sheet Aluminum-Zinc Alloy Coated by the Hot Dipped Process

1.2.1.4.6 ASTM E 1592 - Structural Performance Test for Metal Panel and Siding Systems by Uniform Static Air Pressure Difference

1.2.1.5 Light Gauge Structural Institute (LGSI)

1.2.1.6 Steel Structures Painting Council (SSPC)

1.2.1.6.1 SSPC- SP10 - Steel Structures Painting Manual

1.2.1.7 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

1.2.1.7.1 ANSI/ASHRAE Standard 90.1, Energy Standard for Buildings

1.2.1.8 Local and State Building Codes

1.2.2 Manufacturer Qualifications

1.2.2.1 Manufacturer has a minimum of five years experience in manufacturing and fabrication of retrofit roof framing systems of this nature. Light gauge structural components specified in this section shall be produced in a factory environment (not job-site formed) with fixed-base, roll forming and press-brake equipment assuring the highest level of quality control.

1.2.2.2 Approval shall have been granted to any manufacturing facility producing the retrofit roof framing system components by the MBMA and IAS (International Accreditation Services), for quality assurance in manufacturing operations. A letter from the manufacturer certifying compliance will accompany the product approval submittals.

1.2.2.3 Manufacturer shall be the same as that furnishing the metal roof and wall panel cladding systems specified in Section 07610.

1.2.3 Installation Contractor Qualifications

1.2.3.1 Installation contractor shall be an approved installer, certified by the manufacturer before beginning installation of the retrofit roof framing system and shall meet the following minimum criteria:

1.2.3.1.1 Maintain $250,000 minimum general liability insurance coverage.

1.2.3.1.2 Maintain statutory limits of worker's compensation coverage as mandated by law.

1.2.3.1.3 Has no viable claims pending for negligent acts or defective workmanship on previously performed or current projects.

1.2.3.1.4 Has not filed for protection from creditors under any state or federal insolvency or debtor relief statutes or codes.

1.2.3.1.5 Project foreman is the person having received the specific factory training in the proper installation of the specified retrofit roof framing system and will be present to supervise whenever material is being installed.

1.2.3.1.6 Specific factory training will include the following:

1.2.3.1.6.1 The instructor must have a minimum of 10 years experience in the application of retrofit roof framing systems

1.2.3.1.6.2 A formal syllabus for the classroom and hands-on training

1.2.3.1.6.3 Classroom instructions with review and thorough understanding of the specific product's technical aspects. These shall include proper attachment of new framing to the existing roof structure, general layout of framing and proper temporary bracing methods are used.

1.2.3.1.6.4 Hands-on mock-up instruction with a review and thorough understanding of the specific product's details.

1.2.3.1.6.5 The installation contractor must pass a written and oral exam

1.2.3.1.7 Provide a certification letter that installation contractor has a minimum three years of metal product installation experience immediately preceding the date upon which work is to commence.

1.2.3.2 Pre-installation Conference

1.2.3.2.1 Prior to installation of the retrofit roof framing system, conduct a pre-installation conference at the project site.

1.2.3.2.2 Attending parties shall be Owner's representative, Architect, Contractor, Project Superintendent, Metal Roofing Installer and Retrofit roof framing Installer.

1.2.3.2.3 Agenda to include framing details and anchorage methods, critical sequencing and review of phasing if applicable and inspection sequencing.

1.2.3.2.4 Preparation work on the existing roof that is required to be completed prior to framing installation commences shall be inspected to approve its readiness to proceed.

1.2.4 Installation Quality Control

1.2.4.1 The contractor shall conduct an inspection of the retrofit roof framing system immediately prior to metal roof panel installation. This is to ensure the purlin system is installed at the specified slope and to confirm all roof planes are properly aligned and straight to minimize oil-canning. All system component connections will be inspected as well to ensure they have been installed in accordance with the installation documents.

1.3 SUBMITTALS

1.3.1 Submit complete shop drawings and erection details approved by the general contractor to the architect for review. Do not proceed with manufacture, prior to review of shop drawings. Do not use drawings prepared by the architect for shop or erection drawings.

1.3.2 Shop drawings shall show methods of erection, elevations and plans of retrofit roof framing, sections and details, impending loads at framing anchorage locations, interfaces with materials not supplied and proposed identification of component parts and their finishes.

1.3.3 Shop drawings shall include an existing roof plan that shows actual field obtained perimeter dimensions establishing the limits of the new retrofit construction, changes in roof elevation, location of HVAC, plumbing and electrical equipment and other information that is relative to the existing roof's relationship with the new retrofit roof system. All dimensions are to be verified by the contractor prior to returning approved submittals to the manufacturer.

1.3.4 Shop drawings shall be accompanied by an engineering design calculation package for the structural properties of the retrofit roof framing components and metal roof panel system.

1.3.5 Shop drawings and design calculations shall bear the seal and signature of a Professional Engineer registered to practice in the State of Texas.

1.4 DESIGN REQUIREMENTS

1.4.1 General

1.4.1.1 Design for approval and installation in accordance with the included drawings and these specifications, a complete structural retrofit roof framing and metal roof panel system as a structural package, engineered and factory fabricated by one manufacturer in accordance with AISI, MBMA and ASCE references.

1.4.1.2 Any additions/revisions to framing members as a result of field conditions and/or demands, shall be the contractor's responsibility, and shall be submitted for review and approval by the manufacturer.

1.4.2 Building Code

1.4.2.1 The retrofit metal roof system manufacturer shall engineer the entire system to meet the most current version of the IBC code.

1.4.3 Wind Load Design

1.4.3.1 The retrofit framing assembly shall withstand wind pressures as specified in section 07610.

1.4.3.2 The design uplift force for each connection assembly shall be that pressure given for the area under consideration, multiplied by the tributary load area of the connection assembly. The safety factor listed below shall be applied to the design force and compared against the ultimate capacity. Prying shall be considered when calculating fastener design loads. Single Fastener each connection 3.00 Two or more fasteners each connection 2.25

1.4.4 Live and Snow Load Design

1.4.4.1 Horizontal Assemblies shall withstand minimum live and snow loads as required by the building code plus the weight of the retrofit roof framing components and the metal roof panel system.

1.4.4.2 Horizontal deflection shall be L/180 of span after installation of components and equipment as well a vertical deflection in framing members shall not exceed H/60.

1.4.5 Dead loads

1.4.5.1 The retrofit roof system shall be designed to support the weight of the new metal roof system as well as any collateral loads such as mechanical and electrical systems that may be supported by the retrofit roof system

1.5 DELIVERY AND STORAGE

1.5.1 Deliver retrofit roof framing to jobsite properly packaged to provide protection against transportation damage.

1.5.2 Exercise extreme care in unloading, storage and erecting retrofit roof framing to prevent bending, warping, twisting and surface damage.

1.5.3 Store all materials and accessories above ground on well-skidded platforms under waterproof covering.

PART 2 – PRODUCTS

2.1 MATERIALS

2.1.1 Retrofit Roof framing System Components

2.1.1.1 Base members shall be open-faced channels or zee shapes. Vertical columns shall be cee shapes. Roof purlins shall be zee shapes with the top-flange roll formed or press broken to match the slope of the retrofit roof system when the new roof slope is less than 4 inches per foot. When slopes are greater than this, an angle clip shall be included to attach the purlin at each vertical column member.

2.1.1.2 Eave members shall be cee shapes or angles with the top flange roll formed or press broken to match the slope of the retrofit roof system.

2.1.1.3 Purlins will conform to ASTM-A-1011, minimum yield strength of 57 ksi. The gauge and depth will be as required by the engineering calculations.

2.1.1.4 Vertical columns that support the purlins and as well base members shall have a minimum yield strength of 33 ksi for 18-gauge and lighter material or 57 ksi for 16-gauge and heavier material. The gauge and depth will be as required by the engineering calculations.

2.1.1.5 Bracing angles will conform to ASTM-A-792, 22-gauge 50ksi minimum or 16-gauge 57ksi minimum when required by the engineering calculations.

2.1.1.6 Struts shall conform to ASTM A 653/653M 18-gauge 33 ksi minimum or ASTM-A-1011, 16-gauge 57ksi minimum when required by the engineering calculations.

2.1.1.7 Supply all hardware items required for installation of retrofit roof framing system in accordance with manufacturer's installation instructions.

2.1.2 Finishes:

2.1.2.1 Red Oxide Primer applied to steel components will comply with FS-TTP-636 Modified Alkyd Amino Thermoset with a dry film thickness of 0.6 to 1.0 mil.

2.1.2.2 Galvanized components will conform to ASTM-A-653/653M G-90, G-60 or G-40 as applicable to members being used.

2.1.2.3 Galvalume® components will conform to ASTM-A-792 AZ55.

2.1.3 Acceptable Manufacturer:

2.1.3.1 MBCI – Houston, TX -- (281) 445-8555.

2.1.3.2 Supply all products specified in this section from the same manufacturer as for Sections 07411 and 07600

2.1.4 Other manufacturers desiring approval shall comply with Public Works and Engineering Division 01 Specification requirements.

2.2 MISCELLANEOUS PRODUCTS

2.2.1 Fasteners And Anchors

2.2.1.1 Anchors used for the attachment of the new retrofit roof framing system to the existing roof structural support system shall be of the type and size that is appropriate for secure attachment to satisfy the required wind uplift pressure values at each location, as specified by the retrofit system manufacturer and as specified above in section 1.3. All anchors shall have a corrosion resistance coating and will securely attach to existing structural members. A minimum of two (2) anchors shall be used for continuous base members and four (4) for intermittent base channel members.

2.2.1.2 Fasteners used for the retrofit roof framing system shall be a minimum ¼" diameter with 14 threads per inch having a stress relief head and a corrosion resistant coating as specified by the retrofit roof system manufacturer.

2.2.2. Anchor Penetration Sealant

2.2.2..1 Temporary construction sealant shall be used at each anchor penetration at attachment locations of the new retrofit roof framing system. The Installer shall recommend the appropriate sealant type that is compatible with the existing roof membrane, which will provide a leak-free condition throughout the installation of the retrofit roof framing metal roof systems.

2.2.3 Insulation Assemblies

2.2.3.1 Insulation shall be vinyl backed condensation control blanket of sufficient thickness to provide a minimum "R" value of 6 when tested in accordance with ASTM C 177. The vinyl backing shall provide a permeability of 0.02 perms or less when tested in accordance with ASTM E 96 with a flame spread rating of less than 25 when tested in accordance with ASTM C 84. Insulation shall conform to ASTM C 665, Type ll, Class A or Type lll, Class A.

2.2.3.2 Un-faced fiberglass insulation shall be installed directly over existing roof. Thickness shall be 6" providing a minimum "R" value of 19 when tested in accordance with ASTM C 177.

2.2.4 Ventilation Assemblies

2.2.4.1 The contractor shall provide ventilation to the space between the existing roof and the new metal roof system using components and recommended details from the retrofit

systems manufacturer. Submit airflow calculations with appropriate literature supporting the ventilation system will meet the minimum airflow changes per hour as required by ANSI/ASHRAE Standard 90.1-1989, Model Energy Code of Energy Standard for Buildings.

PART 3 – EXECUTION

3.1 EXISTING ROOF SYSTEM SURVEY AND TESTING

3.1.1 The Contractor shall become familiar with the existing roof system and inform Architect and/or Engineer of any conflicts after inspection.

3.1.2 Before design work begins by the retrofit system manufacturer, the installation contractor shall perform a rooftop survey to collect critical information about the existing roof and its support system. This information shall be provided to the retrofit system manufacturer and will include the following:

3.1.2.1 Perimeter dimensions in plan view.

3.1.2.2 Dimensions of existing exterior and interior parapet walls including height above existing roof, width of coping and slope if applicable.

3.1.2.3 Existing gravel stop or fascia dimensions including vertical exterior face dimension for concealing by new perimeter flashing.

3.1.2.4 Existing perimeter gutters that will not be removed per the drawings.

3.1.2.5 Existing roof support joist type, spacing and span orientation.

3.1.2.6 Depth and type of existing decking and thickness of thermal insulation.

3.1.2.7 Type of existing weatherproofing membrane.

3.1.2.8 Existing roof elevation changes and slope to interior and/or perimeter roof drainage.

3.1.2.9 Wall construction type at any areas requiring new roof counterflashing.

3.1.2.10- Exact locations of existing HVAC equipment relative to the roof's edge including height and physical size of units. For units that are to be elevated above the new roof plane and supported by framing provided by the retrofit system manufacturer, the weight of each unit and the required curb size shall be provided.

3.1.3 The contractor shall obtain pullout values on proposed anchors for attaching the retrofit roof system base members to the existing roof's

structural system. This testing shall be conducted atop the existing roof at multiple areas using a calibrated pull-out tester. All anchors are to penetrate the existing roof assembly and substrate and attach directly to a structural member. The contractor shall then have the anchorage connection designed to satisfy the minimum wind uplift reactions supplied by the retrofit roof system manufacturer multiplied by a safety factor of 2.50. This design analysis shall be submitted to the Architect for review accompanied by the jobsite pull-out testing report along with technical product information on the proposed anchors to be used for attachment of the retrofit roof framing.

3.1.4 The contractor shall determine the compressive strength of the existing roof substrate assembly. These values shall be recorded in pounds per square inch (PSI) obtained from field testing atop the existing roof at multiple areas. The testing results shall be provided to the retrofit roof system manufacturer for conducting an analysis to ensure the retrofit base members will provide sufficient bearing surface area to satisfy the impending loads. Any values determined to exceed the limitations and physical size of the manufacturer's standard base member based on bearing surface area shall require the contractor to remove the existing membrane and insulation at each affected location. Base members will then be attached at the decking to a structural member. Details of this revised attachment condition shall be submitted to the Architect accompanied by the testing report before work commences.

3.1.5 The contractor shall evaluate the existing roof substrate for moisture content and report to the architect any areas that will require removal. Upon evaluation, the Architect will direct the contractor on remedial work to be performed.

3.2 DEMOLITION OF EXISTING ROOF MATERIALS

3.2.1 The existing roofing aggregate will have been removed prior due to abatement however contractor shall inspect the roof prior to finalizing bids and determine if any additional work is required to provide a proper installation.

3.3 FRAMING SYSTEM INSTALLATION

3.3.1 General

3.3.1.1 The contractor shall install the retrofit roof framing system as specified and in accordance with the retrofit systems manufacturer's approved installation documents and erection drawings.

3.3.1.2 Install the retrofit purlins to prevent waves, warpage, buckles, fastening stresses or other distortion. Extreme care should be taken when installing the retrofit roof framing purlins and other roof plane components to minimize oil canning in the metal roof panel system.

3.3.1.3 Field cutting of framing members shall be accomplished by power tools and will be done in a safe manner to prevent damage to the existing roof and adjacent materials. The contractor shall practice good material utilization of members to minimize scrap and to not jeopardize the construction schedule due to unnecessary shortages of framing components

3.3.1.4 Retrofit roof framing base members that are continuous shall be shimmed to prevent rainwater damming that may occur during erection of the retrofit roof framing and metal roof systems. Material used for shims shall be of non-deteriorating composition having a minimum thickness of 3/8 inch and providing solid bearing for the impending loads.

3.3.2 Erection Tolerances

3.3.2.1 Variation of vertical members from plumb: 1/8 inch, maximum

3.3.2.2 Variation of horizontal members from level: 1/8 inch, maximum over length of member

3.3.2.3 Variation of purlins from true roof plane: 1/4 inch in 20’-0” and 3/8” maximum in 40’-0”

3.3.2.4 Variation in purlin runs at ridge and panel end laps: 1/4 inch maximum in 20’-0”

3.4 EXISTING ROOFTOP COMPONENTS AND EQUIPMENT

3.4.1 When mechanical equipment locations conflict with retrofit roof framing components as shown on the manufacturer’s drawings, the contractor will provide additional framing that spans over the equipment. Prior to doing this, the contractor shall notify the manufacturer for proper installation and design of spanning members. Manufacturer shall submit construction details for this condition, if deemed necessary by the Architect. In addition, base members and their anchorage must be re-evaluated to ensure that the increased loading condition is satisfied and compliant with Section 1.4, paragraph 1.4.4.

3.4.2 Existing Plumbing Extension: Existing sanitary plumbing vents shall be extended to new roof jacks located at the new metal roof plane. Extension of piping shall be accomplished with materials matching the existing piping composition subject to local building and plumbing code requirements. Penetrations and their new roof jacks shall not interrupt any metal roof panel side seam unless approved by the manufacturer and installed in accordance with their installation instructions. Use elbow fittings to redirect the pipe to locate the penetration between the metal roof panel side seams. For gas piping that is located at the existing roof elevation, refer to the drawings for requirements on relocating. If the piping is not to be relocated, adjustments may be necessary to avoid attachment and anchorage of retrofit roof framing base members that conflict with the piping. Submit any changes in to the manufacturer and Architect for approval prior to commencing re-work.

3.4.3 Existing Ventilation Equipment Extension: Existing gravity vents, power vents, fresh air make-up, and other vents are to be installed on new metal curbs at the new metal roof plane. The contractor shall construct new ductwork from the existing roof penetration to the new roof curb. Ductwork joints shall be sealed tight to provide a leak-proof assembly and shall be made with material of like composition and gage of the ductwork being extended.

3.5 EXISTING COMPONENTS REINSTALLATION

3.5.1 All equipment being relocated to the new metal roof plane shall be installed securely to prevent displacement and to provide a watertight installation.

3.6 CLEAN UP

3.6.1 The contractor will protect installed framing from damage by subsequent construction activities until final acceptance. All framing system cuttings and debris including unused anchors, framing fasteners, sealant and associated materials shall be collected and disposed of from the jobsite.

Section 05400
COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 This Section includes the following:

1.2.1.1 Exterior load-bearing wall framing.
1.2.1.2 Interior load-bearing wall framing.

1.2.1.3 Gypsum sheathing and joint tape.

1.3 RELATED WORK

1.3.1 Related Work of Other Sections:

1.3.1.1 Section 04810 – Unit Masonry Assemblies.

1.3.1.2 Section 05500 - Miscellaneous Metal Fabrications.

1.3.1.3 Section 06100 – Rough Carpentry.

1.3.1.4 Section 07110 – Bituminous Dampproofing.

1.3.1.5 Section 07210 – Building Insulation.

1.3.1.6 Section 08400 – Aluminum Storefront Construction.

1.3.1.8 Section 09900 - Paints and Coatings.

1.3.1.9 Specifications on Structural Drawings.

1.4 DEFINITIONS

1.4.1 Minimum Uncoated Steel Thickness: Minimum uncoated thickness of cold-formed framing delivered to the Project site shall be not less than 95 percent of the thickness used in the cold-formed framing design. Lesser thicknesses shall be permitted at bends due to cold forming.

1.5 DESIGN/PERFORMANCE REQUIREMENTS

1.5.1 Structural Performance:

1.5.1.1 Design Wind Load: Design, fabricate and install work of this Section to resist wind-load design pressures calculated according to requirements of authorities having jurisdiction or the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever are more stringent.

1.5.1.2 Deflection Limits: Design framing system to withstand design wind load without deflection greater than the following:

1.5.1.2.1 Exterior Non-Load-Bearing Wall Framing: L/600 of the clear span or 3/4", whichever is less.

1.5.1.2.2 Interior Load-Bearing Wall Framing: L/240 of the clear span or 3/4", whichever is less.

1.5.1.2.3 Reduce allowable wall deflections where conditions would result in deleterious effects on supported veneer construction, sealants, flashing and similar weatherproofing system failures).

1.5.1.3 Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).

1.5.1.4 Design exterior non-load-bearing curtain-wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

1.5.1.5 Determine allowable stresses for all cold-formed metal framing in accordance with AISI "Specification for the Design of Cold Formed Steel Structural Members".

1.5.1.6 Required design analysis does not include design of supporting building structure or cold-formed metal framing effect on supporting structures.

1.6 SUBMITTALS

1.6.1 Product Data: For each type of cold-formed metal framing product and accessory indicated.

1.6.1.1 Include physical and structural properties for constructions with one layer each of external gypsum sheathing and internal gypsum drywall continuous over framing, at required design wind load and at L/600 deflection limits.

1.6.1.2 Show minimum uncoated thickness and design thickness upon which cold-formed metal framing span and deflection limitations are based.

1.6.1.3 Calculate structural properties based upon computations in accordance with AISI "Specification for the Design of Cold Formed Steel Structural Members".

1.6.2 Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining Work.

1.6.3 Indicate supplemental strapping, bracing, bridging, splices, accessories, and details of connections, including connections to adjacent work, types and locations of fasteners, as required to comply with requirements.

1.6.4 For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Calculations shall include, but not be limited to, the justification of cold-formed metal framing, bridging, bracing, and connections for compliance with the specified Design/Performance Requirements.

1.6.5 Certification: Include certification signed and sealed by the qualified professional engineer responsible for the structural analysis preparation that the cold-formed metal framing system design complies with the Design/Performance Requirements specified. Submit engineering calculations and certification with first submittal of shop drawings.

1.6.6 Welding Certificates: Copies of certificates for welding procedures and personnel.

1.7 QUALITY ASSURANCE

1.7.1 Installer Qualifications: An experienced installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

1.7.2 Engineering Responsibility: Engage a qualified professional engineer to prepare design calculations, Shop Drawings, and other structural data.

1.7.3 Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.

1.7.4 Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

1.7.5 Mill certificates signed by steel sheet producer or test reports from a qualified independent testing agency indicating steel sheet complies with requirements.

1.7.6 Fire-Test-Response Characteristics: Where metal framing is part of a fire-resistance-rated assembly, provide framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1.7.7 AISI Specifications: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members" or "Load and Resistance Factor Design Specification for Cold-Formed Steel Structural Members" and the following for calculating structural characteristics of cold-formed metal framing.

1.7.8 CCFSS Technical Bulletin: AISI Specification Provisions for Screw Connections.

PART 2 - PRODUCTS

2.1 PRODUCT AND MANUFACTURER

2.1.1 Subject to compliance with requirements, provide products manufactured by one of the following:

2.1.1.1 Clark Steel Framing Industries, Middletown, OH, (Tel) 800-543-7140.

2.1.1.2 Dale Industries, Inc., Dearborn, MI, (Tel) 313-846-9400.

2.1.1.3 Dietrich Industries, Inc., Hutchins, TX, (Tel) 214-225-1100.

2.1.1.4 Amico/Maverick Steel Corp., Ennis, TX, (Tel) 800-346-6586.

2.1.1.5 Harrison Manufacturing Co., Memphis, TN, (Tel) 901-332-4030 or 800-727-0057.

2.1.1.6 USX Corp., United States Steel Group, Pittsburgh, PA, (Tel) 800-874-3381; 412-433-1121.

2.1.1.7 Wheeling Corrugating Company, Stoughton, WI, (Tel) 608-873-9405.

2.2 NON-LOAD BEARING WALL FRAMING

2.2.1 Provide standard punched "Cee" shaped studs, runners and accessories from steel sheet conforming to ASTM A 653, Structural Steel (SS), Grade 33, with G90 zinc-coating (galvanized) by the hot-dip process according to ASTM A 924, and as follows. Provide matching deep leg tracks with minimum 1.250" (33 mm) wide return legs and provisions for vertical movement; "VertiTrack" by Steel Network, (Tel) 888-474-4876, or equivalent approved by City.

Punched Cee Stud Designations, with 1-5/8" Wide Flanges with 1/2" Return Lips	Minimum Uncoated Thickness, Inches	Design Uncoated-Steel Thickness, Inches
362-S-162-33; 400-S-162-33; 600-S-162-33; 800-S-162-33	0.0329 (0.84 mm) (Old 20 gage)	0.0346 (0.88 mm)
362-S-162-43; 400-S-162-43; 600-S-162-43; 800-S-162-43	0.0428 (1.08 mm) (Old 18 gage)	0.0451 (1.14 mm)
362-S-162-54; 400-S-162-54; 600-S-162-54; 800-S-162-54	0.0538 (1.37 mm) (Old 16 gage)	0.0566 (1.44 mm)
362-S-162-68; 400-S-162-68; 600-S-162-68; 800-S 162-68	0.0677 (1.72 mm) (Old 14 gage)	0.0713 (1.81 mm)

2.3 COLD-FORMED STEEL FRAMING ACCESSORIES

2.3.1 Provide manufacturer's standard steel runners (tracks), extra deep deflection tracks, bridging, solid blocking, supplementary framing, web stiffeners, gusset plates, lintels, stud kickers and girts, clip angles, shoes, hangers and end closures, reinforcement plates, fasteners, and accessories as recommended by manufacturer for the application indicated, and as needed to provide a complete metal framing system complying with design/performance requirements specified. Fabricate steel framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33,000 psi (230 MPa). Provide accessories of thickness to match connected members, in manufacturer's standard configurations, unless otherwise indicated.

2.3.1.1 Fasteners: Steel drill screws, ASTM C 954, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

2.3.1.2 Powder Actuated Fasteners: Provide fastener systems of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times the design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

2.3.1.3 Welding Electrodes: Comply with AWS standards.

2.4 GYPSUM SHEATHING AND ACCESSORY MATERIALS

2.4.1 Glass Mat Gypsum Sheathing Board: Glass mat faced gypsum sheathing designed as a exterior substrate for a weather barrier and complying with ASTM C1177, Regular Type, Type X, 1/2" (13 mm) thick. Subject to compliance with requirements, provide "Dens Glass Gold Exterior Sheathing" "Dens Glass Gold Firestop Exterior Sheathing" produced by Gold Bond Building Products, or approved equivalent.

2.4.2 Self Adhering Joint Tape for Exterior Gypsum Sheathing: Carlisle Hardcast “VaporGrip-22” seam, flashing and vapor barrier sealing tape with “CCW-702”, “CCW-1402 Primer/Adhesion Enabler”, or Hardcast “GlasGrip-658” adhesive; Stopaq EZ Wrap, (Tel) 832-243-0899; or Monsey Bakor BlueSkin WP-200, (Tel) 210-659-6533.

2.5 FABRICATION

2.5.1 Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.

2.5.1.1 Fabricate framing assemblies using jigs or templates.

2.5.1.2 Cut framing members by sawing or shearing; do not torch cut.

Fasten cold-formed metal framing members by welding. Wire tying of framing members is not permitted. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

2.5.1.3 Fasten cold-formed metal framing members by screw fastening only. Welding or wire tying of framing members is not permitted.

2.5.1.3.1 Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

2.5.1.3.2 Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.

2.5.1.4 Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

2.5.2 Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

2.5.3 Fabrication Tolerances: Fabricate assembly's level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

2.5.3.1 Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

2.5.3.2 Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1 Examine supporting substrates and abutting structural framing for compliance with requirements, including installation tolerances and other conditions affecting performance of cold-formed metal framing. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREFABRICATION

3.2.1 Structural-framing components may be prefabricated into panels prior to erection. Fabricate panels plumb, square, true to line, and braced against racking with all joints welded. Perform lifting of prefabricated panels in a manner to prevent damage or distortion.

3.3 INSTALLATION

3.3.1 Install cold-formed metal framing according to ASTM C 1007, unless more stringent requirements are indicated.

3.3.2 Install cold-formed metal framing and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements of this Section.

3.3.2.1 Cut members by sawing or shearing; do not torch cut.

3.3.2.2 Provide cripple studs attached to jamb studs above and below all headers of 24-inch (600-mm) or more in opening width.

3.3.2.3 Bolt or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).

3.3.2.4 Fasten cold-formed metal framing by welding or screw fastening, as standard with the fabricator. Wire tying of framing components is not permitted.

3.3.2.5 Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

3.3.2.6 Locate mechanical fasteners and install components according to cold-formed metal framing manufacturer's instructions with screw penetrating joined members but not less than 3 exposed screw threads.

3.3.2.7 Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

3.3.3 Install continuous tracks sized to match studs. Secure tracks as recommended by the stud manufacturer for the type of construction involved, except do not exceed 24-inches (600 mm) o.c. spacing for nail or powder-driven fasteners, or 16-inches (400 mm) o.c. for other types of attachment.

3.3.4 No-load-Bearing Curtainwall Framing: Unless otherwise shown at closer spacing, place studs at maximum 16-inches (400 mm) o.c., not more than 2-inches (50 mm) from each side of openings, doubled at openings, and tripled at corners. Install intermediate studs above and below opening to match wall stud spacing.

3.3.4.1 Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.

3.3.4.2 Use full-length studs, unless spliced connections are indicated for track or tension members.

3.3.4.3 Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.

3.3.4.4 Squarely seat studs against webs of top and bottom tracks. Fasten both flanges of studs at top and bottom tracks.

3.3.4.5 Install lintels, supplementary framing, solid blocking, and bracing in the metal framing system wherever walls or partitions are indicated to support windows, fixtures, equipment, services, heavy trim, and similar work. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from the item supported.

3.3.4.6 Install horizontal stud stiffeners (bridging) using full depths studs in stud system, spaced (vertical distance) at not more than 48-inches (1.2 m) apart. Fasten each stud intersection at each stud flange.

3.3.4.7 Where walls or partitions are braced to structure, provide a continuous horizontal stud wale, of same depth and minimum metal thickness as stud wall or partition, welded or screw fastened to each stud. Provide stud bracing spaced as indicated, but not to exceed 48-inches (1.2 m) apart. Use stud braces of same depth and minimum thickness as stud wall or partition, welded or screw fastened to stud web adjacent to the horizontal stud wale, with the other end fastened to the structure, so as to develop the full axial load carrying capacity of the stud brace.

3.3.4.8 Frame both sides of expansion and control joints, with separate studs; do not bridge the joint with components of stud system.

3.3.4.9 Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

3.3.5 Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

3.3.5.1 Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 GYPSUM SHEATHING

3.4.1 Install gypsum sheathing in accordance with manufacturer's instructions and GA-253 "Application of Gypsum Sheathing". Install boards horizontally with long edges at right angles to studs, with v-groove edge down, ends over center of studs, and with vertical joints staggered.

3.4.1.1 Cut penetrations, edges, and other obstructions of the work; fit tightly against abutting construction, except provide a 3/8-inch (9-mm) setback where non-load-bearing construction abuts structural elements.

3.4.1.2 Apply fasteners so screw heads bear tightly against face of sheathing boards but do not cut into facing.

3.4.1.3 Do not bridge building expansion joints with sheathing; cut and space edges to match spacing of structural support elements.

3.4.2 Install sheathing tape to all joints in sheathing, overlapping tape by not less than tape width at joint intersections. Use primer recommended by tape manufacturer for substrates and conditions to provide secure installation of tape. Coordinate tape installation with related work.

Section 05500
MISCELLANEOUS METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 Section includes furnishing and installing:

1.2.1.1 Rough hardware.

1.2.1.2 Loose bearing and leveling plates.

1.2.1.3 Galvanized loose steel lintels.

1.2.1.4 Miscellaneous framing and supports for the following:

1.2.1.4.1 Sectional overhead doors.
1.2.1.4.2 Louvers.
1.2.1.4.3 Suspended toilet partitions.
1.2.1.4.4 Lavatory counters.
1.2.1.4.5 Applications where framing and supports are not specified in other sections.

1.2.1.5 Galvanized shelf and relieving angles.

1.2.1.6 Galvanized structural steel door frames for sectional overhead doors.

1.2.1.7 Galvanized pipe bollards and curved pipe bollards.

1.2.1.8 Prefabricated galvanized metal framing.

1.2.1.9 Handrails.

1.3 RELATED WORK

1.3.1 Related Work of Other Sections:

1.3.1.1 Section 01454 – Testing Laboratory Services.

1.3.1.2 Section 03300 – Cast-In-Place Concrete. (Drawing #S101)

1.3.1.3 Section 04810 – Unit Masonry Assemblies.

1.3.1.5 Section 05120 - Structural Steel. (Drawing #S101)

1.3.1.6 Section 05210 - Steel Joists. (Drawing #S101)

1.3.1.7 Section 05310 - Steel Deck. (Drawing #S101)

1.3.1.8 Section 05400 - Cold Formed Metal Framing.

1.3.1.9 Section 06100 - Rough Carpentry.

1.3.1.10 Section 08400 - Aluminum Storefront Construction.

1.4 REFERENCES

1.4.1 Comply with the provisions of the following codes, standards and specifications, except as otherwise shown and specified.

1.4.1.1 AISC: Follow AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", including "Commentary of the AISC Specifications".

1.4.1.2 AISI: Follow AISI "Specifications for the Design of Cold-Formed Steel Structural Members".

1.4.1.3 ASTM: Follow ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".

1.4.1.4 AWS: Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel" and D1.3 "Structural Welding Code - Sheet Steel". Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 DESIGN/PERFORMANCE REQUIREMENTS

1.5.1 Design, engineer, fabricate and install the following metal fabrications to withstand the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each respective component of each metal fabrication. Arrange for required design work to be performed by a professional engineer who is legally authorized to practice in the jurisdiction where the Project is located and who is experienced in providing engineering services of the kind indicated and that have resulted in successful installation of metal fabrications similar in material, design, and extent to those required for Project. The following criteria are in addition to ASTM E 985 – “Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.”

1.5.1.1 Handrail and Grab Bar Mounting Plate Reinforcements and Fasteners: Capable of withstanding the maximum bending moment from a load of 250 lbf (113 kg-f) applied at any location along the handrail and grab bar without failure in mounting plates, mounting fasteners, or supporting structure.

1.5.2 Fabrication Workmanship: Provide the following classes of workmanship for miscellaneous metal fabrication items indicated or required.

1.5.2.1 Class 1 Workmanship: Items that are exposed to view in finished spaces in completed Work.

1.5.3 Exposed Surfaces: Sandblast surfaces smooth; grind off mill marks; fill nicks and scratches so that defects do not show when painted. Remove sharp corners and edges.

1.5.4 Welds: Conceal welds where possible. Where exposed, grind welds to small radius with uniform sized cove. When painted, welds shall be undetectable.

1.5.5 Bolts: Use only flat head countersunk bolts in exposed locations.

1.5.6 Straightness: Distortions visible to the eye will be rejected.

1.5.7 Joints: Fit joints to hairline finish.

1.5.7.1 Class 2 Workmanship: Items that are exposed to view in utility areas of the completed Work.

1.5.8 Exposed Surfaces: Moderate irregularities not visible at 30-feet (9 m) may remain. Mill marks may remain. Remove sharp corners and edges.

1.5.9 Welds: Provide neat welds of uniform size. Remove splatter and protrusions.

1.5.10 Bolts: Use only flat or oval head, countersunk bolts where exposed to view.

1.5.11 Straightness: Minor distortions not exceeding 1/8-inch (3 mm) in 8'-0" (2.4 m) will be permitted.

1.5.12 Joints: Provide maximum gap of 1/16-inch (1.5 mm).

1.5.12.1 Class 3 Workmanship: Items that are concealed from view in the completed Work.

1.5.13 Exposed Surfaces: Mill finish with surface preparation for galvanizing or priming.

1.5.14 Welds: Grinding not required.

1.5.15 Bolts: Exposed bolts permitted.

1.6 SUBMITTALS

1.6.1 Submit manufacturer’s product data for each type of manufactured product and accessory required.

1.6.2 Submit shop drawings detailing the fabrication and erection of each metal fabrication indicated.

1.6.2.1 Include plans, elevations, sections, and details of metal fabrications and their connections.

1.6.2.2 Show anchorage and accessory items.

1.6.2.3 Provide templates for anchors and anchor bolts specified for installation as part of the work of other Sections.

1.6.2.4 Seal and sign shop drawings for required design work by a qualified professional engineer responsible for their preparation.

1.6.2.5 Submit certification signed by the professional engineer responsible for shop drawing preparation that the design of the work indicated on the shop drawings complies with the Design/Performance Requirements specified in Section 05500.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Metal Surfaces, General: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.

2.1.2 Ferrous Metals:

2.1.2.1 Steel Plates, Shapes, and Bars: ASTM A 36.

2.1.2.2 Cold-Formed Steel Tubing: ASTM A 500, Grade B.

2.1.2.3 Steel Pipe: ASTM A 53, Type S, Grade A, standard weight (Schedule 40), unless otherwise indicated or required by structural loads, black finish unless galvanized finish is required.

2.1.2.4 Cold-Rolled Structural Steel Sheet: ASTM A 611, Grade A.

2.1.2.5 Hot-Rolled Steel Sheet: ASTM A 569.

2.1.2.6 Galvanized Steel Sheet: ASTM A 653, Commercial Quality Grade, with G90 zinc coating, unless another grade is required for fabrication or design loading.

2.1.2.7 Malleable Iron Castings: ASTM A 47, grade 32510.

2.1.2.8 Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

2.1.2.9 Welding Rod and Bar Electrodes: Select in accordance with AWS Specifications for the metal alloy to be welded.

2.1.2.10 Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.

2.1.2.11 Prefabricated Metal Framing: Equivalent to Unistrut hot-dip galvanized P1000H3 with P3016-1420 nuts, HHCS205075EG hex head cap screws, P1026 ninety-degree angle fittings, (2) P1358 mounting brackets near lower corners of frame, and (4) P2398S beam clamps.

2.1.2.12 Service Station Armored Curb: AISI Type 304 (S30400) stainless steel, minimum 0.0598 (1.52-mm) thick; American Fabricating Engineers, Memphis, TN (Tel) 901-362-7552, or approved equivalent.

2.1.2.13 Handrails: Furnish and install 1-1/2 inch diameter Schedule 40 steel pipe, aluminum, and stainless steel rails as indicated. Include all other parts required for finished installation. All work shall be in accordance with codes and access standards.

2.2 ACCESSORY ITEMS

2.2.1 Nonshrink Nonmetallic Grout: Premixed, prepackaged complying with Corps of Engineers CRD-C 621; Master Builders "Masterflow 713", Cormix Construction Chemicals "Supreme Grout", Sonneborn Building Products "Sonogrout", or L & M Construction Chemicals "Crystex".

2.2.2 Erosion-Resistant Anchoring Cement: Premixed, prepackaged, nonstaining hydraulic expansion cement formulation; Minwax Construction Products "Super Por-Rok".

2.2.3 Anti-Slip Surfacing: 3M Company "Safety-Walk", black color with adhesive recommended by manufacturer for substrates indicated.

2.2.4 Fasteners, General: Provide zinc-coated fasteners for exterior use and where exposed to moisture. Select fasteners for the type, grade and class required for the installation of miscellaneous metal items.

2.2.4.1 Bolts and Nuts: Regular hexagon head, ASTM A 307, Grade A.

2.2.4.2 Lag Bolts: Square head type, FS FF-B-561.

2.2.4.3 Machine Screws: Cadmium plate steel, FS FF-S-92.

2.2.4.4 Plain Washers: Round carbon steel, FS FF-W-92.

2.2.4.5 Lock Washers: Helical spring type carbon steel, FS FF-W-84.

2.2.4.6 Drilled-in Sleeve Type Expansion Anchors: FS FF-S-325, Group II, Type 3 externally threaded stud with full-length expanding sleeve; Hilti sleeve anchor, or equivalent by Powers or Simpson.

2.2.4.7 Drilled-in Wedge-Type Expansion Anchors: FS FF-S-325, Group II, Type 4 externally threaded stud with single-piece wedge; Hilti Kwik Bolt II, or equivalent by Powers or Simpson.

2.2.4.8 Epoxy Adhesive Anchors for Concrete: Hilti Corp., Tulsa, OK, (Tel) 800-879-8000 or 713-462-8699, "HVA Adhesive Anchor", 3/8" (10 mm) x 4" (100 mm) long unless otherwise indicated or required for proper fastening of items indicated, or equivalent by Powers (Rawl), Ramset/Redhead, or Simpson.

2.2.4.9 Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.

2.2.5 Shop Primer for Ferrous Metal: Fabricator's standard, fast-curing, lead and chromate free, VOC compliant, corrosion resistant primer compatible with finish paint systems indicated.

2.2.6 Galvanizing Repair Paint: High zinc-dust content paint for regalvanizing welds in galvanized steel containing not less than 94% zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.

2.3 FABRICATION, GENERAL

2.3.1 Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.

2.3.2 Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or if not indicated, use flat head countersunk Phillips screws or bolts. Locate joints where least conspicuous. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing the work.

2.3.3 Weld corners and seams continuously and in accordance with the recommendations of AWS. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. At exposed connections, finish exposed welds and surfaces smooth and blend so that no roughness shows after finishing and contour at welded surfaces match adjacent surfaces.

2.3.4 Fabricate and space anchoring devices to provide adequate support for the intended use. Coordinate with supporting structure.

2.3.5 Preassemble items in the shop to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain the structural value of the joined pieces. Clearly mark units for reassembly and coordinated installation.

2.3.6 Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware, screws, and similar items.

2.3.7 Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.4 ROUGH HARDWARE

2.4.1 Furnish custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes in the sizes, shapes and dimensions required for framing and supporting and anchoring rough carpentry. Hot-dip galvanize where exposed to atmosphere or embedded into concrete. Furnish malleable iron washers for bolt heads and nuts that bear on wood connections; elsewhere furnish steel washers.

2.5 LOOSE BEARING AND LEVELING PLATES

2.5.1 Provide loose bearing plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting. Galvanize after fabrication.

2.6 LOOSE STEEL LINTELS

2.6.1 Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.

2.6.1.1 Weld adjoining members to form a single unit where indicated.

2.6.1.2 Size loose lintels for equal bearing of one inch per foot of clear span, but not less than 8" (200 mm) bearing at each side of opening.

2.6.1.3 Hot-dip galvanize loose lintels to be located in exterior walls.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

2.7.1 Provide steel framing and supports for applications indicated or that are not part of the structural steel framework, as required to complete work.

2.7.1.1 Galvanize miscellaneous framing and supports in exterior locations.

2.7.1.2 Fabricate units to sizes, shapes and profiles indicated and required to receive adjacent other construction retained by framing and supports.

2.7.1.3 Fabricate from structural steel plates, shapes and bars of welded construction, using mitered joints for field connection.

2.7.1.4 Cut, drill and tap units to receive hardware, hangers and similar items.

2.7.1.5 Equip units with integrally welded 1-1/4" (31 mm) x 1/4" (31 mm) x 8" (200 mm) anchors for casting into concrete and building into masonry.

2.7.1.6 Furnish inserts if units must be installed after concrete is placed.

2.8 MISCELLANEOUS STEEL TRIM

2.8.1 Provide shapes and sizes indicated for the profiles shown. Except as otherwise noted, fabricate units from structural steel shapes and plates and steel bars with continuously welded joints and smooth exposed edges.

2.8.1.1 Use concealed field splices wherever possible.

2.8.1.2 Provide cutouts, fittings, and anchorages as required for coordination of assembly and installation with other work.

2.8.1.3 Galvanize miscellaneous steel trim at exterior locations.

2.9 SHELF AND RELIEVING ANGLES

2.9.1 Fabricate shelf and relieving angles from steel angles of sizes indicated and for attachment to concrete framing.

2.9.1.1 Provide slotted holes to receive 3/4 inch (19 mm) bolts, spaced not more than 6 inches from ends and not more than 24 inches (600 mm) o.c.

2.9.1.2 Shop apply zinc-rich urethane primer in two separate coats to exterior shelf angles.

2.9.1.3 Galvanize shelf angles at exterior locations.

2.10 STRUCTURAL STEEL DOOR FRAMES

2.10.1 Fabricate steel door frames from structural shapes of size and to dimensions indicated, fully welded together.

2.10.1.1 Plug-weld built-up members and continuously weld exposed joints.

2.10.1.2 Provide steel strap anchors for securing door frames into adjoining concrete or masonry, using 1/8" (3 mm) x 2" (50 mm) straps of the length required for a minimum 8" embedment. Weld anchors to frame jambs no more than 12" from both bottom and head of frame and space anchors not more than 30" (450 mm) apart.

2.10.1.3 Extend bottom of frames to floor elevation indicated with steel angle clips welded to frames for anchoring frame to floor with expansion shields and bolts.

2.10.1.4 Galvanize frames and anchors at exterior locations.

2.11 SHOP FINISHES

2.11.1 Galvanize Coated Metal: For shelf angles, exterior wall lintels, other metal fabrications items with exterior exposure hot dip galvanize items in accordance with ASTM A 153 for galvanizing iron and steel hardware ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299" (0.74 mm) thick and heavier.

2.11.2 Shop Painting of Uncoated Metal: Prepare uncoated ferrous metal surfaces to comply with SSPC-SP6 "Commercial Blast Cleaning" for exterior exposures (SSPC Zone 1B), SSPC-SP3 "Power Tool Cleaning" for interior exposures (SSPC Zone 1A), and SSPC-SP1 "Solvent Cleaning" for both interior and exterior exposures to remove oil, grease and similar contaminants.

2.11.2.1 Brush or spray 1 coat of primer paint to fabricated metal items, except apply 2 coats of primer at edges, corners, crevices, welds and concealed surfaces of exterior exposure items.

2.11.2.2 Do not paint surfaces and edges to be field welded or embedded in concrete. Provide minimum 2.0 mill (0.05 mm) dry film thickness per coat.

PART 3 - EXECUTION

3.1 FASTENING TO IN-PLACE CONSTRUCTION

3.1.1 Provide anchorage devices and fasteners for securing miscellaneous metal items to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors.

3.2 CUTTING, FITTING, AND PLACEMENT

3.2.1 Perform cutting, drilling, and fitting required for the installation of the miscellaneous metal items.

3.2.2 Set the work accurately in location, alignment and elevation; with edges and surfaces plumb, level, true and free of rack; and measured from established lines and levels.

3.2.3 Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.

3.2.4 Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations.

3.2.5 Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

3.3 FIELD WELDING

3.3.1 Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work.

3.3.2 Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

3.3.3 Obtain fusion without undercut or overlap. Remove welding flux immediately. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

3.4 TOUCH-UP-PAINTING

3.4.1 Cleaning and touch-up painting of field welds in other than hot-dip galvanized items, bolted connections, and abraded areas of the shop paint on miscellaneous metal is specified in Section 09900 – Paints and Coatings.

3.4.2 For galvanized surfaces clean welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

3.5 INSTALLATION

3.5.1 Setting Loose Bearing Plates: Set loose bearing plates on wedges or other adjustable devices. After items have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with mortar. Pack bedding mortar solidly between bearing surfaces and plates to ensure that no voids remain.

3.5.2 Anchor railing posts in concrete by core drilling holes not less than 5" (125 mm) deep and 3/4" (19 mm) greater than outside diameter of post. Clean holes of all loose material, insert posts and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and place to comply with anchoring material manufacturer's directions. Leave anchorage joint exposed, wipe off surplus anchoring material, and leave 1/8" (3 mm) build-up, sloped away from post.

Section 06100
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 Section includes furnishing and installing wood furring, grounds, nailers and blocking.

1.3 RELATED WORK

1.3.1 Related Work of Other Sections:

1.3.1.1 Section 04810 – Unit Masonry Assemblies.

1.3.1.2 Section 05400 – Cold-Formed Metal Framing.

1.3.1.3 Section 05500 - Miscellaneous Metal Fabrications.

1.3.1.4 Section 07110 - Bituminous Dampproofing.

1.3.1.5 Section 07600 - Flashing and Sheet Metal.

1.4 DELIVERY, STORAGE, AND PROTECTION

1.4.1 Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces.

1.4.2 Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

PART 2 - PRODUCTS

2.1 DIMENSION LUMBER

2.1.1 Provide lumber manufactured to comply with DOC PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review. Provide dressed lumber, S4S, air seasoned with maximum 19 percent maximum moisture content, "S-DRY", 2-inch (50 mm) or less in nominal thickness. Provide graded and grade-marked lumber as follows, complying with the association grading rules, under whose rules the material was produced. In the event Contractor wishes to use lumber of other species or grades, submit pertinent data for City's approval prior to placing orders.

2.1.1.1 Blocking, Furring, Rough Lumber, Joists, Rafters, Headers Beams and Other Horizontal Framing, Not Otherwise Specified: Douglas Fir - Larch No. 2 (WWPA) or Southern Pine No. 2 (SPIB).

2.1.1.2 Concealed Board Lumber: Southern Pine No. 3 (SPIB), any species No. 4 (WCLIB) or any species "Standard" (WWPA).

2.1.1.3 Preservative treat as specified roof curbs and cants; all nailers, blocking, and plates in contact with concrete or masonry; roof edges; wood framing members less than 18" above grade, structural support for decks; and other items indicated.

2.1.1.4 Fire retardant treat all interior blocking and nailers concealed in construction.

2.2 CONSTRUCTION PANELS

2.2.1 Provide plywood panels complying with DOC PS1 "US Product Standard for Construction and Industrial Plywood" and mat formed or composite panels complying with DOC PS2 "Performance Standards for Wood-based Structural-Use Panels". Factory-mark each panel with APA trademark indicating compliance with grade requirements. Provide the following:

2.2.1.1 Plywood Wall Sheathing (only in areas indicated-general sheathing to be Gypsum Sheathing- Densdeck or equal): APA RATED SHEATHING, EXTERIOR or EXPOSURE 1, 32/16, minimum 1/2" thick, veneer plywood only.

2.3 PRESERVATIVE TREATMENT

2.3.1 Comply with applicable requirements of AWPA C2 (Lumber) and AWPA C9 (plywood). Provide treatment after members are shaped with waterborne chromated copper arsenate (CCA), ammonical copper quat-B (ACQ-B), alkaline copper quat-D (ACQ-D), or copper azole (CA-B) preservative oil borne pentachlorophenol (Penta) preservative by vacuum pressure full-cell process in accordance with AWPA Standard Specification P-5 P-8/P-9and as follows:

2.3.1.1 Above Ground Use Waterborne Dry Salt Retention: 0.25 lb./cu. ft.

2.3.1.2 Kiln dry members after treatment to 15% MC. Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.

2.3.1.3 Re-grade and re-stamp lumber after kiln drying in accordance with lumber producer's grading rules.

2.4 FIRE RETARDANT TREATMENT

2.4.1 Comply with AWPA Standards C20 (Lumber) and C27 (Plywood). Provide materials with a flame spread not exceeding 25 (ASTM E 84). Identify "fire retardant treated wood" with appropriate UL classification marking or other testing and inspection agency marking acceptable to authorities having jurisdiction.

2.4.1.1 Interior Exposure Treatment Process: Hickson Corporation "Dricon", Osmose "Flameproof LHC-HTT".

2.4.1.2 Kiln dry after treatment to maximum moisture content of 15% for plywood, 19% for lumber.

2.4.1.3 Do not use twisted, warped, bowed or otherwise defective wood.

2.4.1.4 Schedule of Locations: Except as otherwise indicated, provide fire retardant treated work for interior miscellaneous framing and blocking.

2.5 FASTENERS

2.5.1 Fasteners and Anchors: Provide size and type suited to application shown.

2.5.1.1 Nails: ASTM F 1667. Staples are not an acceptable substitute.

2.5.1.2 Bolts, Nuts, and Washers: ASTM A 307 (Grade A; ASTM F 568, Property Class 4.6), with ASTM A 563 hex nuts and flat washers.

2.5.1.3 Fasteners Exposed to Moisture: For nails, washers, nuts, and bolts cast into concrete or permanent exposure to weather, or high humidity, or ground contact, provide fasteners with hot-dip zinc coating per ASTM A 153, or of AISI Type 304 stainless steel.

2.5.1.4 Power Driven Nails: CABO NER-272.

2.5.1.5 Mechanical Fasteners (Insulating Sheathing Panel to Steel Deck Systems): Corrosion-resistant coated, self-drilling, self-threading steel drill screws with low profile head below sheathing and manufacturer's standard head elsewhere, and complying with Code: Atlas Roofing “Atlas Nail Base Fastener”, or equivalent recommended in writing by the manufacturer of the roof insulating sheathing. Provide fastener length sufficient to penetrate steel roof deck by not less than 3/4” (Minimum 3 full screw threads excluding tapered threads at tip).

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 General: Set rough carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.

3.1.1.1 Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by the Nailing Schedule requirements of local codes of authorities having jurisdiction.

3.1.1.2 Use common wire nails, unless otherwise indicated. Select fasteners of size that will not penetrate members where opposite side will be exposed or covered with finish materials. Make tight connections between members. Install fasteners without splitting of wood; pre-drilled wood members as required.

3.1.1.3 Do not use materials with defects that might impair quality of rough carpentry or pieces that are too small to use with minimum joints or optimum joint arrangement.

3.1.1.4 Use hot-dip galvanized nails for all exterior work.

3.1.2 Plywood: Follow applicable recommendations contained in Form No. E30L, "APA Design/Construction Guide-Residential & Commercial", for plywood product types and applications shown.

3.1.3 As a minimum, space screw fasteners at 6" o. c. along panel edges supported by framing and roof deck, and space 12" o.c. along intermediate framing or deck (maximum 16" row spacing) within panels, to comply with APA T625 "Wood Structural Panels Over Metal Framing".

Section 07110
BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

1.2.1 Section includes furnishing and installing:

1.2.1.1 Continuous cold applied asphalt emulsion dampproofing at all exterior above grade surfaces of backup construction for masonry and similar cladding and veneer finish systems;

1.2.1.2 Dampproof flashing to adjacent related work to comply with specified performance requirements.

1.3 Related Work

1.3.1 Related Work of Other Sections:

1.3.1.1 Section 03300 – Cast-In-Place Concrete.

1.3.1.2 Section 04810 – Unit Masonry Assemblies.

1.3.1.3 Section 04815 –Glass Unit Masonry Assemblies.

1.3.1.4 Section 05120 - Structural Steel.

1.3.1.5 Section 05400 – Cold-Formed Metal Framing.

1.3.1.6 Section 05500 - Miscellaneous Metal Fabrications.

1.3.1.7 Section 06100 - Rough Carpentry.

1.3.1.8 Section 07411 – Manufactured Metal Roof Panels.

1.3.1.9 Section 07600 - Flashing and Sheet Metal.

1.3.1.10 Section 08400 - Aluminum Storefront Construction.

1.3.1.11 Section 10200 – Aluminum Louvers.

1.4 Performance Requirements

1.4.1 Install dampproofing and flashings to provide a complete vapor barrier over the entire exterior building wall area at the plane indicated and flashings including related work, that are properly adhered to substrates and penetrating work, and do not deteriorate in excess of limitations published by the manufacturer.

1.4.2 Provide vapor proof seals at penetrations through dampproof membrane.

1.5 Submittals

1.5.1 Product Data: Submit manufacturer's product data for each product and accessory material required. Include installation instructions and installation details applicable to Project conditions.

1.5.2 Recycled Content:

1.5.2.1 Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.

1.5.2.2 Indicate relative dollar value of recycled content product to total dollar value of product included in project.

1.5.2.3 If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.

1.5.2.4 If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

1.5.3 Local/Regional Materials:

1.5.3.1 Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.

1.5.3.2 Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.

1.5.3.3 Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.

1.5.3.4 Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

1.5.4 Biobased materials:

1.5.4.1 Indicate type of biobased material in product.

1.5.4.2 Indicate the percentage of biobased content per unit of product.

1.5.4.3 Indicate relative dollar value of biobased content product to total dollar value of product included in project.

1.5.5 Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.

1.6 SEQUENCING AND SCHEDULING

1.6.1 Coordinate and sequence dampproofing installation will not be exposed to sunlight for more than seven days prior to cover up by subsequent construction.

PART 2- PRODUCTS

2.1 Cold Applied Asphalt Emulsion Dampproofing

2.1.1 Semi-fibrated type semi-mastic, non-asbestos, ASTM D 1227, Type IV, except containing non-asbestos fibrous reinforcement and fillers; Sonneborne "HydroCide 700B" or equivalent by Celotex, Gulf States Asphalt, Karnak, Koppers, Manville, or Tremco.

2.2 MISCELLANEOUS MATERIALS

2.2.1 Concealed Dampproof Flashing: Provide 8-mil polyethylene sheet with 32-mil rubberized asphalt adhesive coating. Subject to compliance with requirements, provide Protecto Wrap Co. "Ice & Water Guard" flashing tape, W. R. Grace "Perm-A-Barrier", Polyguard Products "Polyguard 650", or Sandell Manufacturing "Sando-Seal", or Henry “Blueskin TWF 40”. Install over cured dampproofing.

PART 3 - EXECUTION

3.1 PREPARATION

3.1.1 Clean the substrates of projections and substances detrimental to work; comply with recommendations of prime materials manufacturer.

3.1.2 Protection of Other Work: Do not allow liquid and mastic compounds to enter and clog drains and conductors. Prevent spillage and migration onto other surfaces of work, by masking or otherwise protecting adjoining work.

3.2 INSTALLATION

3.2.1 Comply with manufacturer's instructions including exposure limitation, except where more stringent requirements are shown or specified, and except where Project conditions require extra precautions or provisions to ensure satisfactory performance of work.

3.2.2 Apply 2 coats of cold applied asphalt emulsion dampproofing material, by brushing or spraying at rate of 5.0-gal. per 100 sq. ft., to produce a uniform dry film thickness of not less than 30-mils.

3.2.3 Install flashings, cant strips and similar accessories as shown, or as recommended by the prime materials manufacturer even though not shown.

3.2.3.1 Fill voids, seal joints, and apply bond breakers (if any) as recommended by prime materials manufacturer with particular attention at construction joints.

3.2.3.2 Flash joints in substrate to related work with dampproof flashing in manner recommended by prime materials manufacturer.

3.2.3.3 Comply with details shown and manufacturer's recommendations.

3.2.3.4 Shelf Angles and Lintels: Install dampproofing flashing tape on all shelf angles and steel lintels starting at nosing and working back toward wall, up shelf angle back leg, and onto back-up wall construction, lapping all joints and edges shingle fashion a minimum of 2-inches.

3.2.3.5 Dampproofing Termination at Floor Slab: Extend dampproof flashings as shown to provide complete vapor barrier over plane of exterior wall sheathing and other areas indicated. Provide vapor proof seals at penetrations through dampproof membrane. Extend dampproof-flashing tape from exterior sheathing 2-inches onto exterior concrete floor slab to a neat line to continuously seal joint between floor slab and exterior wall construction at the plane of the dampproofing. Coordinate with installation of related work of other Sections.

3.2..3.6 Other Joints: Tape other substrate joints not suitable to receive flashing and joint tape with a 6-inch layer of glass fabric mesh tape equivalent to Karnak #31 or Koppers "Glasfab" set in initial coat of dampproofing topcoat tape extending topcoat application approximately 3-inches onto initial coat. Lap all tape splices shingle fashion a minimum of 3-inches. Apply topcoat of dampproofing material as specified.

Section 07210
BUILDING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 Section includes furnishing and installing building insulation at exterior wall, soffit and roof areas shown.

1.3 RELATED WORK

1.3.1 Related Work of Other Sections:

1.3.1.1 Section 05400 - Cold Formed Metal Framing.

1.3.1.2 Section 06100 - Rough Carpentry.

1.3.1.3 Section 09200 – Lath and Plaster.

1.4 SUBMITTALS

1.4.1 Submit manufacturer's product data for each product and accessory material required.

1.4.2 Recycled Content:

1.4.2.1 Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.

1.4.2.2 Indicate relative dollar value of recycled content product to total dollar value of product included in project.

1.4.2.3 If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.

1.4.2.4 If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

1.4.3 Local/Regional Materials:

1.4.1.1 Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.

1.4.1.2 Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.

1.4.1.3 Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.

1.4.1.4 Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

1.4.4 VOC data:

1.4.1.1 Adhesives:

1.4.1.1.1 Submit manufacturer's product data for adhesives. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.

1.4.1.1.2 Submit Green Seal Certification to GS-36 and description of the basis for certification.

1.4.1.1.3 Submit manufacturer's certification that products

comply with SCAQMD #1168. Submit manufacturer's certification that products comply with SCAQMD Rule 1168 in areas where exposure to freeze/thaw conditions and direct exposure to moisture will not occur. In areas where freeze/thaw conditions do exist or direct exposure to moisture can occur, submit manufacturer's certification that products comply with Bay Area AQMD Reg. 8, Rule 51 for containers larger than 16 oz and with California Air Resources Board (CARB) for containers 16 oz or less.]

1.4.5 Biobased materials:

1.4.5.1 Indicate type of biobased material in product.

1.4.5.2 Indicate the percentage of biobased content per unit of product.

1.4.5.3 Indicate relative dollar value of biobased content product to total dollar value of product included in project.

1.4.6 Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.

1.4.7 Operating and Maintenance Manuals Submittals (in addition to requirements of 01782):

1.4.7.1 Verify that plastic products to be incorporated into the Project are labeled in accordance with ASTM D1972. Where products are not labeled, provide product data indicating polymeric information in Operation and Maintenance Manual.

1.4.7.1.1 Type 1: Polyethylene Terephthalate (PET, PETE).

1.4.7.1.2 Type 2: High Density Polyethylene (HDPE).

1.4.7.1.3 Type 3: Vinyl (Polyvinyl Chloride or PVC).

1.4.7.1.4 Type 4: Low Density Polyethylene (LDPE).

1.4.7.1.5 Type 5: Polypropylene (PP).

1.4.7.1.6 Type 6: Polystyrene (PS).

1.4.7.1.7 Type 7: Other. Use of this code indicates that the package in question is made with a resin other than the six listed above, or is made of more than one resin listed above, and used in a multi-layer combination.

1.4.8 Documentation of manufacturer's take-back program for insulation materials. Coordinate with construction waste management. Include the following:

1.4.8.1 Appropriate contact information.

1.4.8.2 Overview of procedures.

1.4.8.3 Limitations and conditions, if any, applicable to the project.

1.5 DELIVERY, STORAGE AND PROTECTION

1.5.1 Protect insulation materials from physical damage and deterioration by moisture, soiling, and other sources. Store materials inside in a dry location. Handle store and protect materials in accordance with manufacturer's printed instructions.

PART 2 - PRODUCTS

2.1 INSULATION PRODUCTS AND MANUFACTURERS

2.1.1 Foil Faced Glass Fiber or Mineral Fiber Blanket Insulation: ASTM C 665, Type III, Class A flame spread.

2.1.1.1 Product: Johns-Manville "Flame Resistant FSK- 25" blankets or Owens-Corning "Flame Spread 25", or Knauf "FSK-25 Foil Faced Blanket".

2.1.1.2 Thickness, Thermal Resistance, and Locations: min 6" thick, R-21 at soffit areas indicated.

2.1.2 Unfaced Glass Fiber or Mineral Fiber Blanket Insulation: ASTM C 665, Type I, Class A flame spread.

2.1.2.1 Product: Owens-Corning "Unfaced Fiberglas Building Insulation", or Certainteed "Unfaced Building Insulation", or Manville "Unfaced" blankets, or Knauf "Unfaced Thermal and Acoustical Blanket".

2.1.2.2 Thickness, Thermal Resistance, and Locations: 3-1/2" thick, R-13 in perimeter walls and other areas indicated.

2.1.3 Rigid Insulation: Rigid Closed cell extruded polysterene thermal board insulation:

2.1.3.1 Comply with ASTM C578-95, Type X, density 1.35 .b/cuft min, compressive strength 15 psi (ASTM 1621-94)

2.1.3.2 Thermal resistance: 5 year aged R values of 5.4 and 5.0 min deg F-ft2-h/Btu2/inch at 40 deg F and 75dF respectively (ASTM C 518-91).

2.1.3.3 Water absorption: Max .01% by volume (ASTM C 272-91).

2.1.3.4 Surface Burning Characteristics: Flame Spread: 5; Smoke Developed: 165

2.2 MISCELLANEOUS MATERIALS

2.2.1 Tapes and Sealants: 3M No. 8086 Contractor Sheathing Tape.

2.2.2 Impaling Clips: Type recommended by insulation manufacturer.

2.2.3 Stucco Netting: For support of blanket insulation as indicated.

2.2.4 Wire: For support of blanket insulation as indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Installation, General: Install a single layer of insulation of the required thickness over entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Install insulation units to substrate by the method indicated, or if not indicated mechanically anchor to provide permanent placement and support of units.

3.1.1.1 Comply with insulation manufacturers written instructions applicable to products and application indicated.

3.1.1.2 Vapor Barriers: Set vapor barrier faced insulation units with vapor barrier installed toward the exterior of construction. Repair cuts and tears in vapor barriers with vapor barrier tape. Do not obstruct ventilation spaces, except for fire stopping.

3.1.1.3 Provide wire supports at maximum 48” centers where construction will not provide permanent and secure support of insulation.

3.1.1.4 Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

3.1.1.5 Seal overlapping joints in vapor retarders with adhesives or vapor-retarder tape according to vapor-retarder manufacturer's instructions. Seal butt joints and fastener penetrations with vapor-retarder tape. Locate all joints over framing members or other solid substrates.

3.1.1.6 Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.

3.1.1.7 Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.1.2 Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

Section 07411
MANUFACTURED METAL ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 Section includes furnishing and installing:

1.2.1.1 Factory prefinished, roll formed metal roof panels.

1.2.1.2 Matching prefinished fasteners, flashings, trim, closures, two-piece cleats, sealants, and appurtenances and devices incidental to or necessary for a sound, secure, and complete installation.

1.2.1.3 Roof deck insulation.

1.2.1.4 Coordination of manufactured metal roof panel work with related work of other Sections.

1.3 RELATED WORK

1.3.1 Related Work of Other Sections:

1.3.1.1 Section 05500 – Miscellaneous Metal Fabrications.

1.3.1.2 Section 06100 – Rough Carpentry.

1.3.1.3 Section 07600 – Flashing and Sheet Metal.

1.3.1.4 Section 07900 - Joint Sealants

1.4 REFERENCES

1.4.1 Comply with applicable portions of the following standards, codes and specifications:

1.4.1.1 SMACNA: "Architectural Sheet Metal Manual", Sheet Metal and Air Conditioning Contractors National Association, Inc.

1.4.1.2 LGSI: “Light Gage Structural Institute”

1.4.1.3 AISC: "Steel Construction Manual", American Institute of Steel Construction.

1.4.1.4 AISI: "Cold Form Steel Design Manual", American Iron and Steel Institute (1996 Edition).

1.4.1.5 UL580: “Tests for Uplift Resistance of Roof Assembles", Underwriters Laboratories, Inc.

1.4.1.6 UL2218: Class 4 Impact Resistance Rating

1.4.1.7 ICBO: Evaluation Report No. ER-5409, ICBO Evaluation Service, Inc.

1.4.1.8 ASTM E 1680-95: "Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems, American Society for Testing and Materials.

1.4.1.9 ASTM E 1646-95: "Standard Test Method for Water Penetration Through Exterior Metal Roof Panel Systems, American Society for Testing and Materials.

1.4.1.10 ASTM A 792-83-AZ50 (Painted) & ASTM A792-83-AZ55 (Bare Galvalume Plus®): "Specifications for Steel Sheet, Aluminum-Zinc Alloy Coated by the Hot Dip Process, General Requirements (Galvalume®)", American Society for Testing and Materials.

1.4.1.11 ASTM E 1514-93: "Standard Specification for Structural Standing Seam Steel Roof Panel Systems", American Society for Testing and Materials.

1.4.1.12 ASTM E 408-71: Standard Test Method for Total Normal Emittance of Surfaces Using Inspection- Meter Techniques. (Energy Star® for Roof Products).

1.4.1.13 ASTM E 903-96 Standard Test Method for Solar Absorptance, Using Integrating Spheres. (Energy Star® for Roof Products)

1.5 DESIGN/PERFORMANCE REQUIREMENTS

1.5.1 General:

1.5.1.1 Provide manufactured metal roof panel work that is weathertight including penetrations of related work, is sound and well secured to substrates, and does not deteriorate in excess of limitations published by the manufacturer.

1.5.1.2 Metal roof system must be tested in accordance with

Underwriters Laboratories, Inc. (UL) Test Method 580 "Tests for Uplift Resistance of Roof Assemblies".

1.5.1.3 Metal roof system must be installed in accordance with UL Construction No. 238B (minimum 2" thick rigid insulation and min. 22 gauge Type A, B, F or N metal deck with low/high fixed/floating clips 2'-6" on center).

1.5.1.4 Metal roof system must be tested in accordance with ASTM E 1592-95 for negative loading. Determine panel bending and clip-to-panel strength by testing in accordance with ASTM E 1592-95 procedures. Capacity for gauge, span or loading other than those tested may be determined by interpolating between test values only.

1.5.1.5 Metal roof system must meet the air infiltration requirements of ASTM E 1680-95 when tested with a 6.24 PSF pressure differential. The resulting air infiltration leakage rate will be a minimum of 0.019cfm/sq. ft.

1.5.1.6 Metal roof system must meet the water penetration requirements of ASTM E 1646-95 when tested with a 12.00 PSF pressure differential with no uncontrollable water leakage when five gallons per hour of water is sprayed per square foot of roof area.

1.5.2 Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift resistance class 90 and as per latest City of Houston codes.

1.5.3 Structural Performance: Provide metal roof panel assemblies capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 1592.

1.5.3.1 Wind Loads: Determine loads based on the following minimum design wind pressures:

1.5.3.1.1 Uniform pressure of 31.5 lbf/sq. ft. (217 kPa), acting inward or outward.

1.5.3.1.2 The design uplift force for each connection assembly shall be that pressure given for the area under consideration, multiplied by the tributary load area of the connection assembly. The safety factor listed below shall be applied to the design force and compared against the ultimate capacity. Prying shall be considered when calculating fastener design loads.

1.5.3.1.2.1 Single fastener in each connection: 3.00

1.5.3.1.2.2 Two or more fasteners in each connection: 2.25

1.5.3.2 Thermal Loads: Roof panels shall be free to move in response to the expansion and contraction forces resulting from a total temperature range of 0-degrees F to 180-degrees F during the life of the structure.

1.6 SUBMITTALS

1.6.1 Product Data: Submit manufacturer's product data for each panel material and accessory required. Include installation instructions and installation details applicable to Project conditions.

1.6.2 Shop Drawings: Submit complete shop drawings and erection details, approved by the metal roofing manufacturer, to the City for review. Do not proceed with manufacture of roofing materials prior to review of shop drawings and field verification of all dimensions. Do not use drawings prepared by Architect for shop or erection drawings.

1.6.2.1 Show methods of erection, roof panel layout, sections and details, anticipated loads, flashings, sealants, interfaces with all materials not supplied and proposed identification of component parts and their finishes.

1.6.3 Performance Tests: Submit certified test results by a recognized testing laboratory or manufacturer's lab (witnessed by a professional engineer) in accordance with specified test methods for each panel system.

1.6.4 Calculations: Submit engineering calculations defining all cladding loads for all roof areas based on design criteria listed in Design/Performance Requirements, allowable clip loads and required number of fasteners to secure the panel clips to the designated substructure.

1.6.4.1 Compute uplift loads on clip fasteners with full recognition of prying forces and eccentric clip loading.

1.6.4.2 Calculate holding strength of fasteners in accordance with submitted test data provided by the fastener manufacturer based on length of embedment and properties of materials.

1.6.4.3 Submit thermal calculations and details of floating clip, flashing attachments, and accessories certifying free movement in response to the expansion/ contraction forces resulting from a total temperature differential of 110 degrees F.

1.6.5 Samples: Submit samples and color chips for all proposed finishes. Submit one 8-inch long sample of panel, including clips. Submit two 3 inches x 5 inch color chip samples in color selected by City.

1.7 QUALITY ASSURANCE

1.7.1 Manufacturer: Minimum of five years experience in manufacturing

metal roof systems of the type required for this Project. Panels specified in this section shall be produced in a factory environment (not with a portable roll former) with fixed-base roll forming equipment and in line leveling, assuring the highest level of quality control. A letter from the manufacturer certifying compliance will accompany the product material submittals.

1.7.2 Installer: Arrange for work of this Section to be performed by an installer that is approved and certified by the metal roof panel manufacturer before the beginning of installation of the metal roof system, specifically for metal roof system specified. Certification by manufacturer must include the following:

1.7.2.1 Have no viable claims pending regarding negligent acts or defective workmanship on previously performed or current projects.

1.7.2.2 Has not filed for protection from creditors under any state or federal insolvency or debtor relief statutes or codes.

1.7.2.3 Project foreman is the person having received certification by the manufacturer specific training in the proper installation of the selected metal roof system and will be present to supervise whenever material is being installed. Specific certified installer program shall include the following:

1.7.2.3.1 The instructor must have a minimum of 10 years' experience in the application of metal roof systems.

1.7.2.3.2 A formal syllabus for the classroom and hands-on training.

1.7.2.3.3 Classroom instruction with review and thorough understanding of the specific product's technical manual.

1.7.2.3.4 Hands-on mock-up instruction with a review and thorough understanding of the specific product's details.

1.7.2.3.5 The installation contractor must pass a written and oral exam.

1.7.2.4 Provide five references from five different architects or building owners for projects that have been in service for a minimum of two years, stating satisfactory performance by the installation contractor.

1.7.2.5 Provide certification letter that installation contractor has a minimum of three years' of metal product installation experience immediately preceding the date upon which work is to commence.

1.7.3 Pre-Installation Conference:

1.7.3.1 Prior to installation of roofing system, conduct a pre-installation conference at the project site.

1.7.3.2 Attendance: City Engineer, Contractor, Project Superintendent, and Certified Installer.

1.7.3.3 Agenda:

1.7.3.3.1 Roofing details and agenda
1.7.3.3.2 Critical work sequencing and review of phasing plan
1.7.3.3.3 Inspection sequencing

1.7.4 Test Reports: Submit test reports showing that roof panel systems has been tested and meets or exceeds the requirements specified in the Design/Performance Requirements article of this Section.

1.7.5 Metal Roof System Fabrication Certification: Submit a letter from the metal roof system manufacturer certifying the roof panels have been produced in a factory environment (not job site roll formed) with fixed-base roll forming equipment and in line leveling.

1.7.6 Certified Installers Qualifications:

1.7.6.1 Submit certificate from manufacturer certifying that installer of the metal roof system has met all of the criteria outlined in "1.02 C. Installer's Qualifications" and is an authorized installer certified by the manufacturer.

1.7.6.1.1 Submit formal syllabus for the classroom and hands-on training.
1.7.6.1.2 Submit five references from five different architects or building owners for projects that have been in service for a minimum of two years, stating satisfactory performance by the installation contractor.

1.8 DELIVERY, STORAGE, AND HANDLING

1.8.1 Deliver components, sheets, metal roof panels, and other manufactured items so as not to be damaged or deformed. Package metal roof panels for protection during transportation and handling.

1.8.1.1 Unload, store, and erect metal roof panels in a manner to prevent bending, warping, twisting, and surface damage.

1.8.1.2 Stack metal roof panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal roof panels to ensure dryness. Do not store metal roof panels in contact with other materials that might cause staining, denting, or other surface damage.

1.8.1.3 Protect strippable protective covering on metal roof panels from exposure to sunlight and high humidity, except to

extent necessary for period of metal roof panel installation.

1.8.1.4 Protect foam-plastic insulation as follows:

1.8.1.4.1 Do not expose to sunlight, except to extent necessary for period of installation and concealment.

1.8.1.4.2 Protect against ignition at all times. Do not deliver foam-plastic insulation materials to Project site before installation time.

1.8.1.4.3 Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.9 PROJECT CONDITIONS

1.9.1 Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal roof panels to be performed according to manufacturers' written instructions and warranty requirements.

1.9.1.1 Field Measurements: Verify locations of roof framing and roof opening dimensions by field measurements before metal roof panel fabrication and indicate measurements on Shop Drawings.

1.10 COORDINATION

1.10.1 Coordinate installation of plumbing vents and other roof penetrations, which are specified in other Sections.

1.10.2 Coordinate metal panel roof assemblies with rain drainage work, flashing, trim, and construction of decks, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation**.**

1.11 WARRANTY

1.11.1 Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal roof panel assemblies that fail in materials or workmanship within specified warranty period.

1.11.1.1 Failures include, but are not limited to, the following:

1.11.1.1.1 Structural failures, including rupturing, cracking, or puncturing.

1.11.1.1.2 Deterioration of metals, metal finishes, and other materials beyond normal weathering.

1.11.1.2 Warranty Period: 20 years from date of Substantial Completion.

1.11.2 Special Warranty on Panel Finishes: Manufacturer's standard form in

which manufacturer agrees to repair finish or replace metal roof panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1.11.2.1 Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

1.11.2.1.1 Color fading more than 5 Hunter units when tested according to ASTM D 2244.
1.11.2.1.2 Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
1.11.2.1.3 Cracking, checking, peeling, or failure of paint to adhere to bare metal.

1.11.2.2 Finish Warranty Period: 20-years from date of Substantial Completion.

1.11.3 Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer's standard No Dollar Limit form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.

1.11.3.1 Warranty Period: 20-years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ROOF PANEL SYSTEM DESCRIPTION

2.1.1 Roof Panel System Profile: 2 inch high x 3/4" inch wide rib x 16-inch wide, striated panel.

2.1.2 Roof Panel System Style: Vertical leg, concealed fastener, standing seam, utilizing male and female rib configurations, with factory applied hot-melt mastic in female rib, continuously locked together by an electrically powered mechanical seaming device during installation.

2.1.3 Roof Panel Minimum Design Thickness: Minimum 0.0238-inch thick (old 24 gage); UL 90 Listed.

2.1.4 Substrate: Galvalume®steel sheet, minimum yield of 50,000 PSI.

2.1.5 Roof Panel Mounting Clips: Two piece floating clip, 18 gauge base, 24 gauge top, with factory applied mastic (# UL-90 rated - Underwriters Laboratories) and utility clips, 24 gauge, with factory-applied mastic.

2.1.6 Roof Panel Texture: Smooth with striations.

2.1.7 Roof Panel System Accessories: Provide all components required per the metal roof system manufacturer's approved shop drawings for a complete metal roof system to include panels, panel clips,

trim/flashing, fascias, ridge, closures, sealants, fillers and any other required items.

2.1.7.1 All outside closures will be fabricated from prefinished sheet steel of the same gauge, finish and color as the roof panels.

2.1.7.2 All tape seal to be a pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with a release paper backing. Provide permanently elastic, non-sagging, non-toxic, non-staining tape seal approved by the metal roof system manufacturer.

2.1.7.3 All tube sealant to be a one-part elastomeric polyurethane sealant approved by the metal roof system manufacturer.

2.1.7.4 Flashing and Trim: Formed from 0.0238-inch- (0.60-mm-) thick, factory prefinished aluminum-zinc alloy-coated steel sheet with same finish system and color matching roof panels. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, ridges, fasciae, and fillers.

2.1.7.5 Gutters: Formed from 0.0238-inch- (0.60-mm-) thick, aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- (2400-mm-) long sections, sized according to SMACNA's "Architectural Sheet Metal Manual." Furnish gutter supports spaced 36 inches (900 mm) o.c., fabricated from same metal as gutters. Provide bronze, copper, or aluminum wire ball strainers at outlets. Finish gutters to match metal roof panels.

2.1.7.6 Downspouts: Formed from 0.0238-inch- (0.60-mm-) thick, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; in 10-foot- (3-m-) long sections, complete with formed elbows and offsets. Finish downspouts to match metal roof panels.

2.1.7.7 Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

2.1.8 Roof Panel Fasteners:

2.1.8.1 All self-tapping/self-drilling fasteners, bolts, nuts, self-locking rivets and other suitable fasteners shall be designed to withstand specified design loads.

2.1.8.2 Use long life fasteners for all interior and exterior metal roof system applications.

2.1.8.3 Provide fasteners with a factory applied coating in a color to

match metal roof system application.

2.1.8.4 Provide neoprene washers under heads of exposed fasteners.

2.1.8.5 Locate and space all exposed fasteners in a true vertical and horizontal alignment. Use proper torque settings to obtain controlled uniform compression for a positive seal without rupturing the neoprene washer.

2.1.9 Roof Panel Finish**:**

2.1.9.1 Exterior Roof Panel Finish: High-Performance Organic Finish (2-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: conversion coating; Organic Coating: manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2604 and with coating and resin manufacturers' written instructions and qualifying for specified 20-year special project warranty.

2.1.9.2 Interior Roof Panel Finish: Manufacturer’s standard factory applied baked-on epoxy primer.

2.1.9.3 Exposed Color: Match MBCI Rustic Red.

2.1.10 Manufacturer and Product: Provide MBCI, Houston, TX, (Tel) 713-445-8555, "BattenLok" architectural roof panel system.

2.2 THERMAL INSULATION

2.2.1 Roof Insulation: Extruded polystyrene board to ASTM C578, Type IV, rigid, closed cell type, with integral high density skin.

2.2.1.1 Aged Thermal Resistance (ASTM C518): R-5 per inch (RSI 0.87 per 25 mm).

2.2.1.2 Board Size: 48 inch (1 220 mm) wide, 96 inch (2 440 mm) long, 4" (100 mm) thick.

2.2.1.3 Compressive Strength: Minimum 25 psi (170 kPa).

2.2.1.4 Water Absorption (ASTM C272): 0.1% by volume maximum.

2.2.1.5 Edges: Square.

2.2.1.6 Water Vapor Permeance (ASTM E96): less than 1.0 perm (60 ng/Pa•s•m^2) for products greater than 1 inch thick.

2.2.1.7 Flame Spread/Smoke Developed Values (ASTM E84): 5/165.

2.2.1.8 Manufacturer and Product Name: Styrofoam Deckmate Plus by the Dow Chemical Company or approved equal.

2.2.2 Mechanical Fasteners: screw-type, 3 ga. (6.4 mm) diameter, drilled self-tapping, galvanized steel; sufficient length to securely anchor system into place and to withstand all super-imposed loads; complete with 1-1/2 inch (38 mm) diameter [PVC] [14 ga. (1.8 mm) thick galvanized steel] discs.

2.3 UNDERLAYMENT MATERIALS

2.3.1 Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felts.

2.3.2 Slip Sheet: Building paper, minimum 5 lb/100 sq. ft. (0.24 kg/sq. m), rosin sized.

2.4 SUBSTRATE BOARDS

2.4.1 Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M.

2.4.1.1 Type and Thickness: Type X, 5/8 inch (16 mm).

2.4.1.2 Product: Subject to compliance with requirements, provide "Dens-Dek" by Georgia-Pacific Corporation.

2.4.2 Substrate-Board Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FMG 4470, designed for fastening substrate board to substrate.

2.5 WALL LINER PANEL

2.5.1 Wall Panels: Wall panels shall consist of MBCI's Designer Series 12.0 Flat Panel with concealed fastening system, or equal by same manufacturer as roof panel system. Seal joints between panels with joint sealant as specified. Insulation for panels cores shall be mineral insulation of a type standard with panel manufacturer and shall be noncombustible as defined by NFPA No. 220. Fasten panels to adjoining panels and to steel framework by method recommended by panel manufacturer and approved before work is started.

2.6 SOFFIT PANEL

2.6.1 Soffit Panels shall be MBCI's Flex Loc panel system with concealed fastening clips with low profile pancake head fasteners, or approved equal by same roof panel manufacturer.

2.7 FABRICATION

2.7.1 General: Fabricate and finish metal roof panels and accessories at

the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

2.7.2 Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

2.7.3 Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

2.7.3.1 Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

2.7.3.2 Seams: Fabricate nonmoving seams in accessories with flat-lock seams. Seal seams and secure with pop rivets. Seal pop rivet heads with sealant.

2.7.3.3 Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

2.7.3.4 Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.

2.7.3.5 Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal roof panel manufacturer.

2.7.3.5.1 Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal roof panel manufacturer for application but not less than thickness of metal being secured.

2.8 FINISHES, GENERAL

2.8.1 Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.8.2 Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.8.3 Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the

range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8.4 Material shall be in-line leveled prior to roll forming the panel profile.

2.8.5 Where possible, roll form panels in continuous lengths, full length of detailed runs. Standard panel length shall be no more than 50 feet long.

2.8.6 Fabricate trim/flashing and accessories to detailed profiles.

2.8.7 Fabricate trim/flashing from same material as panel.

2.8.8 Fabricate metal panels and related work as shown, or if not shown, provide manufacturer's standard product fabrications providing weathertight construction. To the greatest extent possible, fabricate metal panel components at the factory ready for field installation.

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1 After steel framing and deck have been installed, but before beginning installation of metal roof panel work in any area, examine the supporting structure and report all conditions in writing to the City Engineer which would prevent the proper execution of the metal roof panel system work or endanger its permanency.

3.1.1.1 Verify that installation may be made in accordance with approved shop drawings and manufacturer's instructions. This specifically includes verifying that secondary structural members and/or decking are installed to meet UL and building code requirements.

3.1.1.2 Coordinate with metal roof system manufacturer to insure that reduced clip spacings at eave, rake, ridge and corner areas are accommodated.

3.1.1.3 Examine roughing-in for components and systems penetrating metal roof panels to verify actual locations of penetrations relative to seam locations of metal roof panels before metal roof panel installation.

3.1.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 THERMAL INSULATION INSTALLATION

3.2.1 Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment.

3.2.2 Substrate Board: Install substrate boards over roof deck on entire

roof surface. Attach with substrate-board fasteners.

3.2.2.1 Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

3.2.2.2 Comply with UL requirements for fire-rated construction.

3.2.3 Board Insulation: Extend insulation in thickness indicated to cover entire roof using full boards to the greatest extent possible.

3.2.3.1 Erect insulation boards horizontally and secure in accordance with roof insulation manufactures instructions

3.2.3.2 Provide fastening to comply with UL 90 wind uplift resistance requirements.

3.2.3 Felt Underlayment: Install felt underlayment and building-paper slip sheet on roof sheathing under metal roof panels, unless otherwise recommended by metal roof panel manufacturer. Use adhesive for temporary anchorage, where possible, to minimize use of mechanical fasteners under metal roof panels. Apply at locations indicated below, in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

3.2.3.1 Apply from eave to ridge.

3.2.4 Install flashings and other sheet metal to comply with Design/Performance Requirements specified in this Section.

3.2.5 Apply slip sheet over underlayment before installing metal roof panels.

3.3 METAL ROOF PANEL INSTALLATION

3.3.1 General: Comply with material manufacturers' instructions and recommendations for installation, as applicable to Project conditions and approved shop drawings. Anchor panels and other components securely in place, with provisions for thermal and structural movement. Conceal fasteners from view to the greatest extent possible.

3.3.1.1 Provide metal roof panels of full length from eave to ridge, unless otherwise indicated or restricted by shipping limitations.

3.3.1.2 Anchor metal roof panels and other components of the Work securely in place, with provisions for thermal and structural movement.

3.3.1.3 Field cutting of metal roof panels by torch is not permitted.

3.3.1.4 Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction. Predrill panels.

3.3.1.5 Provide metal closures at peaks, rake edges, rake walls, and each side of ridge and hip caps.

3.3.1.6 Flash and seal metal roof panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.

3.3.1.7 Locate and space fastenings in uniform vertical and horizontal alignment.

3.3.1.8 Install ridge and hip caps as metal roof panel work proceeds.

3.3.1.9 Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.

3.3.1.10 Lap metal flashing over metal roof panels to allow moisture to run over and off the material.

3.3.2 Fasteners: Use stainless-steel fasteners for surfaces exposed to the exterior and galvanized steel fasteners for surfaces exposed to the interior.

3.3.3 Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal roof panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal roof panel manufacturer.

3.3.3.1 Seal metal roof panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal roof panel manufacturer.

3.3.3.2 Prepare joints and apply sealants to comply with requirements in Section 07900 - Joint Sealants.

3.3.4 Panel Installation: Provide, space, and attach two-piece cleats and support plates through insulation and into metal roof deck with corrosion resistant fasteners of quantity, type, length, strength and spacing as required to provide a complete weathertight roof system complying with design/performance requirements specified, so that the installed roof panel system is weathertight, without waves, warps, buckles, fastening stresses, or distortion.

3.3.4.1 Install roof panels to positively interlock panel clips and provide secure attachment of related work taking care to not cause panel distortion.

3.3.4.2 Close the interlocking seam by motorized seamer to assure complete sealant engagement and to assure structural integrity of panel-to-panel joints and panel to clip connections.

3.3.4.3 Attachment at the sides of miters and all roof panel edges shall be as required to comply with UL Class 90 wind uplift performance requirements.

3.3.5 Replace damaged components and components that have deteriorated beyond successful repair by means of finish touch-up or similar minor repair procedures.

3.4 CLEANING AND PROTECTION

3.4.1 Remove temporary protective coatings and strippable films (if any) as each panel is installed.

3.4.2 Dispose of excess materials and remove debris from site.

3.4.3 Upon completion of panel installation, clean panel surfaces as recommended by panel manufacturer.

3.4.4 Protect work against damage until final acceptance. Replace or repair to the satisfaction of the City, any work that becomes damaged prior to final acceptance.

3.4.5 Touch up minor scratches and abrasions with touch up paint supplied by the metal roof system manufacturer.

SECTION 07600
FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.1.1 Coping, parapet and cap flashings.

1.1.2 Gutters, downspouts, and gravel stops.

1.1.3 Counterflashings over flexible base flashings, roof mounted equipment, vent stacks and exhaust fans.

1.1.4 Expansion-joint cover flashings.

1.1.5 Precast concrete splash blocks.

1.2 RELATED SECTIONS

1.2.1 Section 05165- Retrofit Roofing.

1.2.2 Section 06100 – Rough Carpentry

1.2.3 Section 07411- Manufactured Metal Roof Panels

1.2.4 Section 07900: Joint Sealers.

1.3 REFERENCES

1.3.1 American Society for Testing and Materials (ASTM):

1.3.2 A 167 - Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

1.3.3 A 653 - Steel Sheet, Zinc Coated, (galvanized) by the Hot-Dip process, Structural (Physical) Quality Property.

1.3.4 A 924 - Steel Sheet, Zinc Coated, (galvanized) by the Hot-Dip process.

1.3.5 D 226 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

1.3.5.1 Federal Standards (FS):

1.3.5.1.1 O-F-506 - Flux, Soldering, Paste and Liquid.
1.3.5.1.2 QQ-L-201F - Lead Sheet.
1.3.5.1.3 QQ-S-571 - Solder, Tin Alloy.
1.3.5.1.4 SS-C-153 - Cement, Bituminous, Plastic.
1.3.5.1.5 TT-C-494- Coating Compound, Bituminous, Solvent Type Acid Resistant.

1.3.5.2 National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.

1.3.5.3 Sheet Metal and Air Conditioning Contractor's National Association (SMACNA): Architectural Sheet Metal Manual.

1.4 SYSTEM DESCRIPTION

1.4.1 Work of this Section is to physically protect membrane roofing, base flashings, and expansion joints from damage that would permit water leakage to building interior.

1.5 QUALITY ASSURANCE

1.5.1 Applicator: Company specializing in sheet metal flashing work with three years minimum experience.

1.6 SUBMITTALS

1.6.1 Submit under provisions of Section 01330.

1.6.2 Product List: Submit list of proposed Products and manufacturers, including all items specified in Part 2 – Products or otherwise required by the Work.

1.6.3 Shop Drawings and Product Data: Describe material profile, jointing pattern, jointing details, fastening methods, and installation details.

1.6.4 Samples: Provide full sized sample of metal flashing illustrating typical seam, external corner, internal corner, material, and finish.

1.6.5 Manufacturer's Installation Instructions: Include installation sequence, special instructions and precautions, and Material Safety Data Sheets (MSDS).

1.7 DELIVERY, STORAGE AND HANDLING

1.7.1 Deliver and store products under provisions of Section 01610.

1.7.2 Stack preformed material to prevent twisting, bending, or abrasion, and to provide ventilation.

1.7.3 Prevent contact with materials during storage, which may cause discoloration, staining, or damage.

1.8 PROJECT CONDITIONS - ENVIRONMENTAL REQUIREMENTS

1.8.1 Do not install sheetmetal components during inclement weather.

1.8.2 Do not install sheetmetal components to damp or frozen surface.

1.9 SEQUENCING AND SCHEDULING

1.9.1 Coordinate work under provisions of Section 01330.

1.9.2 Coordinate with demolition work and with work of other trades to ensure sufficient materials and manpower are available to completely replace and make watertight all roofing removed each day.

1.9.3 Limit removal of existing sheetmetal components, to ensure membrane new installation can be made watertight by end of day.

1.9.4 Coordinate installation of flanged metal components, including gravel guards, pitch pans, and accessories to ensure strip-in with hot bitumen (where applicable) on same day they are installed.

1.9.5 Schedule work to avoid storage on, and traffic over finished work.

PART 2 - PRODUCTS

2.1 SHEET MATERIALS

2.1.1 Galvanized Steel: ASTM A 653, Grade A, G90, 24-gage minimum core steel.

2.1.2 Lead: FS QQ-L-201F, 4-lb/sq ft and 2-1/2-lb/sq ft.

2.1.3 Prefinished Galvanized Steel: ASTM A 653, Grade A, G90, 24 gage minimum core steel, exposed face prefinished with fluorocarbon type coating (Kynar[7] 500), color as selected by Owner's Representative from manufacturer's standard selections; unexposed face finished with manufacturer's standard primer; manufactured by Centria, PAC-CLAD, or MBCI. Protect finish with factory applied plastic film.

2.1.4 Stainless Steel: ASTM A 167, Type 302/304, soft temper; 24-gage minimum; No. 2D finish.

2.2 COMPONENTS

2.2.1 Counter and Slip Flashings, Base and Cover Plates, End Caps, Joint Fasteners, and Gravel Stops: Profiled as indicated and to suit existing conditions.

2.3 FASTENERS

2.3.1 MANUFACTURERS

2.3.1.1 Construction Fasteners, Inc.

2.3.1.2 Hilti

2.3.1.3 Olympic

2.3.1.3 Powers

2.3.1.4 Simplex

2.3.2 Fasteners and Anchorage Devices: Comply with SMACNA requirements, unless otherwise indicated.

2.3.2.1 Appropriate for purpose intended; approved by Factory Mutual where required.

2.3.2.2 Rust-resistant and compatible with materials to be joined.

2.3.2.3 Ferrous Metals: Stainless steel; finish of exposed fasteners same as flashing metal.

2.3.2.4 Rivets: Stainless steel (rivet and mandrel), Series 44.

2.3.3 Length: As required for thickness of material to penetrate substrate 1/2-inch minimum.

2.3.4 Exposed Fasteners: Provide metal-jacketed neoprene or EPDM washers; jacket color to match pre-finished sheetmetal.

2.3.4.1 Mechanical Fasteners for Sheetmetal to Substrate Anchorage:

2.3.5 Masonry: One-step, screw-type drive anchor (nailing); heat-treated, stress relieved, stainless steel pin; zinc jacketed; sized for intended application; minimum 1-1/4-inch length x 1/4-inch diameter; Hammer-Screw® manufactured by Powers Fasteners, Inc.

2.3.6 Wood Blocking: Hexagonal head screws, stainless steel, with neoprene rubber washers; jacket color to match pre-finished sheetmetal.

1 Concrete: Same as masonry or other power actuated fasteners, suitable for application.

2.3.6.1 Roofing Nails: Hot-dipped galvanized or non-ferrous type, with annular rings, size as required to suit application; minimum 11-gage with 3/8-inch diameter head.

2.3.6.2 Mechanical Fasteners for Sheetmetal to Metal Fabrications (Support Framing) Anchorage: Appropriate for purpose intended, size as required to suit application and achieve positive anchorage to substrate material.

2.4 ACCESSORIES

2.4.1 Solder: FS QQ-S-571; 50/50 type.

2.4.2 Flux: FS O-F-506; and special stainless steel type.

2.4.3 Metal Primer: Zinc-rich, or Zinc Chromate, compatible with metal and substrate material.

2.4.4 Protective Backing Paint: FS TT-C-494, Bituminous.

2.4.5 Bedding Compound: Rubber-asphalt type, acceptable to roof membrane manufacturer.

2.4.6 Asphalt Primer: ASTM D 41, cut-back type.

2.4.7 Plastic Cement: FS SS-C-153, ASTM D 4586, Type I-asphaltic, compatible with roofing bitumen, ASBESTOS FREE.

2.4.8 Reglets/Receivers: Recessed stainless steel; face and ends covered with plastic tape.

2.4.9 Sealant: As specified in Section 07900. Urethane.

2.4.9.1 Metal Contact: Type I.

2.4.10 Vent Flashings: Preformed 2-1/2-lb lead sheet, with 4-inch wide roof flange; minimum height above roof: 8-inches.

2.4.11 Penetration Seal System: ChemCurb™ System – Penetration Seals, manufactured by Chem Linc, Inc. 416 E. Ransom St., Kalamazoo, MI 49007, (880-826-1681).

2.4.11.1 Curb Components: Precast, polymer modified cement or structural urethane.

2.4.11.2 Curb Adhesive: Special silicone sealant – DURALINk™.

2.4.11.3 Pourable Sealant: Two-component urethane.

2.4.12 Substitutions: Under provisions of Section 01610.

2.5 FABRICATION

2.5.1 Form all sheetmetal components (except corners) in longest practical length up to 10-feet maximum; true to shape, square, accurate in size, and free from distortion or defects detrimental to appearance or performance.

2.5.2 Fabricate continuous cleats and starter strips of same material as sheet, interlockable with sheet.

2.5.3 Hem exposed edges of metal 1/2-inch; miter and seam corners.

2.5.4 Fabricate vertical faces with bottom edge formed outward 3/4-inch at 30 degrees and hemmed to form drip.

2.5.4.1 Where vertical height exceeds 8-inches, fabricate with stiffing grooves in accordance with SMACNA, unless specifically approved otherwise.

2.5.5 Form all sheetmetal material to provide watertight joints:

2.5.5.1 Unprotected Horizontal Surfaces (expansion joint covers, etc.): Standing seam or drive cleat joints.

2.5.5.2 Vertical Surfaces (copings, cap flashings, gravel guards, etc.): Flat lock or cover and backer plate seams.

2.5.6 Fabricate corners on all sheetmetal components (gravel guards, copings, cap flashings, etc.) to form one piece with minimum 18-inch and maximum 36-inch long legs.

2.5.7 Prefabricate all sheetmetal accessory components (pitch pans, utility sleeves, umbrellas, etc.) as much as practical.

2.5.8 Miter all sheetmetal corners and solder, weld, or fasten and seal all joints watertight:

2.5.8.1 Prefinished Galvanized Steel: Apply minimum 1/4-inch bead of sealant between connecting metal flanges and drill and fasten with rivets at 2-inches o.c.

2.5.8.2 Stainless Steel: Solder joints watertight.

2.5.8.3 Unfinished Galvanized Steel: Solder joints watertight.

2.5.9.4 After soldering, remove flux. Wipe and wash solder joints clean.

2.5.9.5 Install sealant so it will not be visible on outside of joints.

2.5.9 Fabricate elements complete with required connection pieces.

2.5.10 Fabricate all components with allowance for expansion at joints. Provide enlarged or oval holes at all piercing fasteners.

2.5.11 Fabricate all components with horizontal (flat) surfaces with built-in slope for drainage toward roof unless indicated otherwise.

2.5.12 Fabricate gutter and downspout accessories seal watertight.

2.6 FINISH

2.6.1 Shop prepare and prime exposed ferrous metal surfaces.

2.6.2 Backpaint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15-mils.

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1 Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.

3.1.2 Verify membrane termination and base flashings are in place, sealed, and secure.

3.1.3 Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

3.2.1 Field measure site conditions prior to fabricating work.

3.2.2 Apply bituminous protective backing on surfaces in contact with dissimilar materials.

3.3 INSTALLATION

3.3.1 Install starter and edge strips, and cleats before starting installation.

3.3.2 Install reglets and/or receivers on vertical surfaces to receive counterflashings.

3.3.2.1 Sawcut new reglets where required.

3.3.2.1.1 Install receiver component and anchor with lead wedges at 12-inches on center.

3.3.2.1.2 Provide bayonet style lap joints, minimum 4-inch overlap.

3.3.2.1.3 Fill voids between wedges with backer rod.

3.3.2.1.4 Seal receiver to vertical face of wall.

3.3.2.2 Install surface mounted reglets true to lines and levels.

3.3.2.2.1 Seal top of reglets with sealant.

3.3.3 Insert flashings into reglets or receivers to form tight fit. Apply 1/4-inch bead of sealant and lap sheetmetal minimum 4-inches.

3.3.3.1 <u>Reglets</u>: Secure in place with plastic wedges at maximum 6-inches on center.

3.3.3.2 <u>Receivers</u>: Secure in place with neoprene head screws at maximum 12-inches on center.

3.3.4 Seal flashings into reglets with sealant.

3.3.5 Secure flashings in place using concealed fasteners. Use exposed fasteners only in locations approved by Owner's Representative.

3.3.6 Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

3.3.7 Provide minimum 6-inch wide backer and cover plates at copings and gravel guards. Fit to ensure complete and permanent watertight seal of joints.

3.3.7.1 Apply 1/4-inch bead of sealant between each layer of metal at each edge.

3.3.7.2 Backer Plates: Secure with fasteners suitable for substrate, 6-inches o.c. each face.

3.3.7.3 Cover Plates: Hook front or exposed face of cover plate over drip edge.

3.3.7.4 Fasten back or unexposed edge of copings using screws with neoprene washers,
12-inches o.c.

3.3.7.5 Do not use mastic between sheetmetal components.

3.3.8 Lock and seal all sheetmetal joints watertight.

3.3.9 Install lead flashings at all soil pipe penetrations. Coat exposed lead with flashing cement.

3.3.10 Install lead flashings at all roof drains.

3.3.11 Provide Penetration Seal System at all small penetrations not otherwise detailed.

3.3.11.1 Clean roof surfaces to receive Penetration Seal Systems.

3.3.11.2 Clean pipes and penetrating elements to remove plastic cement, bitumen, and other contaminants by wire brushing and scraping.

3.3.11.3 Caulk around penetrating elements with special silicone sealant – DURALINk™.

3.3.11.4 Apply beads of special silicone sealant to flat side of first precast curb component. Place caulked curb onto roof surface to form half circle around penetrating element.

3.3.11.5 Apply beads of special silicone sealant to flat side and to scarf joints of second precast curb component. Place second section of curb onto roof surface to form circle with first section. Press scarf joints together firmly and press both sections down.

3.3.11.6 Apply continuous bead of special silicone sealant around outside edge of curb at roof.

3.3.11.7 Fill around penetrating element with pourable sealant to top of curb.

3.3.12 Protect all membrane penetrations as indicated and as recommended in SMACNA and NRCA manuals.

3.4 SCHEDULE – MATERIALS

3.4.1 Exposed to View Components at:

3.4.1.1 One-Piece Flashing and Expansion Joint Terminations: Galvanized steel, powder coated to match adjacent prefinished galvanized steel components.

3.4.1.2 All Other Components: Prefinished galvanized steel.

3.4.2 Concealed Components, (Counterflashings, Expansion Joint Covers, Etc.): Stainless steel.

3.4.3 Rain Hoods and Umbrellas: Stainless steel.

3.5 SCHEDULE - MINIMUM STEEL THICKNESS

3.5.1 Cap and Counterflashing: 24-gage,

3.5.2 Concealed Components: Stainless steel – 22

3.5.3 Downspouts: 24-gage prefinished.

3.5.4 Downspout brackets: 1/8 inch by 1 inch wrapped with 24 gage prefinished.

3.5.5 Gutters 9 x 9 inch: 22 gage prefinished, brackets ¼ x 1 ½ inch galvanized wrapped with 24- gage prefinished 24 inches o.c.

3.5.6 Gutters 5 x 5 inch: 24 gage prefinished, brackets ¼ x 1 ½ inch galvanized wrapped with 24- gage prefinished.

3.5.7 Hook Strips or Cleats: 22-gage, Stainless steel – 22.

Section 07840
FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 Section includes furnishing and installing fire stop systems in the following fire rated construction, but does not include load-bearing repairs to concrete floor slab penetration holes.

1.2.1.1 Penetrations of fire rated floor and wall constructions both empty and those penetrated by cables, conduits, pipes, ducts and similar construction.

1.2.1.2 Openings between structurally separate sections of fire rated floors, walls, and expansion joints.

1.2.1.3 Gaps between top of fire rated walls and fire rated structural floor or roof construction.

1.2.1.4 Openings in fire rated walls and floors penetrated by structural members.

1.2.1.5 Safing slot gaps between edge of floor and curtain wall construction.

1.2.1.6 Other locations where specifically shown on the Drawings.

1.3 RELATED WORK

1.3.1 Related Work of Other Sections:

1.3.1.1 Section 04810 – Unit Masonry Assemblies.

1.3.1.2 Section 07900 - Joint Sealants.

1.4 DESIGN/PERFORMANCE REQUIREMENTS

1.4.1 Provide fire stop systems conforming to both Flame (F) and Temperature (T) ratings as tested by nationally accepted test agencies per ASTM E-814 or UL 1479 fire tests.

1.4.1.1 The F and T ratings must be a minimum of one hour but not less than the fire resistance rating of the assembly being penetrated.

1.4.1.2 Conduct fire tests with a minimum positive test-pressure-differential of 0.03-inch of water column.

1.4.2 For a fire stop application that does not have a fire rated system available from any of the listed manufacturers, use a system derived from a similar design subject to acceptance of both manufacturer and authorities having jurisdiction.

1.5 QUALITY ASSURANCE

1.5.1 Installer: Arrange for installation to be performed by a firm that has been trained and approved by the manufacturer of the products for the proposed UL Listed firestopping systems and that has a minimum of 5-years successful experience as a firestop installation contractor.

1.5.1.1 Installer shall arrange and for the services of manufacturer's factory representative to train applicators, and review system selection and installation procedures at the Project Site.

1.5.2 Designs: Provide materials and construction that are identical to those tested by Underwriters Laboratory, Inc., for each specific UL fire rated assembly required for the Project.

1.5.3 Mock-Up: Prepare Jobsite mock-ups of each different type of firestopping and smoke seal design required at locations selected by City. Approved mock-ups may be left in place as part of the Work and constitute the standard for remaining work.

1.6 DELIVERY, STORAGE, AND HANDLING

1.6.1 Deliver products to Project Site in original, unopened packages with manufacturers' labels identifying products legible and intact.

1.6.2 Include on labels names of products and manufacturers, date of manufacture and shelf life, where applicable. Also, include UL labels for fire-resistance ratings applicable to Project.

1.6.3 Use materials with limited shelf life within period indicated. Remove from Project Site and discard any materials whose shelf life has expired.

1.6.4 Store materials off the ground and protected from environmental conditions as required by manufacturer. Remove from Project Site and discard any materials that have been exposed to moisture or have otherwise deteriorated.

1.7 PROJECT CONDITIONS

1.7.1 Conform to manufacturer's printed installation instructions and when applicable, curing in accordance with temperature and humidity requirements.

1.8 SEQUENCING AND SCHEDULING

1.8.1 Sequence and coordinate application of firestopping with other work to:

1.8.1.1 Avoid unnecessary exposure of firestopping to likely damage during construction operations.

1.8.1.2 Ensure that firestopping is installed prior to installation of enclosing or concealing work, with sufficient time allowed for inspection, testing, and correction of defective firestopping.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

2.1.1 Manufacturers: Subject to compliance with requirements, provide complete fire stop systems that use only products listed in one of the rated designs scheduled in Part 3 of this Section, that are produced by one of the following manufacturers, and that do not require material changes in details and construction of related work:

2.1.1.1 3M Fire Protection Products (3M), St. Paul, MN, www.3m.con/firestop, distributed by SSI, Inc., Houston, TX, (Tel) 713-862-3900.

2.1.1.2 Hilti Construction Chemicals, Inc. (Hilti), (Tel) 918-252-6901 or www.hilti.com/us.

2.1.1.3 Specified Technologies, Inc. (STI), www.stifirestop.com, distributed by D-F-W Supply Co., Inc., Houston, TX (Tel) 713-943-3643.

2.1.1.4 Tremco, Inc., Beachwood, OH (Tel) 800-321-7906 or www.tremcosealants.com.

2.1.2 Firestopping Material: Provide the following asbestos free materials arranged in designs which produce Flame (F) and Temperature (T) ratings of not less than one hour but not less than the fire resistance rating of the assembly being penetrated, as tested per ASTM E 814.

2.1.2.1 Intumescent Putty: One part hand moldable 100% solids intumescent putty, UL listed for both Flame (F) and Temperature (T) ratings, and designed to restrict transmission of temperature as well as passage of flame, smoke and water; 3M Fire Barrier Moldable Putty, STI Spec Seal Firestop Putty, or Tremco Tremstop putty, as appropriate for designs required.

2.1.2.2 Intumescent Firestop Sealant: One part sealant, providing an airtight, waterproof seal that bonds to most building materials, available in a gun grade for wall and overhead applications and self leveling for floor applications, UL listed for both Flame (F) and Temperature (T) ratings, and designed to restrict transmission of temperature as well as passage of flame, smoke and water; 3M Fire Barrier CP 25 WS+, or Hilti FS One or FS 601 sealant, or STI Spec Seal SSS100 sealant, or Tremco Tremstop IA sealant, as appropriate for designs required.

2.1.2.3 Firestop Device: Prefabricated device designed for use around plastic pipe penetrations of fire-rated walls and floors, made from a steel collar with intumescent material, UL listed for both Flame (F) and Temperature (T) ratings; 3M Fire Barrier Plastic Pipe Device or Hilti CP 642 Firestop Collar, or STI Firestop Collars, or STI SpecSeal Pillows, or Tremco Tremstop D collar, as appropriate for designs required.

2.1.2.4 Intumescent Sheet/Trowelable Compound: Composite sheet of intumescent material or trowelable intumescent compound used to seal large openings and seal penetrations against flame spread, smoke and toxic fumes, UL listed for both Flame (F) and Temperature (T) ratings; 3M Fire Barrier CS 195 Composite Sheet, or Hilti FS 635 compound, or STI SpecSeal SSM Mortar, or Tremco Tremstop M mortar, as appropriate for designs required.

2.1.2.5 Silicone Sealant: One part, gun-grade, ready to use, moisture curing, silicone sealant; 3M Fire Barrier 2000 Sealant, or STI SpecSeal Pen 300 Sealant, or Tremco Fyre-Sil gunnable or self-leveling sealant, as appropriate for designs required.

2.1.2.6 Elastomeric Spray: STI SpecSeal AS105, or Hilti CP-672 Fire Joint Spray, or 3M Fire Dam 150 Spray, or Tremco Tremstop Acrylic gunnable sealant or spray, as appropriate for designs required.

2.1.2.7 Damming Insulation: ASTM C 612, Class 1 and 2, spun mineral wool non-combustible felts with UL Fire Hazard Classification (ASTM E 84) of 15 Flame Spread, 0 Fuel Contributed, and 0 Smoke Developed; United States Gypsum Company "Thermafiber" Fire Safing Insulation, or Tremco CeraBlanket mineral wool, or equivalent.

2.1.3 Miscellaneous Materials: Provide anchoring devices, restricting collars, backup materials, clips, sleeves, supports and other miscellaneous materials used in actual fire tests, compatible with firestopping products and substrates, approved for use as indicated by firestopping products manufacturer, and which have been approved by UL or other acceptable testing and inspecting agency for use in fire-resistance rated designs indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1 Require installer to examine substrates to determine if they are in satisfactory condition and do not have defects that would interfere with the satisfactory installation of firestopping materials.

3.2 PREPARATION

3.2.1 Clean surfaces and substrates of dirt, oil, loose materials, and other foreign materials that may affect proper bond or installation of firestops in accordance with manufacturer's written instructions.

3.2.1.1 Provide proper primers as required for conditions and which comply with manufacturer's recommendations for substrates and conditions.

3.2.1.2 Do not apply firestops to surfaces previously painted or treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required to comply with manufacturer's instructions.

3.2.1.3 Mask to protect adjoining surfaces. Remove excess material and stains on surface of materials not indicated to receive firestopping materials.

3.3 INSTALLATION

3.3.1 Install firestopping materials in accordance with manufacturers printed instructions to provide a Flame (F) and Temperature (T) rating of at least one hour but not less than the rating of the assembly being penetrated.

3.3.2 Ensure that anchoring devices, backup materials, clips, sleeves, supports and other materials used in the actual fire test are installed.

3.3.3 Install firestops with sufficient pressure to properly fill and seal openings and to ensure an effective smoke seal.

3.3.4 Tool or trowel exposed surfaces of firestops to eliminate air pockets and to ensure contact and adhesion of firestopping material to substrates. Remove excess firestop material promptly as work progresses and upon completion.

3.4 FIELD QUALITY CONTROL:

3.4.1 Promptly notify City if specified firestop systems cannot comply with requirements specified.

3.4.2 Installer shall examine firestops for proper installation and compliance with specified requirements.

3.4.3 Maintain accessibility of each installation area until completion of applicable inspections by governing authorities.

3.4.4 Remove and reinstall unacceptable firestops and arrange for reinspection to verify compliance with requirements.

3.5 FIRESTOPPING SYSTEM AND APPLICATION SCHEDULE

3.4.5 Provide one of the following UL listed firestopping designs and associated materials at each of the penetration types indicated or required for the Project.

Penetration Type	3M		Hilti		STI		Tremco	
1. Metal pipe or	CAJ1001	CAJ1044	CAJ1149	CAJ1226	CAJ1030	CAJ1213	CAJ1233	CAJ1064
conduit through	CAJ1006	CAJ1058	CAJ1150		CAJ1045	CAJ1214	CAJ1288	
Concrete or	CAJ1009	CAJ1060	CAJ1154		CAJ1048	CAJ1215	CAJ1205	
Masonry	CAJ1014	CAJ1175	CAJ1155		CAJ1079	CAJ1217	CAJ1187	

	CAJ1015	CAJ1176	CAJ1156		CAJ1080	CAJ1232	CAJ1145	
	CAJ1017	CAJ1091	CAJ1158		CAJ1089	CAJ1198	CAJ1047	
	CAJ1021	CAJ1112	CAJ1172		CAJ1090	WJ1025	CAJ1179	
	CAJ1027		CAJ1173		CAJ1142	WJ1033	CAJ1113	
2. Metal pipe or conduit through Gypsum	WL1001	WL1010	WL1052		WL1028	WL1079	WL1097	
	WL1002	WL1017	WL1054		WL1029	WL1088	WL1113	
	WL1003	WL1036	WL1056		WL1033	WL1090	WL1051	
	WL1009		WL1058		WL1049	WL1093	WL1020	
			WL5029		WL1062	WL1101		
			WL1085		WL1078			
3. Insulated metal pipe through Concrete or Masonry	CAJ5001	CAJ5030	CAJ5044		CAJ5010	CAJ5005	CAJ5067	
	CAJ5002	CAJ5041	CAJ5045		CAJ5021	CAJ5006	CAJ5121	
	CAJ5003	CAJ5060	CAJ5046		CAJ5029	CAJ5011	CAJ5081	
	CAJ5005	CAJ5004	CAJ5048		CAJ5042		CAJ5005	
	CAJ5009		CAJ5090		CAJ5051			
	CAJ5017		CAJ5091		CAJ5058			
	CAJ5024				CAJ5087			
4. Insulated metal pipe through Gypsum	WL5001	WL5032	WL5016	WL5025	WL5014	WL5051	WL5082	
	WL5002	WL5038	WL5017	WL5028	WL5025	WL5054	WL5081	
	WL5009	WL5039	WL5019	WL5029	WL5026		WL5083	
	WL5010	WL5040	WL5021		WL5027			
	WL5011		WL5022		WL5028			
	WL5023		WL5046		WL5029			
	WL5024		WL5047		WL5033			
5. Plastic pipe through	CAJ2001	CAJ2028	CAJ2062	CAJ2110	CAJ2038	CAJ2095	CAJ2229	CAJ2233
	CAJ2	CAJ20	CAJ2		CAJ20	CAJ2	CAJ21	CAJ2

	002	40	066		39	098	84	075
Concrete or	CAJ2003	CAJ2090	CAJ2091		CAJ2045	CAJ2105	CAJ2074	CAJ2116
Masonry	CAJ2005	FA2011	CAJ2141		CAJ2056	CAJ2106	CAJ2076	CAJ2160B
	CAJ2006	FA2016	CAJ2109		CAJ2063	CAJ2138	CAJ2085	CAJ2069
	CAJ2007		CAJ2118		CAJ2064	CAJ2139	CAJ2073	FA2042
6. Plastic pipe	WL2002	WL2005	WL2051	WL2098	WL2048	WL2076	WL2176	WL2076
through gypsum	WL2003	WL2033	WL2052	WL2078	WL2059	WL2078	WL2177	WL2078
	WL2004	WL2073	WL2053	WL2075	WL2075	WL2093	WL2083	WL2093
							WL2082	WL2169
							WL2061	WL2062
							WL2063	WL2125
7. Jacketed cable	CAJ3001	CAJ3031	CAJ3069		CAJ3042		CAJ3141	
through	CAJ3005	CAJ3041	CAJ3070		CAJ3043		CAJ3144	
Concrete or	CAJ3009	CAJ3044	CAJ3079		CAJ3084		CAJ3068	
Masonry	CAJ3010	CAJ3058	CAJ3095		CAJ3095			
	CAJ3011	CAJ3071			CAJ3096			
	CAJ3014	CAJ3074						
	CAJ3015	CAJ3080						
	CAJ3021	FB3004						
	CAJ3029	WJ3015						
	CAJ3030							
8. Jacketed cable	WL3001	WL3030	WL3045		WL3024	WL3065	WL3131	
through gypsum	WL3008	WL3031	WL3046		WL3025	WL3076	WL3043	
	WL3009	WL3032	WL3047		WL3049			
	WL3015	WL3056	WL3048		WL3058			
	WL3022		WL3065		WL3059			

9. Cable tray or	CAJ4 003	CBJ40 05	CAJ4 017		CAJ60 06		WJ401 2	
electric bussway	CAJ4 006	CBJ40 21	CAJ4 035		CAJ80 16		WJ400 5	
through	CAJ6 001	CBJ40 22			CAJ80 33			
Concrete or	CAJ6 002	FA600 1			CAJ80 35			
Masonry	CBJ4 001	WJ400 8			CAJ80 36			
	CBJ4 003							
10. Cable tray or	WL40 04		WL40 11		WL40 05		WL401 2	
electric bussway					WL40 08			
through gypsum								
11. Mixed or	CAJ1 066	CBJ10 20	CAJ1 140		CAJ12 08		CAJ31 41	
multiple penetrating	CAJ1 092	CBJ10 21	CAJ1 172		CAJ12 09		CAJ31 44	
items through	CAJ1 148	CBJ10 31	CAJ1 174		CAJ80 16		CAJ80 34	
concrete or	CAJ2 020	CBJ80 04	CAJ5 044		CAJ80 33		CAJ80 57	
Masonry	CAJ2 030	CBJ80 05	WJ80 04		CAJ80 35			
	CAJ2 044	CBJ80 08	CAJ8 056		CAJ80 36			
	CAJ3 075	FA100 2	CAJ8 041		CAJ80 52			
	CAJ8 001	FA200 2	CAJ6 006		CAJ50 42			
	CAJ8 003	FB300 1			WJ80 06			
	CAJ8 006	FA800 1						
	CAJ8 013							
12. Mixed or	WL10 16	WL203 2	WL10 57	WL10 95	WL10 93		WL31 31	
multiple penetrating	WL10 37	WL305 1	WL80 13		WL80 03		WL30 43	
items through	WL20 31	WL306 2	WL80 04		WL80 11			
Gypsum								
13. Expansion	CAJ0 004	J900B	FF-S-1008	WL10 95	WWS 0017	HWD1 001	WWJ0 024	
joint, curtain wall,	CBJ0	J900C	WWS		WWS	WWD	WWD	

	013		-1011		1009	0001	0009	
safing, slots and construction gaps	CBJ0020	U900J	FW-S-1002		WWS1010	WWD1001	WWJ0025	
	WJ0003	U900L	FFS-1017		WWS0023	WWD1002	WWD0010	
					WWS0029		CAJ0011	
					FWD1001		CAJ0026	
14. Wall/ceiling interface between top of wall and Roof Deck	N/A		HW-D-0003	HW-D-0010	WWS0017	FWD1001	HWD0016	
			HW-D-0004	HW-D-0042	WWS1009	HWD1001	HWD0017	
			HW-D-0005		WWS1010	WWD0001		
			HW-D-0008		WWS0023	WWD1001		
					WWS0029	WWD1002		
15. Applications not listed	Contact one of the specified manufacturer's technical representatives and request an engineered drawing detail to suit field conditions. Provide manufacturer's written statement describing the basis for the untested designs and the authority of the person making them.							

Section 07900
JOINT SEALANTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 Summary: Section includes furnishing and installing joint sealants and back-up materials at locations indicated and required to comply with performance requirements.

1.3 RELATED WORK

1.3.1 Related Work of Other Sections:

1.3.1.1 Section 04810 – Unit Masonry Assemblies.

1.3.1.2 Section 05500 - Miscellaneous Metal Fabrications.

1.3.1.3 Section 07411 - Manufactured Metal Roof Panels.

1.3.1.4 Section 08110 – Steel Doors and Frames.

1.3.1.5 Section 08400 – Aluminum Storefront Construction.

1.3.1.6 Section 08800 – Glass and Glazing.

1.3.1.7 Section 09900 - Paints and Coatings.

1.3.1.8 Section 10200 – Aluminum Louvers.

1.4 PERFORMANCE REQUIREMENTS

1.4.1 It is required that sealant work provide durable weathertight joint seals that are well cured, of uniform depth, tooled to provide good adhesion to sealant bond surfaces, and not to deteriorate in excess of limits published by sealant manufacturer.

1.5 SUBMITTALS

1.5.1 Submit manufacturer’s product data and details showing layout of recommended minimum and maximum joint width to depth relationships, and recommended primers for substrates and conditions indicated. Include material specifications showing compliance with requirements.

1.5.2 Preconstruction Sealant Testing: Perform sealant manufacturer's standard tests for compatibility and adhesion of sealants with each material that will come in contact with sealants and each condition required by systems.

1.5.2.1 Test a minimum of 12 samples of each metal, glazing, and other material. Determine adhesion test data of sealant bond to actual production samples of finished metal and glass that will be incorporated into the work. Perform adhesion tests in accordance with ASTM C 794.

1.5.2.2 Prepare samples using techniques and primers required for installed systems.

1.5.2.3 Perform tests under environmental conditions that duplicate those under which systems will be installed.

1.5.2.4 For materials that fail tests, determine corrective measures required to prepare each material to ensure compatibility with and adhesion of sealants, including, but not limited to, specially formulated primers. After performing these corrective measures on the minimum number of samples required for each material, retest materials.

1.5.2.5 Compatibility statement that the materials in contact with the sealant such as gaskets, spacers, setting blocks, are compatible with the sealant after 21-days exposure to 2000 to 4000 microwatts of ultraviolet radiation.

1.5.2.6 Stress statements that the sealant dimensions (per detail) do not exceed 20-psi when exposed to the specified wind load (6:1 Safety Factor).

1.5.2.7 Certification from sealant manufacturer that the sealant manufacturer has reviewed all sealant details and finds same suitable for the purpose intended and compatible with the surfaces with which they are in contact.

1.5.3 Local/Regional Materials:

1.5.3.1 Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.

1.5.3.2 Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.

1.5.3.3 Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.

1.5.3.4 Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

1.5.4 VOC data:

1.5.4.1 Architectural Sealants:

1.5.4.1.1 Submit manufacturer's product data for sealants. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.

1.5.4.1.2 Submit manufacturer's certification that products comply with Bay Area Resources Board, reg. 8, rule 51.

1.5.4 Architectural Sealants:

1.5.4.1 Toxicity/IEQ:

1.5.4.1.1 Comply with applicable regulations regarding toxic and hazardous materials, and as specified. Sealants must meet or exceed requirements of Bay Area Resources Board, reg. 8, rule 51.

1.5.4.1.2 Sealants containing aromatic solvents, fibrous talc, formaldehyde, halogenated solvents, mercury, lead, cadmium, chromium and their compounds, are not permitted.

1.5.5 Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.

1.6 QUALITY ASSURANCE

1.6.1 Perform preconstruction joint sealer/substrate tests to confirm adhesion and compatibility and field tests to confirm technique required for appearance and adhesion.

1.6.2 Mockups: Prior to installing exterior joint sealant work, construct mockups of joint sealant s between each type of substrate construction and finish required to verify selections made under Sample submittals and to demonstrate sealant joint adhesion and compatibility, aesthetic effects, as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for Work.

1.6.2.1 Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by City.

1.6.2.2 Notify City 7-days in advance of the dates and times when mockups will be constructed.

1.6.2.3 Demonstrate the proposed range of aesthetic effects and workmanship.

1.6.2.4 Obtain City's approval of mockups before start of Work.

1.6.2.5 Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

1.7 DELIVERY, STORAGE AND PROTECTION

1.7.1 Deliver materials and store in manufacturer’s original unopened containers. Store materials between 40-degrees F (4-degrees C) and 90-degrees F (32-degrees C).

1.8 PROJECTION CONDITIONS

1.8.1 Do not apply joint sealants, primers, and related materials to surfaces without first verifying compatibility required by the Quality Assurance paragraph. Install sealants when air temperature and substrate temperature are over 40-degrees F (4-degrees C) and rising, but less than 100-degrees F (37-degrees C).

PART 2 - PRODUCTS

2.1 SEALANT MATERIALS

2.1.1 Type "A" - One-Part Low-Modulus Fast-Curing Silyl-Terminated Polyether Sealant: ASTM C 920, Type M, Grade NS, Class 25, and Uses NT, M, G, A, and, as applicable to joint substrates indicated, O; non-staining, non-bleeding, non-streaking, medium modulus with -50% to +100% joint movement capability and a tensile strength of 290 psi at 100% elongation when tested after 14-days at 77-degrees F (25-degrees C.) and 50% relative humidity per ASTM D 412.

2.1.1.1 Product: Sonneborn "Sonolastic 150" sealant.

2.1.1.2 Primers: Provide manufacturer's recommended primers for anodized aluminum, limestone, concrete, Portland cement plaster, and other porous masonry and stone.

2.1.1.3 Locations: All exterior locations not otherwise noted or specified, including interior sealant joints on interior side of components subject to thermal movement from exterior heat sources.

2.1.1.4 Colors: As selected by City from manufacturer's full range of available standard colors.

2.1.2 Type "B" - Two-Part Pourable Urethane Sealant: ASTM C 920, Type M, Grade P, Class 25, and Uses T, M, A, and, as applicable to joint substrates indicated, O.

2.1.2.1 Products: Subject to compliance with requirements, provide Pecora "NR-200 Urexpan" or Tremco "THC-900" or Sika "Sikaflex-2C-SL" or Bostik Construction Products Division "Chem-Calk 550" or Sonneborn "Sonolastic Paving Joint Sealant".

2.1.2.2 Locations: Exterior locations subject to vehicular and pedestrian traffic.

2.1.2.3 Colors: As selected by City from manufacturer's standard available colors.

2.1.3 Type "C" Two-Part Low-Sag or Non-Sag Urethane Sealant: Type M, Grade NS, Class 25, and Uses T, M, A, and, as applicable to joint substrates indicated, O.

2.1.3.1 Products: Subject to compliance with requirements, provide Pecora "Dynatred" or Tremco "THC-901" or Bostik Construction Products Division "Chem-Calk 500" or Sika "Sikaflex-2C-NS" or Sto "CR671 Traffic Joint Sealant".

2.1.3.2 Locations: Exterior locations subject to vehicular and pedestrian traffic.

2.1.3.3 Colors: As selected by City from manufacturer's standard available colors.

2.1.4 Type "D" - Acrylic-Emulsion Sealant: Manufacturer's standard, one- part, non-sag, mildew-resistant, acrylic-emulsion sealant complying with ASTM C 834, formulated to be paintable and recommended for exposed applications on interior and protected exterior exposures involving joint movement of not more than ± 7.5%.

2.1.4.1 Products: Subject to compliance with requirements, provide Bostik Construction Products Division "Chem-Calk 600" or Pecora Corp. "AC-20+Silicone" or Polymeric Systems, Inc. "PSI-701" or Sonneborn Building Products Division/Rexnord Chem. Products, Inc. "Sonolac" or Tremco, Inc. "Tremco Acrylic Latex Caulk 834".

2.1.4.2 Locations: All exposed interior locations.

2.1.4.3 Colors: As selected by City from manufacturer's standard colors.

2.1.5 Type "E" - One-Part Non-Acid Curing Mildew-Resistant Silicone Sealant: ASTM C 920, Type S, Grade NS, Class 25, and Uses NT, M, G, A, and, as applicable to joint substrates indicated, O; medium modulus sealant formulated with fungicide that are intended for sealing interior ceramic tile joints and other non-porous substrates that are subject to in-service exposures to high humidity and temperature extremes.

2.1.5.1 Products: Subject to compliance with requirements, provide either Dow Corning "786 Mildew Resistant Sealant", or GE Silicones "Sanitary 1700 Sealant", or Pecora "898 Silicone", or Polymeric Systems, Inc. "PSI 611", or Tremco "Tremsil 600 White".

2.1.5.2 Locations: Interior tile and other similar locations subject to both high humidity and temperature extremes.

2.1.5.3 Colors: As selected by City from manufacturer's standard colors.

2.1.6 Type "F" - Butyl Sealant: Manufacturer's standard one-part, non-sag, solvent release curing, polymerized butyl sealant complying with FS TT-S-001657 for Type I and formulated with minimum of 75% solids to be nonstaining, paintable, and have a tack-free time of 24 hours or less.

2.1.6.2 Products: Subject to compliance with requirements, provide Bostik Construction Products Division "Chem-Calk 300" or Pecora Corp. "BC- 158" or Polymeric Systems, Inc. "PSI-301" or H. B. Fuller Co. "PTI 757" or Tremco, Inc. "Tremco Butyl Sealant".

2.1.6.3 Locations: Concealed interior locations.

2.1.7 Acoustical Sealant for Concealed Joints: Manufacturer's standard, nondrying nonhardening, nonskinning, nonstaining, gunnable, synthetic rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.

2.1.7.1 Products: Subject to compliance with requirements, provide Pecora Corp. "BA-98" or Tremco Inc. "Tremco Acoustical Sealant" or US Gypsum "Acoustical Sealant" or Sika "Sikaflex 11 FC".

2.1.7.2 Locations: Concealed gypsum drywall partitions perimeter and penetrations.

2.2 ACCESSORY MATERIALS

2.2.1 Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by the sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.2.2 Joint Sealant Backing: osed-cell polyethylene foam rod, non-gassing.

PART 3 - EXECUTION

3.1 PREPARATION

3.1.1 Examination:

3.1.1.1 Examine substrates and verify that joint dimensions are correct and that substrate is in proper condition to receive sealants.

3.1.1.2 Do not proceed with installation until unsatisfactory conditions have been corrected.

3.1.2 Cleaning Joints:

3.1.2.1 Clean out joints just before installing sealants; follow joint sealer manufacturer’s recommendations.

3.1.2.2 Remove dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; oil, grease, water repellents, water, surface dirt and frost, and other similar materials which would prevent or reduce sealant bond.

3.1.2.3 Clean metal, glass, and other non-porous surfaces by means that are not harmful to substrates or leave residues capable of interfering with sealant adhesion.

3.1.3 Joint Sealant Backing: Install joint backing without twisting, compress more than 50%, or stretch during installation. Install sealant backup materials to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

3.1.3.1 For joints 1/4-inch to 1/2-inch wide, install backer rod to provide sealant joint depth equal to joint width.

3.1.3.2 For joints wider than 1/2-inch, install backer rod at depth to provide 1/2-inch sealant joint depth.

3.1.3.3 Do not leave gaps between ends of joint-fillers. Do not stretch, twist, puncture or tear joint-fillers. Remove absorbent joint-fillers that have become wet prior to sealant application and replace with dry material.

3.1.3.4 Install bond breaker tape between sealants and joint-fillers, compression seals or back of joints where required to prevent third-side adhesion of sealant to back of joints.

3.1.4 Bond Surface Priming:

3.1.4.2 Prime cleaned joint substrates where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience.

3.1.4.3 Follow joint sealer manufacturer's recommendations.

3.1.4.4 Confine primers to sealant bond area; do not allow spillage or migration onto adjoining surfaces.

3.1.4.5 Prime bond surfaces prior to installation of sealant joint backing.

3.1.5 Mixing:

3.1.5.1 Mix multi-part sealants in accordance with sealant manufacturer’s printed instruction, using only whole units.

3.1.5.2 Do not use partial units.

3.2 INSTALLATION

3.2.1 Manufacturer’s Instructions: Follow sealant manufacturers' printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

3.2.2 Masking: Mask surfaces that might be permanently stained or damaged by sealant contact or by cleaning methods required to remove sealant smears. Promptly remove tape after tooling without disturbing joint seal.

3.2.3 Installation Technique: Install sealants using techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

3.2.4 Tooling: Tool non-sag sealants slightly concave prior to time skinning or curing begins to form smooth, uniform beads, to eliminate air bubbles and air pockets, and to assure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.2.5 Protection: Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion.

3.3 FIELD QUALITY CONTROL

3.3.1 Procedure: Make a cut in the sealant across the joint for the entire depth of the sealant. Make two vertical cuts several inches long, paralleling the sides of the joint as closely as possible and extending down from the cross cut. Grasp the free length of sealant and pull at a 90-degree angle, tearing sealant from joint for several inches.

3.3.2 Interpretation of Results: Field quality control test results shall be interpreted as follows:

3.3.2.1 Sealant Tears Cohesively: Pass

3.3.2.2 Sealant Fails in Adhesion at Joint Face: Fail; remove sealant, prepare joint bond surfaces anew, and reinstall sealant to comply with requirements.

Section 08110
STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 Summary: Section includes furnishing and installing:

1.2.1.1 Steel doors.

1.2.1.2 Steel frames.

1.2.1.3 Sidelight frames

1.2.1.4 Fire-rated door and frame assemblies.

1.2.1.5 Vision lite frame trim in doors.

1.3 RELATED WORK

1.3.1 Related Work of Other Sections:

1.3.1.1 Section 04810 – Unit Masonry Assemblies.

1.3.1.2 Section 06100 - Rough Carpentry.

1.3.1.3 Section 07900 - Joint Sealants.

1.3.1.4 Section 08700 - Finish Hardware.

1.3.1.5 Section 08800 – Glass and Glazing.

1.3.1.6 Section 09250 - Gypsum Drywall Systems.

1.3.1.7 Section 09900 - Paints and Coatings.

1.4 SUBMITTALS

1.4.1 Product Data: For each type of door and frame indicated, include door designation, type, level and model, material description, core description, construction details, label compliance, sound and fire-resistance ratings, and finishes.

1.4.2 Shop Drawings: Show the following:

1.4.2.1 Elevations of each door design.

1.4.2.2 Details of doors including vertical and horizontal edge details.

1.4.2.3 Frame details for each frame type including dimensioned profiles.

1.4.2.4 Details and locations of reinforcement and preparations for hardware.

1.4.2.5 Details of each different wall opening condition.

1.4.2.6 Details of anchorages, accessories, joints, and connections.

1.4.2.7 Coordination of glazing frames and stops with glass and glazing requirements.

1.4.3 Door Schedule: Use same reference designations indicated on Drawings in preparing schedule for doors and frames.

1.5 QUALITY ASSURANCE

1.5.1 Steel Door and Frame Standard: Comply with ANSI A 250.8, unless more stringent requirements are indicated.

1.5.2 Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.

1.5.2.1 Test Pressure: Test at positive pressure in accordance with UBC Standard 7-2.

1.5.2.2 Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.

1.6 DELIVERY, STORAGE, AND HANDLING

1.6.1 Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

1.6.2 Inspect doors and frames on delivery for damage, and notify shipper and supplier if damage is found. Minor damages may be repaired provided refinished items match new work and are acceptable to City. Remove and replace damaged items that cannot be repaired as directed.

1.6.3 Store doors and frames at building site under cover. Place units on minimum 4-inch- (100-mm-) high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If door packaging becomes wet, remove cartons immediately. Provide minimum 1/4-inch (6-mm) spaces between stacked doors to permit air circulation.

1.7 SEQUENCING AND SCHEDULING

1.7.1 Submit data and schedule at earliest possible date, particularly where acceptance of schedule must precede fabrication of units that must be built into other work. Coordinate door and frame work with wood doors specified in Section 08210 – Wood Doors and finish hardware specified in Section 08700 – Finish Hardware.

PART 2 - PRODUCTS

2.1 MANUFACTRURERS

2.1.1 Available Manufacturers: Subject to compliance with Project requirements, provide steel door and frame units produced by one of the following:

2.1.1.1 Amweld Building Products, Inc. (330) 527-4385.

2.1.1.2 Curries Co. (515) 423-1334.

2.1.1.3 Deansteel Manufacturing Co. (210) 226-8271

2.1.1.4 The Kewanee Corp. (800) 666-4481.

2.1.1.5 Mesker Door Co. (205) 851-6670.

2.1.1.6 Premier Products, Inc. (318) 361-0796.

2.1.1.7 Republic Builders Products (901) 352-3383.

2.2 MATERIALS

2.2.1 Steel Sheet, General: Thickness dimensions, including those referenced in ANSI A250.8, are minimums as defined in referenced ASTM standards for both uncoated steel sheet and the uncoated base metal of metallic-coated steel sheets.

2.2.2 Hot-Rolled Steel Sheets: ASTM A 569/A 569M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

2.2.3 Cold-Rolled Steel Sheets: ASTM A 366/A 366M, Commercial Steel (CS), or ASTM A 620/A 620M, Drawing Steel (DS), Type B; stretcher-leveled standard of flatness.

2.2.4 Anchors and Accessories: Manufacturer's standard units suitable for type of wall construction, and as follows.

2.2.4.1 Provide square profile stops with mitered corners for glazing and louvers.

2.2.4.2 Use galvanized items for units built into exterior walls and Apparatus Bay doors.

2.2.4.3 Provide 18 x 14 mesh galvanized steel insect screen on roll formed galvanized steel frames with mitered corners, mounted on interior side of door louvers.

2.2.4.4 Provide countersunk flat or small oval head Philips or Jackson head fasteners where exposed to view.

2.2.5 Primer: Manufacturer's standard rust-inhibitive primer, suitable as a base for specified finish paints.

2.3 DOORS AND FRAMES

2.3.1 General: Provide doors of sizes, thicknesses, and designs indicated.

2.3.2 Provide the following doors and frames complying with ANSI/SDI 100 "Recommended Specifications for Standard Steel Doors and Frames", and as specified.

2.3.2.1 Exterior Doors and Apparatus Bay Doors: Level 3 and Physical Performance Level A for Extra Heavy Duty, Model 2 doors, "Seamless Design", fabricated with minimum 0.053" (1.3 mm) thick (old 16 gage) hot-dip galvanized steel faces and edges, "Steel Stiffened Core", with top and bottom flush end closures sealed to eliminate moisture entry into door, and with closer reinforcement.

2.3.2.2 Interior Doors: Level 2 and Physical Performance Level B for Heavy Duty, Model 2 doors, "Seamless Design" fabricated from minimum 0.042" (1.0 mm) thick (old 18 gage) steel faces, with "Steel Stiffened Core" and with closer reinforcement.

2.3.2.3 Exterior Frames an Apparatus Bay Door Frames: Level 3 and Physical Performance Level A for Extra Heavy Duty frames, fabricated from minimum 0.053" (1.3 mm) thick (old 16 gage) hot-dip galvanized steel with mitered and continuously seam welded (including rabbets and stop) corners, and with temporary spreader bar at bottom.

2.3.2.4 Interior Frames: Level 2 and Physical Performance Level B for Heavy Duty frames, fabricated from minimum 0.042" (1.0 mm) thick (old 18 gage) steel sheet with mitered reinforced mechanically joined corners.

2.4 FABRICATION

2.4.1 General: Fabricate steel door and frame units to comply with ANSI A250.8 and to be rigid, neat in appearance, and free from defects including warp and buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site.

2.4.2 Exterior Door Construction: For exterior locations and elsewhere as indicated, fabricate doors, panels, and frames from metallic-coated steel sheet. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 0.053-inch- (1.3-mm-) thick (old 16 gage), metallic-coated steel channels with channel webs placed even with top and bottom edges.

2.4.3 Interior Door and Panel Faces: Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from the following material:

2.4.3.1 Cold-rolled steel sheet.

2.4.4 Core Construction: Manufacturer's standard core construction of the type specified that produces a door complying with SDI standards.

2.4.5 Clearances for Non-Fire-Rated Doors: Not more than 1/8 inch (3.2 mm) at jambs and heads, except not more than 1/4 inch (6.4 mm) between pairs of doors. Not more than 3/4 inch (19 mm) at bottom.

2.4.5.1 Clearances for Fire-Rated Doors: As required by NFPA 80.

2.4.6 Single Acting, Door-Edge Profile: Square edge, unless beveled edge is indicated.

2.4.7 Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

2.4.8 Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.

2.4.9 Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

2.4.10 Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation for hardware.

2.4.10.1 For concealed overhead door closers, provide space, cutouts, reinforcement, and provisions for fastening in top rail of doors or head of frames, as applicable.

2.4.11 Frame Construction: Fabricate frames to shape shown.

2.4.11.1 For exterior applications and doors to Apparatus Bay, fabricate frames with mitered or coped and continuously welded corners, rabbets, stops, and seamless face joints.

2.4.11.2 For interior applications, fabricate knockdown frames with mitered or coped corners, for field assembly.

2.4.11.3 Provide welded frames with temporary spreader bars.

2.4.11.4 Provide terminated (hospital type) stops at interior frames, unless otherwise indicated.

2.4.12 Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

2.4.13 Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.

2.4.14 Glazing Stops: Manufacturer's standard, formed from 0.032-inch- (0.8-mm-) thick (old 20 gage) steel sheet.

2.4.14.1 Provide nonremovable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.

2.4.15.2 Provide screw-applied, removable, glazing stops on inside of glass, louvers, and other panels in doors.

2.4.16 Astragals: As required by NFPA 80 to provide fire ratings indicated.

2.5 FINISHES

2.5.1 Prime Finish: Manufacturer's standard, factory-applied coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.

3.1.2 Placing Frames: Comply with provisions in SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

3.1.2.1 Except for frames located in existing walls or partitions, place frames before construction of enclosing walls and ceilings.

3.1.2.2 In masonry construction, provide at least three wall anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.

3.1.2.3 In metal-stud partitions, provide at least three wall anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Attach wall anchors to studs with screws.

3.1.2.4 For in-place gypsum board partitions, install knock-down, drywall slip-on frames.

3.1.2.5 Install fire-rated frames according to NFPA 80.

3.1.2.6 For openings 90 inches (2286 mm) or more in height, install an additional anchor at hinge and strike jambs.

3.1.2.7 Seal open seams in exterior units to whatever extent not completed at the factory prior to painting.

3.1.3 Door Installation: Comply with ANSI A250.8. Fit hollow-metal doors accurately in frames, within clearances specified in ANSI A250.8. Shim as necessary to comply with SDI 122 and ANSI/DHI A115.1G.

3.1.3.1 Fire-Rated Doors: Install within clearances specified in NFPA 80.

3.1.3.2 Smoke-Control Doors: Install to comply with NFPA 105.

3.2 ADJUSTING AND CLEANING

3.2.1 Cleanup: Remove excess weld splatter by grinding flush with adjacent surfaces, without grinding skips or gouging parent metal. Refer to Section 09900 - Paints and Coatings for surface preparation, primer and field applied finish coats.

3.2.2 Prime-Coat Touchup: Immediately after installation, sand smooth any rusted or damaged areas of prime coat and apply touch up of compatible air-drying primer.

3.2.3 Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

Section 08400
ALUMINUM STOREFRONT CONSTRUCTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 Section includes furnishing and installing:

1.2.1.1 Exterior entrance doors.

1.2.1.2 Exterior storefront and fixed window wall framing systems.

1.2.1.3 Exterior operable windows as indicated.

1.2.1.4 Window screens at each operable window.

1.2.1.5 Glass and glazing in conjunction with the work of this Section and as specified in Section 08800.

1.2.1.6 Sealants, joint fillers, gaskets, blocking and related materials in conjunction with each of the above components and to all adjacent work.

1.2.1.7 Anchors, inserts, reinforcements, support brackets, flashings, weeps, and similar elements in conjunction with each of the above components.

1.2.1.8 Steel supports at entrance storefront.

1.2.1.9 Cleaning work of this Section.

1.3 RELATED WORK

1.3.1 Related Work of Other Sections:

1.3.1.1 Section 04810 – Unit Masonry Assemblies.

1.3.1.2 Section 05500 - Miscellaneous Metal Fabrications.

1.3.1.3 Section 07110 - Bituminous Dampproofing.

1.3.1.4 Section 07900 - Joint Sealants.

1.3.1.5 Section 08700 - Finish Hardware.

1.3.1.6 Section 08800 - Glass and Glazing.

1.4 REFERENCE STANDARDS

1.4.1 Comply with applicable standards and specifications published by NAAMM, AAMA, and AA, including definitions of terms and designations not otherwise defined herein.

1.4.2 Comply with applicable standards and recommendations by NAAMM, in "Metal Curtain Wall Specifications Manual", "Entrance Manual" and other published specifications and standards, except to the extent more stringent requirements are indicated.

1.4.3 Comply with the "Glazing Manual" issued by the Glass Association of North America, latest editions.

1.4.4 Aluminum Association (AA) "Standards for Anodically Coated Aluminum Alloys for Architectural Applications".

1.4.5 Aluminum Association "Standards for Aluminum Mill Products".

1.4.6 National Association of Architectural Metal Manufacturers (NAAMM) "Metal Finishes Manual".

1.5 DESIGN/PERFORMANCE REQUIREMENTS

1.5.1 General: Provide aluminum entrance and storefront systems capable of withstanding loads and thermal and structural movement requirements indicated without failure, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project. Failure includes the following:

1.5.1.1 Air infiltration and water penetration exceeding specified limits.

1.5.1.2 Framing members transferring stresses, including those caused by thermal and structural movement, to glazing units.

1.5.2 Glazing: Physically and thermally isolate glazing from framing members.

1.5.2.1 Thermally Broken Construction: Provide systems that isolate aluminum exposed to exterior from aluminum exposed to interior with a material of low thermal conductance.

1.5.3 Wind Loads: Provide entrance and storefront systems, including anchorage, capable of withstanding wind-load design pressures calculated according to requirements of authorities having jurisdiction or the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever are more stringent.

1.5.3.1 Deflection of framing members in a direction normal to wall plane is limited to 1/175 of clear span or 3/4-inch (19-mm), whichever is smaller, unless otherwise indicated.

1.5.3.2 Static-Pressure Test Performance: Provide entrance and storefront systems that do not evidence material failures, structural distress, failure of operating components to function normally, or permanent deformation of main framing members exceeding 0.2 percent of clear span when tested according to ASTM E 330.

1.5.3.2.1 Test Pressure: 150 percent of inward and outward wind-load design pressures.

1.5.3.2.2 Duration: As required by design wind velocity; fastest 1-mile (1.609-km) of wind for relevant exposure category.

1.5.4 Dead Loads: Provide entrance- and storefront-system members that do not deflect an amount which will reduce glazing bite below 75-percent of design dimension when carrying full dead load.

1.5.4.1 Provide a minimum 1/8-inch (3.18-mm) clearance between members and top of glazing or other fixed part immediately below.

1.5.4.2 Provide a minimum 1/16-inch (1.59-mm) clearance between members and operable windows and doors.

1.5.5 Air Infiltration: Provide entrance and storefront systems with permanent resistance to air leakage through fixed glazing and frame areas of not more than 0.06-cfm/sq. ft. (0.3 L/s/sq. m) of fixed wall area when tested according to ASTM E 283 at a static-air-pressure difference of 1.57-lbf/sq. ft. (75.2 Pa).

1.5.6 Water Penetration: Provide entrance and storefront systems that do not evidence water leakage through fixed glazing and frame areas when tested according to ASTM E 331 at minimum differential pressure of 20 percent of inward-acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures," but not less than 6.24-lbf/sq. ft. (299-Pa). Water leakage is defined as follows:

1.5.7 Uncontrolled water infiltrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.

1.5.8 Thermal Movements: Provide entrance and storefront systems, including anchorage, that accommodate thermal movements of systems and supporting elements resulting from the following maximum change (range) in ambient and surface temperatures without buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, failure of doors or other operating units to function properly, and other detrimental effects.

1.5.8.1 Temperature Change (Range): 120-deg F (67-deg C), ambient; 180-deg F (100-deg C), material surfaces.

1.5.9 Structural-Support Movement: Provide entrance and storefront systems that accommodate structural movements including, but not limited to, sway and deflection.

1.5.10 Dimensional Tolerances: Provide entrance and storefront systems that accommodate dimensional tolerances of building frame and other adjacent construction.

1.6 SUBMITTALS

1.6.1 Product Data for each product specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.

1.6.2 Shop Drawings showing fabrication and installation of entrance and storefront system including plans, elevations, sections, details of components, and attachments to other units of Work. Include metal and glass thickness, details of all field connections and anchorage, fastening and sealing methods, metal finishes, location of all joints, direction of expansion of wall and related components, exposed fasteners, work to be performed by other trades which adjoins and/or is secured to storefront system components, and all other pertinent information.

1.6.2.1 For installed products indicated to comply with certain design loadings, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6.2.2 Include certification signed and sealed by the qualified professional engineer responsible for the structural analysis preparation that the storefront system design complies with the Design/Performance Requirements specified. Submit engineering calculations and certification with first submittal of shop drawings.

1.6.2.3 Show full and complete details of the entire system, related construction, general layout and elevations, glazing system, and setting blocks, connections, shims, glass types and sealant types.

1.6.2.4 Show sequence of erection. Accommodate deviation and qualification to the erection sequence by Contractor without altering the design profiles.

1.6.2.5 Do not change shop drawings and data bearing City's final review stamp, or deviate from construction operations, unless changes and deviations are coordinated with glass manufacturer and submitted to City for review.

1.6.2.6 Begin fabrication only after receiving shop drawings bearing City's final review stamp.

1.6.3 Samples for initial selection in the form of manufacturer's color charts showing the full range of colors available for components with factory-applied color finishes.

1.6.4 Samples for verification of each type of exposed finish required in manufacturer's standard sizes. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.

1.6.5 Product test reports from a qualified independent testing agency evidencing compliance of storefront system with requirements based on comprehensive testing of manufacturer's current system.

1.6.6 Preconstruction Sealant Testing: Perform sealant manufacturer's standard tests for compatibility and adhesion of sealants with each material that will come in contact with sealants and each condition required by systems.

1.6.6.1 Test a minimum of 12 samples of each metal, glazing, and other material. Determine adhesion test data of sealant bond to actual production samples of finished metal and glass that will be incorporated into the work. Perform adhesion tests in accordance with ASTM C 794.

1.6.6.2 Prepare samples using techniques and primers required for installed systems.

1.6.6.3 Perform tests under environmental conditions that duplicate those under which systems will be installed.

1.6.6.4 For materials that fail tests, determine corrective measures required to prepare each material to ensure compatibility with and adhesion of sealants, including, but not limited to, specially formulated primers. After performing these corrective measures on the minimum number of samples required for each material, retest materials.

1.6.6.5 Compatibility statement that the materials in contact with the sealant such as gaskets, spacers, setting blocks, are compatible with the sealant after 21 days exposure to 2000 to 4000 microwatts of ultraviolet radiation.

1.6.6.6 Stress statements that the sealant dimensions (per detail) do not exceed 20-psi when exposed to the specified wind load (6:1 Safety Factor).

1.6.6.7 Certification from sealant manufacturer that the sealant manufacturer has reviewed all sealant details and finds same suitable for the purpose intended and compatible with the surfaces with which they are in contact.

1.7 QUALITY ASSURANCE

1.7.1 Testing Agency Qualifications: To qualify for approval, an independent testing agency must demonstrate to City's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.

1.7.2 Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of storefront systems that are similar to those indicated for this Project in material, design, and extent.

1.7.3 Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing storefront systems similar to those required for this Project and who is acceptable to manufacturer.

1.7.3.1 Engineering Responsibility: Engage a qualified professional engineer to prepare or supervise the preparation of data for storefront systems, including drawings, testing program development, test-result interpretation, and comprehensive engineering analysis that shows systems' compliance with specified requirements.

1.7.3.2 Contractor shall examine and study the Drawings and Specifications to insure the work as described is complete and submit written notification to the City of all discrepancies. Direct requests for clarification of conditions to the City.

1.7.3.3 Contractor shall examine and study the Drawings and Specifications with regard to the surfaces and structural framing to which all applicable work in this Section is attached and anchored. Submit written notification to the City of all deficiencies and detrimental factors that would effect proper and timely installation of the work of this Section. Furnish and install supplementary parts to comply with design/performance requirements and complete the work indicated. Design and size framing sections and components to meet the design/performance requirements. Furnish and install clips and bracing for secure anchorage of the storefront system elements to the structure.

1.7.3.4 Contractor shall coordinate and verify, by measurement at the Project Site, all dimensions affecting work of this Section. Bring field dimensions that are at variance with those on the approved shop drawings to the attention of the City. Obtain decisions regarding corrective measures from the City before the start of installation of affected items. Assure compatibility of adjacent items in relationship to work of this Section.

1.7.3.5 Contractor shall coordinate and schedule work of this Section with the work of other Sections so as not to delay Job progress.

1.7.3.6 Contractor shall maintain design concept as shown (member sizes, basic profiles, and component alignment). Modify only as necessary to meet performance requirements.

1.7.4 Source Limitations: Obtain each type of storefront system from one source and by a single manufacturer.

1.7.5 Product Options: Drawings indicate size, profiles, and dimensional requirements of entrance and storefront systems and are based on the specific system indicated. Other manufacturers' systems with equal performance characteristics may be considered. Refer to Section 01610 – Product Requirements for substitution procedures.

1.7.5.1 Do not modify intended aesthetic effects, as judged solely by City, except with City's approval and only to the extent needed to comply with performance requirements. Where modifications are proposed, submit comprehensive explanatory data to City for review.

1.7.6 Welding Standards: Comply with applicable provisions of AWS D1.2, "Structural Welding Code--Aluminum."

1.7.6.1 Engage welders who have satisfactorily passed AWS qualification tests for welding processes involved and who are currently certified for these processes.

1.8 DELIVERY AND STORAGE OF MATERIALS

1.8.1 Store materials delivered to the Site to permit easy access to and handling of the materials. Store materials neatly, properly stacked on dunnage, and protected from warping and damage.

1.8.1.1 Transport, handle, and store materials and components in a manner to preclude damage.

1.8.1.2 Deliver accessory materials in manufacturer's labeled containers.

1.8.1.3 Exercise care in handling and protect all materials and finishes during fabrication, shipment, storage, and erection as necessary to prevent damage to the finished surfaces.

1.8.1.4 Remove all units and components that are cracked, bent, chipped, scratched, or otherwise unsuitable for installation and replace with new, approved items.

1.9 PROJECT CONDITIONS

1.9.1 Field Measurements: Verify dimensions by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.9.1.1 Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

1.10 WARRANTY

1.10.1 Provide special project warranty as specified, agreeing to remove and replace entrance and storefront system work, including but not limited to, aluminum entrance units, storefront framing systems, and glass and glazing work which becomes unserviceable or objectionable in appearance due to failure in materials or workmanship. Warranty includes removal and replacement of related work that must be removed to properly repair or replace storefront system work.

1.10.1.1 Failure of materials and workmanship includes, but is not limited to, excessive leakage or air infiltration, excessive deflections, deterioration of finish of metal in excess of normal weathering, and defects in hardware and accessories, weatherstripping, sealants, deterioration of glass coating, glass breakage resulting from thermal conditions, deterioration of insulating glass unit edge seal an other components of the work. Failure of materials or workmanship of entrance units includes failures in operation of doors and hardware.

1.10.1.2 Warranty period shall be 2-years for storefront system work from the Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PRODUCT AND MANUFACTURER

2.1.1 Details shown are based on the following systems produced by Kawneer Co., Inc.; equivalent systems produced by Vistawall Architectural Products, Efco Corporation, or Atlas Engineered Metals will be acceptable as approved by City.

2.1.1.1 Kawneer Company, Inc. "Tri-Fab VG 451 Center-Shear Block Series Framing System" with sill pan extrusion, project out operable windows with 4-bar hinges and cam locks, full screens matching window finish, and complying with Design/Performance Requirements and other requirements specified.

2.1.1.2 Kawneer Company, Inc. "500 Series Wide Stile Entrance Doors" with custom size top and bottom rails as indicated, complying with Design/Performance Requirements and other requirements specified.

2.2 MATERIALS

2.2.1 Aluminum:

2.2.1.1 Sheet and Plate: ASTM B 209 (ASTM B 209M). Provide alloy and temper recommended by manufacturer for strength, application of required finish, but not less than 22,000-psi ultimate tensile strength.

2.2.1.2 Extruded Bars, Rods, Shapes and Tubes: ASTM B 221 (ASTM B 221M). Provide alloy and temper recommended by manufacturer for strength, application of required finish, but not less than 22,000-psi ultimate tensile strength.

2.2.1.3 Welding Rods and Bare Electrodes: AWS A 5.10.

2.2.2 Steel Materials, General: Fabricate steel reinforcements and supports as follows:

2.2.2.1 Structural Steel Plates, Shapes, and Bars: ASTM A 36 (ASTM A 36M), pickled when exposed to view.

2.2.2.2 Hot-Rolled Steel Sheet and Strip: ASTM A 570 (ASTM A 570M).

2.2.2.3 Cold-Rolled Steel Sheet and Strip: ASTM A 611.

2.2.2.4 Stainless Steel Flashing: ASTM A 666, dead-soft, 0.018-inch-(0.047-mm-) thick stainless steel of type selected by manufacturer for compatibility with system.

2.2.3 Glazing as specified in Section 08800 – Glass and Glazing.

2.2.4 Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers; in hardness recommended by manufacturer.

2.2.5 Framing system gaskets and joint fillers as recommended by manufacturer for joint type.

2.2.6 Sealants: Provide structural and weatherseal sealants recommended by the manufacturer of the structural sealant storefront system.

2.2.6.1 Glazing sealants and fillers as specified in Section 08800 – Glass and Glazing.

2.2.6.2 Structural silicone sealant shall be specifically designed and tested for use as structural sealant.

2.2.6.3 Secondary seal or weatherseal silicone sealants shall be compatible with the structural silicone sealant. Weatherseal shall accommodate a 50 percent increase or decrease of joint width as measured

2.2.7 Framing System Gaskets and Joint Fillers: As recommended by manufacturer for joint type.

2.2.8 Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

2.3 COMPONENTS

2.3.1 Inserts, Brackets and Reinforcements: Provide manufacturers standard high strength aluminum brackets and reinforcements where possible. Where steel units are required for inserts, higher strength or other reason, hot-dip galvanize the units after fabrication, with 2.0 oz. zinc coating, complying with ASTM A 123.

2.3.2 Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Finish exposed portions to match glazed aluminum curtain wall.

2.3.2.1 Provide fasteners and accessories complying with the "Design/Performance Requirements". Provide self-locking fasteners and nuts with nylon inserts or patches as manufactured by USM Corporation, Nylok Fastener Division, or equivalent approved by City.

2.3.2.2 At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended by manufacturer.

2.3.2.3 Where fasteners anchor into aluminum less than 0.125-inch (3.2 mm) thick, provide reinforcement to receive fastener threads.

2.3.2.4 Use exposed fasteners with countersunk Phillips screw heads finished to match framing members, unless otherwise indicated.

2.3.3 Anchors: 3-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

2.3.3.1 Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.

2.3.3.2 Concealed Fasteners: Provide aluminum, 300 Series stainless steel or other non-corrosive metal fasteners of types proven to be compatible with the materials and items being fastened and required to

2.3.3.3 Exposed Fasteners: Provide Phillips countersunk flat-head screws where exposed, unless otherwise approved or required. Finish exposed fasteners to match finish of exposed aluminum in which they occur.

2.3.3.4 Shims: Provide galvanized steel (ASTM A 36 or A 283) and 300 Series stainless steel as approved by the City. Use aluminum or plastic shims only as approved by the City.

2.3.3.5 Thermal Break: Provide rigid polyvinyl chloride (PVC) extrusions as required to conform to the structural performance requirements as indicated on the Drawings and specified in the "Design/Performance" paragraph.

2.4 FABRICATION

2.4.1 General: Fabricate storefront system according to Shop Drawings. Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.4.2 Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.

2.4.3 Prepare components to receive concealed fasteners and anchor and connection devices.

2.4.4 Fabricate components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.

2.4.5 Welding: Weld components to comply with referenced standard and Shop Drawings, unless otherwise indicated. Weld before finishing components. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

2.4.6 Glazing Pockets: Provide minimum clearances for thickness and type of glass indicated according to GANA's "Glazing Manual".

2.4.7 Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

2.5 ALUMINUM FINISH

2.5.1 General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

2.5.2 Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5.3 Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

2.5.4 Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 607.1.

2.6 METAL PRIMING

2.6.1 General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying primer.

2.6.2 Surface Preparation: Perform manufacturer's standard cleaning operations to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel.

2.6.3 Priming: Apply manufacturer's standard corrosion-resistant primer immediately after surface preparation and pretreatment.

2.6.3.1 Paint for Carbon Steel:

2.6.3.1.1 Concealed Parts: One shop coat of rust inhibitive primer or zinc chromate primer; FS TT-P-645.

2.6.3.1.2 Exposed Parts: One shop coat of zinc rich paint; MIL-P-2103S and MIL-P-38336.

2.6.3.2 Galvanizing of Carbon Steel:

2.6.3.2.1 Steel Sheets: FA QQ-S-775c.
2.6.3.2.2 Hot-dipped for Shapes, Plates, Bars, and Strip: ASTM A 123.

2.6.3.3 Aluminum (Concealed Parts): One shop coat of zinc chromate primer; FS TT-P-645.

2.6.3.4 Dielectric Paint Between Dissimilar Metals: One coat of bituminous paint; FS TT-C-494 or MIL-P-6883A.

2.7 SEALANTS

2.7.1 One-Part Non-Acid Curing Silicone Sealant: ASTM C 920, Type S, Grade NS, Class 25, and Uses NT, M, G, A, and, as applicable to joint substrates indicated, O; medium modulus with a tensile strength between 45-psi and 75-psi at 100% elongation when tested after 14 days at 77°F (25° C.) and 50% relative humidity per ASTM D 412.

2.7.1.1 Products: Subject to compliance with requirements, provide either General Electric "Silpruf 2000" or Dow Corning "795 Building Construction Sealant".

2.7.1.2 Locations: All metal-to-metal and metal to glass dynamically moving joint locations not otherwise noted or specified, including interior sealant joints on interior side of components subject to thermal movement from exterior heat sources.

2.7.1.3 Colors: As selected by City from manufacturer's standard colors.

2.7.2 Narrow joint sealant conforming to AAMA Standard 803.3.

2.7.2.1 Tremco "Curtain Wall Sealant" conforming to AAMA Standard 809.2.

2.7.3 Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by the sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.7.4 Joint Sealant Backing:

2.7.4.1 Closed-cell polyethylene foam rod, non-gassing.

2.7.4.2 Expanding foam sealant; Polytite B by Polytite Manufacturing Corp. or Polyseal by Sandell Mfg. Co.

2.8 MISCELLANEOUS MATERIALS

2.8.1 Self-Adhesive Elastic Flashing: Protecto Wrap Co. "Ice & Water Guard" flashing tape, W. R. Grace "Perm-A-Barrier", Polyguard Products "Polyguard 650", or equivalent 40 mil thick rubberized asphalt self adhesive tape. Include recommended primers.

2.9 FABRICATION

2.9.1 General: Complete the cutting, fitting, forming, drilling, and grinding of all metal work prior to cleaning, finishing, treatment, and application of coatings. Conceal fasteners wherever possible. Fabricate and assemble components in accordance with approved shop drawings. Deviations of any nature will not be permitted without prior approval of the City. Minor adjustments for weather integrity or strength may be suggested for City's approval. In the event of controversies over design or details, the decision of the City will take precedence.

2.9.2 Carefully fabricate components and assemble with proper and approved provision for thermal expansion and contraction, material and fabrication and installation tolerances, and adjoining building component tolerances and design criteria.

2.9.3 Weld aluminum by methods and with materials recommended by the aluminum manufacturer and AWS to avoid distortion and discoloration at welds. Grind exposed welds smooth and restore mechanical finish. Remove arises from cut edges and ease edges and corners to a radius of approximately 1/64-inch.

2.9.3.1 Where weld metal must be exposed before anodizing, select filler alloys to closely match the composition of the base metal. Follow parent metal manufacturer's recommendations for such filler alloys.

2.9.3.2 Where concealed weldments are to be made on materials that have been previously anodized or paint coated, remove anodizing or paint film in the area of fusion prior to welding. Mask parts at weld areas during anodizing or sand clean prior to welding. Crazing or discoloring of the anodizing or paint coating on the exposed areas will not be acceptable.

2.9.3.3 Fit and assemble the work at the shop to the greatest extent possible. Disassemble only as required for shipment and erection. Maintain true continuity of line and accurate relation of planes and angles. Provide secure attachment and support at mechanical joints, with hairline fit of contacting members.

2.9.3.4 Where 2 or more sections of metal are used in building up members, bring contact surfaces to a smooth, true, and even surface and secured together so that the joints will be weathertight without the use of pointing material. Exposed sealants, except where shown, will not be permitted. Tolerance extrusions to eliminate edge projection and misalignment at joints.

2.9.4 Fasteners: Provide stainless steel fasteners with self-locking devices, unless otherwise noted, and of sufficient size and strength to withstand the applicable design wind load and dead load forces with safety allowance factors as required for the specific materials. Space fasteners to develop the maximum strength of the members they secure or support. Provide washers and other accessory items of the same material as the fastener. Torque-tighten all assembly fasteners (except as may be required at expansion joints) to achieve the maximum torque-tension relationship in the fastener. At expansion joints, torque-tighten fasteners so as to provide proper support of the expansion joint connection elements and free noiseless movement at the connection without rattling.

2.9.5 Conceal fasteners unless otherwise shown or approved. Where exposed fasteners are required, provide countersunk Phillips oval head type, unless otherwise indicated. Finish exposed fasteners to match surrounding metal finish.

2.9.6 Provide extruded aluminum removable members, such as glass stops, securely engaged into adjacent components as indicated.

2.9.7 Exposed Cladding, Trim, Panels, and Similar Components:

2.9.7.1 Fabricate cladding elements with fabricated edge flanges as indicated and conforming to the flatness requirements specified. Provide backside stiffener members to maintain required flatness and structural performance.

2.9.7.2 Do not exceed the following surface slope at any point, when measured at room temperature, measured from the nominal plane of the surface in its final installed position:

2.9.7.2.1 1.0 deg. for surfaces having a finish of high reflectivity.

2.9.7.2.2 1.25 deg. for surfaces having a finish of medium reflectivity.

2.9.7.2.3 1.5 deg. for surfaces having a finish of low reflectivity.

2.9.8 Use certified welders and make structural steel welds to conform to the requirements of the American Welding Society Specifications D1.1 "Structural Welding Code - Steel".

2.9.8.1 Remove dirt, grease, lubricant, and organic materials by vapor or solvent degreasing.

2.9.8.2 Repair joints rejected because of welding defects only by re-welding. Remove defective welds by chipping or machining. Do not flame cut welds.

2.9.8.3 Where welding is done in proximity to glass or finished surfaces, protect glass and finished surfaces from damage due to weld sparks, spatter, or tramp metal.

2.9.8.4 Touch up paint welds in galvanized metal with zinc rich paint.

2.9.8.5 Fill pinholes in welds and surface damage on all exposed surfaces of work visible under finished lighting condition when viewed from a distance of 6', with 2 component automotive body filler compatible with primer paint. Match adjacent metal surface finish unless otherwise indicated.

2.10 SHOP PAINTING WALL SYSTEM SUPPORT FRAMING

2.10.1 Remove scale, rust, and other deleterious materials before the shop coat of paint is applied. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2 "Hand Tool Cleaning". Remove oil, grease and similar contaminants in accordance with SSPC SP-1 "Solvent Cleaning".

2.10.2 Apply 1 shop coat of primer paint to fabricated support framing, except apply 2 coats of paint to surfaces that are inaccessible after assembly or erection. Change color of second coat.

2.10.3 Brush or spray on metal primer paint, at a rate to produce a uniform dry film thickness of 2.0-mils for each coat. Provide full coverage of joints, corners, edges, and all exposed surfaces.

2.11 FABRICATION QUALITY CONTROL

2.11.1 Provide full access to City and its authorized representatives to plants, shops, and assembly points to view and inspect the processes and methods employed in the fabrication, finishing, pre-assembling, and glazing (as applicable) of the storefront system components for this Project.

2.11.2 Provide work true to detail with sharp, clean profiles straight and free from defects, dents, marks, indentations, waves, or flaws of any nature impairing strength or appearance, fitted with proper joints and intersections and with specified finishes.

2.11.3 All items the City's authorized representative notes to have any deficiency shall:

2.11.3.1 Be removed from production lines.

2.11.3.2 Not be loaded and shipped.

2.11.3.3 Not be installed or assembled on the Project Site until repairs or replacement parts are approved by authorized representative.

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1 After lines and grades have been established by the Contractor, but before beginning installation in any area, examine the supporting structure in the vicinity of storefront system work and report all conditions in writing to the Contractor which would prevent the proper execution of the storefront system work or endanger its permanency.

3.1.2 Do not proceed with installation in the affected area until unacceptable conditions have been corrected.

3.2 INSTALLATION

3.2.1 General: Comply with manufacturer's written instructions for protecting, handling, and installing storefront system. Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight, unless otherwise indicated. Provide means to drain water to the exterior to produce a permanently weatherproof system.

3.2.2 Do not cut, trim weld, or braze component parts during erection, in any manner that would damage the finish, decrease the strength, or result in visual imperfection or failure in performance of the construction.

3.2.3 Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

3.2.4 Install components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.

3.2.5 Install framing members plumb and true in alignment with established lines and grades.

3.2.6 Install factory-assembled frame units plumb and true in alignment with established lines and grades.

3.2.7 Anchorage: After system components are positioned, fix connections to building structure as indicated on Shop Drawings.

3.2.7.1 Provide separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

3.2.8 Welding: Weld components to comply with referenced standard and Shop Drawings, unless otherwise indicated. Weld in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.

3.2.9 Install glazing according to Shop Drawings. Comply with requirements of Section 08800 – Glass and Glazing, unless otherwise indicated.

3.2.10 Sealants and Related Materials: Use sealing materials in strict accordance with sealant manufacturer's printed instructions. Apply sealants only by mechanics specially trained or experienced in their use. Ensure that sealants, tapes, gaskets, separators, joint fillers, and back-up materials are physically and chemically compatible with each other and with adjacent materials. Before applying sealant, completely remove all mortar, dirt, dust, moisture, and other foreign matter from sealant bond surfaces. Clean metal surfaces with oil free solvent, such as Toluene or Xylene. Wash one small area at a time and then dry with a clean white cloth before solvent evaporates. Do not apply sealant to damp surfaces. Apply primers as required by manufacturer. Apply primer to stone bond surfaces to prevent staining. Mask adjoining surfaces when required to maintain a clean and neat appearance. Tool sealing compounds to fill the joint and provide a smooth finished surface.

3.2.10.1 Thoroughly seal all metal-to-metal joints between elements of storefront system work by buttering joints with sealant immediately prior to the final assembly of abutting sections. Clean all excess sealant from exposed surfaces.

3.2.10.2 Install sleeves, lugs, and related items in a full bed of sealant and seal perimeter when component is in final installed position as indicated or required by specified "Performance Requirements". Clean all excess sealant from exposed surfaces.

3.2.11 Install component parts level, plumb, true to line, and with uniform joints and reveals. Secure to structure with non-staining and non-corrosive shims, anchors, fasteners, spacers, and fillers. Use erection equipment that will not mar or stain finished surfaces in any way.

3.2.12 Clean debris, dust, and other substances from behind and adjacent to the storefront system work as it is erected, and provide temporary closures to prevent the accumulation of such substances in the void spaces behind the glazed window wall system.

3.2.13 Assembly and Anchorage:

3.2.13.1 Anchor component parts securely in place, by bolting, welding, or other permanent mechanical attachment system, which will comply with performance requirements and expected movements of adjacent parts. Install slip-joint linings wherever possible to permit such movements without detrimental affect to work.

3.2.13.2 Apply a bituminous coating of approximately 30-mil dry film thickness, or other suitable permanent separator, on concealed contact surfaces of dissimilar materials, before assembly or installation.

3.2.13.3 Set sill members and other members with joint fillers and elastomeric sealant to provide weathertight construction.

3.2.14 Flashing: Provide flashings of the material and profiles indicated. Provide continuous flashings in longest lengths possible. Lap joints 6" minimum and seal concealed area of entire lap with curtain wall sealant. Provide mechanical fasteners to maintain contact of overlapping elements.

3.3 ERECTION TOLERANCESS

3.3.1 Provide installed storefront system components conforming with to following erection tolerances:

3.3.1.1 Maximum Deviation for Vertical Member: 1/8-inch maximum in story height of 13-feet and 1/4-inch maximum.

3.3.1.2 Maximum Deviation for Horizontal Members: 1/8-inch maximum in a 30-foot run.

3.3.1.3 Maximum offset from true alignment between two abutting members shall be 1/32-inch. No edge projection or misalignment will be permitted.

3.3.1.4 Maximum joint gap or opening between removable glazing stop and adjacent member shall be 1/32-inch and/or a maximum 1/32-inch cumulative opening at both ends of removable member (1/64-inch each end).

3.4 CLEANING

3.4.1 Clean completed system, inside and out, promptly after erection and installation of glass and sealants (allow for nominal cure of liquid sealants). Provide proper and adequate protection and cleaning procedures during remainder of construction period, so that the system will be without damage and deterioration at time of acceptance.

3.4.1.1 Just prior to Date of Substantial Completion, clean storefront system thoroughly and polish glass. Demonstrate proper cleaning methods and materials to the City's maintenance personnel.

3.4.1.2 Submit a "Cleaning and Maintenance Manual" listing the types of cleaning compounds, cleaning methods, and the types of sealant and glazing materials to be used for cleaning, repair, and maintenance of the work, as specified.

3.5 PROTECTION

3.5.1 Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure storefront system is without damage or deterioration at the time of Substantial Completion.

SECTION 08700
DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 Section includes furnishing and installing door hardware, thresholds, weatherstripping and seals.

1.2.2 Related Sections include the following:

1.2.2.1 Division 8 Sections, (08110, 08400, 08700, 08800).

1.3 PERFORMANCE REQUIREMENTS

1.3.1 Furnish and install each door hardware item to provide proper operation and required function of every unit without binding or failure.

1.3.1.1 Interior Door Opening Force: Adjust hardware operation at interior non-fire-rated doors to provide an opening force not greater than 5 lbs at a point 3” from latch, measured to leading edge of door.

1.3.1.2 Exterior and Fire Rated Door Opening Force: At exterior doors and fire-rated doors, adjust hardware opening force in small increments above the opening force required for interior non-fire-rated doors to close and latch the door.

1.3.1.3 Closer Sweep Adjustment: Adjust closer sweep period so that from a 70 degree open position, door will take at least 3 seconds to move to a point 3” from latch, measured to leading edge of door.

1.4 SUBMITTALS

1.4.1 Submit manufacturer's technical product data for each item of hardware. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into vertical format “hardware sets" indicating complete designations of every item required for each door or opening. Use specification heading numbers with any variations suffixed a, b, etc

1.4.2 Coordinate hardware with doors, frames, gates and related work to ensure proper size thickness, hand, function, and finish of hardware. If requested by Architect, submit one sample of each type of exposed hardware unit, finished as required, and tagged with full description for coordination with schedule. Submit data and schedule at earliest possible date, particularly where acceptance of schedule must precede fabrication of other work (e. g. hollow metal frames) that is critical to the Project construction schedule.

1.4.1.1 Type, style, function, size and finish of each hardware item.
1.4.1.2 Name and manufacturer of each item.

1.4.1.3 Fastenings and other pertinent information.

1.4.1.4 Hardware set location cross-referenced to both Drawing floor plan and door schedule indications.

1.4.15 Explanation of all abbreviations, symbols, and codes in schedule.

1.4.1.6 Mounting locations for hardware.

1.4.1.7 Door and frame sizes and materials.

1.4.3 Coordinate keying instructions, and keying information. Deliver keys and key control box to Owner in person and obtain receipt (No Exceptions).

1.5 QUALITY ASSURANCE

1.5.1 Supplier Qualifications: A recognized finish hardware supplier who has been furnishing hardware in the Project's vicinity for a period of not less than 2 years, and who is, or employs an experienced hardware consultant (AHC) who is available, at reasonable times during the course of the Work, for consultation about Project's hardware requirements, to Owner, Architect and Contractor.

1.5.2 Coordination and Schedules: Hardware units and usage specified in Part 2 of this Section and scheduled on the Drawings establish quality, quantity, function and finish required for each door opening. Review, coordinate and confirm that hardware specified for each opening is the proper function. In case of controversy, make appropriate notations of proposed changes from specified requirements on supplier's hardware schedule and request written clarification from the Architect prior to proceeding.

1.5.3 Fire-Rated Openings: Provide door hardware for fire rated openings that comply with NFPA Standards No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not. All hardware shall comply with standards UBC 702 (1997) and UL 10C.

1.5.4 Where emergency exit devices are required on fire-rated doors (with supplementary marking on doors' UL labels indicating "Fire Door to be equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".

1.6 DELIVERY, STORAGE, AND HANDLING

1.6.1 Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.

1.6.2 Packaging of door hardware is the responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

1.6.3 Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

1.6.4 Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).

1.6.5 Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

1.7 WARRANTY

1.7.1 Special warranties:

1.7.1.1 Door Closers: Ten year period

1.7.1.2 Exit Devices: Three year period

1.7.1.3 Automatic Door Operators: Two year period

1.7.1.4 Locks and Cylinders: Three year period

1.8 MAINTENANCE

1.8.1 Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

1.8.2 Parts kits: Furnish manufacturer's standard parts kits for locksets, exit devices, and door closers.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

2.1.1 General: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws. With each hardware item, furnish machine screws for installation into steel, and provide threaded to the head wood screws for installation into wood; all-purpose threads are not acceptable. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed screws to match the hardware finish. Provide concealed fasteners for hardware units that are exposed when the door is closed, except to the extent no standard units of the type specified are available with concealed fasteners. Provide through bolts for closer installation.

2.2 HARDWARE UNITS AND USAGE

2.2.1 Units specified below establish the design, grade, function, finish, size, and other qualities required for this Project. Provide the following hardware units in the quantities specified and locations indicated on the Door Schedule. Provide US 26D finish unless otherwise specified. Refer to Door Schedule on Drawings for door sizes, fire ratings, hardware function, exit devices, door closers, and other requirements at each door opening

2.2.1.1 Butt Hinges: Provide the following butt hinges produced by Ives, or equivalent butt hinges produced by, Hager, or Bommer, as approved. Provide 1-1/2 pair per door leaf up to 7'-6" high and one additional hinge per leaf for each additional 2'-6" of door height.

2.2.1.1.1 Out-Swinging Exterior Doors Except Storefront: Ives 5BB1HW 4.5 x 4.5 NRP x non-ferrous.
2.2.1.1.2 In-swinging Exterior Doors: Ives 5BB1HW 4.5 x 4.5 non-ferrous.
2.2.1.1.3 Out-Swinging Interior High Frequency Doors: Ives 5BB1HW 4.5 x 4.5 x NRP.
2.2.1.1.4 In-Swinging Interior High Frequency Doors: Ives 5BB1HW 4.5 x 4.5
2.2.1.1.5 Out-Swinging Interior Average Frequency Doors: Ives 5BB1 4.5 x 4.5 NRP.

2.2.1.1.6 In-Swinging Interior Average Frequency Doors: Ives 5BB1 4.5 x 4.5.

2.2.1.2 Door Closers: All closers to have cast iron body with forged arms. Adjust closers to comply with ADA requirements. Provide type of arm recommended by closer manufacturer for door conditions (use, door hand and swing) indicated.

2.2.1.2.1 Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UBC 7-2 (1997) and UL 10C.

2.2.1.2.2 Door closer shall have fully hydraulic, full rack and pinion action. Closer shall have 1-1/2-inch in diameter piston.

2.2.1.2.4 Hydraulic fluid shall be of a type requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to minus 30 degrees F.

2.2.1.2.5 Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Closers shall have separate adjustment for latch speed, general speed, and back check.

2.2.1.2.6 Provide surface mounted mechanical closers certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory.

2.2.1.2.7 Provide powder coating certified to exceed 100 hours salt Spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.

2.2.1.2.8 Pressure relief valves are not accepted.

2.2.1.2.9 Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers on room side of door.

2.2.1.2.10 Door closers meeting this specification: LCN 1460/4040 Series.

2.2.1.3 Heavy duty cylinder locks:

2.2.1.3.1 Provide cylindrical locksets that comply with ANSI A156.2, Series 4000, Grade 1; tested to exceed 3,000,000 cycles. Functions as listed in Hardware Sets.

2.2.1.3.2 Provide cylindrical locksets that meet ANSI A117.1, Accessibility Code.

2.2.1.3.3 Provide cylindrical locksets that meet UL A label; to have a minimum listing for single doors 4' x 8'

2.2.1.3.4 Provide cylindrical locksets that comply with California Fire Safety Code; lever return to within 1/2" of the door. (where applicable)

2.2.1.3.5 Lockset to have the ability to incorporate either a rigid or free-wheeling lever when in locked mode.

2.2.1.3.6 Chassis to be field-changeable to free-wheeling lever.

2.2.1.3.7 Chassis to be one-piece, modular assembly.

2.2.1.3.8 Chassis to be multi-functional; interchange of function assembly without disassembly of lockset.

2.2.1.3.9 Spindle to be deep-draw manufactured. Manufacturers utilizing stamped spindles are not acceptable.

2.2.1.3.10 Spring Cage to have double compression springs. Manufacturers utilizing torsion springs are not acceptable.

2.2.1.3.11 Spindle and Spring Cage (internal) to be one-piece integrated assembly.

2.2.1.3.12 Levers to be bi-directional, independent assemblies.

2.2.1.3.13 Levers are to be solid. Manufacturers utilizing fillers of any kind are not acceptable.

2.2.1.3.14 Levers are to be plated to match BHMA finishes.

2.2.1.3.15 Levers to have grooved tactile warnings on back side of lever. Manufacturers that insert devices and/or apply materials for warning are not acceptable.

2.2.1.3.16 Anti-rotation plate to be interlocking to lock chassis. Manufacturers utilizing anti-rotation plates with bit-tabs are not acceptable.

2.2.1.3.17 Thru-bolts to be a minimum of ¼" in diameter.

2.2.1.3.18 Thru-bolts to secure anti-rotation plate without sheer line. Manufacturers utilizing fully threaded thru-bolts are not acceptable.

2.2.1.3.19 Adjustment plate to be threaded for door thickness adjustment.

2.2.1.3.20 Adjustment plate to adjust for doors from 1 5/8" thickness to 2 1/8" thickness.

2.2.1.3.21 Adjustment plate to have visual chassis marking for doors 1 ¾" thick.

2.2.1.3.22 Latchbolt to be steel with minimum ½" throw deadlatch on keyed and exterior functions; ¾" throw anti-friction latchbolt on pairs of doors.

2.2.1.3.23 Strike to be ANSI curved lip, 1 ¼" x 4 7/8", 16 gauge, with 1" deep box construction.

2.2.1.3.24 Acceptable Manufacturers: Schlage: ND Series with Sparta lever design. NO SUBSTITUTION.

2.2.1.4 Mortise Locks and latches: as scheduled, fastened with through-bolts and threaded chassis hubs.

2.2.1.4.1 Chassis: Cold-rolled steel, handing field-changeable.

2.2.1.4.2 Latch bolts: ¾" inch projection.

2.2.1.4.3 Lever Trim: Through-bolt, accessible design, cast lever or metal-filled wrought types as schedule.

2.2.1.4.4 Thumb turns: Accessible design not requiring pinching or twisting motions to operate.

2.2.1.4.5 Deadbolts: 1" throw with a ¼" thick hardened steel, free-turning, saw-resistant roller.

2.2.1.4.6 Strikes: 16 gauge curved steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and project clothing.

2.2.1.4.7 Certifications:

2.2.1.4.7.1 ANSI A156.13, Grade 1
2.2.1.4.7.2 UL listed for 3-hour doors

2.2.1.4.8 Approved Manufacturers: Schlage L9000 Series x 17A Lever design. NO SUBSTITUION.

2.2.1.5 Exit Devices: Provide the following at the locations shown on the Door Schedule; Falcon/Monarch.

2.2.1.5.1 Exit Devices shall be touchpad type, fabricated of bronze, brass, stainless steel, or aluminum, plated to the standard architectural finishes to match the balance of the door hardware.
2.2.1.5.2 All exit devices and trim to be of one manufacturer as hereafter listed and in the hardware sets for continuity of design and consideration of warranty.
2.2.1.5.3 Exit Devices to be “UL” listed for life safety. All exit devices for labeled doors shall have “UL” label for “Fire Exit Hardware”. All devices mounted on labeled wood doors are to be through-bolted or per the manufacturer’s listing requirements. All devices shall conform to NFPA 80 and NFPA 101 requirements.
2.2.1.5.4 Touchpad shall extend a minimum of one half of the door width. Touchpad shall match exit device finish.
2.2.1.5.5 Exit devices meeting this specification: Monarch 18 Series or equivalent by Von Duprin.

2.2.1.6 Kick Plates, Push, and Pulls: Provide the following at locations designated; Ives or equivalent by Trimco or Rockwood.

2.2.1.6.1 Kick Plates shall be 10" high x 2" less than door width x minimum 0.0538" (1.3 mm) thick x B3E.
2.2.1.6.2 Mop Plates shall be 4” high x 1” less than door width x minimum 0.0538” (1.3 mm) thick x B3E.
2.2.1.6.3 Push/Pulls: 8200 6” x 16”, 8302 6” x 16”; 8190-0; 9190-0.

2.2.1.7 Stops, Flush Bolts, Dust Proof Strikes, & Silencers: Provide the following at locations designated; IVES, or equivalent by Trimco or Rockwood.

2.2.1.7.1 Floor Stops: Ives FS436, FS41
2.2.1.7.2 Wall Stops: Ives WS407
2.2.1.7.3 Manual Flush Bolts: 1 set IVES FB458/FB358 x DP-1/DP-2 dustproof strike as required at each inactive leaf of a pair of doors (except equipped with exit devices).
2.2.1.7.4 Silencers: IVES SR 64; (3) per single leaf opening, (2) per double leaf opening.

2.2.1.8 Weather stripping, Seals and Thresholds: Provide the following at locations designated; National Guard Products or equivalent by Zero Weatherstripping.

2.3 KEYING REQUIREMENTS

2.3.1 Keys and Keying:

2.3.1.1 Lock cylinders at the Communications and NER rooms only shall be keyed to the existing Best 7 pin interchangeable core system as directed.

2.3.1.2 Provide brass construction cores installed in all locks and cylinders prior to shipping to jobsite.

2.3.1.3 All keys and cores shall be stamped with Visual Key Control, omit change key number on key bow.

2.3.1.4 Provide 3 each cut key per lock.

2.3.1.5 Provide 3 each construction master keys.

2.3.1.6 Provide 2 each control keys.

2.3.2 Key System Requirements: Initiate and conduct meeting(s) with Owner to determine. For estimate use GMK charge. Furnish Owner's written approval of the system. Provide construction key system in accordance with lock manufacturer's standard. Emboss keys "Do Not Duplicate" and key symbol.

2.3.2.1 Key System for all except Communications and NER rooms: Existing Schlage LFIC Classic C Keyway – 5 pin.

2.3.2.2 Permanent keys: deliver only to Owner's representative.

2.3.2.3 Key Transcript: Supply to Owner upon completion.

2.3.2.4 Provide 3 change keys per lock, 5 master keys and 5 grand master keys tagged and organized for Owner's use. Provide 5 construction master keys for contractor’s use.

PART 3 - EXECUTION

3.1 PREPARATION

3.1.1 Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect. Reinforce the attachment substrate for secure installation and adjust for proper operation. Provide clean, properly sized mortises and drilled holes for all mortised and surface applied finish hardware

3.2 INSTALLATION

3.2.1 General: Install each hardware item in compliance with the manufacturer's instructions and recommendations.

3.2.2 Do not install surface-mounted items until finishes have been completed on the substrate. Before painter’s finish is applied, remove all finish hardware, except prime painted items. After finish coats are dry, permanently replace and readjust finish hardware for proper operation.

3.2.3 Set units level, plumb, and true to line and location

3.2.4 Cut and fit threshold and floor covers to profile of doorframes, with mitered corners and hairline joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for bolts and similar items, if any. Screw thresholds to substrate with No. 10 or larger stainless steel screws

3.2.5 Set up Pre-installation, Post installation meeting and final punch list with manufacturer’s agent and hardware installer.

3.3 ADJUSTMENT

3.3.1 Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units that cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.

3.4 HARDWARE SCHEDULE:

SPECWORKS # 87115-B75Z38OCS
HW SET: 01
DOOR NUMBER:
101A 101C 101E 105A

EACH TO HAVE:

1	NOTE:	EXISTING DOOR, FRAME & HARDWARE TO REMAIN	B/O

HW SET: 02
DOOR NUMBER:
101B

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	112HD	628	IVE
1	EA	DEADLOCK	MS1850S - ADVISE BACKSET	628	ADA
2	EA	MORTISE CYLINDER	MATCH EXISTING KEY SYSTEM	626	B/O
1	EA	EXIT INDICATOR	4089	628	ADA
1	EA	PULL/PUSHBAR	9190-0-NO	630	IVE
1	EA	SURFACE CLOSER	1461 CUSH FC	689	LCN
1	EA	MOUNTING PLATE	1460-18PA X AS REQ'D	689	LCN
1	EA	CUSH SHOE SUPPORT	1460-30 X AS REQ'D	689	LCN

1	EA	BLADE STOP SPACER	1460-61 X AS REQ'D	689	LCN
1	SET	SEALS	BY DOOR MANUFACTURER		B/O
1	EA	DOOR SWEEP	198NA	AL	NGP
1	EA	THRESHOLD	513	AL	NGP

HW SET: 03
DOOR NUMBER:
204A

EACH TO HAVE:

3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	PANIC DEVICE	25-R-L	630	FAL
1	EA	MORTISE CYLINDER	MATCH EXISTING KEY SYSTEM	626	B/O
1	EA	SURFACE CLOSER	1461 CUSH FC	689	LCN
1	SET	SEALS	5050B	BRN	NGP
1	EA	DRIP CAP	16A	AL	NGP
1	EA	DOOR SWEEP	95WH	AL	NGP
1	EA	THRESHOLD	896V	AL	NGP

Section 08800
GLASS AND GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 Section includes furnishing and installing glass and glazing and setting systems at the following locations indicated on the Drawings.

1.2.1.1 Vision lites of window wall and curtain wall systems; structural sealant at vertical joints and gaskets at horizontal joints unless otherwise shown.

1.2.1.2 Spandrel glass lites of curtain wall systems; structural sealant at vertical joints and gaskets at horizontal joints unless otherwise shown.

1.2.1.3 Tempered glass entrances doors and sidelights; non-shrink grout and sealant.

1.2.1.4 Interior door glass and sidelights; tape and sealant glazing except use gasket glazing at interior aluminum frames.

1.2.1.5 Unframed mirrors; mirror mastic and setting clips.

1.3 RELATED WORK

1.3.1 Related Work of Other Sections:

1.3.1.1 Section 08110 – Steel Doors and Frames.

1.3.1.2 Section 08121 – Aluminum Frames.

1.3.1.3 Section 07900 – Joint Sealants.

1.3.1.4 Section 08400 - Aluminum Storefront Construction.

1.4 REFERENCES

1.4.1 American Architectural Manufacturers Association

1.4.1.1 AAMA 800-92: Voluntary Specifications and Test Methods for Sealants

1.4.1.2 AAMA GDSG-1-87: Glass Design for Sloped Glazing

1.4.1.3 AAMA TIR-A7-83: Sloped Glazing Guidelines

1.4.2 American National Standards Institute

1.4.2.1 ANSI Z97.1-1984 (Reaffirmed 1994): Glazing Materials Used in Buildings--Safety Performance Specifications and Method of Test

1.4.2.2 American Society for Testing and Materials

1.4.2.2.1 ASTM C 509-94: Specification for Elastomeric Cellular Preformed Gasket and Sealing Material

1.4.2.2.2 ASTM C 719-93: Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants under Cyclic Movement (Hockman Cycle)

1.4.2.2.3 ASTM C 864-93: Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers

1.4.2.2.4 ASTM C 920-95: Specification for Elastomeric Joint Sealants

1.4.2.2.5 ASTM C 1021-92: Practice for Laboratories Engaged in Testing of Building Sealants

1.4.2.2.6 ASTM C 1036-91: Specification for Flat Glass

1.4.2.2.7 ASTM C 1048-92: Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass

1.4.2.2.8 ASTM C 1115-94: Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories

1.4.2.2.9 ASTM C 1172-96: Specification for Laminated Architectural Flat Glass

1.4.2.2.10 ASTM C 1281-94: Specification for Preformed Tape Sealants for Glazing Applications

1.4.2.2.11 ASTM C 1330-96: Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants

1.4.2.2.12 ASTM E 548-94: Guide for General Criteria Used for Evaluating Laboratory Competence

1.4.2.2.13 ASTM E 774-97: Specification for Sealed Insulating Glass Units

1.4.2.2.14 ASTM E 1300-97: Practice for Determining the Minimum Thickness and Type of Glass Required to Resist a Specified Load

1.4.3 American Society of Civil Engineers

1.4.3.1 ASCE 7-95: Minimum Design Loads for Buildings and Other Structures

1.4.4 Code of Federal Regulations

1.4.4.1 16 CFR 1201 (1-1-97 Edition): Safety Standard for Architectural Glazing Materials

1.4.5 Glass Association of North America

1.4.5.1 Glazing Manual, 1997.

1.4.5.2 Laminated Glass Design Guide, 1994.

1.4.6 Glass Tempering Division of Glass Association of North America

1.4.6.1 GTA 89-1-6: Specification for Environmental Durability of Fully Tempered or Heat-Strengthened Spandrel Glass with Applied Opacifiers

1.4.6.2 GTA 95-1-31: Specification for Decorative Architectural Flat Glass

1.4.7 Insulating Glass Certification Council

1.4.7.1 Certified Products Directory--Sealed Insulating Glass. 1996. (Updates issued semiannually)

1.4.7.2 LBL National Technical Information Service, U.S. Department of Commerce

1.4.7.3 LBL-35298 WINDOW 4.1: A PC Program for Analyzing the Thermal Performance of Fenestration Products, March 1994.

1.4.7.4 National Accreditation & Management Institute, Inc. (P.O. Box 366, 207 S. Washington St., Berkeley Springs, WV 25411; 304-258-5111)

1.4.7.5 Directory of Certified Fenestration Products, 1994-1995 ed.

1.4.8 National Fenestration Rating Council

1.4.8.1 NFRC 100-91: Procedure for Determining Fenestration Product Thermal Properties (Currently Limited to U-Values)

1.4.8.2 NFRC 200-95: Procedure for Determining Fenestration Product Solar Heat Gain Coefficients at Normal Incidence

1.4.8.3 NFRC 300-94: Procedures for Determining Solar Optical Properties of Simple Fenestration Products

1.4.9 Sealed Insulating Glass Manufacturers Association

1.4.9.1 SIGMA TM-3000-90: Vertical Glazing Guidelines

1.5 DEFINITIONS

1.5.1 Manufacturer: A firm that produces primary glass or fabricated glass as defined in referenced glazing publications.

1.5.2 Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

1.5.3 Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

1.5.4 Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1.5.5 Deterioration of Insulating Glass: Failure of the hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.6 DESIGN/PERFORMANCE REQUIREMENTS

1.6.1 Design/Performance, General: Provide glazing systems that are capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

1.6.2 Glass Design: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and strengths (annealed or heat treated) required to meet or exceed the following criteria:

1.6.2.1 Glass Thicknesses: Select minimum glass thickness to comply with ASTM E1300, according to the following requirements:

1.6.2.1.1 Specified Design Wind Loads: Determine design wind loads applicable to the Project based upon a 3 second gust wind speed of 110-miles per hour (49-meters per second) at 33-feet (10-meters) above grade (Exposure B, Importance Factor 1.15), according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.4.2, "Analytic Procedure," based on mean roof heights above grade indicated on the Drawings.

1.6.2.2 Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15-degrees from vertical, and under wind action and with a load duration of 60 seconds or less.

1.6.2.3 Maximum Lateral Deflection: For the following types of glass specified in Part 2 - Products of this Section and supported on all four edges, provide the thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1-inch (25-mm), whichever is less.

1.6.2.3.1 For monolithic glass heat-treated to resist wind loads.
1.6.2.3.2 For insulating glass.
1.6.2.3.3 For laminated glass lites.

1.6.2.4 Minimum Glass Thickness for Exterior Lites: Not less than 6 mm (0.23-inch).

1.6.2.5 Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.

1.6.3 Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1.6.3.1 Temperature Change (Range): 120-degrees F (67-degrees C), ambient; 180-degrees F (100-degrees C), material surfaces.

1.6.4 Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:

1.6.4.1 For monolithic-glass lites, properties are based on units with lites 6 mm thick.

1.6.4.2 For laminated-glass lites, properties are based on products of construction indicated.

1.6.4.3 For insulating-glass units, properties are based on units with lites 6 mm thick and a nominal 1/2-inch- (13-mm-) wide interspace.

1.6.4.4 Center-of-Glass U-Values: NFRC 100 methodology using LBL-35298 WINDOW 4.1 computer program, expressed as Btu/ sq. ft. x h x deg F (W/sq. m x K).

1.6.4.5 Center-of-Glass Solar Heat Gain Coefficient: NFRC 200 methodology using LBL-35298 WINDOW 4.1 computer program.

1.6.4.6 Solar Optical Properties: NFRC 300.

1.7 SUBMITTALS

1.7.1 Product Data: For each glass product and glazing material indicated.

1.7.2 Samples: For the following products, in the form of 12-inch- (300-mm-) square Samples for glass and of 12-inch- (300-mm-) long Samples for sealants. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

1.7.2.1 Each color of tinted float glass.

1.7.2.2 Coated vision glass.

1.7.2.3 Insulating glass for each designation indicated.

1.7.2.4 For each color (except black) of exposed glazing sealant indicated.

1.7.3 Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

1.7.4 Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

1.7.5 Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.7.6 Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

1.7.7 Product Test Reports: From a qualified testing agency indicating the following products comply with requirements, based on comprehensive testing of current products:

1.7.7.1 Coated float glass.

1.7.7.2 Insulating glass.

1.7.7.3 Glazing sealants.

1.7.7.4 Glazing gaskets.

1.7.7.5 Sealant Material Test Reports: For exterior flush structural glazing system, submit the following sealant manufacturer's data and information for review:

1.7.7.5.1 Adhesion test data of sealant bond to actual production samples of finished metal and glass that will be used in the Work. Perform adhesion tests in accordance with ASTM C 794.

1.7.7.5.2 Compatibility statement that the materials in contact with the sealant, such as gaskets, spacers, setting blocks, are compatible with the sealant after 21 days exposure to 2,000 to 4,000 microwatts of ultraviolet radiation.

1.7.7.5.3 Statement that sealant stress (detail dimensions) is less than 20 psi when exposed to 30-psf (1.4-KPa) wind load (5:1 Safety Factor).

1.7.7.5.4 Certification from sealant manufacturer that the sealant manufacturer has reviewed all sealant details and finds same suitable for the purpose intended and compatible with the surfaces with which they are in contact.

1.7.8 Warranties: Special warranties specified in this Section.

1.8 QUALITY ASSURANCE

1.8.1 Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.

1.8.2 Source Limitations for Glass and Glazing Products:

1.8.2.1 Clear Float Glass: Obtain clear float glass from one primary-glass manufacturer.

1.8.2.2 Tinted Glass: Obtain tinted, heat-absorbing, and light-reducing float glass from one primary-glass manufacturer for each tint color indicated.

1.8.2.3 Coated Glass: Obtain coated glass from one manufacturer for each type of coating and each type and class of float glass indicated.

1.8.2.4 Insulating Glass: Obtain insulating-glass units from one manufacturer using the same type of glass and other components for each type of unit indicated.

1.8.2.5 Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

1.8.3 Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products. Use a glass testing agency that is an independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

1.8.4 Elastomeric Glazing Sealant Product Testing: Obtain sealant test results for product test reports in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.

1.8.4.1 Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.

1.8.4.2 Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.

1.8.5 Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing indicated below, samples of each glass type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants.

1.8.5.1 Use manufacturer's standard test methods to determine whether priming and other specific preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.

1.8.5.2 Submit not fewer than nine pieces of each type and finish of glass-framing members and each type, class, kind, condition, and form of glass (monolithic, laminated, and insulating units) as well as one sample of each glazing accessory (gaskets, tape sealants, setting blocks, and spacers).

1.8.5.3 Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

1.8.5.4 For materials failing tests, obtain sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.

1.8.6 Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.

1.8.7 Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1.8.7.1 Laminated Glazing: GANA Publications: GANA'S "Glazing Manual" and "Laminated Glass Design Guide."

1.8.7.2 Insulating Glass and Glazing: SIGMA Publications: SIGMA TM-3000, "Vertical Glazing Guidelines," and SIGMA TB-3001, "Sloped Glazing Guidelines."

1.8.8 Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following inspecting and testing agency:

1.8.8.1 Insulating Glass Certification Council.

1.8.8.2 Associated Laboratories, Inc.

1.8.8.3 National Accreditation and Management Institute.

1.9 DELIVERY, STORAGE AND HANDLING

1.9.1 Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.9.2 For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturers written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.10 PROJECT CONDITIONS

1.10.1 Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1.11 WARRANTY

1.11.1 Manufacturer's Special Warranty on Coated-Glass Products: Provide special project warranty as specified, made out to the City and signed by coated-glass manufacturer agreeing to furnish replacements for those coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site. Provide 10-year special project warranty period for coated glass products. See Conditions of the Contact for additional warranty provisions. Provide 10-year special project warranty period for coated glass products.

1.11.2 Manufacturer's Special Warranty on Insulating Glass: Written warranty, made out to the City and signed by insulating-glass manufacturer agreeing to furnish replacements for insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site. See Conditions of the Contact for additional warranty provisions. Provide 10-year special project warranty period for insulated glass products.

PART 2 - PRODUCTS

2.1 PRODUCTS AND ANUFACTURERS

2.1.1 Provide clear float and tinted float glass required, produced by one of the following primary glass manufacturers.

2.1.1.1 AFG Industries, Inc., Kingsport, TN (800) 251-0441

2.1.1.2 Ford Glass Div., Allen Park, MI, (800) 521-6346.

2.1.1.3 Guardian Industries, Carleton, MI (800) 521-9040.

2.1.1.4 Pilkington Libbey-Owens-Ford, Toledo, OH (800) 526-6557.

2.1.1.5 PPG Industries, Inc., Pittsburgh, PA (800) 377-5267

2.1.2 Provide each type of processed glass (coated, laminated, heat strengthened, fully tempered, or insulated glass) required, produced by one of the following:

2.1.2.1 Cesar Color, Inc., Burlington, CA (800) 275-7272

2.1.2.2 Globe Amerada Glass Co., Elk Grove Village, IL (800) 521-9040.

2.1.2.3 HGP & Affiliates, Inc., Dallas, TX (972) 663-3800.

2.1.2.4 Glass Wholesalers, Inc., Houston, TX (713) 353-5800.

2.1.2.5 PPG Industries, Inc., Pittsburgh, PA (800) 377-5267

2.1.2.6 Southwall Technologies, Inc., Palo Alto, CA (800) 365-8794.

2.1.2.7 Technical Glass Products, Kirkland, WA (800) 426-2079.

2.1.2.8 Viracon, Inc., Owatonna, MN (800) 533-2080

2.1.3 Primary Float Glass Products: Provide lites of the following annealed primary glass types conforming to ASTM C 1036, including references to type, class, quality, and if applicable, form, finish, mesh and pattern. Provide heat strengthened or fully tempered glass complying with ASTM C 1048, including references to kind, condition, type, quality and class. Provide laminated glass complying with ASTM C 1172, including references to kind, condition, type, quality, and class.

2.1.3.1 Glass Type G-1 (Gray Tinted Spectrally Selective Low-E Coated Heat-Strengthened Insulating Glass):

2.1.3.1.1 Outer Lite: One lite of 6-mm (0.23-inch) thick PPG Industries “SolarGrey” heat-strengthened gray tinted glass.

2.1.3.1.2 Spacer: Hermetically sealed dehydrated 13-mm (1/2-inch) air space and complying with ASTM E 774, Class A requirements and with manufacturer's standard 13-mm (1/2-inch) spacer, corner design, desiccant, sealant, and sealing system.

2.1.3.1.3 Inboard Lite: One lite of 6 mm thick PPG Industries Solarban 60 (3) heat-strengthened clear Low-E coated float glass.

2.1.3.1.4 Visible Light Transmittance: Between 34 and 36 percent.

2.1.3.1.5 Outdoor Visible Light Reflectance: Between 6 and 8 percent.

2.1.3.1.6 Light to Solar Gain Ratio (LSG): Minimum 1.25

2.1.3.1.7 ASHRAE U-Value - Winter Nighttime: Minimum 0.29.

2.1.3.1.8 ASHRAE U-Value – Summer Daytime: Minimum 0.31.

2.1.3.1.9 Shading Coefficient: Between 0.31 and 0.33.

2.1.3.2 Glass Type G-2 (Gray Tinted Spectrally Selective Low-E Coated Fully-Tempered Insulating Glass):

2.1.3.2.1 Outer Lite: One lite of 6-mm (0.23-inch) thick PPG Industries “SolarGray” fully-tempered gray tinted glass.

2.1.3.1.2 Spacer: Hermetically sealed dehydrated 13-mm (1/2-inch) air space and complying with ASTM E 774, Class A requirements and with manufacturer's standard 13-mm (1/2-inch) spacer, corner design, desiccant, sealant, and sealing system.

2.1.3.1.3 Inboard Lite: One lite of 6 mm thick PPG Industries Solarban 60 (3) fully-tempered clear Low-E coated float glass.

2.1.3.1.4 Visible Light Transmittance: Between 34 and 36 percent.

2.1.3.1.5 Outdoor Visible Light Reflectance: Between 6 and 8 percent.

2.1.3.1.6 Light to Solar Gain Ratio (LSG): Minimum 1.25

2.1.3.1.7 ASHRAE U-Value - Winter Nighttime: Minimum 0.29.

2.1.3.1.8 ASHRAE U-Value – Summer Daytime: Minimum 0.31.

2.1.3.1.9 Shading Coefficient: Between 0.31 and 0.33.

2.1.3.2 Laminated Safety Glass Type G-3 (Door and Sidelite Safety Glass): Type LA, with two panes of 3-mm (1/8-inch) thick clear float glass complying with Type I, Class 1, Quality q3 requirements, and laminated with a clear 0.030" thick polyvinyl butyral interlayer, nominally 6-mm (0.25-inch) thick.

2.1.3.3 Mirror Glass: Clear annealed float glass, Type I, Class 1, Quality q2 (mirror glazing), 1/4" thick, with 2 coats of chemically applied silver with electrolytic copper coating (0.0002" thick), followed by 2 protective coats of clear varnish or shellac applied to silvered and coppered surface and to all mirror edges, followed by final coat of mirror backing paint to produce a coating system complying with FS DD-M-411.

2.2 GLAZING GASKETS

2.2.1 Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal.

2.2.1.1 Neoprene, ASTM C 864.

2.2.2 Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal.

2.2.2.1 Neoprene, ASTM C 864.

2.3 MISCELLANEOUS GLAZING MATERIALS

2.3.1 Sealants, Tapes and Backup Materials: Provide sealants, tapes and backup materials of proven compatibility with other materials that they will contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience. Comply with sealant and glass manufacturer's recommendations for selecting glazing sealants and tapes that are suitable for applications indicated and conditions existing at time of installation. Provide the following chemical curing, elastomeric sealants of the base polymer and movement capability indicated.

2.3.1.1 Non-Structural Silicone Glazing Sealant: One-part medium modulus silicone sealant with minimum ±50% joint movement capability and conforming to ASTM C 920, Type S, Grade NS, Class 25, Use NT, G, A, and as applicable to use indicated, O. Acceptable manufacturer and product includes General Electric Company "Silglaze II", or Dow Corning "Dow Corning 795".

2.3.1.2 Glazing Tape: AAMA 806.3, 100% solids butyl tape with spacer rod; Tremco "Polyshim II" or PTI "PTI 303 Glazing Tape", except use glazing tape lite kits applicable to UL Listed (UBC 7-2 1997 and UL 10C) fire-rated glazing assembly time ratings as produced by Zero International, or equivalent and specified as part of Section 08700 - Finish Hardware work.

2.3.2 Miscellaneous Glazing Materials: Provide products of material, size and shape complying with the referenced glazing standard, requirements of manufacturers of glass and other glazing materials involved for glazing application indicated, and with proven record of compatibility with surfaces contacted in installation.

2.3.2.1 Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

2.3.2.2 Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.

2.3.2.3 Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

2.3.2.4 Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.4 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

2.4.1 Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.

2.4.2 Sizes, Clearances, Bite and Tolerances: Fabricate glass to the sizes required for glazed openings indicated, with edge and face clearances, bite and tolerances complying with recommendations of glass manufacturer and the referenced glazing standard, to comply with performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1 Examine framing glazing, with Installer present, for compliance with the following:

3.1.1.1 Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

3.1.1.2 Presence and functioning of weep system.

3.1.1.3 Minimum required face or edge clearances.

3.1.1.4 Effective sealing between joints of glass-framing members.

3.1.2 Inspect each piece of glass immediately before installation, and remove lites that have observable edge damage or face imperfections from the Project Site.

3.1.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 GLAZING PREPARATION

3.2.1 Clean framing members to receive glass, immediately before glazing. Remove coatings that are not firmly bonded to the substrate.

3.3 GLAZING GENERAL

3.3.1 Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

3.3.2 Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

3.3.3 Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

3.3.4 Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

3.3.5 Center glass lites in each opening. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.

3.3.6 Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

3.3.7 Provide spacers for glass lites where the length plus width is larger than 50 inches (1270 mm) as follows:

3.3.7.1 Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

3.3.7.2 Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

3.3.8 Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.3.9 Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

3.3.10 Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

3.3.11 Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

3.4.1 Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

3.4.1.1 Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

3.4.1.2 Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

3.4.1.3 Do not remove release paper from tape until just before each glazing unit is installed.

3.4.2 Apply heel bead of elastomeric sealant.

3.4.3 Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.4.4 Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING

3.5.1 Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.

3.5.2 Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

3.5.3 Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.5.4 Compress gaskets to produce a weathertight seal without developing bending stresses in glass.

3.5.5 Seal gasket joints with sealant recommended by gasket manufacturer.

3.5.6 Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

3.6.1 Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

3.6.2 Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

3.6.3 Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 PROTECTION AND CLEANING

3.7.1 Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

3.7.2 Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

3.7.3 Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.

3.7.4 Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.

3.7.5 Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

Section 09200
LATH AND PLASTER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 Section includes furnishing and installing:

1.2.1.1 Three coat Portland cement plaster on metal lath for exterior application

1.2.1.2 Two coat EIFS for interior application only.

1.2.1.3 Metal supports for suspended and furred ceilings and vertical furring.

1.2.1.4 Expanded metal lath.

1.2.1.5 Exterior and interior sheathing / gyp panels for cement plaster/ EIFS application

1.2.1.6 Plastering accessories.

1.3 RELATED WORK

1.3.1 Related Work of Other Sections:

1.3.1.1 Section 04810 – Unit Masonry Assemblies.

1.3.1.2 Section 05400 - Cold Formed Metal Framing

1.3.1.3 Section 05500 – Miscellaneous Metal Fabrications.

1.3.1.4 Section 06100 - Rough Carpentry; Grounds, nailers and blocking.

1.3.1.5 Section 07110 – Bituminous Dampproofing.

1.3.1.6 Section 07900 - Joint Sealants.

1.3.1.7 Section 09900 - Paints and Coatings.

1.4 SUBMITTALS

1.4.1 Product Data: Submit product data for each plaster and accessory required, including specifications showing compliance with requirements.

1.4.2 Samples: Submit 2 samples, approximately 12-inch (300 mm) square, of each plaster finish and texture required, showing full range of variations to be expected.

1.5 PROJECT CONDITIONS

1.5.1 Environmental Requirements, General: Comply with requirements of referenced plaster application standards and recommendations of plaster manufacturer for environmental conditions before, during, and after plaster application.

PART 2 - PRODUCTS

2.1 CEMENT PLASTER MATERIALS AND MIXES

2.1.1 Provide three-coat cement plaster on metal lath, complying with ASTM C 1063 and ASTM C 926 and at the locations indicated on the Drawings.

2.1.2 Furring Materials: Cold rolled steel channels; 300-lb. /1000 lf. for 3/4-inch size, 475-lb./1000 lf for 1-1/2-inch size; rust-inhibitive paint for interior locations except hot-dipped galvanized at exterior and "high humidity" areas.

2.1.3 Hangers and Hanger Anchorages: Provide galvanized steel wire hangers conforming to ASTM A 641, Class 1, for suspended plaster

work. Size hanger anchorage devices to develop full strength of hanger but not less than 3x calculated hanger load, except size direct pull-out concrete inserts for 5x calculated hanger load as determined by testing (ASTM E 488) conducted by a qualified independent testing agency.

2.1.4 Metal Lath: Expanded steel; FS QQ-L-101, 3.4-lb./yd., hot-dipped galvanized finish at exterior and "high humidity" areas. Provide self-furring type where indicated or required.

2.1.5 Metal Beads and Accessories: Solid zinc alloy at exterior and "high humidity" areas. Types include square edge casing beads and No. 40 expansion joints and No. 15 control joints by Metalex (Keene) or Inryco/Milcor, Pittcon Industries, Inc. "Softforms" extruded aluminum trim, and standard preformed interior corner reinforcement.

2.1.6 Extruded Aluminum Trim: Fry Reglet Corp., Norcross, GA; MM Systems Corp, Tucker, GA; or Pittcon Industries "Softforms", Riverdale, MD. Provide shapes as indicated.

2.1.7 Scratch Coat Mix: 1-part Portland cement, 1- to 2-parts masonry cement, 2-1/2- to 4-parts sand (ASTM C 897).

2.1.8 Brown Coat Mix: 1-part Portland cement, 1- to 2-parts masonry cement, 3- to 5-parts sand (ASTM C 897).

2.1.9 Base Coat Fibers: Add Dur-O-Wal "Dur-O-Fiber AR Glass" to above mixes as directed by manufacturer, but not to exceed 2-lb./cu. ft. of cementitious materials. Reduce sand quantity as required to maintain workability.

2.1.10 Finish Coat Mix (Interior): water-based, lightweight acrylic coating with integral color and texture and formulated with DPR chemistry as manufactured by Dryvit “E Finishes” in Sandpebble Fine texture. Color to be selected by Architect from full line of colors. Coordinate with Architect for location of mock-up sample.

2.1.11 Finish Coat (Exterior): Acrylic Finish Coat System, Medallion Series PMR, by Dryvit or equal. Color and texture to be selected by Architect. Contractor shall place three (3) 40”x40” color/texture samples on building for selection by Architect. Coordinate with Architect for location of samples.

2.2 SHEATHING BOARDS / GYPSUM PANELS

2.2.1 1/2" DensGlass Gold Exterior Sheathing or approved equal for all exterior applications

2.2.1.1 Size: DensGlass Gold Exterior Sheathing: 1/2" (12.7mm) thick by 4' by 8', 9' or 10' (1.9 lb. per square foot).

2.2.1.2 Composition: Gypsum sheathing manufactured in accordance with ASTM C 1177 with glass mats both sides

and long edges, water-resistant treated core.

2.2.1.3 Fire resistance: Noncombustible when tested in accordance with ASTM E 136. 1/2" or 5/8" DensGlass Gold Exterior Sheathing: Flame spread 10, smoke developed 0, when tested in accordance with ASTM E 84.

2.2.1.4 Refer to manufacturer for product application and limitations.

2.2.2 Glass Mat, Moisture-Resistant Interior Wall Panel: Coated glass mat-faced, moisture- resistant, treated core gypsum wallboard. Physical properties conforming to the applicable sections of ASTM C 1177 and ASTM C 630, DensArmor Plus Interior Panels as manufactured by G-P Gypsum Corp or approved equal.

2.2.2.1 Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

2.2.2.2 Long Edges: Tapered

PART 3 - EXECUTION

3.1 SHEATHING/ GYP BOARD FURRING

3.1.1 Provide DensGlass Gold Exterior Sheathing where indicated on drawings. Install sheathing in accordance with manufacturer's instructions and applicable instructions in GA-253 and ASTM C 1280.

3.1.2 Install DensGlass Gold Exterior Sheathing with gold side out.

Use maximum lengths possible to minimize number of joints.

3.1.3 Attach DensGlass Gold Exterior Sheathing to metal framing with screws spaced 8" o.c. at perimeter where there are framing supports; and 8" o.c. along intermediate framing in field. A greater number of fasteners may be specified to obtain specific values and is allowed up to 4" o.c. spacing.

3.1.4 Drive fasteners to bear tight against and flush with surface of sheathing. Do not countersink.

3.1.5 Locate fasteners minimum 3/8" from edges and ends of sheathing panels, tight against and flush with surface of sheathing.

3.1.6 Weather Resistant Barrier: If a weather barrier is required by the local building code, design professional, owner or cladding manufacturer over DensGlass Gold Exterior Sheathing, one of the following procedures may be used. Consult building code or design authority for proper application selection. Follow manufacturer's installation recommendations.

3.1.6.1 Entire exterior face of gypsum sheathing covered with an asphalt impregnated felt or synthetic fiber wrap such as

Tyvek® Commercial Wrap, or equal.

3.1.6.2 Liquid applied barriers such as Sto Guard® as manufactured by Sto Corp., Dryvit's Backstop® NT or equal.

3.1.6.3 Self adhering membranes.

3.1.7 Install DensArmor plus according to manufacturer's instructions for use in interior applications.

3.2 LATH AND FURRING INSTALLATION, GENERAL

3.2.1 Standards: Comply with ML/SFA 920, "Guide Specifications for Metal Lathing and Furring," and ASTM C 1063.

3.2.2 Install supplementary framing, blocking, and bracing at terminations in work and for support of fixtures, equipment services, heavy trim, grab bars, handrails, furnishings, and similar work to comply with details indicated or, if not otherwise indicated, to comply with applicable written instructions of lath and furring manufacturer.

3.2.2.1 At exterior soffits provide cross bracing and additional furring at hanger wires to resist a uniform wind uplift pressure of 31 psf.

3.2.3 Isolation: Where lathing and metal support system abut building structure horizontally and where partition or wall abuts overhead structure, isolate from structural movement to prevent transfer of loading from building structure.

3.2.3.1 Frame both sides of control joints independently and do not bridge joints with furring and lathing or accessories.

3.2.4 Install additional framing, furring, runners, lath, and beads, as required to form openings and frames for other work as indicated. Coordinate support system for proper support of framed work that is not indicated to be supported independently of metal furring and lathing system.

3.3 NON-LOAD-BEARING FRAMING INSTALLATION

3.3.1 Ceiling Suspension Systems:

3.3.1.1 Preparation and Coordination: Coordinate installation of ceiling suspension system with installation of overhead structural systems to ensure inserts and other structural anchorage provisions have been installed to receive ceiling hangers in a manner that will develop their full strength and at spacings required to support ceiling.

3.3.1.2 Hanger Installation: Comply with ML/SFA 920, "Guide Specifications for Metal Lathing and Furring," and with referenced standards.

3.3.1.2.1 Do not attach hangers to metal deck tabs.

3.3.1.3 Install ceiling suspension system components of sizes and spacings indicated, but not in smaller sizes or greater spacings than those required by referenced lathing and furring installation standards.

3.4 LATHING

3.4.1 Install where plaster base coats are required. Provide appropriate type, configuration, and weight of metal lath selected from materials indicated that comply with referenced ML/SFA specifications and ASTM lathing installation standards.

3.4.1.1 Suspended and Furred Ceilings: Use flat diamond-mesh lath.

3.4.1.2 Vertical Metal Framing and Furring: Use flat, diamond-mesh lath and cold-rolled channel stud framing.

3.4.1.3 Ceramic-Tile Setting Beds: Use flat, diamond-mesh lath.

3.4.1.4 Monolithic Surfaces: Use self-furring, diamond-mesh lath or vertical metal framing and furring as required for plaster thickness.

3.5 PREPARATIONS FOR PLASTERING

3.5.1 Protect contiguous Work from damage and deterioration caused by plastering with temporary covering and other provisions necessary.

3.5.2 Clean plaster bases and substrates for direct application of plaster, removing loose material and substances that may impair the Work.

3.5.3 Etch concrete and concrete unit masonry surfaces indicated for direct plaster application. Scrub with acid-etching solution on previously wetted surface and rinse thoroughly with clean water. Repeat application, if necessary, to obtain adequate suction and mechanical bond of plaster (where dash coat, bonding agent, or additive is not used).

3.5.4 Apply bonding agent on concrete and concrete unit masonry surfaces indicated for direct plaster application.

3.5.5 Apply dash coat on concrete surfaces indicated for direct plaster application. Moist-cure dash coat for at least 24 hours after application and before plastering.

3.5.6 Install temporary grounds and screeds to ensure accurate rodding of plaster to true surfaces; coordinate with scratch-coat work.

3.5.7 Refer to Section 07411 – Manufactured Metal Roof Panel for furnishing and installing prefinished metal flashings.

3.5.8 Surface Conditioning: Immediately before plastering, dampen concrete and concrete unit masonry substrates, except where a bonding agent has been applied, to produce optimum suction for plastering.

3.5.9 Exterior Finish System: Plaster shall be finished smooth and allowed to cure a minimum of 28 days prior to application of finish. Rough surfaces shall be skimmed with Dryvit Genesis or Genesis DM mixture to provide a smooth, flat and level base.

3.6 RING ACCESSORIES INSTALLATION

3.6.1 General: Comply with referenced lathing and furring installation standards for provision and location of plaster accessories. Miter or cope accessories at corners; install with tight joints and in alignment. Attach accessories securely to plaster bases to hold accessories in place and in alignment during plastering.

3.6.1.1 External Corners: Install corner reinforcement at external corners Bend lath around external angles without using corner beads or reinforcement.

3.6.1.2 Terminations of Plaster: Install casing beads, unless otherwise indicated.

3.6.1.3 Control Joints: Install at locations indicated or, if not indicated, at locations complying with the following criteria and approved by the City:

3.6.1.3.1 Where an expansion or contraction joint occurs in surface of construction directly behind plaster membrane.
3.6.1.3.2 Distance between Control Joints: Not to exceed 18-feet (5.4-m) in either direction or a length-to-width ratio of 2-1/2 to 1.
3.6.1.3.3 Wall Areas: Not more than 144-sq. ft. (13-sq. m).
3.6.1.3..4 Horizontal Surfaces: Not more than 100-sq. ft. (9-sq. m) in area.
3.6.1.3.5 Where plaster panel sizes or dimensions change, extend joints full width or height of plaster membrane.

3.7 PLASTER APPLICATION

3.7.1 Portland Cement Plaster Application: Apply Portland cement plaster materials, composition, mixes, and required finishes to comply with ASTM C 926. Moisture cure plaster base and finish coats to comply with ASTM C 926, including written instruction for time between coats and curing in "Annex A2 design Considerations".

3.7.2 Finish Coats:

3.7.2.1 Float Finish: Apply finish coat to a minimum thickness of 1/8-inch (3-mm) to completely cover base coat, uniformly floated to a true even plane with fine-textured finish matching sample.

3.7.2.2 Moist-cure plaster base and finish coats to comply with ASTM C 926, including written instructions for time between coats and curing in "Annex A2 Design Considerations."

3.8 CUTTING, PATCHING, AND CLEANING

3.8.1 Cut, patch, replace, repair, and point up plaster as necessary to accommodate other work. Repair cracks and indented surfaces. Point-up finish plaster surfaces around items that are built into or penetrate plaster surfaces. Repair or replace work to eliminate blisters, buckles, check cracking, dry outs, efflorescence, excessive pinholes, and similar defects. Repair or replace work as necessary to comply with required visual effects.

3.8.2 Remove temporary covering and other provisions made to minimize spattering of plaster on other work. Promptly remove plaster from door frames, windows, and other surfaces not to be plastered. Repair surfaces stained, marred or otherwise damaged during plastering work.

Section 09900
PAINTS AND COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section**.**

1.2 SUMMARY

1.2.1 Section includes furnishing and installing paint and coating systems for the following substrates as indicated. "Paint and Coating Systems" include coating system materials such as primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats. Paint and coating work includes surface preparation and cleaning, primer touch-up of shop primed items, repair of existing coatings (including barrier coats required to properly apply new coating systems), field priming and painting exterior and interior material, equipment and appurtenances, including but not limited to painting the following items within construction limits indicated:

1.2.1.1 All exterior ferrous metals, including lintels, etc, except as specified.

1.2.1.2 All exterior non-ferrous metals, except as specified.

1.2.1.3 Exterior plaster with painted finish.

1.2.1.4 Interior wood with painted finish.

1.2.1.5 All interior ferrous metals, except as specified.

1.2.1.6 All interior non-ferrous metals, except as specified.

1.2.1.7 Interior concrete masonry with painted finish.

1.2.1.8 Interior gypsum drywall with painted finish.

1.2.1.9 All prime coated hardware and other factory primed metal items.

1.2.1.10 Exposed conduit, raceway, boxes, switchgear and electrical cabinets, excluding items located in mechanical rooms.

1.2.1.11 Exposed pipe, pipe hangers and supports, heat exchangers, tanks, insulation, plumbing and ductwork, motors and mechanical equipment, excluding those located in mechanical rooms.

1.2.1.12 All metal grilles, except anodized aluminum, unless otherwise indicated.

1.2.1.13 Items normally requiring painting or finishing, or which are indicated to be painted or finished.

1.2.1.14 Where an item is not specifically mentioned, paint same as similar adjacent materials or surfaces.

1.2.1.15 Make test patches to verify coating system compatibility and adhesion over existing coatings and surfaces.

1.2.2 Do not include painting of:

1.2.2.1 Prefinished or factory finished items (e.g., shop finished woodwork and casework, acoustic materials, anodized aluminum, and similar items).

1.2.2.2 Aluminum, copper, chromium and other plated finishes.

1.2.2.3 Concealed surfaces in concealed and inaccessible areas including furred-areas, pipe chases, duct shafts, and similar spaces.

1.2.2.4 Operating parts of mechanical, electrical and plumbing equipment, including sensing devices, motor and fan shafts, and sprinkler heads.

1.2.2.5 Code required labels and nomenclature plates.

1.2.2.6 Items indicated to receive high-performance coatings (special coatings).

1.3 RELATED WORK

1.3.1 Related Work of Other Sections:

1.3.1.1 Section 04810 – Unit Masonry Assemblies.

1.3.1.2 Section 05500 – Miscellaneous Metal Fabrications.

1.3.1.3 Section 07900 – Joint Sealants.

1.3.1.4 Section 08110 – Steel Doors and Frames

1.3.1.5 Section 08400 – Aluminum Storefront Construction

1.3.1.6 Section 09200 – Lath and Plaster.

1.4 SUBMITTALS

1.4.1 Application Schedule: Submit a schedule of substrates and painting manufacturer's product data for barrier, prime, intermediate and topcoats, application instructions and application equipment recommended by painting manufacturer for application methods scheduled.

1.4.2 Samples: For verification purposes, submit representative samples, approximately 12" x 12" in size, of each color and sheen required on actual substrates.

1.4.2.1 On each sample back, identify surface preparation, fillers, primers, and stains, and intermediate and finish coats used and total dry film thickness.

1.4.2.2 Resubmit samples until required color, sheen and texture are achieved.

1.4.3 Field Mock-Ups and Test Patches:

1.4.1.1 Apply 1-quart mock-up/test patches for each type of coating system and each substrate upon which coatings will be applied to confirm that substrates are properly prepared, that coating systems will adhere and cure in accordance with coating manufacturers printed application instructions, and match approved samples for color and workmanship.

1.4.1.2 Locate mock-ups on Site in locations as directed by the City. When acceptable, mock-ups may be included as part of the Work.

1.4.1.3 Retain mock-ups during construction as a standard for judging completed painting work. Remove unacceptable mock-ups and reapply until acceptable.

1.4.2 VOC data: Submit Green Seal Certification to GS-11 and description of the basis for certification.

1.4.3 Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.

1.5 QUALITY ASSURANCE

1.5.1 Quality Grade: Provide manufacturer's best quality trade sale paint material of coating types specified. Use only material Manufacturer's containers with intact labels with product identification.

1.5.2 Coating Systems: Provide primers, finish coat materials, and related materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by the manufacturer based on testing and field experience. Provide coating materials that do not exceed maximum 350 g/l VOC. Do not thin coatings in excess of limits indicated on coating manufacturers printed instructions.

1.5.3 Color Designations and Selections: Subject to compliance with requirements, names used to designate colors are not intended to imply that manufacturers or products named are required to the exclusion of specified products of other manufacturers. Match colors indicated by reference to manufacturer's standard color designations.

1.5.4 Pigments: Use color pigments that are pure, non-fading, suitable for substrates and service indicated. Lead content in pigment, if any, is limited to contain not more than 0.06% lead, as lead metal based on the total non-volatile (dry-film) of paint by weight. This limitation is extended to interior surfaces and those exterior surfaces, such as stairs, decks, porches, railings, windows, and doors that are readily accessible to children under 7 years of age.

1.5.5 Coating Systems Manufacturer: Subject to compliance with requirements, provide products of one of the following for each substrate indicated:

1.5.5.1 ICI Dulux Paints (ICI)

1.5.5.2 Benjamin Moore and Company (Moore)

1.5.5.3 PPG Industries, Pittsburgh Paints (Pittsburgh)

1.5.5.4 Pratt and Lambert (P & L)

1.5.5.5 The Sherwin-Williams Company (S-W)

PART 2 - PRODUCTS

2.1 EXTERIOR PAINTING SYSTEMS AND MATERIALS

2.1.1 Exterior Ferrous Metal:

2.1.1.1 Latex Semi-Gloss Enamel: 2 finish coats over primer.

2.1.1.1.1 Primer: Rust Inhibitive Latex Primer. ICI: 4020 DevFlex DTM Int/Ext Waterborne Primer & Finish (85XX). Moore: Ironclad Retard-X Rust Inhibitive Primer 162. Pittsburgh: 90-712 Pitt-Tech DTM Acrylic Primer/Finish. P & L: Tech Gard Latex Metal Primer. S-W: DTM Acrylic Primer/Finish B66W1.

2.1.1.1.2 First and Second Finish Coats: Exterior Semi-Gloss Latex Enamel. ICI:4206 Devflex Int/Ext. Waterborne Acrylic Semi-Gloss Enamel (83XX). Moore: Impervex Enamel 309. Pittsburgh: 90-474 Pitt-Tech DTM Satin Enamel. P & L: Accolade Latex Ext. Gloss House & Trim Finish. S-W:Metalatex Semi-Gloss Enamel B42W110.

2.1.2 Exterior Non-Ferrous Metal (Zinc Coated Steel and Aluminum):

2.1.2.1 Latex Semi-Gloss Enamel: 2 finish coats over primer.

2.1.2.1.1 Primer: Latex Galvanized Metal Primer. ICI:4120 XXXX DevFlex All Purpose Metal & Galvanized Primer (5229). Moore: Ironclad Galvanized Metal Latex Primer 155. Pittsburgh:90-712 Pitt-Tech DTM Acrylic Primer/Finish.
S-W:B50W3 Galvite Paint.

2.1.2.1.2 First and Second Finish Coats: Exterior Semi-Gloss Latex Enamel. ICI: 4206 XXXX Devflex Int/Ext. Waterborne Acrylic Semi-Gloss Enamel (83XX). Moore: Impervex Enamel 309. Pittsburgh:90-474 Pitt-Tech Waterborne Satin Enamel. S-W:Metalatex Semi-Gloss Enamel B42W110.

2.1.3 Exterior Cement Plaster:

2.1.3.1 Acrylic Low Luster (Flat) Elastic Masonry Coating: 2 coats over primer with total dry film thickness not less than 5 mils

2.1.3.1.1 Primer Coat: Exterior Latex Flat Paint. ICI: 2200 Dulux Professional Exterior 100% Acrylic Flat Finish (DS8700). Pittsburgh: 6-610 Series Speedhide Exterior Latex Flat Finish. S-W: A-100 Acrylic Latex Flat Exterior Finish A-6 Series.

2.1.3.1.2 Finish Coats: Two rolled-on or brushed-on coats of elastic masonry coating. ICI Decra-Flex 2260-Pittsburgh:Pittflex 4-110 S-WLoxon A24W301/A24W300

2.2 INTERIOR PAINTING SYSTEMS AND MATERIALS

2.2.1 Interior Wood - Painted:

2.2.1.1 Latex Eggshell Enamel Finish: 2 finish coats over primer.

2.2.1.1.1 Primer: Interior Latex Undercoat/Primer. ICI:1020 XXXX Ultra-Hide Acrylic Primer Interior Wood Undercoater (51701). Moore: Latex Enamel Underbody 345. Pittsburgh: 6-855 Enamel Undercoater. P & L: Latex Enamel Undercoating.
S-W:PrepRite Classic Interior Latex Primer B28W101.

2.2.1.1.2 First and Second Finish Coats: Interior Eggshell Latex Enamel. ICI: 1403 XXXX Dulux Ultra Eggshell Interior Acrylic Wall & Trim Enamel. Moore:Regal Aqua-Velvet 319. Pittsburgh: 6-411 Series Speedhide Latex Eggshell Enamel. P & L: Accolade Interior Velvet S-W: Pro-Mar 200 Latex Eggshell Enamel B20W200.

2.2.2 Interior Ferrous Metal:

2.2.2.1 Latex Semi-Gloss Enamel: 2 finish coats over primer.

2.2.1.1.1 Primer: Rust Inhibitive Latex Primer. ICI: 4020 DevFlex DTM Int/Ext Waterborne Primer & Finish (85XX). Moore: Ironclad Retardo Rust-Inhibitive Paint #162. Pittsburgh: 90-712 Pitt-Tech DTM Primer/Finish. P & L: Tech Gard Latex Metal Primer 2190. S-W: DTM Acrylic Primer/Finish B66W1.

2.2.1.1.2 First and Second Finish Coats: Interior Semi-Gloss Latex Enamel. ICI: 4206 Devflex Int/Ext. Waterborne Acrylic Semi-Gloss Enamel (83XX). Moore: Impervex Enamel 309. Pittsburgh: 90-474 Pitt-Tech DTM Satin Enamel. P & L: Accolade Interior Semi Gloss Latex S-W:Metalatex Semi-Gloss Enamel B42W110.

2.2.3 Interior Non-Ferrous Metal (Zinc Coated Steel and Aluminum):

2.2.3.1 Latex Semi-Gloss Enamel: 2 finish coats over primer.

2.2.3.1.1 Primer: Latex Galvanized Metal Primer. ICI: 4020 Devflex DTM Flat Int/Ext Waterborne Primer & Finish. Moore: Ironclad Galvanized Metal Latex Primer #155. Pittsburgh: 90-712 Pitt-Tech DTM Primer/Finish. P & L:Tech Gard Latex Metal Primer Z190. S-W: Galvite B50W3.

2.2.3.1.2 First and Second Finish Coats: Interior Semi-Gloss Latex Enamel. ICI:4206 Devflex Int/Ext. Waterborne Acrylic Semi-Gloss Enamel (83XX). Moore:Impervex Enamel 309. Pittsburgh: 90-474 Pitt-Tech DTM Satin Enamel. P &: Accolade Interior Semi Gloss Latex S-W:Metalatex Semi-Gloss Enamel B42W110.

2.2.3.2 Primer/Waterborne Drywall Topcoat (Interior Exposed Conduit, Electrical Boxes, Piping, Ductwork, Hangers and Hanger Wire, and Steel Deck):

2.2.3.2.1 Surface Preparation: Solvent clean in accordance with SSPC SP1. Use clean tack cloth. All surfaces must be clean and dry.

2.2.3.2.2 Primer: Water based metal primer or alkyd metal primer tinted to match topcoat. ICI Devguard 4160-PPGSpeedhide 6-208 S-W B50Z Series Tnemec Spra-Saf EN Series 30

2.2.3.2.3 Waterborne Acrylic Drywall Finish: Provide one sprayed on coat of one of the following: ICI Devoe Spraymaster Pro Unigrip-WB 1280-1200 PPG Speedhide 6-714 (SG) S-W B42W2 (SG) Tnemec Spra-Saf EN Series 30

2.2.4 Interior Gypsum Drywall Systems:

2.2.4.1 Latex Lusterless (Flat) Emulsion Finish (Ceilings and Horizontal Furring Only): 2 finish coats over primer.

2.2.4.1.1 Primer: Latex-Based Interior White Primer. ICI: 1030 Ultra-Hide PVA Interior Primer Sealer (5019) Moore: Moore's Latex Quick-Dry Prime Seal #201. Pittsburgh: 6-2 Speedhide Latex Wall Primer P & L: Vapex Wall Primer Z30001. S-W:PrepRite 200 Interior Latex Wall Primer B28W200.

2.2.4.1.2 First and Second Finish Coats: Latex-Based Interior Flat Paint. ICI: 1200 Dulux Professional Interior Flat Latex Wall & Trim Finish. Moore: Regal Wall Satin #215. Pittsburgh: 6-70 Speedhide Latex Flat Wall Paint. P & L: Vapex Latex Flat Wall Finish. S-W: ProMar 200 Latex Flat Wall Paint B30W200 Series.

2.2.4.2 Semi-Gloss Prime Coat/Water Based Epoxy Topcoats (Wall Areas): 2 finish coats over primer.

2.2.4.2.1 Primer: Waterborne epoxy, acrylic latex, or alkyd metal primer tinted to match topcoat. ICI Ultra-Hide Aquacrylic Gripper Primer-Sealer 3210-1200 Pittsburgh: Wallhide 80 Line S-W PrepRite 200 Latex Primer Tnemec Series 6

2.2.4.2.2 Finish Coats: Two component low-odor acrylic epoxy. Provide two individual sprayed or rolled on coats with minimum 4 hour curing prior to recoating. ICI Tru-Glaze-WB 4406-Pittsburgh Pitt-Glaze 16-Line S-W B70-200 Series Tnemec Series 114 H. B.

2.2.5 Interior Concrete Masonry Units:

2.2.5.1 Latex Lusterless (Flat) Emulsion Finish: 2 finish coats over filled surface.

2.2.5.1.1 Filler Coat: High-Performance Latex Block Filler. Apply filler coat at a rate to ensure complete coverage with pores filled. ICI: 4000 Bloxfil Interior/Exterior H. D. Acrylic Block Filler (52901) Moore: Latex Block Filler M88 Pittsburgh: 6-7 Latex Masonry Block Filler P & L: Primafil 200 Latex Block Filler Z3 S-W: Heavy-Duty Block Filler B42W46

2.2.5.1.2 First and Second Finish Coats: Latex-Based Interior Flat Paint. ICI: 1407 Dulux Ultra Semi-Gloss Interior Acrylic Wall & Trim Enamel Moore:Moore Craft Super Spec Latex Semi-Gloss Enamel 276 Pittsburgh: 6-512 Speedhide Latex Semi-Gloss Enamel P & L: Aqua Satin Latex Enamel S-W: Pro-Mar 200 Latex Semi-Gloss B31W200

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1 Examine substrates and conditions under which painting work will be performed for compliance with requirements for application of paint. Do not begin paint application until unsatisfactory conditions have been corrected. Notify City Engineer in writing prior to proceeding with painting work of any anticipated problems in using specified coating systems with substrates primed by others. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

3.1.1.1 Moisture Vapor Emission Tests: Test each 1,000-sq. ft. of flooring substrate, or portion thereof, with an anhydrous calcium chloride test kit equivalent to the Vaprecision Test Kit produced by Vaprecision Professional Vapor Emission Testing Systems, Newport Beach, CA (Tel) 800-449-6194.

3.1.1.1.1 Conduct tests for a minimum of 72-hours in accordance with the test kit manufacturers printed instructions.

3.1.1.1.2 An emission rate of less than 3.0-lb./1,000 sq. ft./24 hours indicates that substrate is acceptable for flooring installation.

3.1.1.1.3 If emission rates are 3.0-lb./1,000 sq. ft./24 hours or greater anywhere in the area tested, submit a written test report to City Engineer within 24-hours, indicating the type of test kit used and the test results at each location tested.

3.1.1.1.4 In addition, submit a proposal to furnish and install a vapor emission control penetrant system, or a vapor emission control coating system, or a vapor emission control dispersal membrane system as dictated by test results and produced by Floor Seal Technology, Inc., San Jose, CA (Tel) 800-572-2344, or one of the appropriate "VaprStop" fast-cure epoxy concrete water vapor sealer system produced by DuPont Flooring Systems, Kennesaw, GA (Tel) 800-438-7668, or www.dupontcommercial.com.

3.2 PREPARATION, GENERAL

3.2.1 Perform preparation and cleaning procedures in compliance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.

3.2.1.1 Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove for complete painting of items and adjacent surfaces. Following painting completion in each space or area, reinstall removed items.

3.2.1.2 Clean surfaces to be painted before applying paint or surface treatments. Wash existing painted surfaces with neutral soap, thoroughly rinse, and sand when dry. Feather remaining paint edges smooth with sandpaper. Remove oil and grease prior to cleaning. Schedule cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly painted surfaces.

3.2.1.3 Feather-edge sandpaper existing damaged, flaking, chipped, and blistered paint to provide a smooth imperceptible transition between existing and repaired paint areas. Fill holes, cracks and imperfections in finish surfaces with drywall joint compound, sealant or putty, as appropriate. Sandpaper smooth when dry.

3.2.1.4 Mask surfaces not required to be painted.

3.2.1.5 In addition to paint systems specified:

3.2.1.5.1 Kill mold and mildew with a commercial bleach solution of 5% sodium hypochlorite (NaOCl) in water, diluted 1-part bleach to 4-parts water to produce a 1% working bleach solution. Apply one light even coat to affected substrate by low-pressure tank sprayer and scrub into surface with a synthetic bristle brush. Let solution stand on surfaces approximately five minutes but do not allow to dry. Rinse thoroughly with clear water and dry. Repeat process at persistent mold and mildew areas.

3.2.1.5.2 Seal water stains, lipstick, smoke, crayons, knots or sap streaks, tannin staining from extractive woods, ball-point ink, felt tip marker, pencil marks, and other surface contamination which may bleed through paint, with white shellac or primer/sealer equivalent to ICI 3210-1200 Ultra-Hide Aquacrylic Gripper Stain Killer Primer-Sealer.

3.2.1.5.3 Provide barrier coats over incompatible primers or completely remove incompatible coatings and reprime as required.

3.2.1.6 Recoat primed and sealed surfaces with primer/sealer where evidence of suction spots or unsealed areas in first coat appears, to assure a finish coat with no burn through or other defects due to insufficient sealing. Omit primer on pre-primed and touched-up surfaces only when finish coats do not exhibit suction, adhesion, curing and similar problems that will not provide a fully cured durable coating.

3.2.2 Cementitious Materials: Remove efflorescence, chalk, dust, dirt, grease, oil, and release agents. Roughen as required to remove glaze. Determine that alkalinity and moisture content are within limits permitted by paint manufacturer. Concrete, cement plaster, and cement mortar must have cured at least 28-days prior to start of coating application.

3.2.3 Wood: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth finished surfaces exposed to view, and dust off. Sandpaper smooth when dried. Prime edges, ends and faces of wood required to be job-painted immediately upon delivery to Job.

3.2.4 Metals: Clean pre-primed or painted metal surfaces of grease, dirt, and other foreign substances by solvent or mechanical cleaning. Clean and touch up welds and damaged shop applied prime coats.

3.2.5 Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon

as practicable after preparation and before subsequent surface deterioration. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

3.2.6 Material Preparation: Mix and prepare painting materials in accordance with manufacturer's directions. Do not use paint materials produced by different manufacturers. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue. Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and strain material before using.

3.3 APPLICATION AND WORKMANSHIP

3.3.1 Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned tube radiation, grilles, reflections in windows and mirrors, and similar components and finishes are in place. Extend coatings in these areas as required to maintain the system integrity and provide desired protection. Match approved samples for color, texture, and coverage. Refinish or repaint work not complying with requirements.

3.3.1.1 The number of coats and film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the coating manufacturer. Sand between applications where sanding is required to produce an even smooth surface in accordance with the manufacturer's directions. Sand lightly between each succeeding enamel or varnish coat.

3.3.1.2 Apply additional coats and barrier coats when undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform sheen, finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.

3.3.1.3 Prime Coats: Before application of finish coats, apply a prime coat of material as recommended by the manufacturer to material that is required to be painted or finished and has not been prime coated by others. Clean and touch-up prime paint welds and other damaged areas of shop primed items.

3.3.1.4 Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

3.3.1.4.1 Use electrostatic spray equipment for application of prime and finish coats on painted metal surfaces or provide masking and temporary enclosures to prevent overspray on adjacent surfaces.

3.3.1.5 Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, nonspecular black paint.

3.3.1.6 Paint backs of access panels and removable or hinged covers to match exposed surfaces.

3.3.1.7 Drywall Stipple Enamel Finish: Roll and redistribute paint to an even and fine "orange-peel" texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surface imperfections.

3.3.1.8 Finish exterior doors on tops, bottoms, and side edges same as exterior faces.

3.3.1.9 Finish interior of wall and base cabinets and similar field-finished casework to match exterior.

3.3.1.10 Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment.

3.4 CLEAN-UP

3.3.1 During progress of work, remove from Site discarded paint materials, rubbish, cans and rags at end of each workday.

3.5 PROTECTION

3.5.1 Protect other work, whether to be painted or not, against damage by painting and finishing work. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to the City.

3.5.2 Post "Wet Paint" signs at newly painted areas. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

3.5.3 At completion of work of other trades, touch up and restore all damaged or defaced painted surfaces.

Section 10200
ALUMINUM LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 Section includes furnishing and installing aluminum louvers with bird screens.

1.3 RELATED WORK

1.3.1 Related Work of Other Sections:

1.3.1.1 Section 07110 – Bituminous Dampproofing.
1.3.1.2 Section 07900 – Joint Sealants.

1.3.1.3 Section 09250 – Gypsum Drywall Systems.

1.4 PERFORMANCE REQUIREMENTS

1.4.1 Structural Performance: Provide louvers capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.

1.4.2 Wind Loads: Provide louver system, including anchorage, capable of withstanding wind-load design pressures applicable to the Project based upon a 3 second gust wind speed of 110-miles per hour (49-meters per second) at 33-feet (10-meters) above grade (Exposure B, Importance Factor 1.15), according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.4.2, "Analytic Procedure," based on mean roof heights above grade indicated on the Drawings

1.4.3 Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1.4.3.1 Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4.4 Air-Performance, Water-Penetration, Air-Leakage, and Wind-Driven Rain Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.5 SUBMITTALS

1.5.1 Product Data: For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

1.5.2 Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.

1.5.2.1 For installed louvers and vents indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5.3 Samples for Initial Selection: For units with factory-applied color finishes.

1.5.4 Samples for Verification: For each type of metal finish required.

1.5.5 Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver.

1.6 QUALITY ASSURANCE

1.6.1 Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

1.6.2 Welding: Qualify procedures and personnel according to the following:

1.6.2.1 AWS D1.2, "Structural Welding Code--Aluminum."

1.7 PROJECT CONDITIONS

1.7.1 Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7.1.1 Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PRODUCT AND MANUFACTURER

2.1.1 Drainable Louvers: Provide extruded aluminum louvers, stationary, drainable blade type, as follows:

2.1.1.1 Subject to compliance with requirements, provide Construction Specialties, Inc., Model No. 4157, Airolite Model K 6776, or approved equivalent

2.1.1.2 Louver Depth: 4 inches (100 mm).

2.1.1.3 Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.080 inch (2.0 mm) for blades and 0.080 inch (2.0 mm) for frames.

2.1.1.4 Performance Requirements:

2.1.1.4.1 Free Area: Not less than 7.0 sq. ft. (0.65 sq. m) for 48-inch- (1.2-m-) wide by 48-inch- (1.2-m-) high louver.

2.1.1.4.2 Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 800-fpm (4.1-m/s) free-area velocity.

2.1.1.4.3 Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rain fall rate of 8 inches (200 mm) per hour and a wind speed of 50 mph (22.4 m/s) at a core area intake velocity of 500 fpm (2.5 m/s).

2.1.1.5 AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.1.2 Bird Screens: Provide manufacturer's standard bird screens in rewireable aluminum frames, finished to match louvers.

2.2 BLANK-OFF PANELS

2.2.1 Insulated, Blank-off Panels: Laminated metal-faced panels consisting of insulating core surfaced on back and front with metal sheets.

2.2.1.1 Thickness: 1 inch (25 mm) 2 inches (50 mm).

2.2.1.2 Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch (0.8-mm) nominal thickness.

2.2.1.3 Insulating Core: Unfaced mineral-fiber or foamed-plastic rigid insulation board.

2.2.1.4 Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard extruded-aluminum-channel frames, not less than 0.080-inch (2.0-mm) nominal

thickness, with corners mitered and with same finish as panels.

2.2.1.5 Seal perimeter joints between panel faces and louver frames with 1/8-by-l-inch (3.2-by-25-mm) PVC compression gaskets.

2.2.1.6 Panel Finish: Same finish applied to louvers.

2.2.1.7 Attach blank-off panels to back of louver frames with stainless-steel sheet metal screws.

2.3 ALUMINUM FINISH

2.3.1 General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

2.3.2 Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

2.3.3 Exterior High-Performance Organic Finish (3-Coat Fluoropolymer): AA-C12C40R1x (Chemical finish: cleaned with inhibited chemicals; Chemical finish: conversion coatings; Organic Coating: manufacturer's standard 3-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2605 – "Voluntary Specification, performance Requirements and Test Procedures for Superior Performance Organic Coatings on Aluminum Extrusions and Panels" and with coating and resin manufacturers' written instructions.

2.3.3.1 Color: Provide color to match manufactured metal roof panels as approved by the City.

2.4 FABRICATION, GENERAL

2.4.1 Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

2.4.2 Maintain equal louver blade spacing to produce uniform appearance.

2.4.3 Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

2.4.4 Include supports, anchorages, and accessories required for complete assembly.

2.4.5 Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 60 inches (1524 mm) o.c., whichever is less.

2.4.6 Join frame members to each other and to fixed louver blades with fillet welds concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.4.7 Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1 Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

3.1.1.1 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

3.2.1 Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

3.3.1 Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

3.3.2 Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

3.3.3 Form closely fitted joints with exposed connections accurately located and secured.

3.3.4 Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

3.3.5 Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return

items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

3.3.6 Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

3.4.1 Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.

3.4.2 Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

3.4.3 Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by the City, remove damaged units and replace with new units.

3.4.4 Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

3.0 Performance Time:

3.1 The Contractor shall have 60 calendar days to complete all work associated with this project after receipt of the Notice – To - Proceed.

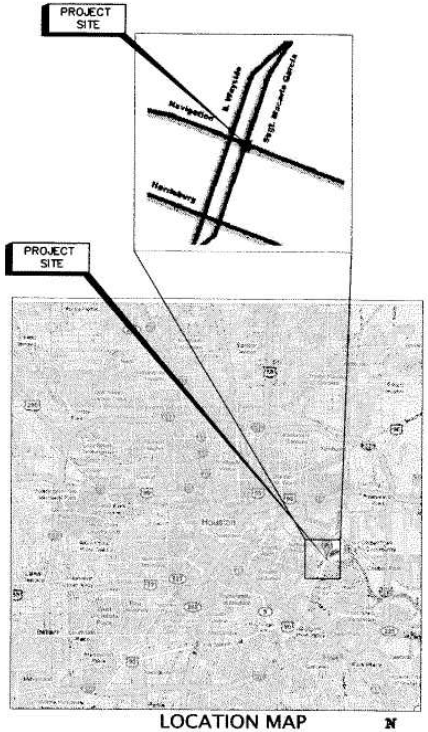
4.0 Drawings:

4.1 Structural drawings seen below beginning on page 185 to page 195

A PDF version of the Structural Drawings can also be viewed on the following web Link
https://purchasing.houstontx.gov/buyer/BidDocumentManager.aspx?id=C23242

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

FIRE STATION 20
RENOVATIONS
XXX XXXXXX HOUSTON TX



LOCATION MAP

N

NATEX CORPORATION ARCHITECTS

2500 WILCREST, SUITE 300
HOUSTON, TEXAS 77042

TELEPHONE: 713-975-9525
FAX: 713-780-7824

MAYOR
BILL WHITE

CONTROLLER
ANNISE D. PARKER

DISTRICT COUNCIL MEMBERS

TONY LAWRENCE
DISTRICT A

JARVIS JOHNSON
DISTRICT B

ANNE CLUTTERBUCK
DISTRICT C

WANDA ADAMS
DISTRICT D

MIKE SULLIVAN
DISTRICT E

M.J KAHN
DISTRICT F

PAM HOLM
DISTRICT G

?
DISTRICT H

JAMES G. RODRIGUEZ
DISTRICT I

AT-LARGE COUNCIL MEMBERS

PETER BROWN
POSITION 1

SUE LOVELL
POSITION 2

MELISSA NORIEGA
POSITION 3

RONALD D. GREEN
POSITION 4

JOLANDA JONES
POSITION 5

PHIL BORISKIE
CHIEF, HOUSTON FIRE DEPARTMENT

CONTRACTING AUTHORITY
FOR THE
CITY OF HOUSTON:

GENERAL SERVICES DEPARTMENT
ISSA DADOUSH, DIRECTOR

CITY DWG. NO:_____

SHEET NO. 001 OF XXX SHEETS

INDEX OF DRAWINGS

SHT. NO.	DWG. NO.	TITLE
		GENERAL
001	G-001	COVER
002	G-002	INDEX OF DRAWINGS AND PROJECT DATA SHEET
		STRUCTURAL
003	S-101	STRUCTURAL GENERAL CRITERIA
004	S-201	EXISTING FOUNDATION AND FIRST FLOOR PLAN
005	S-202	EXISTING SECOND FLOOR FRAMING PLAN
006	S-203	EXISTING ROOF FRAMING PLAN
007	S-501	FOUNDATION DETAILS
008	S-601	WALL SECTIONS
009	S-602	FRAMING DETAILS
010	S-603	FRAMING DETAILS
		ARCHITECTURAL
011	A-101	ARCHITECTURAL SITE PLAN
012	A-102	ARCHITECTURAL MASTER 1ST FLOOR PLAN / MEZZANINE PLAN
013	A-103	ARCHITECTURAL MASTER 2ND FLOOR PLAN
014	A-201	BUILDING ELEVATIONS
015	A-202	BUILDING ELEVATIONS
016	A-301	ROOF PLAN
017	A-401	EXTERIOR WALL SECTIONS
018	A-402	EXTERIOR WALL SECTIONS
019	A-601	DOOR & WINDOW SCHEDULE

NET BUILDING AREA:

NET BUILDING AREA		
EXISTING BLDG		
ROOM #	ROOM NAME	GROSS SQ. FT.
	APPARATUS BAY	2816
	BUILDING	5335
	TOTAL	8151
ACTUAL BLDG		
ROOM #	ROOM NAME	GROSS SQ. FT.
101	APPARATUS BAY	3315
102	CLEAN RM	85
104	MECANICAL RM	335
105	AXI. GENERATOR	67
106	VENDING AREA	45
107	STORAGE	70
201	LOUNGE	852
202	KITCHEN	358
203	DORMITORY	600
204	LOCKER RM	550
205	CREW REST RM	180
206	WOMAN'S REST RM	100
207	SHIEF/CAPTAIN RM	278
208	STUDY RM.	140
209	CAPTAIN'S RM	98
210	CAPTAIN'S RM	98
211	CAPTAIN QRTS	205
212	OFFICER REST RM	80
213	MOP RM	157
214	STAIR LANDING	155
215	STORAGE	36
216	CORRIDOR	107
001	WATCH OFFICE	259
002	MECHANICAL RM	165
	TOTAL	8335

CAPTAIN'S ROOM

CODE ANALYSIS - FIRE STATION 20

APPLICABLE BUILDING CODES:

1. 2003 INTERNATIONAL BUILDING CODE
2. 2003 INTERNATIONAL FIRE CODE
3. 2000 UNIFORM MECHANICAL CODE
4. 2000 UNIFORM PLUMBING CODE
5. 2002 NATIONAL ELECTRICAL CODE
6. 2000 INTERNATIONAL ENERGY CONSERVATION CODE
7. IECC CODE
8. TEXAS ACCESSIBILITY STANDARDS
9. AMERICANS WITH DISABILITIES ACT

OCCUPANCY TYPE:

GROUP B FIRE STATION

CONSTRUCTION TYPE:

TYPE II B

HEIGHT AND NUMBER OF STORIES:

IBC TABLE 503 - MAXIMUM HEIGHT OF BUILDINGS

OCCUPANCY	B
CONSTRUCTION TYPE	II-B
BASIC HEIGHT ALLOWABLE(IN STORIES)	4
INCREASE SPRINKLERS ALLOWABLE(IN STORIES)	-
SUBTOTAL (IN STORIES)	4
MAX. HEIGHT ALLOWABLE(IN FT)	65

LOCATION OF PROPERTY:

BUILDING/ OCCUPANCY	NO OF OPEN SIDES	NORTH	SOUTH	EAST	WEST
FIRE STATION	4	35'-0"	107'-5"	0'-0"	32'-0"

ALLOWABLE FLOOR AREA:

IBC TABLE 5-B

BASIC ALLOWABLE AREA (SF)	23,000
EXISTING BUILDING (SF)	8151
ACTUAL (SF)	8335

FIRE PROTECTION REQUIREMENT:

FIRE RESISTIVE REQUIREMENTS
IBC TABLE 601
TYPE II-B

BUILDING COMPONENT	PROTECTION RATING
EXTERIOR BEARING WALLS	0
INTERIOR BEARING WALLS	0
EXTERIOR NON-BEARING WALLS	2(0)+0
STRUCTURAL FRAME	0
PARTITIONS PERMANENT	0
SHAFT ENCLOSURES	0
FLOORS	0
ROOFS	0
EXTERIOR DOORS / WINDOWS	2(0)+0
STAIRWAY CONSTRUCTION	N/A
AREA SEPARATION WALLS	1 HR
EXIT CORRIDOR WALLS	0
EXIT CORRIDOR DOORS	NON RATED
EXIT CORRIDOR WINDOWS	NON RATED
EXIT ENCLOSURE	N/A
EXIT ENCLOSURE OPENINGS	NOT REQUIRED
NUMBER OF EXITS	1-500+2
EXIT ACCESS TRAVEL DISTANCE	200 FT

OCCUPANT LOAD/ MEANS OF EGRESS:

ACCESSORY USE AREAS (OFFICES, RESTROOMS, MECHANICAL ROOMS) THAT ORDINARILY ARE USED ONLY BY PERSONS WHO OCCUPY THE MAIN AREAS OF AN OCCUPANCY SHALL BE PROVIDED WITH MEANS OF EGRESS AS THOUGH THEY ARE COMPLETELY OCCUPIED, BUT THEIR OCCUPANT LOAD NEED NOT BE INCLUDED WHEN COMPUTING THE TOTAL OCCUPANT LOAD OF THE BUILDING. THE FOLLOWING TABLE DOES INCLUDE THE ACCESSORY USE AREAS MENTIONED ABOVE.

A. OCCUPANT LOAD

IBC TABLE 1003.2.2.2

B. OCCUPANCIES

SPACE OR ROOM	GROSS FLOOR AREA (SF)	OCCUP. LOAD FACTOR (SF/PER)	OCCUP. LOAD (SF/PER)	ACTUAL OCCUPANCY
(ACTUAL) DORMITORY	600	50	12	11
(ACTUAL) CAPTAIN	98	50	2	1
(ACTUAL) CAPTAIN	98	50	2	1
(ACT.) SHIEF/CAPTAIN	278	50	6	1
		TOTAL	19	14

B. EXIT WIDTH REQUIREMENTS

OCCUPANT LOAD FOR 100: TOTAL OCCUPANT LOAD FOR EXIT CALCULATIONS. EXIT WIDTH CALCULATIONS REQUIRED 100=.2=20 CLEAR WIDTH IN INCHES (20/36 I.E. OF EXIT DOORS REQUIRED. PROVIDE MINIMUM OF 3'-0"x6'-8" DOOR AND 32-INCHES CLEAR WIDTH SWING IN DIRECTION OF TRAVEL

C. EXIT CORRIDORS:

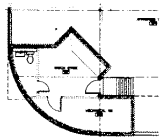
MINIMUM WIDTH 44 INCHES
MINIMUM HEIGHT 7 FEET
EXTRA STAIRS: ADDITIONAL STAIRS

D. PANIC HARDWARE: SECTION 1007.3.10

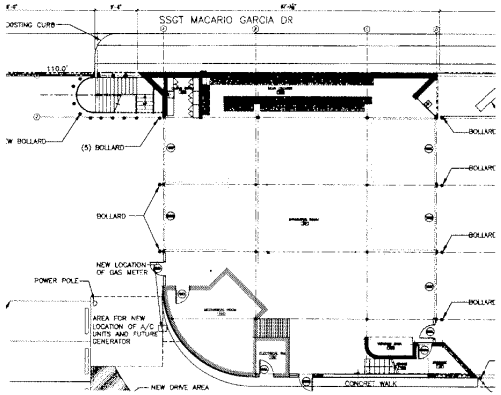
EXIT DOORS SERVING AN OCCUPANT LOAD OF 50 OR MORE SHALL NOT BE EQUIPPED WITH A LATCH OR LOCK UNLESS IT IS PANIC HARDWARE

PLUMBING FIXTURE SCHEDULE:

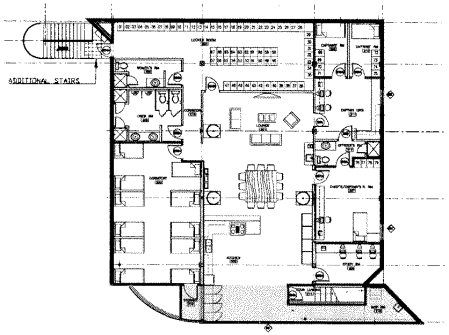
PLUMBING FIXTURE	MALE		FEMALE		UNISEX	
	REQ.	PROVIDED	REQ.	PROVIDED	REQ.	PROVIDED
WATER CLOSET	1	3 EXISTING	1	1 PROVIDED	-	1 PROVIDED
URINAL	-	2 EXISTING	-	-	-	-
LAVATORY	1	3 EXISTING	1	1 PROVIDED	-	-
BATHTUB/ SHOWER	-	3 EXISTING	1	1 PROVIDED	-	-
DRINKING FOUNTAIN	0		0			
SERVICE SINK	1		1 PROVIDED			



C1 MEZZANINE PLAN
SCALE: 3/32"=1'-0"



C1 FIRST FLOOR PLAN
SCALE: 3/32"=1'-0"



C1 SECOND FLOOR PLAN
SCALE: 3/32"=1'-0"

ISSUE LOG

NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

NATEX CORPORATION ARCHITECTS
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TELEPHONE: 713-975-9525
FAX: 713-780-7824

SEAL(S):

REGISTERED ARCHITECT
04/06/09
TEXAS

PROJECT NAME:
FIRE STATION 20
RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:

PROJECT MANAGER | SPONSORING DEPARTMENT
PROJECT MANAGER

OTHER APPROVALS:

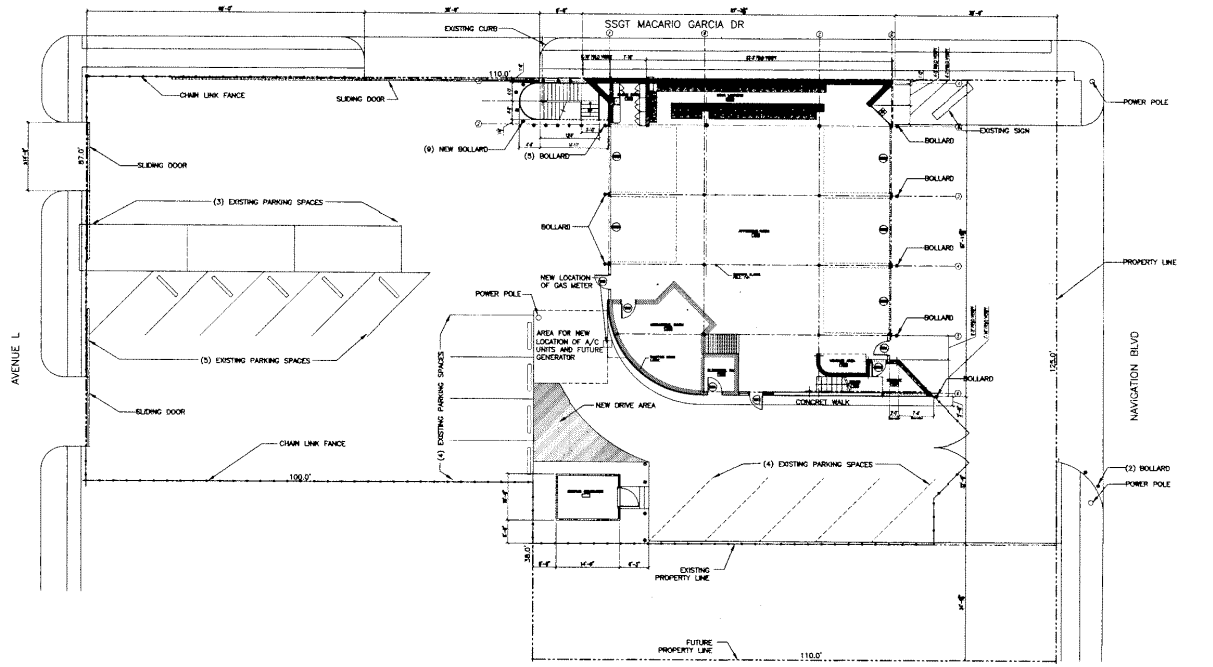
WATER TRANSFERRE | WASTE AND TRANSPORTATION
MECHANICAL ENGINEERING | STREET, BRIDGE & ROW ENGINEERING
STORMWATER ENGINEERING | PLUMBING & ENGINEERING
CITY ENGINEER | DATE
DIRECTOR, DEPT. OF PUBLIC WORKS & ENGINEERING | DATE

DATE: 03/10/09
W.B.S. No.: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: YA
CHECKED BY: CAROLINA WEITZMAN

SHEET TITLE:
INDEX AND PROJECT DATA SHEET

SHEET NO.: G-002
02 OF XX SHEETS

CITY DWG. NO.:



A1 SITE PLAN
SCALE: 1"=10'-0"

ISSUE LOG		
NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

NATEX CORPORATION ARCHITECTS
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HOUSTON, TEXAS 77042
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SEAL(S):

REGISTERED ARCHITECT
CAROLINA WEITZMAN
STATE OF TEXAS

PROJECT NAME:
FIRE STATION 20 RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:

OTHER APPROVALS:

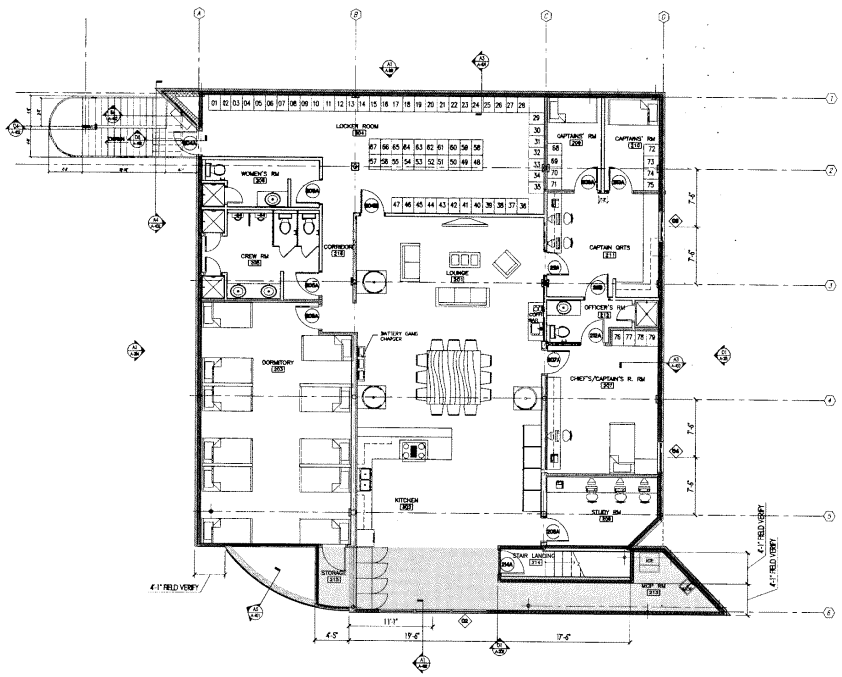
DATE: 03/10/09
W.B.S. No: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: YA
CHECKED BY: CAROLINA WEITZMAN

SHEET TITLE: ARCHITECTURAL SITE PLAN

SHEET NO.:
011 OF XX SHEETS

CITY DWG. NO.:
A-101

062



A1 SECON FLOOR PLAN
SCALE: 3/16"=1'-0"

DRAWING SYMBOL LEGEND

SYMBOL	DESCRIPTION
A	ALPHA/NUMERIC CHARACTER COLUMN CENTER LINE
A1 / A-201	DETAIL NUMBER ON SHEET WHERE SHOWN BUILDING/WALL SECTION DRAWING NUMBER WHERE DETAIL IS FIRST SHOWN
A1 BILL DETAIL SCALE 1/4"=1'-0"	DETAIL NUMBER DETAIL TITLE DETAIL DESIGNATOR DETAIL SCALE
	ELEV. NUMBER ELEVATION SHEET # WHERE ELEV. IS SHOWN
ROOM 101	ROOM NAME ROOM NUMBER
100A	DOOR NUMBER DOOR MARK
100	WINDOW NUMBER WINDOW MARK
2	NOTE NUMBER NOTE NUMBER SYMBOL
1	PARTITION TYPE RE: 711
	EXISTING CMU WALL W/ NEW STUCCO FACE
	EXISTING CMU WALL W/ BRICK FACE
	NEW CMU WALL W/ STACCO FACE
	NEW CMU WALL W/ NEW BRICK FACE
	STUCCO WALL ON METAL STUDS RE: WALL SECTIONS
	GYPSUM DRYWALL PARTITION
	FIRE WALL
	BATT INSULATION SMALL SCALE EXTERIOR WALL
	BATT INSULATION LARGE SCALE EXTERIOR WALL

N

ISSUE LOG

NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

NATEX CORPORATION ARCHITECTS
2500 WILCREST, SUITE 300
HOUSTON, TEXAS 77042
TELEPHONE: 713-978-9525
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SEAL(S):

REGISTERED ARCHITECT
04/09/09
7425
STATE OF TEXAS

PROJECT NAME:
FIRE STATION 20
RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:

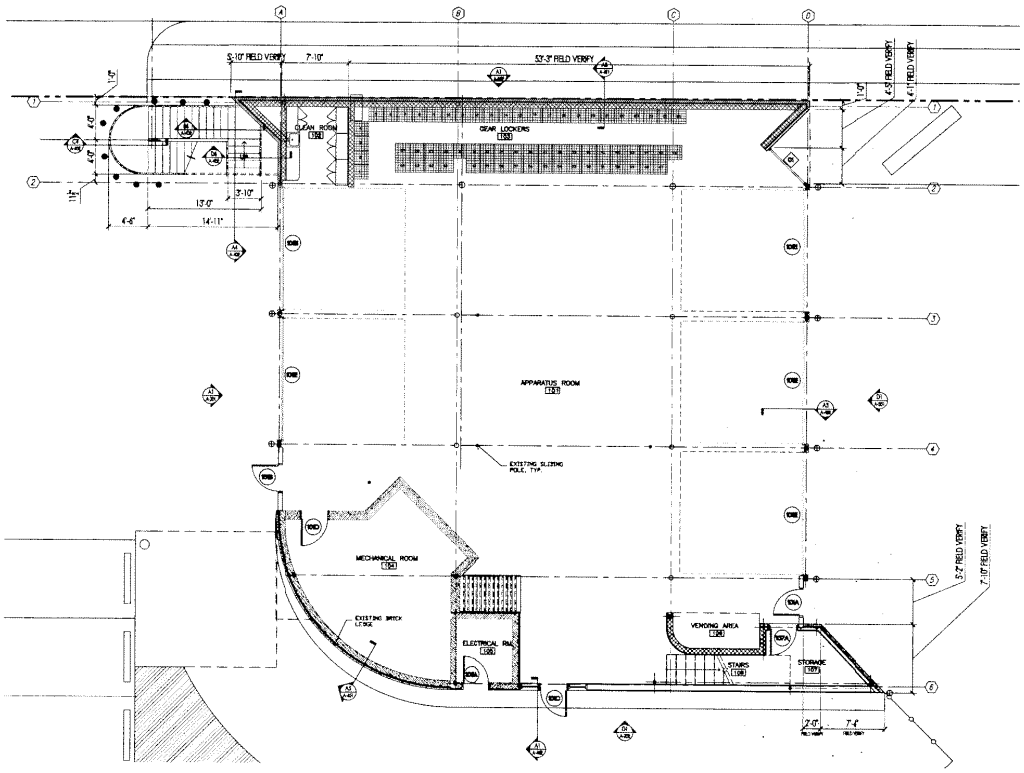
OTHER APPROVALS:

DATE: 03/10/09
W.B.S. No: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: YA
CHECKED BY: CAROLINA WEITZMAN

SHEET TITLE: ARCHITECTURAL MASTER FLOOR PLAN 2ND FLOOR

SHEET NO.: **A-103**
013 OF XX SHEETS

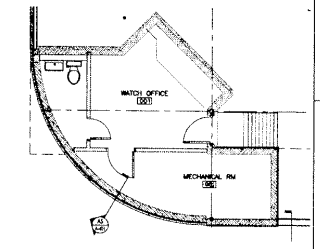
CITY DWG. NO.:



A1 1ST FLOOR PLAN
SCALE: 3/16"=1'-0"

DRAWING SYMBOL LEGEND

SYMBOL	DESCRIPTION
A	ALPHA/NUMERIC CHARACTER
	COLUMN CENTER LINE
A1 / A-201	DETAIL NUMBER ON SHEET WHERE SHOWN
	BUILDING/WALL SECTION
	DRAWING NUMBER WHERE DETAIL IS FIRST SHOWN
A1 SILL DETAIL SCALE: 1"=1'-0"	DETAIL NUMBER
	DETAIL TITLE
	DETAIL DESIGNATOR
	DETAIL SCALE
	ELEV. NUMBER ELEVATION
	SHEET # WHERE ELEV. IS SHOWN
ROOM 101	ROOM NAME
	ROOM NUMBER
100A	DOOR NUMBER
	DOOR MARK
01	WINDOW NUMBER
	WINDOW MARK
2	NOTE NUMBER
	NOTE NUMBER SYMBOL
1	PARTITION TYPE RE: 711
	EXISTING CMU WALL W/ NEW STUCCO FACE
	EXISTING CMU WALL W/ BRICK FACE
	NEW CMU WALL W/ STACCO FACE
	NEW CMU WALL W/ NEW BRICK FACE
	STUCCO WALL ON METAL STUDS RE: WALL SECTIONS
	GYPSUM DRYWALL PARTITION
	FIRE WALL
	BATT INSULATION SMALL SCALE EXTERIOR WALL
	BATT INSULATION LARGE SCALE EXTERIOR WALL



A5 MEZZANINE FLOOR PLAN
SCALE: 3/16"=1'-0"

ISSUE LOG

NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

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SEAL(S):

REGISTERED ARCHITECT
04/09/09
STATE OF TEXAS

PROJECT NAME:
FIRE STATION 20 RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:

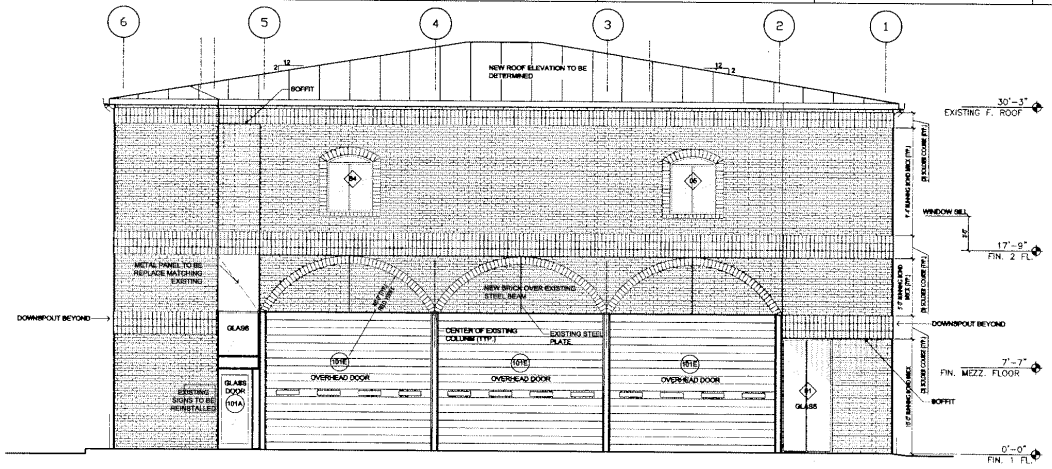
OTHER APPROVALS:

DATE: 03/10/09
W.B.S. No.: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: YA
CHECKED BY: CAROLINA WEITZMAN

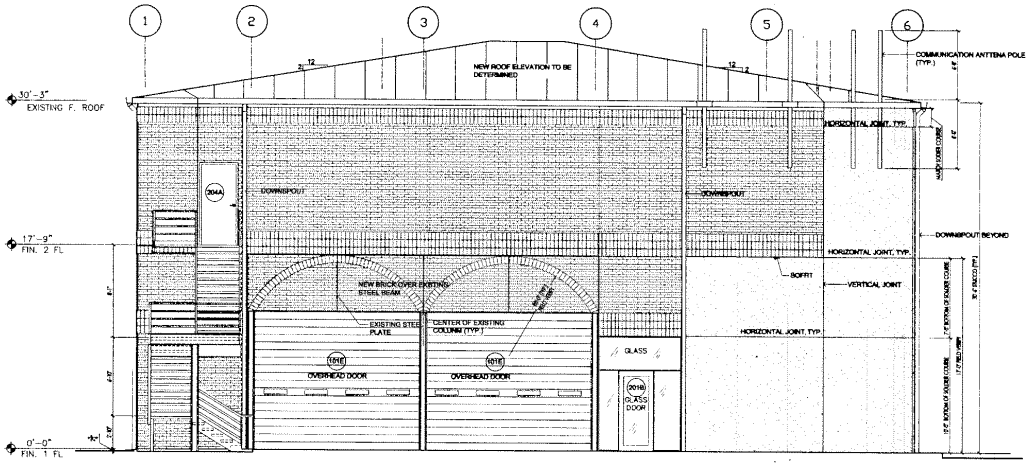
SHEET TITLE: ARCHITECTURAL MASTER 1ST FLOOR PLAN / MEZZANINE PLAN

SHEET NO.: **A-102**
012 OF XX SHEETS

CITY DWG. NO.:



C1 BUILDING NORTH ELEVATION
SCALE: 1/4"=1'-0"



A1 BUILDING SOUTH ELEVATION
SCALE: 1/4"=1'-0"

ISSUE LOG		
NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

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SEAL(S):

REGISTERED ARCHITECT
04/09/09
9823
STATE OF TEXAS

PROJECT NAME:
FIRE STATION 20 RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:

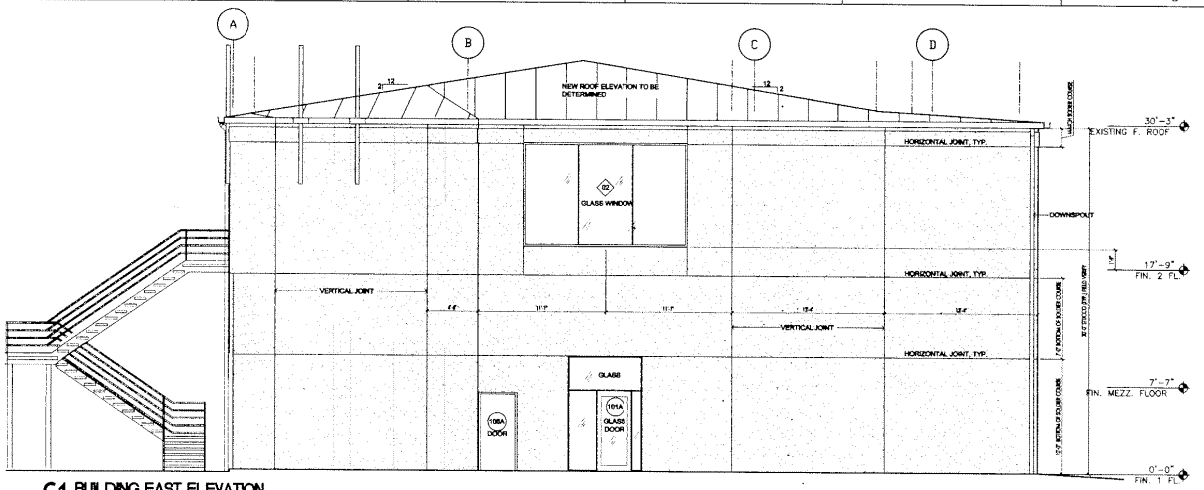
OTHER APPROVALS:

DATE: 03/10/09
W.B.S. No: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: YA
CHECKED BY: CAROLINA WEITZMAN

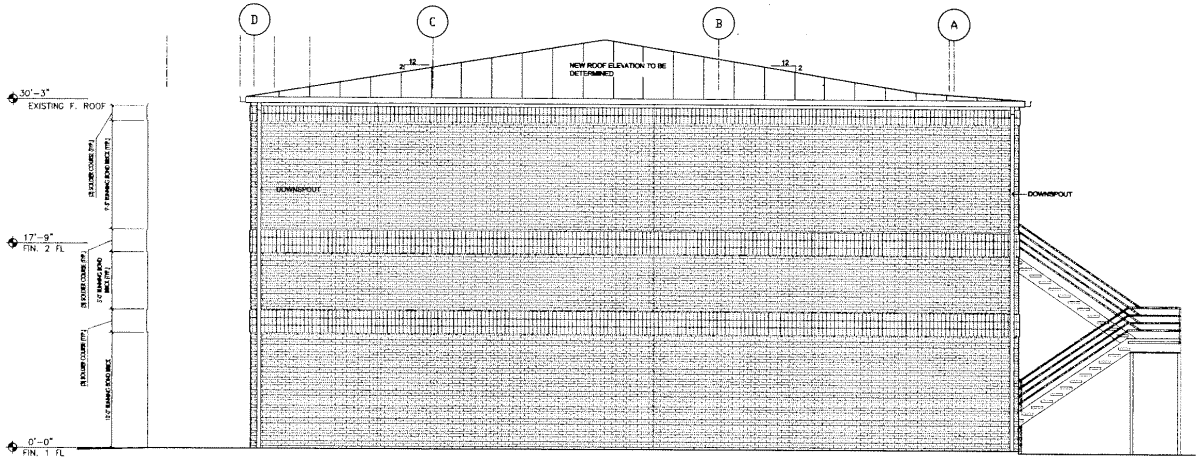
SHEET TITLE:
BUILDING ELEVATIONS

SHEET NO.:
014 OF XX SHEETS

CITY DWG. NO: **A-201**



C1 BUILDING EAST ELEVATION
SCALE: 1/4"=1'-0"



A1 BUILDING WEST ELEVATION
SCALE: 1/4"=1'-0"

ISSUE LOG

NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

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FAX: 713-780-7824

SEAL(S):

REGISTERED ARCHITECT CAROLINA WEITZMAN 04/09/09 3613 STATE OF TEXAS

PROJECT NAME:
FIRE STATION 20 RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:
PROGRAM MANAGER
SPONSORING DEPARTMENT
PROJECT MANAGER

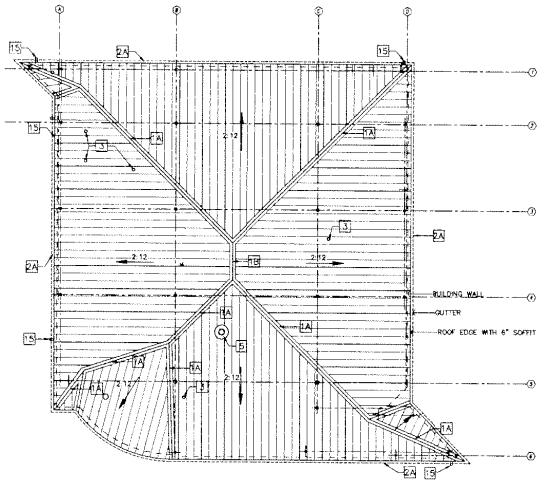
OTHER APPROVALS:
WATER CONSERVATION
TRAFFIC AND TRANSPORTATION
WASTEWATER CONSERVATION
STREET, BRIDGE & ROW DEPARTMENT
STORMWATER CONSERVATION
PLANNING & DEVELOPMENT
CITY ENGINEER
DATE
DIRECTOR, DEPT OF PUBLIC WORKS & ENGINEERING
DATE

DATE: 03/10/09
W.B.S. No.: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: YA
CHECKED BY: CAROLINA WEITZMAN

SHEET TITLE:
BUILDING ELEVATIONS

SHEET NO.:
015 OF XX SHEETS

CITY DWG. NO.: **A-202**



C1 ROOF PLAN
SCALE: 1/8"=1'-0"

NOTES TO DRAWING

- 1A CONTINUOUS RIDGE CAP, NON VENTILATED.
- 1B CONTINUOUS RIDGE CAP, VENTILATED.
- 2A CONTINUOUS METAL GUTTER
- 3 4" VTR. RE: SPEC
- 4 CONTINUOUS VALLEY GUTTER
- 5 12" DUCT DOWN TO KITCHEN HOOD. RE: SPEC
- 6 4" VTR. RE: SPEC
- 7 7" VENT RE: SEPC
- 1S DOWNSPOUT. TYP. CONTRACTOR SHALL INCLUDE IN PROJECT A SPLASH BLOCK AT EACH DOWNSPOUT.

N

ISSUE LOG

NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

NATEX CORPORATION ARCHITECTS
2500 WILCREST, SUITE 300
HOUSTON, TEXAS 77042
TELEPHONE: 713-976-9525
FAX: 713-780-7824

SEAL(S):

REGISTERED ARCHITECT
STATE OF TEXAS
04/09/09
18424

PROJECT NAME:
FIRE STATION 20 RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:
PROJECT MANAGER
PROJECT MANAGER

OTHER APPROVALS:
WATER (SANITARY)
WASTEWATER (SANITARY)
STORM (OF DRAINAGE)
CITY ENGINEER
DATE
DIRECTOR, DIV. OF PUBLIC WORKS & ENGINEERING
DATE

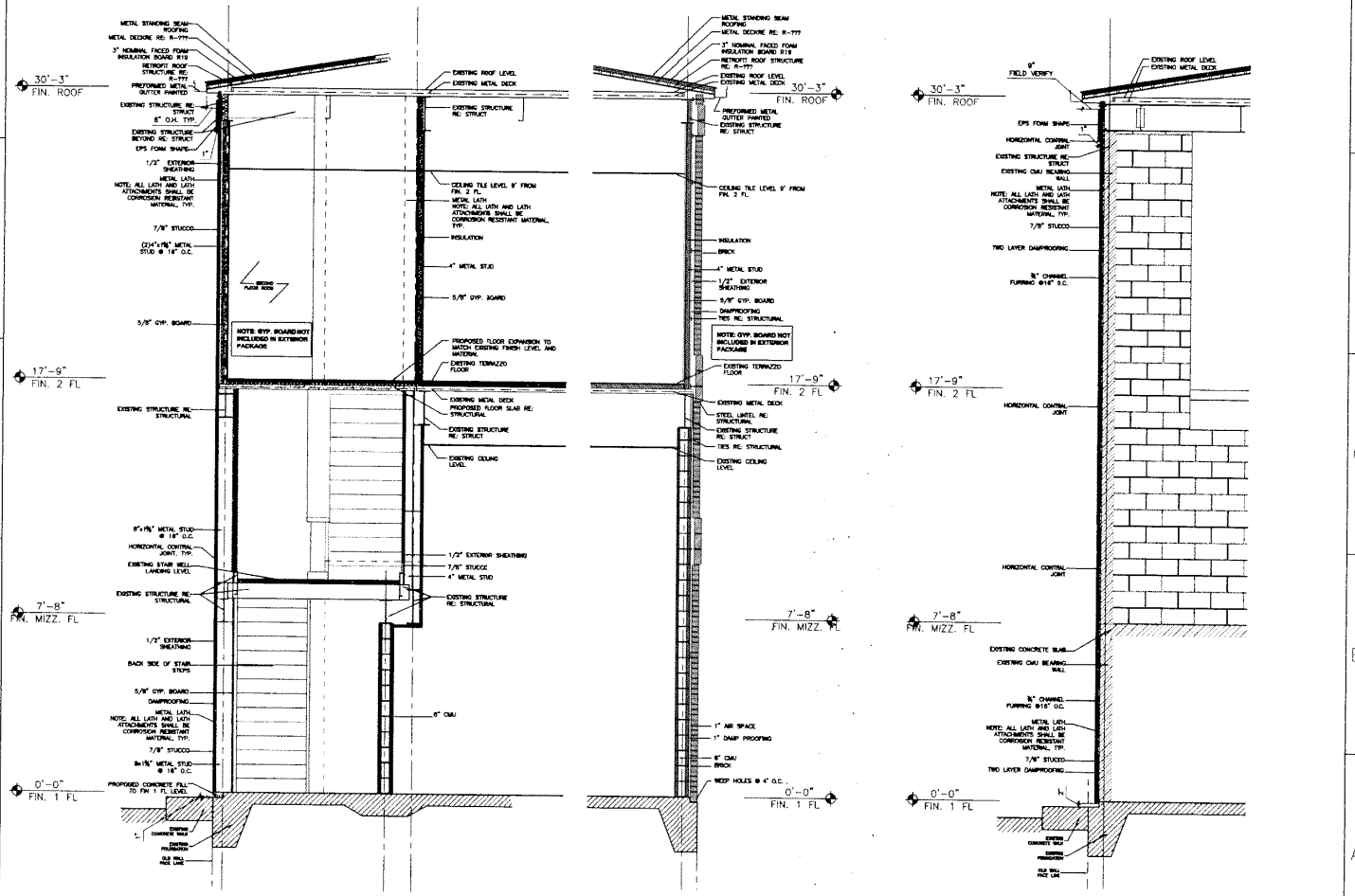
DATE: 03/10/09
W.B.S. No: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: YA
CHECKED BY: CAROLINA WEITZMAN

SHEET TITLE:
ROOF PLAN

SHEET NO.:
016 OF XX SHEETS

CITY DWG. NO.:
A-301

DESIGN FILE:



A1 STUCCO WALL • EXISTING STAIR WELL
SCALE: 1/2"=1'-0"

A3 WEST CMU WALL WITH BRICK FACE
SCALE: 1/2"=1'-0"

A5 EXISTING CMU WALL WITH STUCCO FACE
SCALE: 1/2"=1'-0"

ISSUE LOG

NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

NATEX CORPORATION ARCHITECTS
2500 WILCREST, SUITE 300
HOUSTON, TEXAS 77042
TELEPHONE 713-975-9525
FAX: 713-780-7824

SEAL(S):

REGISTERED ARCHITECT PROFESSIONAL SEAL 04/09/09 15630 STATE OF TEXAS

PROJECT NAME:
FIRE STATION 20 RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:

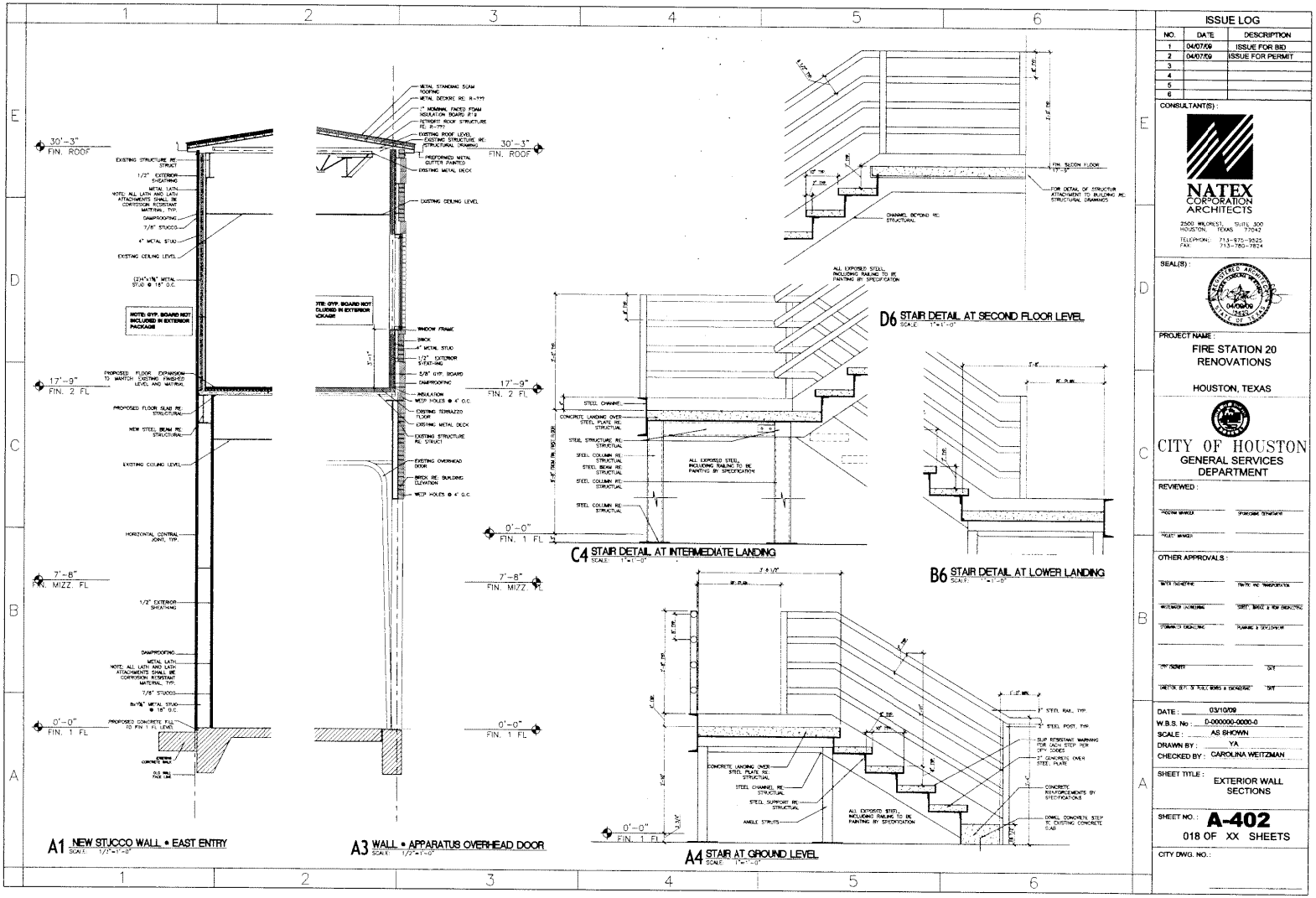
OTHER APPROVALS:

DATE: 03/10/09
W.B.S. No.: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: YA
CHECKED BY: CAROLINA WEITZMAN

SHEET TITLE:
EXTERIOR WALL SECTIONS

SHEET NO.:
017 OF XX SHEETS

CITY DWG. NO.:
A-401



ISSUE LOG		
NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

NATEX CORPORATION ARCHITECTS
2500 WILCREST, SUITE 300
HOUSTON, TEXAS 77042
TELEPHONE: 713-975-9525
FAX: 713-780-7824

SEAL(S):

REGISTERED ARCHITECT JOHN W. NATEX 04/09/09 STATE OF TEXAS

PROJECT NAME:
FIRE STATION 20 RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:

PROGRAM MANAGER — SUPERVISING DIVISION MANAGER
PROJECT MANAGER

OTHER APPROVALS:

WATER DISTRICT — TRAFFIC AND TRANSPORTATION
WASTEWATER ENGINEERING — STREET, BRIDGE & ROW ENGINEERING
STORMWATER ENGINEERING — PLANNING & DEVELOPMENT
CITY ENGINEER — DATE
HARRIS CNTY. OF PUBLIC WORKS & ENGINEERING — DATE

DATE: 03/10/09
W.B.S. No.: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: YA
CHECKED BY: CAROLINA WEITZMAN

SHEET TITLE: EXTERIOR WALL SECTIONS

SHEET NO.: **A-402**
018 OF XX SHEETS

CITY DWG. NO.:

DOOR AND FRAME SCHEDULE

DOOR NO.	DOOR TYPE	DOOR SIZE WD	DOOR SIZE HGT	DOOR SIZE THK	DOOR MATERIAL	DOOR GLAZING	FRAME MATERIAL	FRAME DETAIL HEAD	FRAME DETAIL JAMB	FRAME DETAIL SILL	FIRE RATING	HARDWARE SET NO.	HARDWARE KEYSIDE RM NO.	NOTES
101A	—	—	—	—	—	—	—	—	—	—	NON RATED	01	OUTSIDE ENTRANCE	EXISTING TO REMAIN IN SAME LOCATION
101B	A	—	—	1-3/4"	ALUM. ANODIZED	TEMPERED	ALUM. ANODIZED	C4/A-605	A2/A-605	A4/A-605	NON RATED	—	OUTSIDE ENTRANCE	RE: TYPE FOR FRAME DIMENSIONS
101C	—	—	—	—	—	—	—	—	—	—	NON RATED	—	OUTSIDE ENTRANCE	EXISTING RE: PLAN FOR NEW LOCATION
105A	—	—	—	—	—	—	—	—	—	—	NON RATED	—	OUTSIDE	EXISTING TO REMAIN IN SAME LOCATION
101E	—	—	—	—	—	—	—	—	—	—	NON RATED	—	OUTSIDE	EXISTING TO REMAIN IN SAME LOCATION
204A	B	3'-0"	7'-0"	1-3/4"	HOLLOW METAL PAINTED	—	HOLLOW METAL PAINTED	B5/A-605	—	A5/A-605	NON RATED	—		

PROVIDE ALTERNATE PRICE FOR REPLACING EXISTING DOORS AND WINDOWS, MATCHING EXISTING DIMENSION AND MATERIALS.
PROVIDE PRICE TO REINSTALL ALL EXISTING DOORS AND WINDOWS.

GLAZING: U FACTOR OF 0.58, SHGC OF 0.3

D1 DOOR SCHEDULE
SCALE: N.T.S.

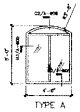
WINDOW SCHEDULE

MARK	SIZE WIDTH	SIZE HEIGHT	TYPE	MATERIAL	GLAZING	NOTES	
01	—	—	—	—	—	EXISTING, PROVIDE PRISE FOR NEW GLASS PANEL TO MATCH EXISTING	
02	—	—	—	—	—	EXISTING RE: FLOOR PLAN FOR NEW LOCATION	
04	4'-0"	5'-0"	A	ANODIZED ALUM. FRAME	DOUBLE PANEL INSULATED	—	OPERABLE
05	4'-0"	5'-0"	A	ANODIZED ALUM. FRAME	DOUBLE PANEL INSULATED	—	OPERABLE

PROVIDE ALTERNATE PRICE FOR REPLACING EXISTING DOORS AND WINDOWS, MATCHING EXISTING DIMENSION AND MATERIALS.
PROVIDE PRICE TO REINSTALL ALL EXISTING DOORS AND WINDOWS.

GLAZING: U FACTOR OF 0.58, SHGC OF 0.3

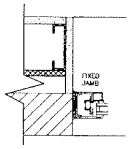
C1 WINDOW SCHEDULE
SCALE: N.T.S.



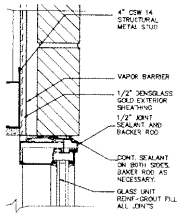
B1 WINDOW TYPES
SCALE: 1/4" = 1'-0"

C2 HEAD DETAIL
SCALE: 3" = 1'-0"

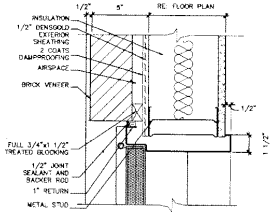
B2 SILL DETAIL
SCALE: 3" = 1'-0"



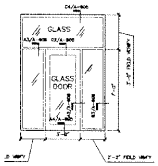
B3 JAMB DETAIL
SCALE: 3" = 1'-0"

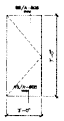


C4 HEAD DETAIL
SCALE: 3" = 1'-0"

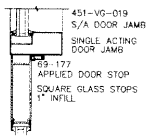


B5 HEAD DETAIL
SCALE: 3" = 1'-0"





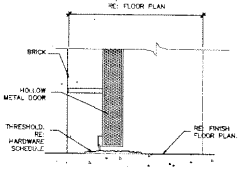
A1 DOORTYPES
SCALE: 1/4" = 1'-0"



A2 JAMB DETAIL
SCALE: 3" = 1'-0"

A3 HORIZONTAL DETAIL
SCALE: 3" = 1'-0"

A4 SILL DETAIL
SCALE: 3" = 1'-0"



A5 SILL DETAIL
SCALE: 3" = 1'-0"

SPECWORKS #87115-EPS2081005

HW SET 01
DOOR NUMBER:
101A 101C 101E 105A

EACH TO HAVE:

1		MUTE	EXISTING DOOR, FRAME & HARDWARE TO REMAIN	BAO

HW SET 02
DOOR NUMBER
101B

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	112HD	628	IVE
1	EA	DEADLOCK	MS1850S - ADVISE BACKSET	626	ADA
2	EA	MORTISE CYLINDER	MATCH EXISTING KEY SYSTEM	626	BAO
1	EA	EXIT INDICATOR	4204	626	ADA
1	EA	PULL PLATE/BAR	L9040-NO	630	IVE
1	EA	SURFACE CLOSER	1461 CUSH FC	689	LCN
1	EA	MOUNTING PLATE	1460-SPACY AS REQD	689	LCN
1	EA	CUSH SHOE SUPPORT	1460-CH X AS REQD	689	LCN
1	EA	BLADE STOP SPACER	1460-S X AS REQD	689	LCN
1	SET	SEALS	BY DOOR MANUFACTURER		BYD
1	EA	DOOR SWEEP	18NA	AL	NGP
1	EA	THRESHOLD	513	AL	NGP

HW SET 03
DOOR NUMBER
204A

EACH TO HAVE:

3	EA	HINGE	NB5194W 4.5 X 4.5 NRP	630	IVE
1	EA	PANIC DEVICE	25-NL	630	FAI
1	EA	MORTISE CYLINDER	MATCH EXISTING KEY SYSTEM	626	BAO
1	EA	SURFACE CLOSER	1461 CUSH FC	689	LCN
1	SET	SEALS	5200B	HRN	NGP
1	EA	DRIP CAP	18A	AL	NGP
1	EA	DOOR SWEEP	18WB1	AL	NGP
1	EA	THRESHOLD	896V	AL	NGP

A6 DOOR HARDWARE SCHEDULE
SCALE: N.T.S.

ISSUE LOG

NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

NATEX CORPORATION ARCHITECTS
2500 WILCREST, SUITE 300
HOUSTON, TEXAS 77042
TELEPHONE: 713-975-9525
FAX: 713-780-7824

SEAL(S):

PROJECT NAME:
FIRE STATION 20 RENOVATIONS
HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:

OTHER APPROVALS:

DATE: 03/10/09
W.B.S. No.: O-000006-0000-0
SCALE: AS SHOWN
DRAWN BY: YA
CHECKED BY: CAROLINA WEITZMAN

SHEET TITLE:
DOOR & WINDOW SCHEDULE

SHEET NO.:
019 OF XX SHEETS

CITY DWG. NO.:
A-605

U:\PROJECTS\F5 - 07101-CHOU\3 Construction Documents\F - ARCHITECTURAL\A-605.dwg

DESIGN FILE

5.0 Structural Plans:

5.1 Structural Plans seen below beginning on page 197 to page 204

A PDF version of the Structural Plans can also be viewed on the following web Link
https://purchasing.houstontx.gov/buyer/BidDocumentManager.aspx?id=C23242

STRUCTURAL GENERAL CRITERIA

1

2 STRUCTURAL LEGEND

3 STRUCTURAL CONCEPTS, STANDARDS & LOADS

4 GENERAL NOTES FOR CONSTRUCTION

5 EXCAVATION, BACKFILLING AND FOUNDATIONS

6 CONCRETE AND REINFORCING STEEL

7 STRUCTURAL STEEL

8 MASONRY

9 INDEPENDENT TESTING LABORATORY

ISSUE LOG

NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S) :

NATEX CORPORATION ARCHITECTS
2500 WILCREST, SUITE 300
HOUSTON, TEXAS 77042
TELEPHONE: 713-975-9625
FAX: 713-780-7924

SEAL(S) :

ASA CONSULTANT ENGINEERS INC.
1155 Dairy Ashford, Suite 117
Houston, Texas 77079
TEL. NO. (281) 531-4441
FAX. NO. (281) 531-4833
SALAUDDIN AHMED
04/07/09

PROJECT NAME :
FIRE STATION 20 RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED :
PROJECT MANAGER — SPONSORING SUPERVISOR

PROJECT MANAGER

OTHER APPROVALS :
WATER TRANSMISSION — WATER AND WASTEWATER
WASTEWATER COLLECTION — STREET, BRIDGE & ROW ENGINEERING
STORMWATER ENGINEERING — PLANNING & DEVELOPMENT

CITY ENGINEER — DATE
HOUSTON DEPT. OF PUBLIC HEALTH & ENVIRONMENT — DATE

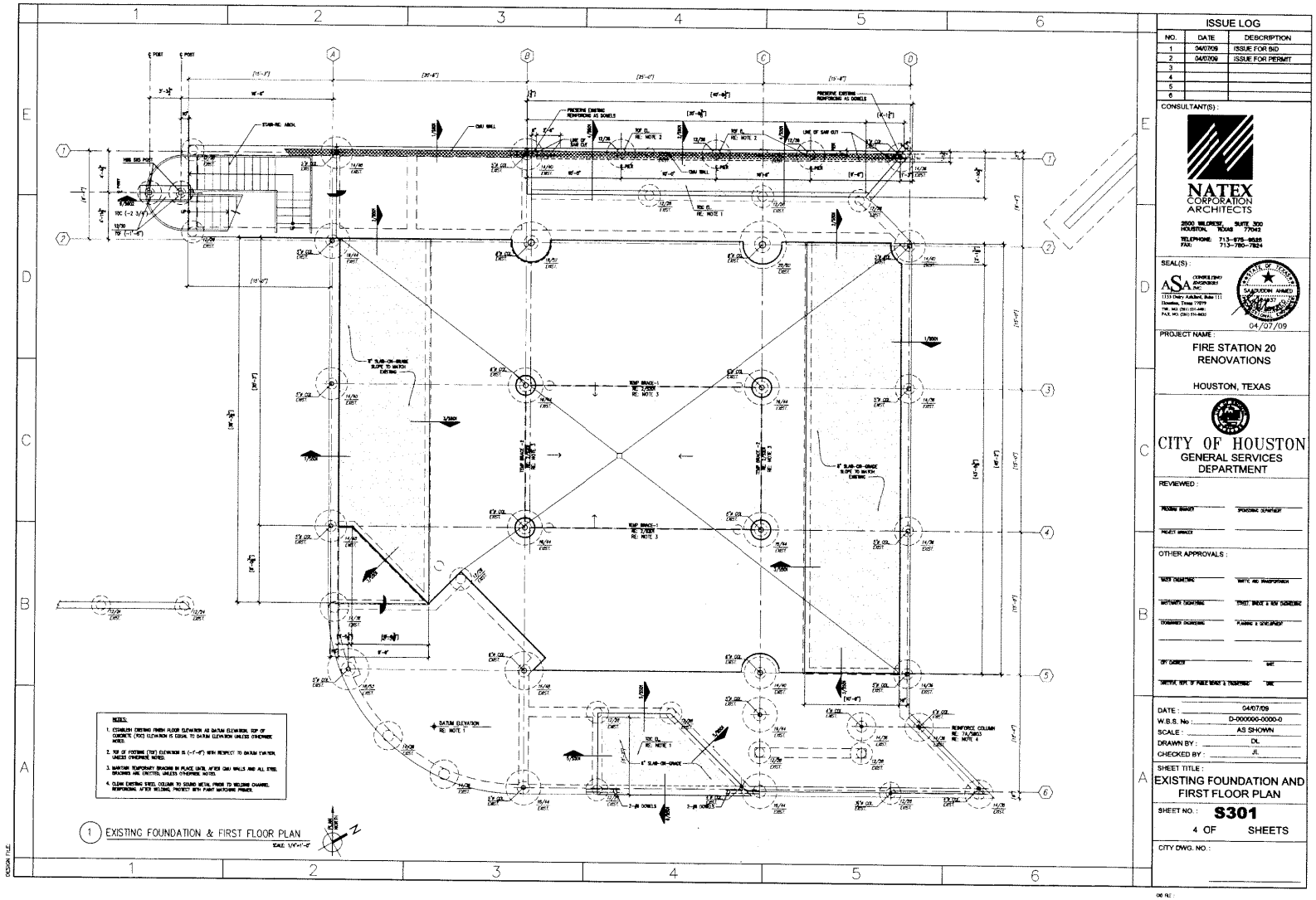
DATE : 04/07/09
W.B.S. No : D-000000-0000-0
SCALE : AS SHOWN
DRAWN BY : DL
CHECKED BY : JL

SHEET TITLE :
STRUCTURAL GENERAL CRITERIA

SHEET NO. : **S101**
3 OF SHEETS

CITY DWG. NO. :

DESIGN FILE:



ISSUE LOG		
NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

NATEX CORPORATION ARCHITECTS
2800 WILCREST, SUITE 300
HOUSTON, TEXAS 77042
TELEPHONE: 713-975-9595
FAX: 713-780-7824

SEAL(S):

ASA CONSULTANTS ENGINEERS INC.
SAQUIBUDDIN AHMED
1133 Dairy Ashford, Suite 111
Houston, Texas 77079
TEL. NO. (281) 531-440
FAX. NO. (281) 531-8652

STATE OF TEXAS
SAQUIBUDDIN AHMED
04/07/09

PROJECT NAME:
FIRE STATION 20
RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:
PROJECT MANAGER
PROCUREMENT DEPARTMENT
PROJECT MANAGER

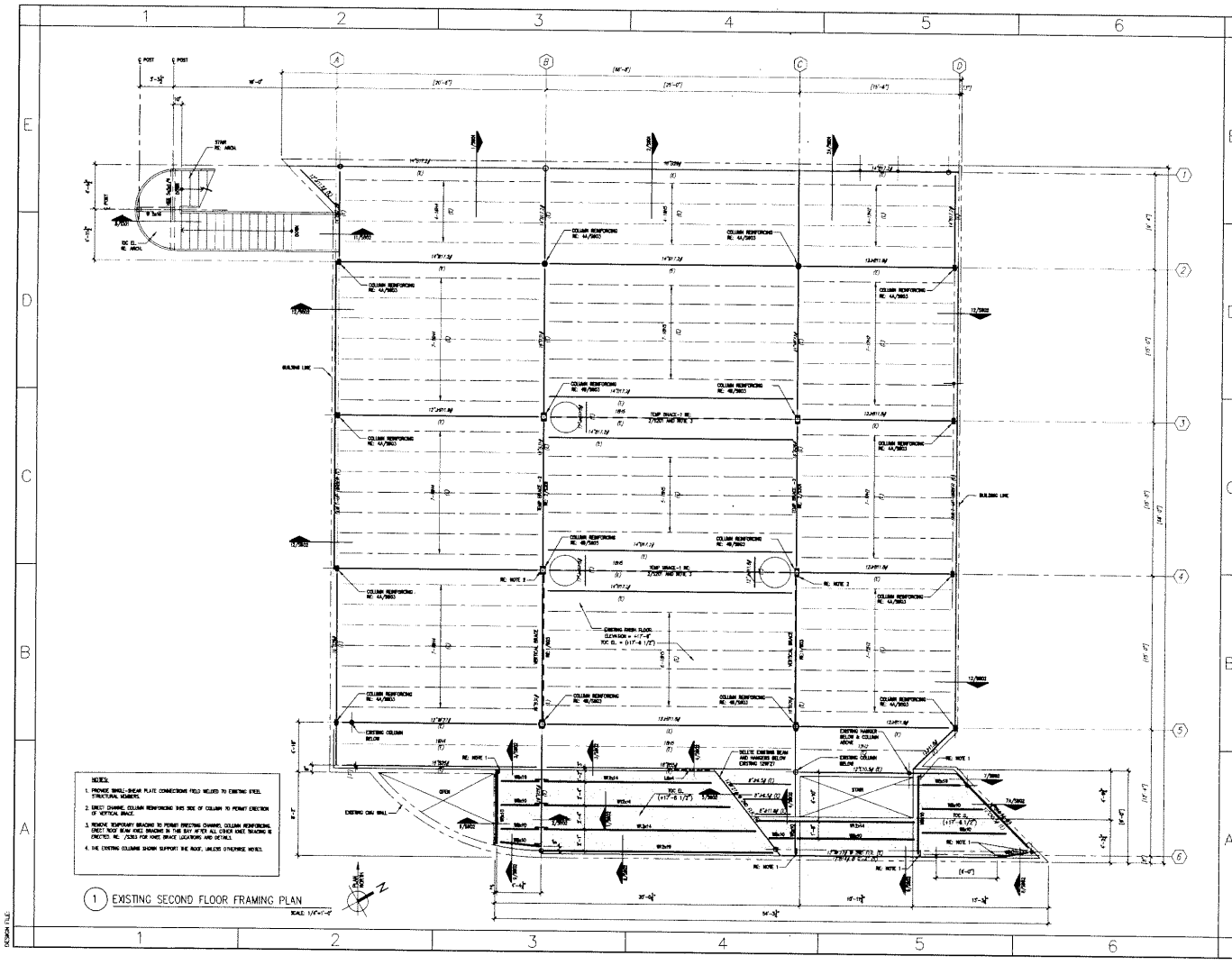
OTHER APPROVALS:
WATER ENGINEERING
TRAFFIC AND TRANSPORTATION
WASTEWATER ENGINEERING
STREET, BRIDGE & ROW ENGINEERING
STORMWATER ENGINEERING
PLANNING & DEVELOPMENT
CITY OWNER
DATE
CAPITAL MGT. OF PUBLIC WORKS & ENGINEERING
DATE

DATE: 04/07/09
W.B.S. No.: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: DL
CHECKED BY: JL

SHEET TITLE:
EXISTING FOUNDATION AND FIRST FLOOR PLAN

SHEET NO.: **S301**
4 OF SHEETS

CITY DWG. NO.:



ISSUE LOG

NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

NATEX CORPORATION ARCHITECTS
3500 WILCREST, SUITE 300
HOUSTON, TEXAS 77042
TELEPHONE: 713-975-9525
FAX: 713-780-7624

SEAL(S):

ASA CONSULTING ENGINEERS, INC.
1115 Dairy Ashford, Suite 111
Houston, Texas 77079
TEL. NO. (281) 531-4441
FAX. NO. (281) 531-4825

STATE OF TEXAS
SABUDDIN AHMED
04/07/09

04/07/09

PROJECT NAME:
FIRE STATION 20 RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:

PROGRAM MANAGER — SUPERVISING SUPERVISOR

PROJECT MANAGER

OTHER APPROVALS:

WATER ENGINEERING — TRAFFIC AND TRANSPORTATION

WASTEWATER ENGINEERING — STREET, BRIDGE & ROW ENGINEERING

STORMWATER ENGINEERING — PLANNING & DEVELOPMENT

CITY OWNER — DATE

DIRECTOR, DEPT. OF PUBLIC WORKS & ENGINEERING — DATE

DATE: 04/07/09
W.B.S. No.: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: DL
CHECKED BY: JL

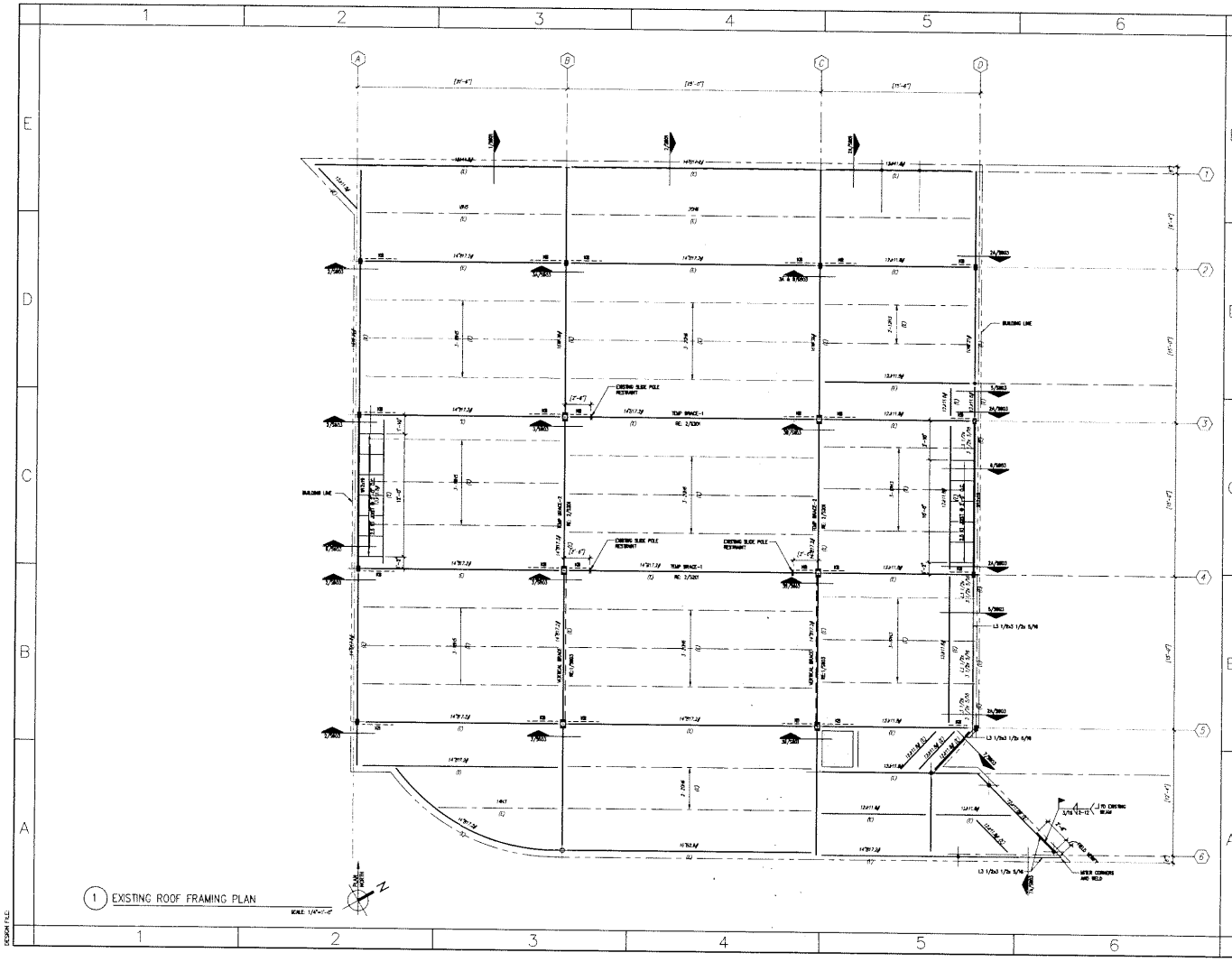
SHEET TITLE:
EXISTING SECOND FLOOR FRAMING PLAN

SHEET NO.: S302
5 OF SHEETS

CITY DWG. NO.:

DESIGN FILE:

DB FILE:



ISSUE LOG		
NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

NATEX CORPORATION ARCHITECTS
2800 WILCREST, SUITE 300
HOUSTON, TEXAS 77042
TELEPHONE: 713-975-9026
FAX: 713-780-7624

SEAL(S):

ASA CONSULTING ENGINEERS INC.
1115 Dairy Ashford, Suite 131
Houston, Texas 77079
TEL. NO (281) 531-4401
FAX. NO. (281) 531-4331

STATE OF TEXAS
SALAUDDIN AHMED
04/07/09

PROJECT NAME:
FIRE STATION 20 RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:
PROGRAM MANAGER
SCHEDULING ACTIVITIES
PROJECT MANAGER

OTHER APPROVALS:
WATER DEPARTMENT
TRAFFIC AND TRANSPORTATION
WASTEWATER DEPARTMENT
STREET, BRIDGE & ROW ENGINEERING
STORMWATER ENGINEERING
PLANNING & DEVELOPMENT
SPL DIVISION
DATE
DIRECTOR, DEPT. OF PUBLIC WORKS & ENGINEERING
DATE

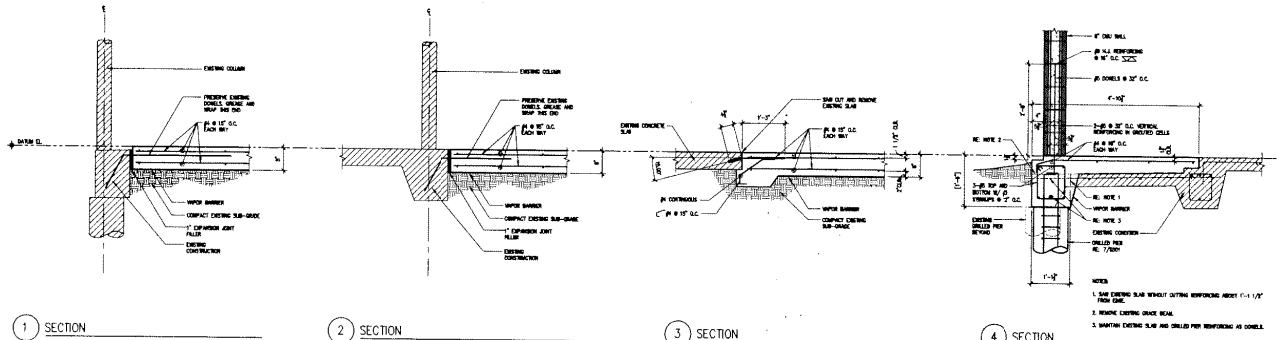
DATE: 04/07/09
W.B.S. No: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: DL
CHECKED BY: JL

SHEET TITLE:
EXISTING ROOF FRAMING PLAN

SHEET NO.: **S303**
6 OF SHEETS

CITY DWG. NO.:

DESIGN FILE:

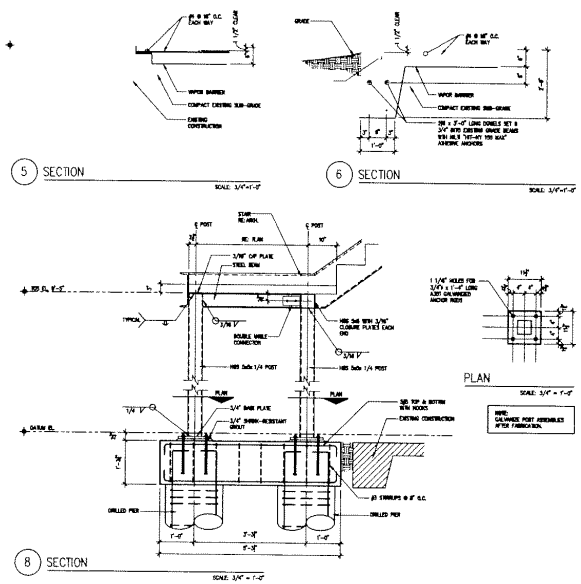


1 SECTION — SCALE: 3/4"=1'-0"

2 SECTION — SCALE: 3/4"=1'-0"

3 SECTION — SCALE: 3/4"=1'-0"

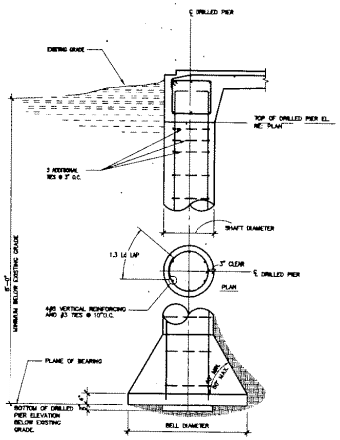
4 SECTION — SCALE: 3/4"=1'-0"



5 SECTION — SCALE: 3/4"=1'-0"

6 SECTION — SCALE: 3/4"=1'-0"

8 SECTION — SCALE: 3/4" = 1'-0"



7 TYPICAL DRILL PIER DETAIL — SCALE: N.T.S.

DRILLED PIER GENERAL NOTES

1. A GEOTECHNICAL REPORT IS NOT AVAILABLE FOR REVIEW.
2. DRILLED PIERS ARE DESIGNED FOR AN ALLOWABLE END BEARING PRESSURE OF 6000 PSF UNDER TOTAL LOAD AND 4000 PSF UNDER DEAD PLUS SUSTAINED LIVE LOAD.
3. THE INDEPENDENT TESTING LABORATORY SHALL CONFIRM THE ALLOWABLE SOIL BEARING CAPACITY IN THE FIELD AT THE ELEVATION DESIGNATED AS THE PLANE OF BEARING FOR THE DRILLED PIER.
4. THE INDEPENDENT TESTING LABORATORY SHALL INSPECT THE BOTTOM AND SIDES OF THE DRILLED PIER PRIOR TO PLACING REINFORCING AND CONCRETE.
5. CENTER ALL DRILLED PIERS UNDER THEIR COLUMNS OR GRADE BEAM, UON.
6. USE ACCURATE DRILLING PRACTICES TO ACHIEVE CLOSE TOLERANCES WITH THE REINFORCING STEEL AND THE ANCHOR ROD TEMPLATE.
7. ALL REINFORCING STEEL FOR DRILLED PIERS SHALL BE DEFORMED NEW BILLET STEEL CONFORMING TO ASTM A615, GRADE 60.
8. ALL SCHEDULED REINFORCEMENT SHALL BE UNIFORMLY DISTRIBUTED.
9. DEPOSIT CONCRETE TO ITS FINAL POSITION BY THE USE OF A TREMIE.
10. CONSOLIDATE CONCRETE IN ITS FINAL POSITION BY VIBRATING.

ISSUE LOG

NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

NATEX CORPORATION ARCHITECTS
2800 WILCREST, SUITE 300
HOUSTON, TEXAS 77042
TELEPHONE: 713-975-9026
FAX: 713-780-7824

SEAL(S):

ASA CONSULTING ENGINEERS INC.
1153 Dairy Ashford, Suite 111
Houston, Texas 77079
TEL. NO. (281) 531-4400
FAX. NO. (281) 531-4405

STATE OF TEXAS — SALVADOR ANNEE — 04/07/09

PROJECT NAME:
FIRE STATION 20 RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:
PROGRAM MANAGER — SPONSORING DEPARTMENT
PROJECT MANAGER

OTHER APPROVALS:
MAYOR'S OFFICE — WATER AND WASTEWATER
WASTEWATER ENGINEERING — STREET, BRIDGE & ROW ENGINEERING
STORMWATER ENGINEERING — PLANNING & DEVELOPMENT
CITY ENGINEER — DATE
CAPITAL IMPR. PROJ. MGMT & ENGINEERING — DATE

DATE: 04/07/09
W.B.S. No.: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: DL
CHECKED BY: JL

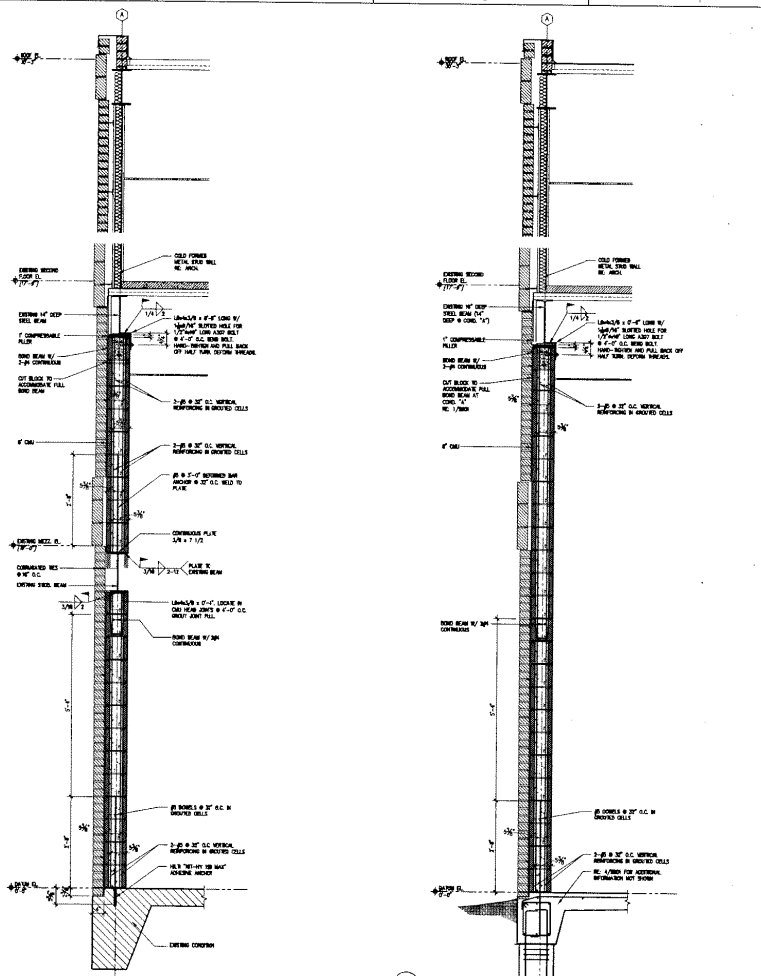
SHEET TITLE:
FOUNDATION DETAILS

SHEET NO.: **S501**
7 OF SHEETS

CITY DWG. NO.

DESIGN FILE:

DOC FILE:



1 SECTION

SCALE: 3/4"=1'-0"

2 SECTION

CONDITION "A" AS NOTED

SCALE: 3/4"=1'-0"

ISSUE LOG		
NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

NATEX CORPORATION ARCHITECTS

2500 WILCREST, SUITE 300
HOUSTON, TEXAS 77042

TELEPHONE: 713-975-6525
FAX: 713-780-7624

SEAL(S):

ASA CONSULTANT ENGINEERING PC.
1155 Dairy Ashford, Suite 111
Houston, Texas 77079
TEL. NO. (281) 531-4001
FAX. NO. (281) 531-3355

STATE OF TEXAS
SAADEDDIN AHMED
No. 52
LICENSED
PROFESSIONAL ENGINEER

04/07/09

PROJECT NAME:

FIRE STATION 20
RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:

PROGRAM MANAGER — SPONSORING DEPARTMENT

PROJECT MANAGER

OTHER APPROVALS:

WATER (WATER/SEWER) — TRAFFIC AND TRANSPORTATION

WASTEWATER (WATER/SEWER) — STREET, BRIDGE & ROW (TRANSPORTATION)

STORMWATER (ENGINEERING) — PLANNING & DEVELOPMENT

CITY ENGINEER — DATE

HOUSTON DEPT. OF PUBLIC WORKS & ENGINEERING — DATE

DATE: 04/07/09
W.B.S. No.: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: DL
CHECKED BY: JL

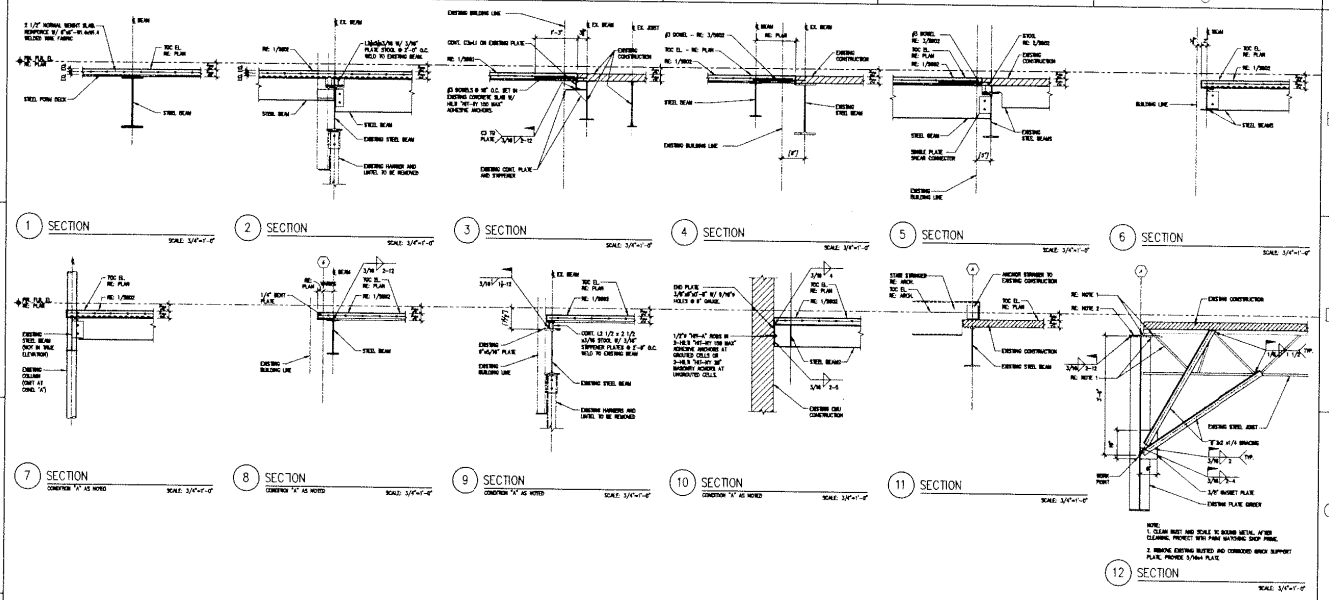
SHEET TITLE:
WALL SECTIONS

SHEET NO.: **S601**
8 OF SHEETS

CITY DWG. NO.:

DESIGN FILE:

DWG FILE:



ISSUE LOG		
NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

NATEX CORPORATION ARCHITECTS
2800 WILCREST, SUITE 300
HOUSTON, TEXAS 77042
TELEPHONE: 713-978-6626
FAX: 713-780-7824

SEAL(S):

ASA CONSULTANTS ENGINEERS, INC.
1333 Corp. Auditorium, Suite 111
Houston, Texas 77079
TBE REG. NO. (281) 531-4401
FAX NO. (281) 531-9035

STATE OF TEXAS
SAIFUDDIN AHMED
04/07/09

PROJECT NAME:

FIRE STATION 20 RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:

PROGRAM MANAGER — SPONSORING DEPARTMENT

PROJECT MANAGER

OTHER APPROVALS:

BLDG INSPECTION — TRAFFIC AND TRANSPORTATION

WASTEWATER ENGINEERING — STREET, BRIDGE & ROW ENGINEERING

STORMWATER ENGINEERING — PLANNING & DEVELOPMENT

DP DESIGNER — DATE

TEXAS DEPT. OF PUBLIC HOUSING & TRANSPORTATION — DATE

DATE: 04/07/09
W.B.S. No.: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: DL
CHECKED BY: JL

SHEET TITLE:

FRAMING DETAILS

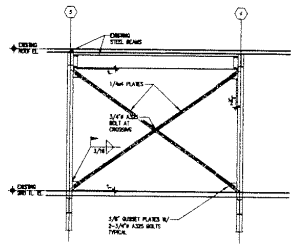
SHEET NO.: **S602**

9 OF SHEETS

CITY DWG. NO.:

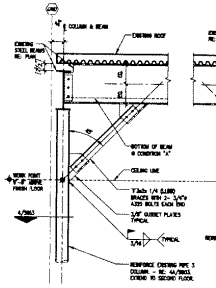
DESIGN FILE:

CAD FILE:



1 VERTICAL BRACE ELEVATION AND COLUMN PLANS

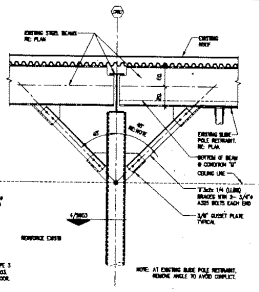
SCALE: 1/4"=1'-0"



2 ELEVATION EXTERIOR KNEE BRACE

COMBINATION "A" AS NOTED

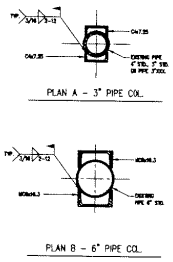
SCALE: 3/4"=1'-0"



3 ELEVATION INTERIOR KNEE BRACE

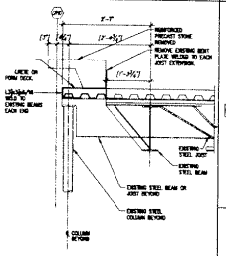
COMBINATION "A" & "B" AS NOTED

SCALE: 3/4"=1'-0"



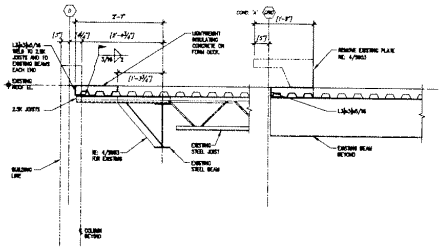
PLAN A - 3" PIPE COL.

PLAN B - 6" PIPE COL.



5 SECTION

SCALE: 3/4"=1'-0"



6 SECTION

SCALE: 3/4"=1'-0"

7 SECTION

SCALE: 3/4"=1'-0"

ISSUE LOG

NO.	DATE	DESCRIPTION
1	04/07/09	ISSUE FOR BID
2	04/07/09	ISSUE FOR PERMIT
3		
4		
5		
6		

CONSULTANT(S):

NATEX CORPORATION ARCHITECTS

2800 WILCREST, SUITE 300
HOUSTON, TEXAS 77042

TELEPHONE: 713-975-9425
FAX: 713-780-7824

SEAL(S):

ASA (CONSULTING) ENGINEERS INC.
1101 Dairy Ashford, Suite 111
Houston, Texas 77079
TEL. NO. (281) 531-4481
FAX. NO. (281) 531-4855

STATE OF TEXAS
SALVADOR ANNED
37
REGISTERED PROFESSIONAL ENGINEER

04/07/09

PROJECT NAME:

FIRE STATION 20 RENOVATIONS

HOUSTON, TEXAS

CITY OF HOUSTON
GENERAL SERVICES DEPARTMENT

REVIEWED:

PROGRAM MANAGER — SPONSORING DEPARTMENT

PROJECT MANAGER

OTHER APPROVALS:

WATER DISTRICTS — WATER AND WASTEWATER

WASTEWATER DISTRICTS — STREET, BRIDGE & ROW ENGINEERING

STORMWATER DRAINAGE — PLANNING & DEVELOPMENT

TDI DIVISION — DATE

TEXAS DEPT. OF PUBLIC HOUSING & TRANSPORTATION — DATE

DATE: 04/07/09
W.B.S. No.: D-000000-0000-0
SCALE: AS SHOWN
DRAWN BY: DL
CHECKED BY: JL

SHEET TITLE:

FRAMING DETAILS

SHEET NO.: S603
2 OF SHEETS

CITY DWG. NO.:

DESIGN FILE:

SECTION C
BUILDING WAGE SCALE

A PDF version of this Building Wage Scale can be viewed on the following web Link
http://purchasing.houstontx.gov/Construction/Construction_Wage_Rate_for_Buildings_2006.pdf

GENERAL CONDITIONS

A PDF version of the General Conditions can be viewed on the following web link:
http://purchasing.houstontx.gov/Construction/Construction_General_Conditions_October_2006.pdf

Document 00800

SUPPLEMENTARY CONDITIONS

The following Paragraphs amend and supplement the 2005 edition of General Conditions. Unaltered portions of General Conditions remain in effect.

ARTICLE 3 - THE CONTRACTOR

3.5 *LABOR*: *Insert the following Paragraph 3.5.3.1.1.*

3.5.3.1.1 Contractor shall make good faith efforts to comply with the City ordinances regarding Minority and Women Business Enterprises (MWBE) and Persons with Disabilities Business Enterprises (PDBE) participation goals which are as follows:

.1 the MWBE goal is 0 percent, and

.2 the PDBE goal is 0 percent.

3.28 *CONTRACTOR DEBT*

3.28.1 IF CONTRACTOR, AT ANY TIME DURING THE TERM OF THIS AGREEMENT, INCURS A DEBT, AS THE WORD IS DEFINED IN SECTION 15-122 OF THE HOUSTON CITY CODE OF ORDINANCES, IT SHALL IMMEDIATELY NOTIFY CITY CONTROLLER IN WRITING. IF CITY CONTROLLER BECOMES AWARE THAT CONTRACTOR HAS INCURRED A DEBT, IT SHALL IMMEDIATELY NOTIFY CONTRACTOR IN WRITING. IF CONTRACTOR DOES NOT PAY THE DEBT WITHIN 30 DAYS OF EITHER SUCH NOTIFICATION, CITY CONTROLLER MAY DEDUCT FUNDS IN AN AMOUNT EQUAL TO THE DEBT FROM ANY PAYMENTS OWED TO CONTRACTOR UNDER THIS AGREEMENT, AND CONTRACTOR WAIVES ANY RECOURSE THEREFORE.

ARTICLE 8 - TIME

8.1 *PROGRESS AND COMPLETION: Delete Paragraph 8.1.6. and replace with the following 8.1.6.*

8.1.6.1 Contractor shall credit the City by Change Order for inspection services for overtime work or work performed on Sundays or Legal Holidays. The amount Contractor credits the City will be **$50.00 per hour** per inspector for inspection services.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.1 *UNIT PRICE WORK*: *Delete Section 9.1 in its entirety and insert the following Section 9.1.*

9.1 References to Unit Prices in individual Specification sections are not applicable to the Contract. Include payment for portions of the Work required by these sections in the Stipulated Price for the Contract.

9.12 ***LIQUIDATED DAMAGES***: *Insert the following Paragraph 9.12.1.1.*

9.12.1.1 The amount of liquidated damages provided in General Conditions Paragraph 9.12.1payable by Contractor or Surety for each and every day of delay beyond Contract Time, are **$3,000.00 per day**.

ARTICLE 11 - INSURANCE AND BONDS

11.2 *INSURANCE TO BE PROVIDED BY CONTRACTOR: Delete Paragraph 11.2.8. and replace with the following 11.2.8.*

11.2.1.4 Contractor shall provide Owners and Contractor's Protective Liability Insurance only if the contractor's bid price is equal to or greater than $100,000.00.

11.2.8 *Endorsement of Primary Insurance:* Each policy except Workers' Compensation Insurance must contain an endorsement that the policy is primary insurance to any other insurance available to additional insured with respect to claims arising under the Contract.

CITY OF HOUSTON -- BIDDER'S BOND

(Must be in an amount at least 10% of the bid. If the bid is upon alternates this bond must be for at least 10% of the highest amount for which the bidder offers to do any or all the work bid upon.)

THE STATE OF TEXAS §
§ KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF HARRIS §

THAT WE, _____ as principal and the other subscriber hereto as Surety, do hereby acknowledge ourselves to be held and firmly bound to the City of Houston, a municipal corporation in the sum of $_____ Dollars ($_____).

The condition of this obligation is that: ---

WHEREAS, the said principal is submitting to the City of Houston his or its bid for the doing for the City of Houston of certain work and construction of which the following is a brief description, to-wit: ---

Bid No. S50-C23242

Structural Bracing Renovations at Fire Station No. 20

in accordance with the plans and specifications for such work upon which such bid is made, to which plans and specifications reference is made for a more full description of the work and construction referred to.

NOW, THEREFORE, if the said bidder is awarded the contract for such work, the said bidder will, within the time provided in the specifications, enter into a contract with the City therefore upon the form and to the purpose and intent provided in the specifications, will furnish insurance as required in the specifications and will furnish a good and sufficient construction surety bond executed by said bidder and one corporate surety organized under the laws of the State of Texas or authorized to do business in the State of Texas and having a fully paid up capital stock of not less than $100,000.00 and duly licensed and qualified by the Board of Insurance Commissioners of the State of Texas, which bond shall be for an amount equal to 100 percent of the contract price and shall be conditioned in accordance with the requirements stated in the specifications upon which such bid is being submitted.

In the event said bidder is unable or fails to execute said contract for the work proposed to be done, is unable or fails to furnish insurance as specified or is unable or fails to furnish said construction bond in the amount and condition as aforesaid, the undersigned principal and surety shall be liable to said City of Houston for the full amount of this obligation which is here and now agreed upon and admitted as the amount of the damages which will be suffered by the City of Houston on account of the failure of such bidder to so comply with the terms of this bid.

Executed this _____day of _____, A.D. 2008.

PRINCIPAL

By_____

By_____

_____
Surety

ONE-YEAR MAINTENANCE BOND

THAT WE, _____, as Principal, hereinafter called Contractor, and the other subscriber hereto, _____, as Surety, do hereby acknowledge ourselves to be held and firmly bound to the City of Houston, a municipal corporation, in the sum of $_____, for the payment of which sum well and truly to be made to the City of Houston and its successors, the said Contractor and Surety do bind themselves, their heirs, executors, administrators, successors, jointly and severally.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the Contractor has on or about this day executed a Contract in writing with the City of Houston for _____ _____, all of such work to be done as set out in full in said Contract documents therein referred to and adopted by the City Council, all of which are made a part of this instrument as fully and completely as if set out in full herein.

NOW THEREFORE, if the said Contractor shall comply with the provisions of Paragraph 11.5.1 of the General Conditions, and correct work not in accordance with the Contract documents discovered within the established one-year period, then this obligation shall become null and void, and shall be of no further force and effect; otherwise, the same is to remain in full force and effect.

Notices required or permitted hereunder shall be in writing and shall be deemed delivered when actually received or, if earlier, on the third day following deposit in a United States Postal Service post office or receptacle, with proper postage affixed (certified mail, return receipt requested), addressed to the respective other party at the address prescribed in the Contract documents, or at such other address as the receiving party may hereafter prescribe by written notice to the sending party.

IN WITNESS THEREOF, the said Contractor and Surety have signed and sealed this instrument on the respective dates written below their signatures and have attached current Power of Attorney.

ATTEST, SEAL: (if a corporation)

WITNESS: (if not a corporation)

By: _____
Name:
Title:

_____
Name of Contractor

By: _____
Name:
Title:
Date:

ATTEST/SURETY WITNESS:

(SEAL)

_____
Full Name of Surety

_____
Address of Surety for Notice

_____

_____
Telephone Number of Surety

By: _____
Name:
Title:
Date:

By: _____
Name:
Title: Attorney-in-Fact
Date:

This Ordinance or Contract has been reviewed as to form by the undersigned legal assistant and have been found to meet established Legal Department criteria. The Legal Department has not reviewed the content of these documents.

_____
Legal Assistant

_____
Date

PERFORMANCE BOND

THAT WE, _____, as Principal, (the "Contractor"), and the other subscriber hereto, _____, as Surety, do hereby acknowledge ourselves to be held and firmly bound to the City of Houston (the "City"), a municipal corporation, in the penal sum of $_____ for the payment of which sum, well and truly to be made to the City, its successors and assigns, Contractor and Surety do bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the Contractor has on or about this day executed a Contract in writing with the City for _____
_____,
all of such work to be done as set out in full in said Contract documents therein referred to and adopted by the City Council, all of which are made a part of this instrument as fully and completely as if set out in full herein.

NOW THEREFORE, if the said Contractor shall faithfully and strictly perform the Contract in all its terms, provisions, and stipulations in accordance with its true meaning and effect, and in accordance with the Contract documents referred to therein and shall comply strictly with each and every provision of the Contract and with this Bond, then this obligation shall become null and void and shall have no further force and effect; otherwise the same is to remain in full force and effect. Should the Contractor fail to faithfully and strictly perform the Contract in all its terms, including but not limited to the indemnifications thereunder, the Surety shall be liable for all damages, losses, expenses and liabilities that the City may suffer in consequence thereof, as more fully set forth herein.

It is further understood and agreed that the Surety does hereby relieve the City or its representatives from the exercise of any diligence whatever in securing compliance on the part of the Contractor with the terms of the Contract, and the Surety agrees that it shall be bound to take notice of and shall be held to have knowledge of all acts or omissions of the Contractor in all matters pertaining to the Contract. The Surety understands and agrees that the provision in the Contract that the City will retain certain amounts due the Contractor until the expiration of 30 days from the acceptance of the Work is intended for the City's benefit, and the City will have the right to pay or withhold such retained amounts or any other amount owing under the Contract without changing or affecting the liability of the Surety hereon in any degree.

It is further expressly agreed by Surety that the City or its representatives are at liberty at any time, without notice to the Surety, to make any change in the Contract documents and in the Work to be done hereunder, as provided in the Contract, and in the terms and conditions thereof, or to make any change in, addition to, or deduction from the Work to be done hereunder; and that such changes, if made, shall not in any way vitiate the obligation in this Bond and undertaking or release the Surety there from.

It is further expressly agreed and understood that the Contractor and Surety will fully indemnify and save harmless the City from any liability, loss, cost, expense, or damage arising

out of Contractor's performance of the Contract.

If the City gives Surety notice of Contractor's default, Surety shall, within 45 days, take one of the following actions:

1. Arrange for Contractor, with consent of the City, to perform and complete the Contract; or

2. Take over and assume completion of the Contract itself, through its agents or through independent contractors, and become entitled to the payment of the balance of the Contract Price.

If the Surety fails to take either of the actions set out above, it shall be deemed to have waived its right to perform and complete the Contract and receive payment of the balance of the Contract Price and the City shall be entitled to enforce any remedies available at law, including but not limited to completing the Contract itself and recovering any cost in excess of the Original Contract Price from the Surety.

This Bond and all obligations created hereunder shall be performable in Harris County, Texas. This Bond is given in compliance with the provisions of Chapter 2253, Texas Government Code, as amended, which is incorporated herein by this reference.

Notices required or permitted hereunder shall be in writing and shall be deemed delivered when actually received or, if earlier, on the third day following deposit in a United States Postal Service post office or receptacle, with proper postage affixed (certified mail, return receipt requested), addressed to the respective other Party at the address prescribed in the Contract documents, or at such other address as the receiving party may hereafter prescribe by written notice to the sending party.

EXECUTED in multiple originals this_____ day of_____, 20_____.

ATTEST/SEAL: (if a corporation)
WITNESS: (if not corporation)

_____
(Name of Principal)

_____
(Address of Principal)

By: _____
Name:
Title:
Date:

By: _____
Name:
Title:
Date:

ATTEST/SEAL
SURETY WITNESS:

_____
(Name of Surety)

_____
(Address of Surety)

By: _____
Name:
Title:
Date:

By: _____
Name:
Title:
Date:

REVIEWED:

This Bond has been reviewed as to form by the undersigned Paralegal and has been found to meet established Legal Department criteria.

_____
Date

_____
Paralegal

STATUTORY PAYMENT BOND

THAT WE, _____, as Principal, hereinafter called Contractor and the other subscriber hereto, _____, as Surety, do hereby acknowledge ourselves to be held and firmly bound unto the City of Houston, a municipal corporation, in the sum of $_____ for the payment of which sum, well and truly to be made to the City of Houston, and its successors, the said Contractor and Surety do bind themselves, their heirs, executors, administrators, successors, jointly and severally.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the Contractor has on or about this day executed a contract in writing with the City of Houston for _____ _____, all of such work to be done as set out in full in said Contract documents therein referred to and adopted by the City Council, all of which are made a part of this instrument as fully and completely as if set out in full herein;

NOW, THEREFORE, if the said Contractor shall pay all claimants supplying labor and materials to him or a Subcontractor in the prosecution of the Work provided for in the Contract, then, this obligation shall be void; otherwise the same is to remain in full force and effect;

PROVIDED HOWEVER, that this Bond is executed pursuant to the provisions of Chapter 2253, Texas Government Code, as amended, and all liabilities on this Bond shall be determined in accordance with the provisions of said Article to the same extent as if it were copied at length herein.

IN WITNESS THEREOF, the said Contractor and Surety have signed and sealed this instrument on the respective dates written below their signatures and have attached current Power of Attorney.

ATTEST, SEAL: (if a corporation)
WITNESS: (if not a corporation)

_____
Name of Contractor

By: _____
Name:
Title:

By: _____
Name:
Title:
Date:

ATTEST/SURETY WITNESS:

(SEAL)

_____
Full Name of Surety

_____
Address of Surety for Notice

_____

_____
Telephone Number of Surety

By: _____
Name:
Title:
Date:

By: _____
Name:
Title: Attorney-in-Fact
Date:

This Ordinance or Contract has been reviewed as to form by the undersigned legal assistant and have been found to meet established Legal Department criteria. The Legal Department has not reviewed the content of these documents.

_____
Legal Assistant

_____
Date