

Specification Documents

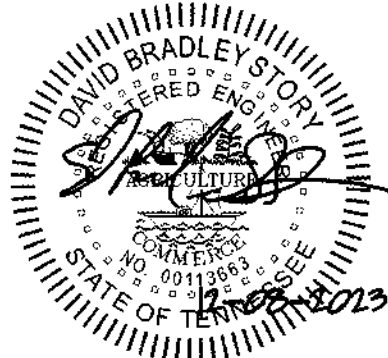
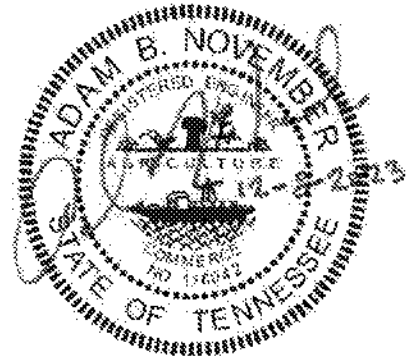
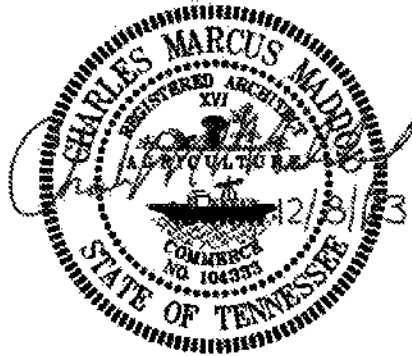
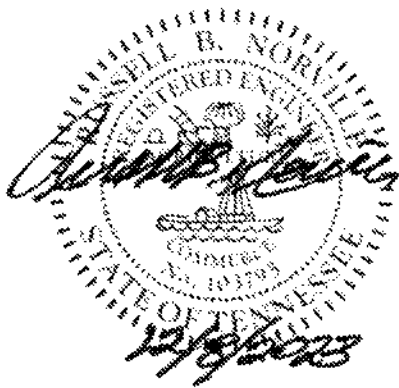
December 8, 2023

CLASSROOM ADDITION TO DYER COUNTY JAIL

for

Dyer County, Tennessee

TLM Project No. J-6401B1



TLM
ASSOCIATES

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CLASSROOM ADDITION TO DYER COUNTY JAIL

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Dyer County, TN

TLM Project No. J-6401B

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END OF SECTION 00 01 15

SECTION 00 11 13 – ADVERTISEMENT FOR BIDS

Bidders may submit bids for project as described in this Document.

Submit bids according to the Instructions to Bidders.

Project Identification: **CLASSROOM ADDITION TO DYER COUNTY JAIL** (TLM no. J-6401B1)

Project Location: **401 E. Cedar St., Dyersburg, TN 38024**

Owner: **Dyer County Government, TN**

Architect: TLM Associates, Inc.; 117 E. Lafayette St.; Jackson, TN 38301; 731-988-9840.

Bids will be received for the following Work (not limited to):

- a) Sitework
- b) General Building Construction
- c) Plumbing
- d) HVAC
- e) Electrical
- f) PEMB erection (*Materials Package is provided by Owner / Separate contract*)

Proposed forms of contract documents, including plans and specifications, are on file at the following:

- TLM Associates, Inc., 117 E. Lafayette Street, Jackson, TN 38301
- Builder's Exchange, 2728 Eugenia Avenue Suite 108, Nashville, TN 37211, www.bxtn.org
- Dodge Data & Analytics, dodge.docs@construction.com
- West Tennessee Plans Room, www.wtplanroom.com

Copies of the documents must be obtained by providing a deposit to TLM Associates, Inc. Each Contractor will receive one (1) set of plans and specifications documents by depositing a refundable fee of **\$200.00** with TLM Associates, Inc. Additional complete sets may be purchased at their own expense. **Digital copy of the plans and specifications are available upon request after the purchase of a bid set.**

Owner will receive sealed bids until the bid time and date at the location given below. Owner will consider bids prepared in compliance with the Instructions to Bidders, and delivered as follows:

Bid Opening Date: **Thursday, May 2, 2024**

Bid Opening Time: **2:00 pm**

Location: **101 West Court Street, Dyersburg, TN 38024**

Bids will be thereafter publicly opened and read aloud.

The Owner reserves the right to reject any and all bids or to waive any informality in the bidding whenever such rejection or waiver is in the interest of the Owner.

A certified check or bank draft, payable to **Dyer County Government, TN**, U.S. Government bonds, or a satisfactory bid bond executed by the bidder and acceptable sureties in an amount equal to five (5) percent of the bid shall be submitted with each bid. No bids may be withdrawn for a period of **60** days after opening of bids. Owner reserves the right to reject any and all bids and to waive informalities and irregularities.

All bidders are required to comply with General Licensing Act of 1976, also known as Tennessee House Bill No. 2180 and T.C.A. 62-6-119 of 1994.

Bidders must be properly licensed under the laws governing their respective trades and be able to obtain insurance and bonds required for the Work. A Performance Bond, separate Labor and Material Payment Bond, and Insurance in a form acceptable to Owner will be required of the successful Bidder. The successful bidder will be required to furnish and pay for satisfactory performance and payment bond, bonds or insurance surety.

A Pre-Bid Conference will be held on April 12, 2024 at 2:00 p.m., local time, at the Dyer Co. Sheriff's Office (lobby entrance). All prospective Bidders are **Encouraged to attend.**

SECTION 00 21 13 – INSTRUCTIONS TO BIDDERS

PART 1 - DOCUMENTS

1.1 BID FORMS AND BID PREPARATION:

- A. Bid Forms and Bid Preparation: All bids will be submitted on forms contained herein and shall be subject to all requirements of the specifications and drawings. Bid forms can be removed from the project manual.
- B. All blank spaces for bid prices must be filled in, in ink or typewritten, in both words and figures.
- C. By the General Contractors Licensing Act of 1976 and T.C.A. 62-6-119 of 1994, Each bidder must submit the following information for his bid to be considered valid. Each bid must be submitted in a sealed envelope bearing on the outside the following information:
 - 1. Name of Bidder.
 - 2. Address of Bidder, including Zip Code and Phone Number, to show whether bidder is a resident of the State of Tennessee.
 - 3. Tennessee License Number of Bidder.
 - 4. Expiration Date of Tennessee License Number.
 - 5. That Classification of Bidder's License which applies to this Bid/ Bidder must write out the work classifications of his license which apply to the work of this project.
 - 6. Name of the Project for which the Bid is submitted.
 - 7. List Subcontractors, License Number, Expiration Date thereof, and License Classification for the following subcontractors on the outside of the envelope containing the Bid:
 - a. Electrical
 - b. Plumbing
 - c. Heating, Ventilation, & Air Conditioning.
 - d. Masonry
 - 8. Item No. 7 is required by Tennessee Law, T.C.A. 62-6-119.
 - a. "The architect, Engineer, Construction Manager, Construction Consultant or any other persons or entity involved in the preparation of the invitation to bid or comparable bid, documents shall direct that the license number, expiration date thereof, and license classification of the contractor applying to the bid for electrical, plumbing or heating ventilation or air conditioning, appear on the outside of the envelope containing the bid; otherwise the Bid shall not be opened or considered."
 - b. "Any Bid envelope which contains the listing of more than one contractor in each classification shall be considered in violation. Failure to observe this section constitutes a Class A Misdemeanor."
- D. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed as "SEALED BID ENCLOSED".

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- E. Conditional bids will not be accepted.
 - F. Examination of Site: Bidders shall visit the site of the project, and the Contractor shall be assumed to have visited the premises and to have allowed for all conditions that might affect his work. No consideration will be given any claim based on lack of knowledge of existing conditions.
 - G. Obligation of Bidder: Bidders shall notify the Architect immediately should, during his examination of the site or any of the associated documents, he find a discrepancy. At the time of the opening of bids, each bidder will be presumed to have inspected the site and to have read and be thoroughly familiar with plans and contract documents (including all addenda). Failure or omission of any bidder to examine any form, instrument or document shall in no way relieve any bidder from any obligation in respect to bid.
 - H. Conditions of Work: Each bidder must inform himself fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful bidder of his obligation to furnish all material and labor necessary to carry out the provisions of his contract. Employ such means and methods that will not cause any interruptions or interference with work by others.

1.2 ADDENDA:

- A. Interpretations and Addenda: The Architect will make every effort necessary to cooperate with bidders in making the proper interpretations of the Contract Documents and in advising all bidders of such interpretation.
- B. Questions from bidders must be directed to the Engineer or Owner as soon as possible to allow sufficient time for preparation and distribution of addenda.
- C. It shall be the bidder's responsibility to make inquiry as to addenda issued. All such addenda shall become a part of the contract and all bidders shall be bound by such addenda, whether they are received by the bidders, or not.
- D. It shall be the responsibility of each prime bidder to forward copies of addenda or otherwise inform their suppliers / subcontractors.

1.3 BID SECURITY:

- A. Bid Guaranty (Bid Bond): The bid must be accompanied by a bid guaranty that shall not be less than 5 percent (5%) of the amount of the bid, and at the option of the bidder may be a certified check, bank draft, U. S. Government Bonds at par value, or a bid bond secured by a surety company. Certified check or bank draft must be made payable to the order of the Owner. The bid guaranty shall insure the execution of the Contract and the furnishing of performance and payment bond or bonds by the successful bidder all as required by the specifications. If the successful bidder withdraws his bid within Ninety (90) days of the bid opening, then his bid bond will automatically be forfeited to the Owner.

PART 2 - CONSIDERATION OF BIDS

2.1 BIDDER(S) CONSTRUCTION EXPERIENCE:

- A. Before a bid is considered for award, the bidder may be requested by the Owner to submit a statement regarding his previous experience in performing comparable work, his business and technical organization, and financial resources.

2.2 QUALIFICATIONS OF BIDDER(S):

- A. Bids are acceptable only from contractors properly and currently licensed.
- B. The bidder is advised that any person, firm, or other party to whom it is proposed to award a subcontract under this contract, must be acceptable to the Owner and/or Architect.

2.3 RECEIVING BIDS:

- A. Bids received prior to the time of opening will be securely kept, unopened. The officer whose duty it is to open them will decide when the specified time has arrived, and no bid received thereafter will be considered; except that when a bid arrived by mail after the time fixed for opening, but before award is made, and it is shown to the satisfaction of the officer authorized to make the award that the non arrival on time was due solely to delay in the mails for which the bidder was not responsible, such bid will be received and considered. No responsibility will be attached to an officer for the premature opening of a bid not properly addressed and identified. Unless specifically authorized, telegraphic bids will not be considered.
- B. Bids will be publicly opened at the time and place fixed for the opening of bids indicated on the Invitation for Bid. Every bid received within the time fixed for receiving bids and that meets all requirements listed in the Instructions to Bidders will be opened and the results made known.
- C. Bids may be withdrawn on written or telegraphic request dispatched by the bidder in time for delivery in the normal course of business prior to the time fixed for opening; provided, that written confirmation of any telegraphic withdrawal over the signature of the bidder is placed in the mail and postmarked prior to the time set for bid opening. Negligence on the part of the bidder in preparing his bid confers no right of withdrawal or modification of his bid after such bid has been opened.

2.4 AWARD OF CONTRACT:

- A. The contract will be awarded to the responsible bidder submitting the lowest proposal complying with the conditions of the Invitation to Bid, provided his bid is reasonable and it is to the best interest of the Owner, at the earliest practicable date. The Owner, however, reserves the right to reject any and all bids and to waive any informality in bids received whenever such rejection or waiver is in the interest of the Owner.

-
- B. The Owner also reserves the right to reject the bid of any bidder who has previously failed to perform properly, or to complete on time, contracts of a similar nature; who is not in a position to perform the contract, or who has habitually and without just cause neglected the payment of bills or otherwise disregarded his obligations to subcontractors, material men, or employees.
 - C. The ability of a bidder to obtain a performance bond shall not be regarded as the sole test of such bidder's competency or responsibility.

PART 3 - PERFORMANCE AND PAYMENT BOND:

- 3.1 Subsequent to the award and within ten days after the prescribed forms are presented for signature the successful bidder shall execute and deliver to the Owner a contract in the form furnished in such number of counterparts as the Owner may require.
- 3.2 Having satisfied all conditions of award as set forth elsewhere in these documents, the successful bidder shall, within the period specified above, furnish bond(s) in a penal sum of at least the full amount of the contract as awarded, in the form included in the specifications, which secures the faithful performance of the contract, and for the payment of all persons, firms, or corporations to whom the contractor may become legally indebted for labor, materials, tools equipment or services of any nature employed or used by him in performing the work. Such bond(s) shall bear the same date as or a date subsequent to, the date of the contract.
 - 1. The current power of attorney for the person who signs for any surety company shall be attached to such bond.
- 3.3 The failure of the successful bidder to execute such contract and to supply the required bonds within ten days after the prescribed forms are presented for signature, or within such extended period as the Owner may grant based upon reasons determined adequate by the Owner shall constitute a default, and the Owner may either award the contract to the next responsible bidder or re-advertise for bids, and may charge against the bidder the difference between the amount of the bid and the amount for which a contract for the work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the bid guaranty.

PART 4 - POST-BID INFORMATION

4.1 LAWS AND REGULATIONS:

- A. The bidder's attention is directed to the fact that all applicable State Laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over

construction of the project shall apply to the contract throughout and they will be deemed to be included in the contract the same as though herein written out in full.

- B. The contractor and all subcontractors shall further comply with applicable building codes as referenced in the various sections of these specifications.
- C. The contractor shall include, either on the bid form or attached thereto, a statement to the fact that the contractor is an Equal Opportunity Employer and that the contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin.
 - 1. Refer to further requirements as specified in the General Conditions.
- D. Project Superintendent: The managing contractor will employ a qualified superintendent, to run the project, with at least 4 years previous experience as a superintendent. The superintendent shall not be removed or transferred from the project by the contractor without prior approval of the Engineer. The Engineer reserves the right to request the removal of the superintendent or any employee, subcontractor, etc. if in his judgment it is in the best interest of the Owner and the Project.

4.2 PRE-CONSTRUCTION CONFERENCE:

- A. Either before or soon after the actual award of the contract (but in any event prior to the start of construction), the contractor or his representative shall attend a pre-construction conference with representatives of the Owner. The conference will serve to acquaint the participants with the general plan of contract administration and requirements under which the construction operation is to proceed, and will inform the contractor of the obligations imposed on him and his subcontractors.
 - 1. The date, time, and place of the conference will be furnished to the contractor by the Architect.

4.3 CONTRACTOR'S LICENSE REQUIREMENTS:

- A. The following is excerpted from the Contractor's Licensing Act of 1976:
 - 1. 62-6-103. Contractor's License Required-- Recovery of Expenses by Unlicensed Contractor.
 - a. Any person, firm or corporation engaged in contracting in this state shall be required to submit evidence that he is qualified to engage in contracting, and shall be licensed as hereinafter provided; it shall be unlawful for any person, firm or corporation to engage in or offer to engage in contracting in the state, unless such person, firm or corporation has been duly licensed under the provisions of this chapter, as hereinafter provided. Any person, firm, or corporation engaged in contracting, including such person, firm, or corporation that engages in the construction of residences or dwellings constructed on private property for the

purpose of resale, lease, rent or any other similar purpose shall be required to submit evidence that he is qualified to engage in contracting and/or building, and shall be licensed. It shall be unlawful for any person, firm, or corporation to engage in, or offer to engage in contracting or building as hereinabove described, unless such person, firm or corporation has been duly licensed under the provisions of this chapter. Any person, firm, or church that owns property and buildings for individual use, and not for resale, lease, rent or other similar purpose, is exempt from the requirements of this chapter. Notwithstanding the foregoing, the license of any person, firm or corporation licensed as a general contractor on March 29, 1976, shall continue in force until the natural expiration thereof.

- b. Contracts entered into by a person who is licensed by the Board shall clearly state that such person is licensed by the State Board for Licensing Contractors and that the Board is authorized to receive complaints relative to such person's professional conduct.
- c. Any unlicensed general contractor covered by the provisions of this chapter shall be permitted in a court of equity to recover actual documented expenses only upon a showing of clear and convincing proof. (Acts 1976 (Adj. S.), Ch. 822, Section 3; 1977, Ch. 9, Section 1; 1979, Ch. 59, Section 7; 1980 (Adj. S.), Ch. 652, Section 5; T.C.A., Section 62-603.)

END OF SECTION 00 21 13

SECTION 00 41 13 – BID FORM

PART 1 - GENERAL

1.1 BID INFORMATION

- A. Bidder: _____

- B. Project Name: **CLASSROOM ADDITION TO DYER COUNTY JAIL**
- C. Project Location: 401 E. Cedar St., Dyersburg, TN 38024
- D. Owner: Dyer County Government, 101 West Court Street, Dyersburg, TN 38024
- E. Architect: TLM Associates, Inc.; 117 E. Lafayette St.; Jackson, TN 38301; 731-988-9840.
- F. Architect Project Number: J-6401B1

1.2 CERTIFICATIONS AND BASE BID

- A. **BASE BID:** The undersigned Bidder, having carefully examined the Existing Conditions of the project area affecting the cost of the work, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by TLM Associates, Inc. and Architect's consultants, having and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all supervision, technical personnel, materials, labor, machinery, tools, services appurtenances, equipment including utility and transportation services, necessary to complete the construction of the above-named project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:

1. _____ Dollars (\$_____).

- B. **UNIT PRICE NO. 1 – Remove & Replace Unsuitable Material/Fill:** This Unit Price will be used to add to or deduct from the base bid allowance, based on actual quantities determined during the work, by geotechnical engineer's representative (Refer to 01 22 13 – UNIT PRICES):

1. _____ Dollars (\$_____).

1.3 ACKNOWLEDGEMENT OF ADDENDA

- A. The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:

1. Addendum No. 1, dated _____.

2. Addendum No. 2, dated _____.

3. Addendum No. 3, dated _____.

1.4 CONTRACTOR'S LICENSE

-
- A. The undersigned further states that it is a duly licensed contractor, for the type of work proposed, and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

1.5 SUBMISSION OF BID

Respectfully submitted this _____ day of _____, 2024.

Submitted By:

(Name of bidding firm or corporation)

Street Address:

City, State, Zip

License No.:

Authorized Signature:

(Handwritten signature)

Signed By:

(Type or print name)

Title:

(Owner/Partner/President/Vice President)

Witness By:

(Notary Public)

Term of Witness Expires:

(Date)

SECTION 00 43 13 – BID SECURITY FORM

The American Institute of Architect, A.I.A. Document A310, latest edition, shall be an acceptable bid bond form for this contract.

END OF SECTION 00 43 13

SECTION 00 43 73 - PROPOSED SCHEDULE OF VALUES

1.1 PROPOSED SCHEDULE OF VALUES FORM

- A. Proposed Schedule of Values Form: As an attachment to the bid form, provide a breakdown of the bid amount, including alternates, in enough detail to facilitate continued evaluation of bid. Coordinate with the Project Manual table of contents. Provide multiple line items for principal material and subcontract amounts in excess of **five** percent of the Contract Sum.
- B. Arrange schedule of values consistent with format of AIA Document G703.
 - 1. Copies of AIA standard forms may be obtained from the American Institute of Architects: <http://www.aia.org/contractdocs/purchase/index.htm>; docspurchases@aia.org; (800) 942-7732.

END OF DOCUMENT 00 43 73

SECTION 00 45 00 – DRUG FREE WORKPLACE AFFIDAVIT

STATE OF: TENNESSEE
COUNTY OF:

The undersigned, principal officer, of _____, an employer of five (5) or more employees contracting with, _____ County, Tennessee government to provide construction services, hereby states under oath as follows:

1. The undersigned is a principal officer of _____ (hereinafter referred to as the "Company"), and is duly authorized to execute this Affidavit on behalf of the Company.
2. The Company submits this Affidavit pursuant to T.C.A. § 50-9-113, which requires each employer with no less than five (5) employees receiving pay who contracts with the state or any local government to provide construction services to submit an affidavit stating that such employer has a drug-free workplace program that complies with Title 50, Chapter 9, of the *Tennessee Code Annotated*.
3. The Company is in compliance with T.C.A. § 50-9-113.
4. Attached hereto is a true and correct copy of the company's "certificate of compliance" (certified application) from the Tennessee Department of Labor and Workforce Development.

Further affiant saith not.

Principal Officer

STATE OF:
COUNTY OF:

Before me personally appeared _____, with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who acknowledged that such person executed the foregoing affidavit for the purposes therein contained.

Witness my hand and seal at office this _____ day of _____, 20____.

Notary Public

ATTACH A COPY OF YOUR CERTIFICATE OF COMPLIANCE TO THIS AFFIDAVIT, PLACE IN A SEPARATE SEALED ENVELOPE, AND ATTACH TO THE OUTSIDE OF THE SEALED ENVELOPE CONTAINING YOUR BID. IF YOUR COMPANY HAS LESS THAN FIVE (5) EMPLOYEES, SIGN BELOW, PLACE THIS AFFIDAVIT ONLY IN A SEPARATE SEALED ENVELOPE, AND ATTACH TO THE OUTSIDE OF THE SEALED ENVELOPE CONTAINING YOUR BID.

.....

IF LESS THAN FIVE (5) Employees Sign Here:

Title:

NON-BOYCOTT OF ISRAEL AFFIDAVIT

Concerning the Non-Boycott of Israel Act (TCA 12-4-1 et seq.), by submission of this bid/quote/proposal, each supplier and each person signing on behalf of any supplier certifies, and in the case of a joint bid/quote/proposal, each party thereto certifies as to its own organization, under penalty of perjury, "that to the best of its knowledge and belief that each supplier is not boycotting Israel pursuant to § 12-4-1 and will not during the term of any award. Note: Applicable only to contracts of \$250,000 or more and to suppliers with 10 or more employees.

The undersigned hereby acknowledges receipt of this affidavit and certifies that the submittal in response to this solicitation is in full compliance with the listed requirements. Failure to properly acknowledge issues concerning the above is grounds for bid rejection and may subject the signer to penalties as directed by the appropriate laws.

A contract entered into on or after July 1, 2022, that fails to comply with this section is void.

Signature

Printed Name

Title

Date

IRAN DIVESTMENT ACT AFFIDAVIT

As per Tennessee Code Annotated, Title 12, and effective July 1, 2016:

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to § 12-12-106.

Signature

Date

SECTION 00 52 13 – AGREEMENT FORM

The American Institute of Architect, A.I.A. Document A101, 2017 Edition entitled "Standard Form of Agreement between Owner and Contractor" shall be the contract form for this project.

END OF SECTION 00 52 13

SECTION 00 60 00 - FORMS

1.1 FORM OF AGREEMENT AND GENERAL CONDITIONS

- A. The following form of Owner/Contractor Agreement and form of the General Conditions shall be used for Project:
1. AIA Document A101, "Standard Form of Agreement between Owner and Contractor, Stipulated Sum."
 - a. The General Conditions for Project are AIA Document A201, "General Conditions of the Contract for Construction."
 2. AIA Document A102, "Standard Form of Agreement between Owner and Contractor, Cost Plus Fee, Guaranteed Maximum Price."
 - a. The General Conditions for Project are AIA Document A201, "General Conditions of the Contract for Construction."
 3. AIA Document A103, "Standard Form of Agreement between Owner and Contractor, Cost Plus Fee."
 - a. The General Conditions for Project are AIA Document A201, "General Conditions of the Contract for Construction."
 4. AIA Document A105, "Standard Form of Agreement between Owner and Contractor for a Small Project, Where the Basis of Payment Is a Stipulated Sum."
 - a. The General Conditions for Project are AIA Document A205, "General Conditions of the Contract for Construction of a Small Project."
 5. AIA Document A132, "Standard Form of Agreement between Owner and Contractor, Construction Manager as Adviser Edition."
 - a. The General Conditions for Project are AIA Document A232, "General Conditions of the Contract for Construction, Construction Manager as Adviser Edition."
 6. AIA Document A133, "Standard Form of Agreement between Owner and Contractor, Construction Manager as Constructor, Guaranteed Maximum Price."
 - a. The General Conditions for Project are AIA Document A201, "General Conditions of the Contract for Construction."
 7. AIA Document A133, "Standard Form of Agreement between Owner and Contractor for Integrated Project Delivery."
 - a. The General Conditions for Project are AIA Document A295, "General Conditions of the Contract for Integrated Project Delivery."
 8. The General Conditions are [included in the Project Manual] [incorporated by reference].
 9. The Supplementary Conditions for Project [are incorporated into a modified copy of the General Conditions included in the Project Manual] [are separately prepared and included in the Project Manual].
 10. Owner's document(s) bound following this Document.

1.2 ADMINISTRATIVE FORMS

- A. Administrative Forms: Additional administrative forms are specified in Division 01 General Requirements.
- B. Copies of AIA standard forms may be obtained from the American Institute of Architects; <http://www.aia.org/contractdocs/purchase/index.htm>; docspurchases@aia.org; (800) 942-7732.
- C. Preconstruction Forms:
 - 1. Form of Performance Bond and Labor and Material Bond: AIA Document A312, "Performance Bond and Payment Bond."
 - 2. Form of Certificate of Insurance: AIA Document G715, "Supplemental Attachment for ACORD Certificate of Insurance 25-S."
- D. Information and Modification Forms:
 - 1. Form for Requests for Information (RFIs): AIA Document G716, "Request for Information (RFI)."
 - 2. Form of Request for Proposal: AIA Document G709, "Work Changes Proposal Request."
 - 3. Change Order Form: AIA Document G701, "Change Order."
 - 4. Form of Architect's Memorandum for Minor Changes in the Work: AIA Document G707, "Architect's Supplemental Instructions."
 - 5. Form of Change Directive: AIA Document G714, "Construction Change Directive."
- E. Payment Forms:
 - 1. Schedule of Values Form: AIA Document G703, "Continuation Sheet."
 - 2. Payment Application: AIA Document G702/703, "Application and Certificate for Payment and Continuation Sheet."
 - 3. Form of Contractor's Affidavit: AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 - 4. Form of Affidavit of Release of Liens: AIA Document G706A, "Contractor's Affidavit of Payment of Release of Liens."
 - 5. Form of Consent of Surety: AIA Document G707, "Consent of Surety to Final Payment."

END OF DOCUMENT 00 60 00

SECTION 00 61 13 – PERFORMANCE AND PAYMENT BONDS

The American Institute of Architects, A.I.A. Document A312, 2017 Edition, entitled “Performance Bond” and “Payment Bond” shall be the contract bond form for this project. The General/Prime Contractor shall provide a bond for the contract amount.

END OF SECTION 00 61 13

SECTION 00 72 13 - GENERAL CONDITIONS

The American Institute of Architects Document A201-2017, Articles 1 through 15, pages 1 through 40, is hereby made a part of the specification by reference.

END OF SECTION 00 72 13

SECTION 00 81 10 - SPECIAL CONDITIONS

Time for Completion:

All work shall be completed in accordance with the following requirements:

1. All work shall commence on or after the date referenced on the Notice To Proceed, and be Substantially Complete within: **270 Calendar Days** from Notice To Proceed. Notice To Proceed is expected approx.. 60 days following Bid Opening. There are no restrictions on work hours.

Liquidated Damages: As actual damages for any delay in completion are impossible of determination, the Contractor and his sureties shall be liable for and shall pay Owner the sum of **\$1,000.00** fixed, agreed, and liquidated damages for each calendar day exceeding the time indicated above, until the work is Substantially Complete. Liquidated Damages shall not apply, where timely acquisition of materials and/or circumstances are beyond control of the Contractor.

END OF SECTION 00 81 10

SECTION 00 81 17 – SUPPLEMENTARY CONDITIONS

Modifications to AIA General Conditions A201-2017

Introduction: The following supplements modify, delete and/or add to the General Conditions. Where any article, paragraph or subparagraph in the General Conditions is supplemented by one of the following paragraphs, the provisions of such article, paragraph or subparagraph shall remain in effect and the supplemental provisions shall be considered as added thereto. Where any article, paragraph or subparagraph in the General Conditions is amended, voided, or superseded by any of the following paragraphs, the provisions of such article, paragraph or subparagraph not so amended, voided, or superseded shall remain in effect.

Supplements and Changes to the General Conditions, A.I.A. Form A201 2017 Edition.

ARTICLE 1 – GENERAL PROVISIONS

1.2 Execution, Correlation, Intent and Interpretations:

Add the following to 1.2.1 - Later claims for extra compensation for labor, materials, and equipment which could have been foreseen shall not be recognized.

ADD 1.2.4 as follows:

1.2.4 If any error, discrepancy or variances are found in the documents, the Contractor shall notify the Architect before beginning the work involved. The Architect will make correction, interpretation or clarification promptly, basing his decision on the intent of the Documents.

ARTICLE 3 - CONTRACTOR

3.4 Labor and Materials: Add the following:

3.4.4 All material delivered to the job site shall be so stored and handled as to preclude inclusion of any foreign substances or causing of any discoloration therein and to prevent any damage thereto which might reduce its effectiveness as part of the work.

3.4.5 All work as described or required shall be executed in neat, skillful, workmanlike manner in accordance with best recognized trade practices. Only competent workmen who satisfactorily perform their duties shall be employed on work.

3.4.6 Trade Names: Where trade names appear in the specifications, they are used to indicate standards of quality. However, this is intended to be an open specification (except as otherwise designated), accessible to any reputable manufacturer whose product, in Architect's opinion, is equal to that named or described and meets requirements of Contract Documents. The Architect, however, shall be sole judge of products submitted as being equal to those specified in respect to comparative qualities, and his decision shall be final and conclusive.

3.4.7 No asbestos containing materials may be used in this project nor may asbestos containing building materials be included as a building element.

3.9 Superintendent: Add the following:

3.9.4 Contractor's Superintendent shall devote his full time to this project and shall maintain his office on job site. He shall direct, coordinate and supervise all work under this contract and shall inspect all materials delivered to project. He shall ascertain whether or not they comply with contract requirements and shall reject all nonconforming materials. He shall have all nonconforming materials removed immediately from the project site.

3.14 Cutting and Patching of Work: Add the following:

3.14.3 Cutting and patching shall be the responsibility of the subcontractor requiring access to an area such as the mechanical contractor or electrical contractor needing to get to their respective equipment or lines.

3.14.4 Patch work shall be performed by the appropriate subcontractor engaged in a given craft or trade; that is, the plaster subcontractor shall do all patching of plaster; ceramic tile subcontractor shall patch ceramic tile, etc.

3.14.5 The cost of required patching shall be the responsibility of that subcontractor requiring access.

3.14.6 Patching of all finishes shall match existing to meet Architect's approval.

3.15 Cleaning Up: Add to 3.15.1 the following: He shall replace any broken glass, remove stains, spots, marks and dirt from decorated work, clean hardware, remove paint spots and smears from all surfaces, clean fixtures and wash all concrete and tile.

ARTICLE 7 - CHANGES IN THE WORK

7.3 Construction Change Directives - Add after Clause 7.3.10 the following:

7.3.11 A "reasonable" amount for overhead and profit shall be defined as follows:

- (1) For the subcontractor, 11% of the net extra cost of the work he performs.
- (2) For the Contractor, 5-1/2% of the net extra cost of the work performed by subcontractors.
- (3) For the Contractor, 11% of the net extra cost of the work he performs with his own forces.

9.3.1 Application for Payments: Add to 9.3.1 the following:

Ninety-five percent (95%) of value of work executed and ninety-five percent (95%) of value of materials properly stored on site, less previous payments, shall be paid each month by Owner to Contractor based on Architect's approval of Application for Payment. Approved forms are A.I.A. forms G702 and G703, 1992 Edition.

9.8 Substantial Completion

Add to 9.8.2 the following:

9.8.2.1 Upon notification by the Contractor that the work is sufficiently complete for Architect's inspection, the architect will, within a reasonable time conduct an inspection. As a result of this inspection the Architect will issue a list of items (Punch List) to the Contractor which requires completion or correction.

9.8.2.2 After the Architect has inspected the project and provided the Contractor with a "Punch List", and the Contractor has corrected those items listed in the "Punch List", the Contractor shall notify the Architect of corrections and ask for a final inspection.

9.8.2.3 When the Architect makes his final inspection to verify those corrections and perhaps finds that some of the items which were previously listed have not been corrected, the Architect may elect to retain the full amount of the dollar estimate of the "Punch List". This retainage will be paid upon final completion requirements as specified in 9.10 of the General Conditions. See Section 01 77 17 - Close-Out Procedures for Re-Inspection fees.

10.2 Safety of Persons and Property: Add the following, 10.2.9:

All work shall be considered under the care, custody or control of the Contractor until completion and acceptance by the Owner and Architect.

ARTICLE 11 - INSURANCE AND BONDS

11.1.1 Supplement as follows: Workman's Compensation and Employer's Liability.

The Contractor agrees to comply with the provisions of the Workman's Compensation Laws of the State in which the work is performed and to require all subcontractors likewise to comply. The Contractor agrees that, prior to the beginning of any work by the Contractor or Subcontractors, as the case may be, the Contractor will furnish to the Owner for himself and for each subcontractor a certificate from insurance company showing issuance of workman's compensation coverage for the State, or a certificate from the State Workman's Board showing proof of liability to pay compensation directly.

Employer's Protective Liability: \$100,000.00 per person - \$300,000.00 each occurrence for Property Damage.

\$300,000.00 per person - \$500,000.00 each occurrence for Bodily Injury Liability.

Further, the Contractor shall maintain such other insurance (with limits as shown below) to protect the Contractor, the Owner, and the Architect from any claims for property damage or personal injury, including death, which may arise out of operations under the Contract. The Contractor shall furnish the Owner certificates and policies of such insurance (as specified below) before the work begins.

Below is listed the additional insurance coverage which shall be procured by the Contractor at his own expense.

1. The Contractor's General Liability Insurance shall be in an amount not less than \$1,000,000.00 combined single limits for injuries and property damage, for any one occurrence, with a \$2,000,000.00 aggregate.
 - 1B. There shall also be a \$1,000,000.00 "umbrella".
 - 1C. Vehicle - \$1,000,000.00 Combined Single Limit occurrence, including Hired and Non-Owned Auto Liability.
2. Owners Contractors Protective (OCP) shall be provided in the name of the Owner and for a minimum of \$1,000,000.00 per occurrence \$2,000,000 aggregate.

ADD 11.1.2 as follows:

The Contractor shall furnish a Performance Bond and a Labor and Materials Payment Bond in an amount equal to 100% of the Contract Sum as security for the payment of all persons performing labor on the project under this contract and furnishing materials in connection with this contract. Form of Instruments shall be A.I.A. A- 311, February 1970 Edition; no substitutes. Bond shall be furnished through an agent domiciled and legally authorized to do business in the State in which the work is to be performed and delivered to the Owner not later than the date of execution of the contract. Surety company shall be one acceptable to the Owner and Architect.

ADD 11.1.5 as follows:

The Owner and TLM Associates, Inc. shall be additional named insureds under the Contractor's insurance policy or policies and the Certificate of Insurance shall so state.

ADD 11.1.6 as follows:

The insurance as specified above shall contain a "**per project endorsement**" such that the above coverages shall apply to this specific project.

When such hazard exists and before any earth moving or excavating equipment is used on the premises, the Contractor or Subcontractor involved shall provide coverage for liability arising from the destruction of property below the surface of the ground (U coverage).

When explosives are used or when such hazard exists or becomes present on the premises, the contractor or Subcontractor shall purchase insurance covering all liability arising from blasting or explosion (X & C Coverage). The Architect shall be notified 72 hours (excluding weekends and holidays) prior to the use of explosives.

ADD 11.1.7 as follows:

Builder's Risk Insurance shall be purchased by the **Managing Contractor** at his own expense and shall cover fire, extended coverage, vandalism, and malicious mischief. Said insurance policy to be in the name of the Owner, Architect, the Contractor and the Subcontractor "as their interests may appear" and to cover the full value of the work in sufficient amount to cover fully the value of the work performed and material on the site. This insurance will not be applicable to any tools or equipment when such tools and equipment are not part of the structure being constructed. The Contractor shall be responsible for the securing and maintaining of fire insurance and other insurance on any tools, equipment, or supplies which are to remain his property.

ARBITRATION

References to Arbitration shall be removed from the General Conditions. These deletions are located as follows: 13.1, 15.3.2 and the entirety of 15.4.

EXECUTION OF CONTRACT

- A. Subsequent to the award and within ten days after the prescribed forms are presented for signature the successful bidder shall execute and deliver to the Owner a contract in the form furnished in such number of counterparts as the Owner may require.
- B. The failure of the successful bidder to execute such contract and to supply the required bonds within ten days after the prescribed forms are presented for signature, or within such extended period as the Architect may grant based upon reasons determined adequate by the Owner shall constitute a default, and the Owner may either award the Contract to the next responsible bidder or re-advertise for bids, and may charge against the bidder the difference between the amount of the bid and the amount for which a contract for the work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the bid guaranty.

PRE-CONSTRUCTION CONFERENCE

- A. Either before or soon after the actual award of the contract (but in any event prior to the start of construction), the Contractor or his representative shall attend a pre-construction conference with representatives of the Owner and the Architect. The conference will serve to acquaint the participants with the general plan of contract administration and requirements under which the construction operation is to proceed, and will inform the Contractor of the obligations imposed on him and his subcontractors.
- B. The date, time and place of the conference will be furnished to the Contractor by the Architect.

LAWS AND REGULATIONS

- A. The bidder's attention is directed to the fact that all applicable State Laws, municipal ordinances and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout and they will be deemed to be included in the contract the same as though herein written out in full.
- B. The Contractor and all subcontractors shall further comply with applicable building codes as referenced in the various sections of the specifications.
- C. The Contractor shall include, on the bid form, a statement to the fact that the Contractor is an Equal Opportunity Employer and that the Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin.

PROJECT SUPERINTENDENT: The Contractor will employ a qualified superintendent, to run the project, with at least 4 years previous experience as a superintendent.

END OF SECTION 00 81 17

SECTION 01 11 13 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 The General Conditions of the Contract and Supplementary General Conditions of the Contract of this specification are herein made a part of this section of the specifications. The Contractor shall carefully examine all drawings and all sections of the specifications so as to properly coordinate his work with the work of others.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. **The work of this contract includes a CLASSROOM ADDITION TO DYER COUNTY JAIL as indicated in the contract documents.**

1.3 CONTRACTOR'S DUTIES

- A. Except as specifically noted, provide and pay for labor, materials and equipment, tools, construction equipment and machinery, water, heat and utilities required for construction; other facilities and services necessary for proper execution and completion of work.
- B. Pay legally required sales, consumer and use taxes.
- C. Secure and pay for, as necessary for proper execution and completion of work and as applicable at time of receipt of bids, Permits, Government Fees and Licenses.
- D. Give required notices.
- E. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities which bear on performance of work.
- F. Promptly submit written notice to Designer of observed variance of Contract Documents from legal requirements. It is not the Contractor's responsibility to make certain that drawings and specifications comply with codes and regulations.
- G. Appropriate modifications to contract documents will adjust necessary changes. Assume responsibility for work known to be contrary to requirements without notice.
- H. Enforce strict discipline and good order among employees. Do not employ or work unfit persons or persons not skilled in assigned work.

1.4 CONTRACTS

- A. Construct work under single lump sum contract.

1.5 SPECIAL ORDER MATERIALS

- A. The Contractor shall be advised that certain products, materials and equipment may be available on special order basis only; and shall place his order for same with the manufacturer early so as not to delay the work.

1.6 CONTRACTOR USE OF PREMISES

- A. Confine operations at site to areas permitted by Law, Ordinances, Permits and Contract Documents.
- B. Do not unreasonably encumber site with materials or equipment.
- C. Do not load structure with weight that will endanger structure.
- D. Assume full responsibility for protection and safe keeping of products stored on premises.
- E. Move any stored products which interfere with operations of Owner or other Contractor.
- F. Obtain and pay for use of additional storage or work areas for needed operations.

1.7 COORDINATION WITH OCCUPANTS

- A. Cooperate with Owner during work operations as necessary. Maintain existing exits.
- B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
- C. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.8 EXAMINATION OF SURFACES

- A. All Contractors shall examine all surfaces on which, or against which, their work is to be applied and shall notify the Designer of any defects that they may discover which, in their opinion would be detrimental to the proper installation of their product. Installation of material by the Contractors shall be considered as indication of acceptance of the surface by them.

1.9 COMPLETION

- A. It is the intent of these specifications and the Contract Documents that each and every fixture, piece of equipment, appliance, and any other related articles shown on the drawings or specified herein, as required for the proper completion of the work, shall be completely installed, connected, wired, and made satisfactorily operable for use and service for which it was intended. The manufacturer or vendor of any fixture, equipment or appliance shall see to it that all connections, whether mechanical or wired, are properly built-in or attached to the article when or before it reaches the job site so it will operate with the connections prepared therefore in the building. Nevertheless and notwithstanding any omission or failure on the part of the manufacturer or vendor to provide suitable connections, it shall be and it is the responsibility of the Contractor to install and connect such articles.

PART 2 - PRODUCTS

N/A

PART 3 - EXECUTION

N/A

END OF SECTION 01 11 13

SECTION 01 22 13 – UNIT PRICES

PART 1 - GENERAL

1.1 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- C. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule, as applicable, contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. **UNIT PRICE NO. 1 – Remove & Replace Unsuitable Material/Fill:**

- 1. Excavate and remove unsuitable material and replace with suitable compacted fill, per one (1) Cu. Yd. This Unit Price will be used to add to or deduct from the Base Bid Quantity Allowance – see below (Also refer to Drawing Sheet S1.0, Note 3.3), and based on actual quantities determined during the work, by geotechnical engineer's representative.
- 2. Unit of Measurement: per One (1) Cu. Yd.
- 3. Quantity Allowance in Base Bid: 10 Cu. Yds.

END OF SECTION 01 22 13

SECTION 01 25 00 – SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.
 - 3. Substitution for Equivalent Products: Refer to Section 01 60 00 Product Requirements under Subpart 1.4.C and Subpart 2.3.A.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit one electronic copy of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

-
- b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from applicable code organization.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 15 (fifteen) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within [15] fifteen days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
 - a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

-
- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than [15] days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Requested substitution provides sustainable design characteristics that specified product provided.
 - c. Substitution request is fully documented and properly submitted.
 - d. Requested substitution will not adversely affect Contractor's construction schedule.
 - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - f. Requested substitution is compatible with other portions of the Work.
 - g. Requested substitution has been coordinated with other portions of the Work.
 - h. Requested substitution provides specified warranty.
 - i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within [30] thirty days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect

will return requests without action, except to record noncompliance with these requirements:

- a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
- b. Requested substitution does not require extensive revisions to the Contract Documents.
- c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
- d. Substitution request is fully documented and properly submitted.
- e. Requested substitution will not adversely affect Contractor's construction schedule.
- f. Requested substitution has received necessary approvals of authorities having jurisdiction.
- g. Requested substitution is compatible with other portions of the Work.
- h. Requested substitution has been coordinated with other portions of the Work.
- i. Requested substitution provides specified warranty.
- j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 25 00

SECTION 01 26 63 – CHANGE ORDERS PROCEDURES

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Promptly implement change order procedures.
- B. Provide full written data required to evaluate changes.
- C. Maintain detailed records of work done on a time-and-material/force account basis.
- D. Provide full documentation to Architect on request.
- E. Designate in writing the member of Contractor's organization:
- F. Who is authorized to accept changes in the work.
- G. Who is responsible for informing others in the Contractor's employ of the authorization of changes in the work.
- H. Owner will designate in writing the person who is authorized to execute Change Orders.

1.2 RELATED REQUIREMENTS

- A. Agreement: The amounts of established unit prices.
- B. Conditions of the Contract:
 - 1. Methods of determining cost or credit to Owner resulting from changes in Work made on a time and material basis.
- C. Contractor's claims for additional costs.
- D. Section 01 29 76: Payment Procedures
- E. Section 01 78 39: Project Record Documents

1.3 DEFINITIONS

- A. Change Orders: See General Conditions
- B. Architect's Supplemental Instructions: A written order, instructions, or interpretations, signed by Architect making minor changes in the Work not involving a change in Contract Sum or Contract Time.

1.4 PRELIMINARY PROCEDURES

- A. Owner or Architect may initiate changes by submitting a Proposal Request to Contractor. Request will include:
 - 1. Detailed description of the Change, Products, and location of the change in the Project.
 - 2. Supplementary or revised Drawings and Specifications.
 - 3. The projected time span for making the change and a specific statement as to whether overtime work is, or is not, authorized.
 - 4. A specified period of time during which the requested price will be considered valid.
 - 5. Such request is for information only, and is not an instruction to execute the changes, nor to stop Work in progress.

- B. On request, provide additional data to support time and cost computations:
 - 1. Labor required.
 - 2. Equipment required.

- C. Products required:
 - 1. Recommended source of purchase and unit cost.
 - 2. Quantities required.
 - 3. Taxes, insurance and bonds.
 - 4. Credit for work deleted from Contract, similarly documented.
 - 5. Overhead and profit.
 - 6. Justification for any change in Contract Time.

- D. Support each claim for additional costs, and for work done on a time-and-material/force account basis, with documentation as required for a lump-sum proposal, plus additional information.

- E. Name of the Owner's authorized agent who ordered the work, and date on the order.

- F. Dates and times work was performed, and by whom.

- G. Time record, summary of hours worked, and hourly rates paid.

- H. Receipts and invoices for:
 - 1. Equipment used, listing dates and times of use.
 - 2. Products used, listing of quantities.
 - 3. Subcontracts.

1.5 PREPARATION OF CHANGE ORDERS

- A. Architect will prepare each Change Order.

- B. Form: Change order: AIA Document G701 – 2001 Change Order.

-
- C. Change Order will describe changes in the Work, both deletions, with attachments of revised
 - D. Contract Documents to define details of the change.
 - E. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.

1.6 LUMP-SUM/FIXED PRICE CHANGE ORDER

- A. Content of Change Orders will be based on, either:
 - 1. Architect's Proposal Request and Contractor's responsive Proposal as mutually agreed between Owner and Contractor.
 - 2. Contractor's Proposal for a change, as recommended by Architect.
- B. Owner and Architect will sign and date the Change Order as authorization for the Contractor to proceed with the changes.
- C. Contractor may sign and date the Change Order to indicate agreement with the terms therein.

1.7 UNIT PRICE CHANGE ORDER

- A. Content of Change Orders will be based on, either:
 - 1. Architect's definition of the scope of the required changes.
 - 2. Contractor's Proposal for a change, as recommended by Architect.
 - 3. Survey of complete work.
- B. The amount of the unit prices to be:
 - 1. Those stated in the Agreement.
 - 2. Those mutually agreed upon between Owner and Contractor.
- C. When quantities of each of the items affected by the Change Order can be determined prior to start of the work:
 - 1. Owner and Architect will sign and date the Change Order as authorization for Contractor to proceed with the changes.
 - 2. Contractor may sign and date the Change Order to indicate agreement with the terms therein.
- D. When quantities of the items cannot be determined prior to start of the work:

-
1. Architect or Owner will issue a construction change authorization directing Contractor to proceed with the change on this basis of unit prices, and will cite the applicable unit prices.
 2. At completion of the change, Architect will determine the cost of such work based on the unit prices and quantities used. Contractor shall submit documentation to establish the number of units of each item and any claims for a change in Contract Time.
 3. Architect will sign and date the Change Order to indicate their agreement with the terms therein.
 4. Owner and Contractor will sign and date the Change Order to indicate their agreement with the terms therein.

1.8 CORRELATION WITH CONTRACTOR'S SUBMITTALS

- A. Periodically revise Request for Payment forms to record each change as a separate item of Work, and to record the adjusted Contract Sum.
- B. Periodically revise the construction Schedule to reflect each change in Contract Time.
- C. Upon completion of work under a Change Order, enter pertinent changes in Record Documents.

PART 2 - PRODUCTS

- A. N/A

PART 3 - EXECUTION

- A. N/A

END OF SECTION 01 26 63

SECTION 01 29 76 – PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Submit Applications for Payment to Engineer in accordance with the schedule established by Conditions of the Contract and Agreement between Owner and Contractor.

1.2 RELATED REQUIREMENTS

- A. Agreement between Owner and Contractor: Lump Sum.
- B. Conditions of the Contract: Progress Payments, Retainages and Final Payment.

1.3 FORMAT AND DATA REQUIRED

- A. Submit applications typed on an AIA Document G-702, Application for Payment, with itemized data arranged on a schedule of values consistent with format of AIA Document G703.
- B. Provide itemized data on continuation sheet. Format, schedules, line items and values: Those of the Schedule of Values accepted by Engineer.

1.4 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

- A. Application Form:
 - 1. Fill in required information, including that for Change Order executed prior to date of submittal of application.
 - 2. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.
 - 3. Execute certification with signature of a responsible officer of Contractor's firm.
- B. Continuation Sheets:
 - 1. Fill in total list of all scheduled component items of Work, with item number and scheduled dollar value for each item.
 - 2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored.
 - 3. Round off values to nearest dollar or as specified for Schedule of Values.
- C. List each Change Order executed prior to date of submission, at the end of the continuation sheets.

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- D. List by Change Order Number, and description, as for an original component item of work.

1.5 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

- A. When the Owner or the Engineer requires substantiating data, Contractor shall submit suitable information, with a cover letter identifying:
 - 1. Project
 - 2. Application number and date
 - 3. Detailed list of enclosures
- B. For stored products:
 - 1. Item number and identification as shown on application.
 - 2. Description of specific material.
 - 3. Submit one (1) copy of data and cover letter for each copy of application.

1.6 PREPARATION OF APPLICATION FOR FINAL PAYMENT

- A. Fill in Application form as specified for progress payments.

1.7 SUBMITTAL PROCEDURE

- A. Submit Applications for Payment to Engineer at the times stipulated in the Agreement.
- B. Number: 1 original or 1 digital copy of each Application.
- C. When Engineer finds Application properly completed and correct, he will transmit certificate for payment to Owner, with copy to Contractor.

PART 2 - PRODUCTS

N/A

PART 3 - EXECUTION

N/A

END OF SECTION 01 29 76

SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1-Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS

- A. The types of submittal requirements specified in this section include shop drawings, product data, samples and miscellaneous work related submittals. Individual submittal requirements are specified in applicable sections for each unit of work. Refer to other Division 1 sections and other contract documents for requirements of administrative submittals.
- B. Definitions: Work related submittals of this section are categorized for convenience as follows:
 - 1. Shop drawings include specially prepared technical data for this project, including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements and similar information not in standard printed form for general application to a range of similar projects.
 - 2. Product data include standard printed information on materials, products and systems; not specially prepared for this project, other than the designation of selections from among available choices printed therein.
 - 3. Samples include both fabricated and un-fabricated physical examples of materials, products and units of work; both as complete units and as smaller portions of units of work; either for limited visual inspection or (where indicated) for more detailed testing and analysis.
 - 4. Miscellaneous submittals related directly to the work (non-administrative) include warranties, maintenance agreements, workmanship bonds, project photographs, survey data and reports, physical work records, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, operating and maintenance materials, overrun stock, and similar information, devices and materials applicable to the work and not processed as shop drawings, product data or samples.

1.3 GENERAL SUBMITTAL REQUIREMENTS

- A. Coordination and Sequencing: Coordinate preparation and processing of submittals with performance of the work so that work will not be delayed by submittals. Coordinate and sequence different categories of submittals for same work, and for interfacing units of work, so that one will not be delayed for coordination of A/E's review with another.

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- B. Preparation of Submittals: Provide permanent marking on each submittal to identify project, date, Contractor, subcontractor, submittal name and similar information to distinguish it from other submittals. Show Contractor's executed review and approval marking and provide space for Architect's/Engineer's "Action" marking. Package each submittal appropriately for transmittal and handling. Submittals which are received from sources other than through Contractor's office will be returned by A/E "without action".

1.4 SPECIFIC-CATEGORY SUBMITTAL REQUIREMENTS

- A. General: Except as otherwise indicated in individual work sections, comply with requirements specified herein for each indicated category of submittal.
- B. Shop Drawings: Provide newly prepared information, on reproducible sheets, with graphic information at accurate scale (except as otherwise indicated), with name of preparer indicated (firm name). Show dimensions and note which are based on field measurement. Identify materials and products in the work shown. Indicate compliance with standards, and special coordination requirements. Do not allow shop drawing copies without appropriate final "Action" markings by Architect/Engineer to be used in connection with the work.
 - 1. 1 Digital Submittal submitted to Architect / Engineer.
 - 2. Product Data: Collect required data into one submittal for each unit of work or system; and mark each copy to show which choices and options are applicable to project. Include manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked, and special coordination requirements. Maintain one set of product data (for each submittal) at project site, available for reference by Architect/Engineer and others.
 - 3. Submittals: Do not submit product data, or allow its use on the project, until compliance with requirements of contract documents has been confirmed by Contractor. Submittal is for information and record, unless otherwise indicated. Initial submittal is final submittal unless returned promptly by Architect/Engineer, marked with an "Action" which indicates an observed non-compliance.
 - 4. Samples: Provide units identical with final condition of proposed materials or products for the work. Include "range" samples (not less than 3 units) where unavoidable variations must be expected, and describe or identify variations between units of each set. Provide full set of optional samples where Architect's/Engineer's selection is required. Prepare samples to match Architect's/Engineer's samples where so indicated. Include information with each sample to show generic description, source or product name and manufacturer, limitations, and compliance with standards. Samples are submitted for review and confirmation of color, pattern, texture and "kind" by Architect/Engineer. Architect/ Engineer will not "test" samples (except as otherwise indicated) for compliance with other requirements, which are therefore the exclusive responsibility of Contractor.
 - 5. Submittals: At Contractor's option, provide preliminary submittal of a single set of samples for Architect's/Engineer's review and "action." Otherwise, initial submittal is final submittal unless returned with "action" which requires re-submittal. Submit 1 set of samples in final submittal.

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6. Quality Control Set: Maintain returned final set of samples at project site, in suitable condition and available for quality control comparisons by Architect/Engineer, and by others.

1.5 INSPECTION AND TEST REPORTS

- A. Classify each as either "shop drawing" or "product data", depending upon whether report is uniquely prepared for project or a standard publication of workmanship control testing at point of production; process accordingly.

1.6 WARRANTIES

- A. Refer to "Products" section for specific general requirements on warranties, product/workmanship bonds, and maintenance agreements. In addition to copies desired for Contractor's use, furnish 2 executed copies, except furnish 2 additional (conformed) copies where required for maintenance manuals.

1.7 CLOSEOUT SUBMITTALS

- A. Refer to individual work sections and to "closeout" sections for specific requirements on submittal of closeout information, materials, tools and similar items.
 1. Record Document Copies: Furnish one set.
 2. Maintenance/Operating Manuals: Furnish 2 bound copies.
 3. Materials and Tools: Refer to individual work sections for required quantities of spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.
 4. General Distribution: Provide additional distribution of submittals (not included in foregoing copy submittal requirements) to subcontractors, suppliers, fabricators, installers, governing authorities and others as necessary for proper performance of the work. Include such additional copies in transmittal to Architect/Engineer where required to receive "Action" marking before final distribution. Record distributions on transmittal forms.

1.8 ACTION ON SUBMITTALS

- A. Architect's/Engineer's Action: Where action and return is required or requested, Architect/Engineer will review each submittal, mark with "Action", and where possible return within 2 weeks of receipt. Where submittal must be held for coordination, Contractor will be so advised by A/E without delay.
- B. Action Stamp: Architect's/Engineer's action stamp, for use on submittals to be returned to Contractor, is self-explanatory as marked.

PART 2 - PRODUCTS

A. N/A

PART 3 - EXECUTION

A. N/A

END OF SECTION 01 33 00

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if

bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS, NAMES, AND ADDRESSES OF ORGANIZATIONS

A. (AASHTO)

- 1. American Association of State Highway and Transportation Officials
444 North Capitol Street,
Washington, D.C. 20001

B. (ANSI)

- 1. American National Standards Institute
(Formerly American Standards Association - ASA)
1430 Broadway
New York, New York 10018

C. (AREA)

- 1. American Railroad Engineering Association
2000 "L" Street, N.W.
Washington, D.C. 20036

D. (ASCE)

- 1. American Society of Civil Engineers
345 East 47th Street
New York, New York 10017

E. (ASME)

- 1. American Society of Mechanical Engineers
345 East 47th Street
New York, New York 10017

F. (ASTM)

- 1. American Society of Testing and Materials
1916 Race Street

Philadelphia, Pennsylvania 19103

G. (AWWA)

1. American Water Works Association
6666 W. Quincy Avenue
Denver, Colorado 80235

H. (FHWA)

1. Federal Highway Administration
Federal Building, U. S. Courthouse
Nashville, Tennessee 37202

I. (FSS)

1. Federal Specification and Standards
General Services Administration
Specifications and Consumer Information
Distribution Section (WFSIS)
Washington Navy Yard, Building 197
Washington, D.C. 20407

J. (NACE)

1. National Association of Coatings Engineers

K. (NCAC)

1. 2002 North Carolina Accessibility Code with 2004 Amendments

L. (NIOSH)

1. National Institute for Occupational Health and Safety

M. (SSPC)

1. Steel Structures Painting Council

N. (TDOEC)

1. Tennessee Department of Environment and Conservation
TERRA Building
150 9th Avenue North
Nashville, Tennessee 37219

O. (TDOT)

1. Tennessee Department of Transportation
James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37219

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 43 00 – TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Contractor will employ and pay for the services of an Independent Testing Laboratory to perform specified testing.
 - 1. Contractor shall cooperate with the laboratory to facilitate the execution of its required services.
 - 2. Employment of the laboratory shall in no way relieve the contractor's obligations to perform the work of the contract.
 - 3. The Independent Laboratory shall be approved by the Engineer.

1.2 RELATED REQUIREMENTS

- A. Conditions of the contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.
- B. Respective sections of specifications: Certification of products.
- C. Testing laboratory inspection, sampling and testing is required for, but not necessarily limited to:
 - 1. Earthwork
 - 2. Concrete
 - 3. Grout
 - 4. Structural Steel

1.3 LABORATORY DUTIES

- A. Cooperate with engineer and contractor; provide qualified personnel after due notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction:
 - 1. Comply with specified standards.
 - 2. Ascertain compliance of materials with requirements of Contract Documents.
- C. Promptly notify engineer and contractor of observed irregularities or deficiencies of work or products.
- D. Promptly submit written report of each test and inspection; one copy each to engineer, Owner, contractor, and one copy to record documents file. Each report shall include:
 - 1. Date issued.
 - 2. Project title and contract number.
 - 3. Testing laboratory name, address and telephone number.
 - 4. Name and signature of laboratory inspector.
 - 5. Date and time of sampling of inspection.
 - 6. Record of temperature and weather conditions.
 - 7. Date of test.
 - 8. Identification of product and specification section.

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9. Location of sample or test in the Project.
 10. Type of inspection or test.
 11. Results of tests and compliance or lack thereof with contract documents.
 12. Interpretation of test results, when requested by engineer.

E. Perform additional tests as required by engineer or the Owner.

F. Limitations of Authority of Testing Laboratory: Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on requirements of contract documents.
2. Approve or accept any portion of the work.
3. Perform any duties of the contractor.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory personnel provide access to work, to assist in testing operations as required.

B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.

C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which require pre-qualification testing by the testing laboratory.

D. Furnish copies of products test reports as required.

E. Furnish incidental labor and facilities:

1. To provide access to work to be tested
2. To obtain and handle samples at the project site or at the source of the product to be tested.
3. To facilitate inspections and tests.
4. For storage and curing of test samples.

F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

G. Employ and pay for the services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required:

H. For the contractor's convenience, when initial tests indicate work does not comply with contract documents, make arrangements with laboratory and pay for additional samples and test required.

I. Responsible for other testing, which is to be supplied by contractor.

J. Provide other testing, which is to be supplied by contractor.

END OF SECTION 01 43 00 – TESTING LABORATORY SERVICES

SECTION 01 50 00 – CONSTRUCTION FACILITIES AND TEMPORARY CONSTRUCTION CONTROLS

PART 1 - GENERAL

1.1 The General Conditions of the Contract and Supplementary General Conditions of the Contract of this specification are herein made a part of this section of the specifications. The Contractor and Subcontractor shall carefully examine all drawings and all sections of the specifications so as to properly coordinate his work with the work of others.

1.2 DESCRIPTION

A. Furnish, install and maintain temporary utilities and facilities required for construction, remove on completion of work.

B. References:

1. Section 01 50 01 – Field Engineering

1.3 REQUIREMENTS OF REGULATORY AGENCIES

A. Comply with National Electric Code.

B. Comply with Federal, State and Local Codes and regulations and with utility company requirements.

PART 2 - PRODUCTS

2.1 TEMPORARY OFFICE AND STORAGE SHEDS

A. Each Sub-Contractor shall provide a suitable office storage shed, and other structures as may be necessary to carry on the work.

B. Storage sheds shall be of sufficient size to hold materials required on the job site at one time, and shall have floors raised at least 6" above the ground on heavy joists or sleepers. Sheds shall be watertight.

2.2 TELEPHONE

A. All Contractors shall be responsible for their phone service.

2.3 TOILET FACILITIES

A. Each Sub-Contractor shall have access to temporary toilet facilities furnished by the Construction Manager.

B. The toilets shall, in construction details, equipment, connection, and maintenance, conform to all rules, regulations and requirements of the local Health Department having jurisdiction.

2.4 TEMPORARY ENCLOSURES

- A. The Sub-Contractor shall provide temporary weather tight enclosures for all exterior openings as soon as the walls and the roof are built when it is necessary to protect the work from the weather and to permit the use of temporary heat.

2.5 RODENT AND VERMIN CONTROL

- A. The Sub-Contractor shall provide on the job site ample and suitable containers with covers, and shall be fully responsible for containing and removing from the site all refuse from meals eaten on the site and other rodent or vermin attracting refuse.
- B. During the construction period, any and all precautions shall be exercised to control the entry and breeding of rodents and vermin.

2.6 TEMPORARY HEAT

- A. The Construction Manager shall provide any temporary heat which may be required for protection of work in place or in progress (drying- out the work) and to enable the work to continue in cold weather.
- B. Coordinate with requirements specified in electrical work.
- C. Such heat shall be provided by means of an approved temporary heating apparatus, which, in installation and operations, will not damage the finished work in the building. The Sub-Contractor shall provide adequate and proper fuels and shall maintain fires as required above.
- D. Permanent Heating System Used for Temporary Heat: After the construction of the building has reached a point where the permanent heating apparatus is available for use, the Sub-Contractor may, subject to the approval of the Owner, use the permanent heating apparatus to provide temporary heat. In such a case, the Sub-Contractor shall make such necessary connections as are required for supplying temporary heat sufficient to prevent any part of the building from freezing and to make possible the continuation of the various phases of this work. The Sub-Contractor shall be responsible for, and shall make good at his own expense, any damage to the permanent heating apparatus which occurs while same is being used to provide temporary heat.
- E. All costs in connection with the providing of temporary heat shall be paid by the Sub-Contractor.

2.7 TEMPORARY WATER SUPPLY

- A. Each Sub-Contractor may have use of the Owners water supply if the privilege is not abused. Extensions to Owner's service will be by sub-contractor requiring water service.

2.8 TEMPORARY ELECTRICAL SERVICE

- A. Each Sub-Contractor may use the owner's electrical service if the privilege is not abused.

2.9 PROTECTION

- A. The Construction Manager will provide barricades and protection for the perimeter of the site, if necessary. Any other barricades and protection for specific phases of the work will be the responsibility of the Bidder performing that work
- B. Provide protection for all shrubs, trees, lawns, roads, drives, adjacent buildings and equipment - both on and off the property and in roads and streets adjacent.

2.10 REMOVAL

- A. Temporary facilities shall be removed promptly when each becomes no longer required.

2.11 PROJECT SIGN

- A. To be provided by the Construction Manager.

PART 3 - EXECUTION

N/A

END OF SECTION 01 50 00-TEMPORARY CONSTRUCTION CONTROLS

SECTION 01 60 00 – PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and equivalent products.
- B. Related Sections include the following:
 - 1. Division 01 Section "References" for applicable industry standards for products specified.
 - 2. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
 - 3. Divisions 02 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Equivalent Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

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- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating equivalent products of other named manufacturers.

1.4 SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 - 2. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Identification of items that require early submittal approval for scheduled delivery date.
 - 3. Initial Submittal: Within 14 days after date of commencement of the Work, submit 1 copy of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.
 - 4. Completed List: Within 60 days after date of commencement of the Work, submit 1 copy of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - 5. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.
- B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Form 13.1A.]

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2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - i. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - j. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor, through Construction Manager, of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order.
 - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

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- C. Equivalent Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of an equivalent product request. Architect will notify Contractor, through Construction Manager, of approval or rejection of proposed equivalent product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
 - b. Use product specified if Architect cannot make a decision on use of an equivalent product request within time allocated.
 2. Equivalent product requests with supporting information can be submitted with the initial and completed/final product list for Architect's review and approval as denoted in 1.4.A under items 3 and 4.
- D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

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3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Refer to Divisions 02 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
- B. Product Selection Procedures:
1. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a equivalent product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Equivalent Products" Article for consideration of an unnamed product by the other named manufacturers.
 2. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
 3. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density,

or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Architect will consider requests for substitution if received within 60 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.
- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - 1. Requested substitution does not require extensive revisions to the Contract Documents.
 - 2. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - 3. Substitution request is fully documented and properly submitted.
 - 4. Requested substitution will not adversely affect Contractor's Construction Schedule.
 - 5. Requested substitution is compatible with other portions of the Work.
 - 6. Requested substitution provides specified warranty.
 - 7. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

2.3 EQUIVALENT PRODUCTS

- A. Conditions: Architect will consider Contractor's request for equivalent product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - 1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, and specific features and requirements indicated.
 - 3. Evidence that proposed product provides specified warranty.
 - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 - 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 29 – CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 3. Products: List products to be used and firms or entities that will perform the Work.
 4. Dates: Indicate when cutting and patching will be performed.
 5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.

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7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety. Operating elements include the following:
 1. Primary operational systems and equipment.
 2. Air or smoke barriers.
 3. Fire-suppression systems.
 4. Mechanical systems piping and ducts.
 5. Control systems.
 6. Communication systems.
 7. Conveying systems.
 8. Electrical wiring systems.
 9. Operating systems of special construction in Division 13 Sections.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
 1. Water, moisture, or vapor barriers.
 2. Membranes and flashings.
 3. Exterior curtain-wall construction.
 4. Equipment supports.
 5. Piping, ductwork, vessels, and equipment.
 6. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and

wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

- a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 01 73 29

SECTION 01 74 19 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Disposing of nonhazardous construction waste.
- B. Related Sections include the following:
 - 1. Division 01 Section "Temporary Facilities and Controls" for environmental-protection measures during construction.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

1.4 WASTE MANAGEMENT PLAN

- A. General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 - 1. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.

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- C. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:
1. Total quantity of waste.
 2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
 3. Total cost of disposal (with no waste management).
 4. Savings in hauling and tipping fees that are avoided.
 5. Handling and transportation costs. Include cost of collection containers for each type of waste.
 6. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement waste management plan as approved by Architect and Owner. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

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1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 01 74 19

01 77 00 – CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Warranties.
 - 3. Final cleaning.
- B. Related Sections include the following:
 - 1. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
 - 2. Division 01 Section "Cleaning" for progress cleaning of Project site.
 - 3. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 5. Divisions 02 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. For first two subparagraphs below, see Evaluations.
 - 3. Advise Owner of pending insurance changeover requirements.
 - 4. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 5. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

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6. Delete first subparagraph below if submittal of final record information is delayed until final acceptance.
 7. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 8. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 9. Coordinate first subparagraph below with Division 08 door hardware Sections. Revise if Owner makes final changeover or if key-control system manufacturer delivers keys directly to Owner.
 10. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 11. Complete startup testing of systems.
 12. Submit test/adjust/balance records.
 13. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 14. Advise Owner of changeover in heat and other utilities.
 15. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 16. Delete both subparagraphs below if Project does not include these items or if they are delayed until final acceptance.
 17. Complete final cleaning requirements, including touchup painting.
 18. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

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3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report and warranty.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit 1 digital of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

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1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.

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- f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - m. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Replace parts subject to unusual operating conditions.
 - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - q. First subparagraph below describes a major work item that may be disruptive to closeout procedures.
 - r. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - s. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - t. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01 77 00

SECTION 01 78 39 – PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
- B. Related Sections include the following:
 - 1. Division 01 Section "Closeout Procedures" for general closeout procedures.
 - 2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Divisions 02 through 33 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up Record Prints.
 - 2. Number of Copies: Submit copies of Record Drawings as follows:
 - a. Initial Submittal: Submit one set(s) of corrected Record Transparencies and one set(s) of marked-up Record Prints. Include Change Order changes and RFI changes. Architect will initial and date each transparency and mark whether general scope of changes, additional information recorded, and quality of drafting are acceptable. Architect will return transparencies and prints for organizing into sets, printing, binding, and final submittal.
 - b. Final Submittal: Submit one set(s) of marked-up Record Prints, one set(s) of Record Transparencies, and three copies printed from Record Transparencies. Print each Drawing, whether or not changes and additional information were recorded.

3. Final Submittal: Submit one set(s) of marked-up Record Prints, one set(s) of Record CAD Drawing files, one set(s) of Record CAD Drawing plots, and three copies printed from record plots. Plot and print each Drawing, whether or not changes and additional information were recorded.

a. Electronic Media: CD-R.

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one copy of each Product Data submittal.

D. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

B. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

1. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.

2. Accurately record information in an understandable drawing technique.

3. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

C. Content: Types of items requiring marking include, but are not limited to, the following:

1. Dimensional changes to Drawings.

2. Revisions to details shown on Drawings.

3. Depths of foundations below first floor.

4. Locations and depths of underground utilities.

5. Revisions to routing of piping and conduits.

6. Revisions to electrical circuitry.

7. Actual equipment locations.

8. Duct size and routing.

9. Locations of concealed internal utilities.

D. Changes made by Change Order or Construction Change Directive.

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1. Changes made following Architect's written orders.
 2. Details not on the original Contract Drawings.
 3. Field records for variable and concealed conditions.
 4. Record information on the Work that is shown only schematically.
 5. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 6. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 7. Mark important additional information that was either shown schematically or omitted from original Drawings.
 8. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- E. Record Transparencies: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Architect. When authorized, prepare a full set of corrected transparencies of the Contract Drawings and Shop Drawings.
- F. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.
- G. Refer instances of uncertainty to Architect for resolution.
- H. Owner will furnish Contractor one set of transparencies of the Contract Drawings for use in recording information.
- I. Print the Contract Drawings and Shop Drawings for use as Record Transparencies. Architect will make the Contract Drawings available to Contractor's print shop.
- J. Record CAD Drawings: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Architect. When authorized, prepare a full set of corrected CAD Drawings of the Contract Drawings, as follows:
1. Format: Same CAD program, version, and operating system as the original Contract Drawings.
 2. Retain subparagraph above or first subparagraph below.
 3. Format: DWG, Version Architectural Desktop 2006, operating in Microsoft Windows operating system.
 4. Incorporate changes and additional information previously marked on Record Prints. Delete, redraw, and add details and notations where applicable.
 5. Refer instances of uncertainty to Architect for resolution.
 6. Architect will furnish Contractor one set of CAD Drawings of the Contract Drawings for use in recording information.
 - a. Architect makes no representations as to the accuracy or completeness of CAD Drawings as they relate to the Contract Drawings.
 - b. CAD Software Program: The Contract Drawings are available in Architectural Desktop 2006.

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- K. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- L. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Record Transparencies: Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.
 3. Record CAD Drawings: Organize CAD information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each CAD file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
 5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 01 78 39

SECTION 02 41 19 – SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following: Selective Demolition of the following portions of the existing jail structure.

1. Saw cut opening in existing cmu and cmu cavity wall (refer to structural and architectural drawings).
2. Security razor wire, fencing, and support structure adjacent to new addition.

- B. See Division 01 Section "Construction Waste Management and Disposal" for disposal of demolished materials.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

1.3 SUBMITTALS

- A. Schedule of Selective Demolition Activities: Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, interruption of utility services, use of elevator and stairs, and locations of temporary partitions and means of egress.

1.4 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in concrete saw cutting demolition work similar to that indicated for this Project.

1.5 PROJECT CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Notify Designer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Storage or sale of removed items or materials on-site is not permitted.

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- D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

- 1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Designer.
- E. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.
- F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
- B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

3.4 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 5. Dispose of demolished items and materials promptly. Comply with requirements in Division 01 Section "Construction Waste Management and Disposal."

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

- A. The extent of concrete work shown on drawings.

1.3 QUALITY ASSURANCE:

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:
 - 1. ACI 301 "Specifications for Structural Concrete for Buildings."
 - 2. ACI 318 "Building Code Requirements for Reinforced Concrete."
 - 3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."
 - 4. ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures."
- B. Concrete Testing Service: Employ, at Contractor's expense a testing laboratory acceptable to Designer to perform material evaluation tests and to design concrete mixes.
- C. Materials and installed work may require testing and retesting, as directed by Designer, at anytime during progress of work. Allow free access to material stockpiles and facilities. Tests not specifically indicated to be done at Owner's expense, including retesting of rejected materials and installed work, shall be done at Contractor's expense.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including reinforcement (including fibrous reinforcement) and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, and others as requested by Designer.
- B. Samples: Submit samples of materials as specified and as otherwise requested by Designer, including names, sources and descriptions.
- C. Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design test as specified.

PART 2 - PRODUCTS

2.1 FORM MATERIALS:

- A. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- B. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.2 REINFORCING MATERIALS:

- A. Reinforcing Bars (ReBar): ANSI/ASTM A 615, Grade 60, deformed (detailed and fabricated in accordance with latest edition of ACI 318 & 315).
- B. Welded Wire Fabric (WWF): ANSI/ASTM A 185, welded steel wire fabric.
- C. Fibrous Reinforcement: 100 percent virgin polypropylene fibrillated fibers containing no reprocessed olefin materials and specifically manufactured to an optimum gradation for use as concrete secondary reinforcement. Reinforcement shall be equal to Fibermesh Inforce E3 as manufactured by SI Concrete Systems. Refer S1.0 for additional information.
- D. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Support spacing shall be in accordance with CRSI recommendations and shall be adequate to maintain clearance for reinforcing as indicated or recommended by ACI 318 and CRSI prior to, during and after concrete placement Use wire bar type supports complying with CRSI recommendations, unless otherwise acceptable.
- E. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

2.3 CONCRETE MATERIALS:

- A. Portland Cement: ANSI/ASTM C 150, Type I, unless otherwise acceptable to Designer.
- B. Normal Weight Aggregates: ANSI/ASTM C 33, and as herein specified. Maximum aggregate size 1-1/2".
- C. Light Weight Aggregates: ASTM C330, and as herein specified. Maximum aggregate size 1".
- D. Limestone Aggregates: Approved aggregate shall be used in all exterior exposed concrete.
- E. Water: Potable.
- F. Air-Entraining Admixture: ANSI/ASTM C 260.
- G. Water-Reducing Admixture: ANSI/ASTM C 494, Type A, and contain not more than 1% chloride ions.

H. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

1. "Eucon WR-75"; Euclid Chemical Co.
2. "Pozzolith 322N"; Master Builders.
3. "Plastocrete 160"; Sika Chemical Corp.
4. "Chemtard"; Chem-Masters Corp.

I. Water Reducing, Accelerator Admixture: ASTM C 494, Type C or E.

J. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

1. "Accelguard HE"; Euclid Chemical Co.
2. "Pozzolith 122-HE"; Master Builders.
3. "Darex"; W.R. Grace.
4. "Sikacrete"; Sika Chemical Co.

K. Calcium chloride: not permitted.

L. Fly ash: ASTM C618, Class F Fly Ash replacing 15-25% of the mass of cementitious material.

2.4 RELATED MATERIALS:

A. Waterstops: Provide flat, dumbbell type or centerbulb type waterstops at construction joints and other joints as shown. Size to suit joints.

B. Polyvinyl chloride (PVC) waterstops: Corps of Engineers CRD-C 572.

C. Moisture Barrier: Provide moisture barrier cover over prepared base material where indicated. Use only materials which are resistant to decay when tested in accordance with ANSI/ASTM E 154, as follows:

D. Polyethylene sheet not less than 6 mils thick.

E. 1½ inch rigid insulation under slabs.

F. Non-Shrink Grout: CRD-C 621, ASTM C1107 and tested in accordance with ASTM C-827, factory premixed grout.

G. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

1. Type D, Non-metallic, Non-shrink
 - a. "Masterflow 713"; Master Builders.
 - b. "SonogROUT"; Sonneborn-Contech.
 - c. "Euco-NS"; Euclid Chemical Co.
 - d. "Five Star Grout"; U.S. Grout Co.
 - e. "DuragROUT"; L & M Const. Chemical Co.

H. Chemical Hardener (ChHd-Fn): Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 lbs. of fluosilicates per gal.

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- I. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
 - J. Moisture-Retaining Cover: One of the following, complying with ANSI/ASTM C 171.
 - 1. Waterproof paper.
 - 2. Polyethylene film.
 - 3. Polyethylene-coated burlap.

2.5 PROPORTIONING AND DESIGN OF MIXES:

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Designer for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Designer.
- B. Submit written reports to Designer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Designer.
- C. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:
 - 1. 3000 psi 28-day compressive strength; 480 lbs. cement per cu. yd. minimum; W/C ratio, 0.62 maximum (non-air entrained), 0.57 maximum (air entrained).
 - 2. 3500 psi 28 day compressive strength 520 lbs cement per cu. yd. minimum; w/c ratio .58 maximum (non-air entrained) .52 maximum (air entrained).
 - 3. 4000 psi 28-day compressive strength; 560 lbs. cement per cu. yd. minimum; W/C ratio, 0.54 maximum (non-air entrained), 0.48 maximum (air entrained).

2.6 CONCRETE SCHEDULE:

- A. Footings: 3000 psi Non-Air Entrained
- B. Block Cores Below Grade: 3000 psi Non-Air Entrained
- C. Exterior Exposed Piers and Walls: 4000 psi Air Entrained
- D. Interior Piers and Walls: 4000 psi Non-Air Entrained
- E. Slabs on Grade Interior: 4000 psi Non-Air Entrained
- F. Slabs On Grade Exterior: 4000 psi Air Entrained

2.7 ADJUSTMENT TO CONCRETE MIXES:

- A. Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Designer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Designer before using in work.

2.8 ADMIXTURES:

- A. Use water-reducing admixture in all concrete.
- B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50F (10C).
- C. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content within following limits:
- D. Concrete structures and slabs exposed to freezing and thawing or subjected to hydraulic pressure:
 - 1. 3% to 5% for maximum 2" aggregate.
 - 2. 3% to 7% for maximum 3/4" aggregate.
 - 3. 6% to 8% for maximum 1/2" aggregate.
 - 4. Other Concrete: 2% to 4% air.
- E. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions, and Designer's approval.
- F. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
 - 1. Ramps and sloping surfaces: Not more than 3".
 - 2. Reinforced foundation systems: Not more than 4".
 - 3. Other concrete: Not more than 4".

2.9 CONCRETE MIXES:

- A. Job-Site Mixing: Mix materials for concrete in appropriate drum type batch machine mixer. For mixers of one cu. yd., or smaller capacity, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than one cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd., or fraction thereof.
- B. Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.
- C. Ready-Mix Concrete: Comply with requirements of ANSI/ASTM C 94, and as herein specified.
- D. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ANSI/ASTM C 94 may be required.
- E. When air temperature is between 85 F (30C) and 90F (32C), reduce mixing, delivery, and beginning placing operation time from 1-1/2 hours to 75 minutes, and when air temperature is above 90F (32C), reduce mixing, delivery, and beginning placing operation time to 60 minutes.
- F. Tempering and Control of Mixing Water: Concrete shall be mixed only in quantities for immediate use. Concrete which has set shall not be retempered, but shall be discarded.

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- G. When concrete arrives at the project with slump below that suitable for placing, as indicated by the Specifications, water may be added only if neither the maximum permissible water-cement ratio nor the maximum slump is exceeded. The water shall be incorporated by additional mixing equal to at least half of the total mixing required. An addition of water above that permitted by the limitation on water-cement ratio shall be accompanied by a quantity of cement sufficient to maintain the proper water-cement ratio. Such addition shall be authorized by the Designer or his representative.

PART 3 - EXECUTION

3.1 FORMS:

- A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.
- B. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.
- C. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.
- E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.
- F. Chamfer, exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- G. Form Ties: Factory-fabricated, adjustable-length, removable or snapoff metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.
- H. Unless otherwise indicated, provide ties so portion remaining within concrete after removal is at least 1-1/2" inside concrete.
- I. Unless otherwise shown, provide form ties which will not leave holes larger than 1" diameter in concrete surface.

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- J. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.
 - K. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

3.2 PLACING REINFORCEMENT:

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
- C. Accurately position, support and secure reinforcement against displacement by formwork construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required to maintain proper clearances.
- D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces. Corner bars shall be furnished at all insertions or walls and bond beams where continuous reinforcing is required.
- E. Corner bars shall be furnished at all intersections of footings, walls and bond beams where continuous reinforcing is required.
- F. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.3 JOINTS:

- A. Construction Joints: Locate and install construction joints, which are not shown on drawings, so as not to impair strength and appearance of the structure, as acceptable to Designer.
- B. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.
- C. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints.
- D. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions.

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- E. Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs on ground and vertical surfaces, such as column pedestals, foundation walls, grade beams and elsewhere as indicated.
 - F. Joint filler and sealant materials are specified in Division-7 sections of these specifications.
 - G. Contraction (Control) Joints in Slabs-on-Ground: Construct contraction joints in slabs-on-ground to form panels of patterns as shown. Use inserts 1/3 of slab depth, unless otherwise indicated.
 - H. Contraction joints may be formed by saw cuts of 1/3 the slab thickness as soon after slab finishing without dislodging aggregate, maximum time of 8 hours after concrete placement.
 - I. Joint sealant material is specified in Division-7 sections of these specifications.

3.4 INSTALLATION OF EMBEDDED ITEMS:

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.5 PREPARATION OF FORM SURFACES:

- A. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.
- B. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.6 CONCRETE PLACEMENT:

- A. Preplacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
- B. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.
- C. General: Comply with ACI 304, and as herein specified.

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- D. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation, maximum free fall of 4' 0". Concrete to be placed with chutes, hoppers, baffles drop pipes or flexible drop chute to avoid segregation as recommended by ACI 304.
 - E. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
 - F. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.
 - G. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
 - H. Placing Concrete Slabs: Deposit and consolidate concrete slabs by mechanical vibrating equipment in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
 - I. Consolidate placed concrete by mechanical vibrating equipment during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.
 - J. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 - K. Maintain reinforcing in proper position during concrete placement operations.
 - L. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
 - M. When air temperature has fallen to or is expected to fall below 40F (4C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50F (10C), and not more than 80F (27C) at point of placement.
 - N. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - O. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
 - P. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

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- Q. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90F (32C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing.
 - R. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
 - S. Wet forms thoroughly before placing concrete.
 - T. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.7 FINISH OF FORMED SURFACES:

- A. Rough Form Finish (RfFm-Fn): For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.
- B. Smooth Form Finish (SmFm-Fn): For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.
- C. All exposed to view surfaces shall receive a rubbed finish.

3.8 MONOLITHIC SLAB FINISHES:

- A. Scratch Finish (Scr-Fn): Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated.
- B. After placing slabs, plane surface to a tolerance not exceeding 1/2" in 10' when tested with a 10' straightedge. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms or rakes.
- C. Float Finish (Flt-Fn): Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.
- D. After screening, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance not exceeding 1/4" in 10' when tested with a 10' straightedge. Cut down high spots and fill low spots. Uniformly slope surface to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

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- E. Trowel Finish (Tr-Fn): Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, paint or other thin film finish coating system.
 - F. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8" in 10' when tested with a 10' straightedge. Grind smooth surface defects which would telegraph through applied floor covering system.
 - G. Non-Slip Broom Finish (NSBrm-Fn): Apply non-slip broom finish to all exterior concrete, including platforms, steps and ramps, and elsewhere as indicated.
 - H. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Designer before application.
 - I. Chemical-Hardener Finish (ChHd-Fn): Apply chemical-hardener finish to interior concrete floors where indicated. Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Dilute liquid hardener with water, and apply in 3 coats; first coat, 1/3 strength; second coat, 1/2 strength; third coat, 2/3 strength. Evenly apply each coat, and allow 24 hours for drying between coats.
 - J. Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions.
 - K. After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.
 - L. Finishing of Concrete Containing Fibrous Reinforcement: In addition to finishing methods described above, contractor shall remove all traces of fibrous reinforcement at slab surface as directed by Designer.

3.9 CONCRETE CURING AND PROTECTION:

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting; keep continuously moist for not less than 7 days.
- C. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
- D. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover curing, by curing compound, and by combinations thereof, as herein specified.
- E. Provide moisture curing by following methods.
 - 1. Keep concrete surface continuously wet by covering with water.
 - 2. Continuous water-fog spray.

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3. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

- F. Curing, Sealing and Dustproofing Compounds: The compound shall be a clear liquid acrylate-based polymer that contains no oils, saponifiable resins, waxes, or chlorinated rubbers. It shall have a minimum of 30% solids content and have test data from an independent laboratory indicating a maximum moisture loss of 0.030 grams per sq. cm. when applied at a coverage rate of 300 sq. ft. per gallon and tested in accordance with federal specification TT-C-800A. Compound shall be applied in two coats to guarantee sealing and dustproofing. Coverage rate shall be as per manufacturer's recommendation but no more than 300 square feet per gallon, each coat. The compound shall be equal to Sonneborn Kure-N-Seal 30. Contractor to verify compatibility with floor finish specified.
- G. Provide moisture-cover curing as follows:
- H. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- I. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

3.10 SHORES AND SUPPORTS:

- A. Comply with ACI 347 for shoring and reshoring in multistory construction, and as herein specified.
- B. Extend shoring from ground to roof of structure, unless otherwise permitted.

3.11 REMOVAL OF FORMS:

- A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of work, may be removed after cumulatively curing at not less than 50F (10C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28-days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form-facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.12 RE-USE OF FORMS:

- A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces.
- B. Apply new form coating compound as specified for new formwork.
- C. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Designer.

3.13 MISCELLANEOUS CONCRETE ITEMS:

- A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
- D. Reinforced Masonry: Provide concrete grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

3.14 CONCRETE SURFACE REPAIRS:

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Designer.
- B. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.
- C. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- D. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Designer. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning.

Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

- E. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
 - F. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope.
 - G. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
 - H. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
 - I. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Designer.
 - J. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 - K. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
 - L. Use epoxy-based mortar for structural repairs, where directed by Designer.
 - M. Repair methods not specified above may be used, subject to acceptance of Designer.
- 3.15 QUALITY CONTROL TESTING DURING CONSTRUCTION:
- A. The Contractor will employ a testing laboratory to perform all tests and to submit test reports.
 - B. Sampling and testing for quality control during placement of concrete shall include the following, unless otherwise directed by Designer.
 - C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - D. Slump: ASTM C 143; one test for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.

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- E. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete, ASTM C 231 pressure for normal weight concrete; one for each set of compressive strength test specimens.
 - F. Concrete Temperature: Test hourly when air temperature is 40 F (4C) and below, and when 80F (27C) and above; and each time a set of compression test specimens made.
 - G. Compression Test Specimen: ASTM C 31; one set of 6 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field- cure test specimens are required.
 - H. Compressive Strength Tests: ASTM C 39; one set for each 100 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 5,000 sq. ft. of surface area placed; 2 specimens tested at 7 days, 3 specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
 - I. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 - J. When strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 - K. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive by more than 500 psi.
 - L. Test results will be reported in writing to Designer and Contractor on same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7- day tests and 28-day tests.
 - M. Chemical-Hardener Finish (ChHd-Fn): Apply chemical-hardener finish to interior concrete floors where characteristics have not been attained in the structure, as directed by Designer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.
 - N. Batch Ticket Submittal: Contractor shall provide Designer with batch tickets for concrete with fibrous reinforcement showing the amount of reinforcement used in mixes for each pour. Concrete that does not meet specification requirements shall be removed and replaced at the direction of the Designer of record at the contractor's expense.

END OF SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

SECTION 05 12 00 – STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

- A. Extent of structural steel work is shown on drawings, including schedules, notes and details to show size and location of members, typical connections, and type of steel required.
- B. Structural steel is that work defined in AISC "Code of Standard Practice" and as otherwise shown on drawings.
- C. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.

1.3 QUALITY ASSURANCE:

- A. Codes and Standards: Comply with provisions of following, except as otherwise indicated:
 - 1. AISC "Code of Standard Practice for Steel Buildings and Bridges".
 - 2. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", including "Commentary" and Supplements thereto as issued.
 - 3. AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.
 - 4. AWS D1.1 "Structural Welding Code".
 - 5. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".
- B. Qualifications for Welding Work
 - 1. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".
 - 2. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
 - 3. If recertification of welders is required, retesting will be Contractor's responsibility.

1.4 CERTIFICATION:

- A. Fabricator for structural steel shall be certified by AISC as a Group II Fabricator: Complex steel Building Structures, under the AISC Quality Certification Program. No part of the structural

fabrication may be subcontracted to a shop which does not maintain a minimum of Group II AISC Certification without the prior written consent of the structural engineer.

- B. If a fabricator is not certified by AISC they may request to be pre-approved by the Designer prior to bidding. The Designer or Engineer shall visit the fabricator's facility to observe the fabricator's operation to include facilities, testing, and quality control. The fabricator requesting pre-approval shall be responsible for all cost incurred by the Designer associated with this request.

1.5 SUBMITTALS:

- A. Product Data: Submit producer's or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
- B. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
- C. High-strength bolts (each type), including nuts and washers.
- D. Structural steel primer paint.
- E. Shrinkage-resistant grout.

1.6 SHOP DRAWINGS:

- A. Submit shop drawings prepared under supervision of a registered professional engineer, including complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams.
- B. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols, and show size, length, and type of each weld.
- C. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed by others.
- D. Test Reports: Submit copies of reports of tests conducted on shop and field bolted and welded connections. Include data on type (s) of tests conducted and test results.

1.7 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials to site at such intervals to insure uninterrupted progress of work.
- B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not to delay work.

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- C. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.
 - D. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.
- B. Plates, Angles, and Bars: ASTM A36
- C. Rolled Shapes (Except Angles): ASTM A572, Grade 50.
- D. Cold-Formed Steel Tubing: ASTM A 500, Grade B.
- E. Hot-Formed Steel Tubing: ASTM A 501.
- F. Steel Pipe: ASTM A 53, Type E or S, Grade B.
- G. Anchor Bolts: ASTM F1554 (with S1 supplement), grade as indicated. Provide hexagonal heads and nuts for all connections.
- H. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:
 - I. High Strength Bolts: ASTM A325N, Type 1 (US Manufacturer), typical, unless noted otherwise.
 - J. High Strength Heavy Hex Nuts (Plain): ASTM A563, Grade C
 - K. High Strength Heavy Hex Nuts (Galv.): ASTM A563, Grade DH (chase threads)
 - L. Hardened Steel Washers (Plain): ASTM F436, Type 1
 - M. Tension Indicating Washers: ASTM F959
 - N. Through Bolts (Wood Construction): ASTM A307
 - O. Threaded Tension Rods: ASTM A36 with UNC (Coarse) Threads
 - P. Turnbuckles: Load rated Turnbuckles with UNC (Coarse) Threads

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- Q. Headed Studs: ASTM A108, Grade 1015 or 1020, cold finished carbon steel with dimensions complying with AISC
 - R. Electrodes for Welding: Comply with AWS Code.
 - S. Structural Steel Primer Paint: Fabricator's standard rust- inhibiting primer.
 - T. Cement Grout: Portland cement (ASTM C 150, Type I or Type III) and clean, uniformly graded, natural sand (ASTM C 404, Size No. 2). Mix at a ratio of 1.0 part cement to 3.0 parts sand, by volume, with minimum water required for placement and hydration.
 - U. Non-metallic Shrinkage-Resistant Grout: Pre-mixed, non- metallic, non-corrosive, non-staining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with CRD-C621.
 - V. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - 1. Euco N.C.; Euclid Chemical Co.
 - 2. Crystex; L&M Construction Chemicals
 - 3. Masterflow 713; Master Builders
 - 4. Five Star Grout; U.S. Grout Corp.
 - 5. Upcon; Upco Chem. Div., USM Corp.
 - 6. Propak; Protex Industries, Inc.

2.2 FABRICATION:

- A. Shop Fabrication and Assembly
 - 1. Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.
 - 2. Quenched and tempered medium-carbon steel bolts, nuts and washers, complying with ASTM A 325.
 - 3. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
 - 4. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.
- B. Connections
 - 1. Weld or bolt shop connections, as indicated.
 - 2. Bolt field connections, except where welded connections or other connections are indicated.
 - 3. Provide high-strength threaded fasteners for principal bolted connections.

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4. Provide unfinished threaded fasteners for only bolted connections of secondary framing members to primary members (including purlins, girts, and other framing members taking only nominal stresses) and for temporary bracing to facilitate erection.
 5. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" (RCRBSJ).

C. Welded Construction

1. Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.
2. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.

D. Steel Wall Framing

1. Select members which are true and straight for fabrication of steel wall framing.
2. Build up welded door frames attached to structural steel framing. Weld exposed joints continuously and grind smooth. Plug weld steel bar stops to frames, except where shown removable. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10" o.c., unless otherwise indicated.

E. Holes for Other Work

1. Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.
2. Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.
3. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.3 SHOP PAINTING:

A. General

1. Shop paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel which is partially exposed on exposed portions and initial 2" of embedded areas only. Structural steel items that are to have fireproofing applied shall be unpainted and unprimed (coordinate with Designer).
2. Apply 2 coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

B. Surface Preparation

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1. After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale, and spatter, slag or flux deposits.
 2. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:
 - a. SP-1 "Solvent Cleaning".
 - b. SP-2 "Hand Tool Cleaning".
 - c. SP-3 "Power Tool Cleaning".
 - d. SP-7 "Brush-off Blast Cleaning".
- C. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils. Use painting methods which result in full coverage of joints, corners, edges, and exposed surfaces.

PART 3 - EXECUTION

3.1 ERECTION:

A. Surveys

1. Employ a registered professional engineer or land surveyor for accurate erection of structural steel.

B. Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Designer.

C. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been agreed upon with Designer.

D. Temporary Shoring and Bracing

1. Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads.
2. Remove temporary members and connections when permanent members are in place and final connections are made.
3. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

E. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

F. Anchor Bolts

1. Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.
2. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.

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3. Refer to Division 3 of these specifications for anchor bolt installation requirements in concrete, and Division 4 for masonry installation.

G. Setting Bases and Bearing Plates

1. Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.
2. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
3. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
4. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow curing.
5. For proprietary grout materials, comply with manufacturer's instructions.

H. Field Assembly

1. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
2. Level and plumb individual members of structure within specified AISC tolerances.

- I. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.

- J. Splice members only where indicated and accepted on shop drawings.

- K. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.

- L. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

- M. Do not enlarge holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

N. Gas Cutting

1. Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing.
2. Cutting will be permitted only on secondary members which are not under stress, as acceptable to Designer.
3. Finish gas-cut sections equal to a sheared appearance when permitted.

O. Touch-Up Painting

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1. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint.
 2. Apply paint to exposed areas using same material as used for shop painting.
 3. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

3.2 QUALITY CONTROL:

- A. Engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.
- B. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.
- C. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.
- D. Testing agency may inspect structural steel at plant before shipment; however, Designer reserves right, at any time before final acceptance, to reject material not complying with specified requirements.
- E. Correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any non-compliance of original work, and as may be necessary to show compliance of corrected work.
- F. Shop Bolted Connections: Inspect in accordance with AISC specifications.
- G. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:
 1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 2. Perform visual inspection of all welds.
 3. Perform tests of welds as follows. Inspection procedures listed are to be used at Contractor's option.
 4. Liquid Penetrant Inspection: ASTM E 165.
 5. Magnetic Particle Inspection: ASTM E 109; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not acceptable.
 6. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T".
 7. Ultrasonic Inspection: ASTM E 164.
 8. Field Bolted Connections: Inspect in accordance with AISC specifications.
- H. Field Welding: Inspect and test during erection of structural steel as follows:
 1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 2. Perform visual inspection of all welds.

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3. Perform tests of welds as follows: All full penetration field welds at moment and torsion connections shall be tested.
 4. Liquid Penetrant Inspection: ASTM E 165.
 5. Magnetic Particle Inspection: ASTM E 109; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not acceptable.
 6. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2- 2T".
 7. Ultrasonic Inspection: ASTM E 164.

END OF SECTION 05 12 00

SECTION 05 40 00 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Load-bearing wall framing.
2. Exterior non-load-bearing wall framing.
3. Interior non-load-bearing wall framing.
4. Floor joist framing.
5. Roof rafter framing.
6. Ceiling joist framing.
7. Soffit framing.

B. Related Requirements:

1. Section 05 50 00 "Metal Fabrications" for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.
2. Section 09 21 16.23 "Gypsum Board Shaft Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies, with height limitations.
3. Section 09 22 16 "Non-Structural Metal Framing" for standard, interior non-load-bearing, metal-stud framing, with height limitations and ceiling-suspension assemblies.

1.02 ACTION SUBMITTALS

A. Product Data: For the following:

1. Cold-formed steel framing materials.
2. Load-bearing wall framing.
3. Exterior non-load-bearing wall framing.
4. Interior non-load-bearing wall framing.
5. Vertical deflection clips.
6. Single deflection track.
7. Double deflection track.
8. Drift clips.
9. Floor joist framing.
10. Roof-rafter framing.
11. Ceiling joist framing.
12. Soffit framing.
13. Post-installed anchors.
14. Power-actuated anchors.
15. Sill sealer gasket.
16. Sill sealer gasket/termite barrier.

- B. Shop Drawings:
 - 1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
 - 2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
- C. Delegated Design Submittal: For cold-formed steel framing.

1.03 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Welding certificates.
- C. Product Certificates: For each type of code-compliance certification for studs and tracks.
- D. Product Test Reports: For each listed product, for tests performed by a qualified testing agency.
 - 1. Steel sheet.
 - 2. Expansion anchors.
 - 3. Power-actuated anchors.
 - 4. Mechanical fasteners.
 - 5. Vertical deflection clips.
 - 6. Horizontal drift deflection clips
 - 7. Miscellaneous structural clips and accessories.
- E. Research Reports:
 - 1. For nonstandard cold-formed steel framing post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
 - 2. For sill sealer gasket/termite barrier, showing compliance with ICC-ES AC380.

1.04 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.
- B. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- C. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel

Stud Association, the Steel Framing Industry Association, the Steel Stud Manufacturers Association, or the Supreme Steel Framing System Association.

- D. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
- E. Comply with AISI S230 "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect and store cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling as required in AISI S202.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Super Stud Building Products Inc.
- B. CEMCO; California Expanded Metal Products Co.
- C. SCAFCO Steel Stud Company
- D. Steel Construction Systems; Stone Group of Companies
- E. ClarkDietrich
- F. Marino\WARE
- G. The Mill Steel Co

2.02 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design cold-formed steel framing.
- B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
 - 1. Design Loads: As indicated on Drawings.
 - 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:

- a. Exterior Load-Bearing Wall Framing: Horizontal deflection of 1/600 of the wall height.
 - b. Interior Load-Bearing Wall Framing: Horizontal deflection of 1/360 of the wall height under a horizontal load of 5 lbf/sq. ft..
 - c. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/600 of the wall height.
 - d. Interior Non-Load-Bearing Framing: Horizontal deflection of 1/360 of the wall height under a horizontal load of 5 lbf/sq. ft..
 - e. Floor Joist Framing: Vertical deflection of 1/360 for live loads and 1/240 for total loads of the span.
 - f. Roof Rafter Framing: Vertical deflection of 1/360 of the horizontally projected span for live loads.
 - g. Ceiling Joist Framing: Vertical deflection of 1/360 of the span for live loads and 1/240 for total loads of the span.
- 3. Design framing systems to provide for movement of framing members located outside the insulated building envelope 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.
 - 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Upward and downward movement of 1/2 inch.
 - 5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- C. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing complies with AISI S100 and AISI S200.
- 1. Floor and Roof Systems: AISI S210.
 - 2. Wall Studs: AISI S211.
 - 3. Headers: AISI S212.
 - 4. Lateral Design: AISI S213.
- D. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to authorities having jurisdiction.

2.03 COLD-FORMED STEEL FRAMING MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G60.

- B. Steel Sheet for Vertical Deflection Clips: ASTM A653/A653M, structural steel, zinc coated, of grade and coating as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G60.

2.04 LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0677 inch.
 - 2. Flange Width: 1-5/8 inches.
 - 3. Section Properties:
 - a. Minimum Allowable Section Modulus: $S_x = 1.175 \text{ in}^3$, $S_y = 0.18 \text{ in}^3$
 - b. Minimum Allowable Moment of Inertia: $I_x = 3.524 \text{ in}^4$, $I_y = 0.218 \text{ in}^4$
 - c. Minimum Allowable Moment: $M_x = 39,811 \text{ lb-in}$
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0677 inch.
 - 2. Flange Width: 1-1/4 inches.
- C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0677 inch.
 - 2. Flange Width: 1-5/8 inches.
 - 3. Section Properties:
 - a. Minimum Allowable Section Modulus: $S_x = 1.175 \text{ in}^3$, $S_y = 0.18 \text{ in}^3$
 - b. Minimum Allowable Moment of Inertia: $I_x = 3.524 \text{ in}^4$, $I_y = 0.218 \text{ in}^4$
 - c. Minimum Allowable Moment: $M_x = 39,811 \text{ lb-in}$

2.05 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0677 inch.
 - 2. Flange Width: 1-5/8 inches.
 - 3. Section Properties: Minimum section modulus, $S_x = 1.174 \text{ in}^3$; Minimum moment of Inertia, $I_x = 3.524 \text{ in}^4$; Minimum capacity, $M_x = 26767 \text{ in-lb}$.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0677 inch.
 2. Flange Width: 1-1/4 inches.
- C. Vertical Deflection Clips, Exterior: Manufacturer's standard bypass or head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
1. SCAFCO Steel Stud Company
 2. Steel Construction Systems; Stone Group of Companies
 3. ClarkDietrich
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
1. Minimum Base-Metal Thickness: 0.0677 inch.
 2. Flange Width: 1 inch plus the design gap for one-story structures and 1 inch plus twice the design gap for other applications.
- E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
 - a. Minimum Base-Metal Thickness: 0.0677 inch.
 - b. Flange Width: 1 inch plus the design gap for one-story structures and 1 inch plus twice the design gap for other applications.
 2. Inner Track: Of web depth indicated, and as follows:
 - a. Minimum Base-Metal Thickness: 0.0677 inch.
 - b. Flange Width: Dimension equal to sum of outer deflection track flange width plus 1 inch.
- F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.06 INTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0677 inch.
 2. Flange Width: 1-5/8 inches.

3. Section Properties: Minimum section modulus, $S_x = 1.174 \text{ in}^3$; Minimum moment of Inertia, $I_x = 3.524 \text{ in}^4$; Minimum capacity, $M_x = 26767 \text{ in-lb}$.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0677 inch.
 2. Flange Width: 1-1/4 inches.
- C. Vertical Deflection Clips, Interior: Manufacturer's standard bypass or head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
1. SCAFCO Steel Stud Company
 2. ClarkDietrich
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
1. Minimum Base-Metal Thickness: 0.0677 inch.
 2. Flange Width: 1 inch plus the design gap for one-story structures and 1 inch plus twice the design gap for other applications.
- E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
 - a. Minimum Base-Metal Thickness: 0.0677 inch.
 - b. Flange Width: 1 inch plus the design gap for one-story structures and 1 inch plus twice the design gap for other applications.
 2. Inner Track: Of web depth indicated, and as follows:
 - a. Minimum Base-Metal Thickness: 0.0677 inch.
 - b. Flange Width: Dimension equal to sum of outer deflection track flange width plus 1 inch.
- F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.07 FLOOR JOIST FRAMING

- A. Steel Joists: Manufacturer's standard C-shaped steel joists, of web depths indicated, punched with standard holes, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0677 inch.
 2. Flange Width: 1-5/8 inches, minimum.
 3. Section Properties:
 - a. Minimum Allowable Section Modulus: $S_x = 1.175 \text{ in}^3$, $S_y = 0.18 \text{ in}^3$
 - b. Minimum Allowable Moment of Inertia: $I_x = 3.524 \text{ in}^4$, $I_y = 0.218 \text{ in}^4$
 - c. Minimum Allowable Moment: $M_x = 39,811 \text{ lb-in}$
- B. Steel Joist Track: Manufacturer's standard U-shaped steel joist track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0677 inch.
 2. Flange Width: 1-1/4 inches, minimum.

2.08 ROOF-RAFTER FRAMING

- A. Steel Rafters: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0677 inch.
 2. Flange Width: 1-5/8 inches, minimum.
 3. Section Properties:
 - a. Minimum Allowable Section Modulus: $S_x = 1.175 \text{ in}^3$, $S_y = 0.18 \text{ in}^3$
 - b. Minimum Allowable Moment of Inertia: $I_x = 3.524 \text{ in}^4$, $I_y = 0.218 \text{ in}^4$
 - c. Minimum Allowable Moment: $M_x = 39,811 \text{ lb-in}$

2.09 CEILING JOIST FRAMING

- A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, punched with standard holes, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0677 inch.
 2. Flange Width: 1-5/8 inches, minimum.
 3. Section Properties: Minimum Section Modulus, $S_x = 1.174 \text{ in}^3$; Minimum moment of Inertia, $I_x = 3.524 \text{ in}^4$; Minimum moment Capacity, $M_x = 26767 \text{ in-lb}$.

2.10 SOFFIT FRAMING

- A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0677 inch.

2. Flange Width: 1-5/8 inches, minimum.
3. Section Properties: Minimum Section Modulus, $S_x = 1.174 \text{ in}^3$; Minimum moment of Inertia, $I_x = 3.524 \text{ in}^4$; Minimum moment Capacity, $M_x = 26767 \text{ in-lb}$.

2.11 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 1. Supplementary framing.
 2. Bracing, bridging, and solid blocking.
 3. Web stiffeners.
 4. Anchor clips.
 5. End clips.
 6. Foundation clips.
 7. Gusset plates.
 8. Stud kickers and knee braces.
 9. Joist hangers and end closures.
 10. Hole-reinforcing plates.
 11. Backer plates.

2.12 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.
- B. Anchor Bolts: ASTM F1554, Grade 36, threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A153/A153M, Class C.
- C. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC193, ICC-ES AC58, or ICC-ES AC308 as appropriate for the substrate.
 1. Uses: Securing cold-formed steel framing to structure.
 2. Type: Torque-controlled expansion anchor, Torque-controlled adhesive anchor, or adhesive anchor.
 3. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.
 4. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 or Group 2 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

- D. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.13 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A780.
- B. Cement Grout: Portland cement, ASTM C150/C150M, Type I; and clean, natural sand, ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C1107/C1107M, and with a fluid consistency and 30-minute working time.
- D. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.
- E. Sill Sealer Gasket: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.
 - 1. Manufacturer:
 - a. Sound Away
 - b. Or Approved Equal
- F. Sill Sealer Gasket/Termite Barrier: Minimum 68-mil nominal thickness, self-adhering sheet consisting of 64 mils of rubberized asphalt laminated on one side to a 4-mil-thick, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.
 - 1. Manufacturer:
 - a. Protecto Wrap
 - b. Or Approved Equal
 - 2. Physical Properties:
 - a. Peel Adhesion: 17.0 lb/in of width when tested in accordance with ASTM D412.
 - b. Low-Temperature Flexibility: Pass at minus 25 deg F when tested in accordance with ASTM D146/D146M.
 - c. Water Vapor Permeance: 0.05 perm maximum when tested in accordance with ASTM E96/E96M, Method B.
 - d. Resistance to Termite Penetration: Comply with ICC-ES AC380.

2.14 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
 - 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.
- C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet and as follows:
 - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error are not to exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.
- C. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sill sealer gasket at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.
- E. Install sill sealer gasket/termite barrier in accordance with manufacturer's written instructions at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.03 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - 1. Screw, 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.
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads equal 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.

- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 07 21 00 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.04 INSTALLATION OF LOAD-BEARING WALL FRAMING

- A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
 - 1. Anchor Spacing: As shown on Shop Drawings.
- B. Squarely seat studs against top and bottom tracks, with gap not exceeding 1/8 inch between the end of wall-framing member and the web of track.
 - 1. Fasten both flanges of studs to top and bottom tracks.
 - 2. Space studs as follows:
 - a. Stud Spacing: As indicated on Drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
- D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.
- E. Align floor and roof framing over studs according to AISI S200, Section C1. Where framing cannot be aligned, continuously reinforce track to transfer loads.
- F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure.
- G. Install headers over wall openings wider than stud spacing. Locate headers above openings. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
 - 1. Frame wall openings with not less than a double stud at each jamb of frame. Fasten jamb members together to uniformly distribute loads.
 - 2. Install tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

- H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.
 - 1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.
- I. Install horizontal bridging in stud system, spaced vertically as indicated on Shop Drawings. Fasten at each stud intersection.
 - 1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to 6 inches deep.
 - 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges, and secure solid blocking to stud webs or flanges.
 - 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- J. Install steel sheet diagonal bracing straps to both stud flanges; terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.
- K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.05 INSTALLATION OF EXTERIOR NONLOADBEARING WALL FRAMING

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: As indicated on Drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - 1. Install single deep-leg deflection tracks and anchor to building structure.
 - 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 - 3. Connect vertical deflection clips to bypassing or infill studs and anchor to building structure.

4. Connect drift clips to cold-formed steel framing and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.
1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
1. Install solid blocking at centers indicated on Shop Drawings.
- G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.06 INSTALLATION OF INTERIOR NONLOADBEARING WALL FRAMING

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
1. Stud Spacing: As indicated on Drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
1. Install single deep-leg deflection tracks and anchor to building structure.
 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 3. Connect vertical deflection clips to studs and anchor to building structure.
 4. Connect drift clips to cold-formed steel metal framing and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.

1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
1. Install solid blocking at centers indicated on Shop Drawings.
- G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.07 INSTALLATION OF JOIST FRAMING

- A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.
- B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches.
 2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections.
- C. Space joists not more than 2 inches from abutting walls, and as follows:
1. Joist Spacing: As indicated on Drawings.
- D. Frame openings with built-up joist headers, consisting of joist and joist track or another combination of connected joists if indicated.
- E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement.
1. Install web stiffeners to transfer axial loads of walls above.
- F. Install bridging at intervals indicated on Shop Drawings. Fasten bridging at each joist intersection as follows:
1. Joist-Track Solid Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.

2. Combination Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and joist-track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.

- G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.
- H. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.08 INSTALLATION TOLERANCES

- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error are not to exceed minimum fastening requirements of sheathing or other finishing materials.

3.09 REPAIR

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

3.10 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.11 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 00

SECTION 06 10 00 – ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. Definition: Rough carpentry includes carpentry work not specified as part of other sections and which is generally not exposed, except as otherwise indicated. Types of work in this section include rough carpentry for:

1. Wood blocking and nailers.

1.3 REFERENCES

- A. Lumber Standards: Comply with PS 20 and with applicable rules of the respective grading and inspecting agencies for species and products indicated.

1.4 SUBMITTALS

- A. Wood Treatment Data: Submit treatment manufacturer's instructions for proper use of each type of treated material.
- B. Pressure Treatment: For each type specified, include certification by treating plant stating chemicals and process used, net amount of preservative retained and conformance with applicable standards.
- C. For water-borne preservatives, include statement that moisture content of treated materials was reduced to a maximum of 15% prior to shipment to project site.

1.5 PRODUCT HANDLING

- A. Delivery and Storage: Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood, and provide air circulation within stacks.

1.6 JOB CONDITIONS

-
- A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. LUMBER, GENERAL

1. Factory-mark each piece of lumber with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.
2. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.
3. Provide dressed lumber, S4S, unless otherwise indicated.
4. Provide kiln-dried lumber with 15% maximum moisture content at time of dressing.
5. Framing Lumber (2" through 4" thick):
 - a. For light framing (less than 6" wide), provide "Stud" grade lumber for stud framing and "Standard" grade for other light framing, any species.
6. For structural framing (6" and wider and from 2" to 4" thick), provide the following grade and species:
 - a. No. 2 grade.
 - b. Southern Pine (SPIB).
7. Boards (less than 2" thick):
 - a. Concealed Boards: Where boards are concealed by other work, provide lumber of 15% maximum moisture content (MC-15) and of following species and grade:
 - 1) Redwood Construction Common (RIS), Southern Pine No. 2 Boards (SPIB), or any species graded Construction Boards (WCLB or WWPA).
 - 2) Board Sizes: Provide sizes indicated or, if not indicated (for sheathing, subflooring and similar uses), provide 1" x 8" boards.

2.2 MISCELLANEOUS LUMBER

- A. Provide wood for support or attachment of other work including cant strips, bucks, nails, blocking, furring, grounds, stripping and similar members. Provide lumber of sizes indicated, worked into shapes shown, and as follows:
1. Moisture content: 15% maximum for lumber items not specified to receive wood preservative treatment.

-
2. Grade: Construction Grade light framing size lumber of any species or board size lumber as required. Provide construction grade boards (RIS or WCLB) or No. 2 boards (SPIB or WWPA).

2.3 MISCELLANEOUS MATERIALS

- A. Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommending nails.
- B. Where rough carpentry work is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners and anchorages with a hot-dip zinc coating (ASTM A 153).
- C. Building Paper: Asphalt saturated felt, non-perforated, ASTM 226.

2.4 WOOD TREATMENT

- A. Preservative Treatment: Where lumber or plywood is indicated as "Treated", or is specified herein to be treated, comply with applicable requirements of AWPB Standards C2 (Lumber) and C9 (Plywood) and of AWPB Standards listed below. Mark each treated item with the AWPB Quality Mark Requirements.
 1. Pressure-treat above-ground items with water-borne preservatives complying with AWPB LP-2. After treatment, kiln-dry to a maximum moisture content of 15%. Treat indicated items and the following:
 - a. Wood cants, nailers, curbs, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers and waterproofing.
 - b. Wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.
 - c. Wood framing members less than 18" above grade.
- B. Pressure-treat the following with water-borne preservatives for ground contact use complying with AWPB LP-22:
 1. Wood members in contact with ground.
 2. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

PART 3 - EXECUTION

3.1 INSTALLATION

A. GENERAL

1. Discard units of material with defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.
2. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.
3. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes. Use common wire nails, except as otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

3.2 WOOD GROUNDS, NAILERS, BLOCKING AND SLEEPERS:

- A. Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
- B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
- C. Provide permanent grounds of dressed, preservative treated, key- bevelled lumber not less than 1-1/2" wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.

END OF SECTION 06 10 00

SECTION 06 41 16 - PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Plastic-laminate-faced architectural cabinets.
2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets unless concealed within other construction before cabinet installation.

B. Related Requirements:

1. Section 12 36 23.13 "Plastic-Laminate-Clad Countertops."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, including panel products, high-pressure decorative laminate adhesive for bonding plastic laminate, fire-retardant-treated materials and cabinet hardware and accessories.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for electrical switches and outlets and other items installed in architectural plastic-laminate cabinets.

C. Samples for Initial Selection:

1. Plastic laminates.
2. PVC edge material.
3. Thermoset decorative panels.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar operations that could damage woodwork have been completed in installation areas. If cabinets must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 43 and 70 percent during the remainder of the construction period.
- C. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.
- D. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that cabinets can be supported and installed as indicated.
- B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Section 08 71 11 "Door Hardware (Descriptive Specification)" to fabricator of architectural woodwork; coordinate Shop Drawings and fabrication with hardware requirements.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.
- B. Grade: Premium.
- C. Regional Materials: Plastic-laminate cabinets shall be manufactured within 500 miles (800 km) of Project site.
- D. Type of Construction: Frameless.
- E. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.
- F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Abet Laminati, Inc.
 - b. Formica Corporation.
 - c. Lamin-Art, Inc.
 - d. Panolam Industries International, Inc.
 - e. Wilsonart International; Div. of Premark International, Inc.
- G. Laminate Cladding for Exposed Surfaces:
 - 1. Horizontal Surfaces: Grade HGS.
 - 2. Postformed Surfaces: Grade HGP.
 - 3. Vertical Surfaces: Grade VGS.

4. Edges: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
5. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.

H. Materials for Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade VGS.
 - a. Edges of Plastic-Laminate Shelves: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
 - b. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
 - c. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.

2. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
3. Drawer Bottoms: Thermoset decorative panels.

I. Dust Panels: 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers unless located directly under tops.

J. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

K. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.

L. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As selected by Designer from laminate manufacturer's full range in the following categories:
 - a. Solid colors, matte finish.
 - b. Wood grains, matte finish.
 - c. Patterns, matte finish.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 8 to 13 percent.

- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
 - 1. Composite Wood and Agrifiber Products: Products shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 - 2. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
 - 3. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde.
 - 4. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.3 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 08 71 11 "Door Hardware."
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 100, self-closing.
- C. Back-Mounted Pulls: BHMA A156.9, B02011.
- D. Wire Pulls: Back mounted, solid metal, 4 inches (100 mm) long, 5/16 inch (8 mm) in diameter.
- E. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
- F. Shelf Rests: BHMA A156.9, B04013; metal, two-pin type with shelf hold-down clip.
- G. Drawer Slides: BHMA A156.9.
 - 1. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
 - 2. For drawers not more than 3 inches (75 mm) high and not more than 24 inches (600 mm) wide, provide Grade 2.
 - 3. For drawers more than 3 inches (75 mm) high but not more than 6 inches (150 mm) high and not more than 24 inches (600 mm) wide, provide Grade 1HD-100.
 - 4. For drawers more than 6 inches (150 mm) high or more than 24 inches (600 mm) wide, provide Grade 1HD-100.
 - 5. For computer keyboard shelves, provide Grade 1HD-100.
- H. Door Locks: BHMA A156.11, E07121.
- I. Drawer Locks: BHMA A156.11, E07041.
- J. Door and Drawer Silencers: BHMA A156.16, L03011.

- K. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 - 1. Satin Stainless Steel: BHMA 630.
- L. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesives: Do not use adhesives that contain urea formaldehyde.
- D. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Adhesive for Bonding Plastic Laminate: PVA.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive.

2.5 FABRICATION

- A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.
- B. Fabricate cabinets to dimensions, profiles, and details indicated.
- C. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Notify Designer seven days in advance of the dates and times woodwork fabrication will be complete.
 - 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.

- D. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.
- B. Before installing cabinets, examine shop-fabricated work for completion and complete work as required.

3.2 INSTALLATION

- A. Grade: Install cabinets to comply with same grade as item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to the extent that it was not completed in the shop.
- C. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).
- D. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
 - 1. Use filler matching finish of items being installed.
- F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
 - 2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 06 41 16

SECTION 07 84 00 – FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

1.2 SUMMARY:

- A. This section includes firestopping for the following:
 1. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
 2. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
 3. Sealant joints in fire-resistance-rated construction.

1.3 RELATED SECTIONS:

- A. The following Sections contain requirements that relate to this Section:
 1. Division 3 Section "Cast-In-Place Concrete" for construction of openings in concrete slabs.
 2. Division 4 Section "Unit Masonry" for joint fillers for non-fire-resistive-rated masonry construction.
 3. Division 7 Section "Insulation" for safing insulation and accessories
 4. Division 7 Section "Joint Sealants" for non-fire-resistive-rated joint sealants.
 5. Division 23 Sections specifying ducts and piping penetrations.
 6. Division 26 Sections specifying cable and conduit penetrations.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: Provide firestopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.
 1. F-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.
 2. T-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with T-ratings, in addition to F ratings, as determined per ASTM E 814, where indicated and where systems protect penetrating items exposed to contact with

adjacent materials in occupiable floor areas. T-rated assemblies are required where the following conditions exist:

- a. Where firestop systems protect penetrations located outside of wall cavities.
 - b. Where firestop systems protect penetrating items larger than a 4-inch-diameter nominal pipe or 16 square inch overall cross-sectional area.
- B. Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated, as determined per ASTM E 119, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.
 - C. For Firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.
 - D. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems
 - E. For floor penetrations with annular spaces exceeding 4 inches or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means.
 - F. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
 - G. For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450, as determined per ASTM E 84.

1.5 SUBMITTALS:

- A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.
- B. Product Data for each type of product specified.
- C. Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.
- D. Shop drawings detailing materials, installation methods, and relationships to adjoining construction for each through-penetration firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspecting agency evidencing compliance with requirements for each condition indicated.
- E. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items.

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- F. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration approved by firestopping manufacturer's fire protection engineer with modifications marked.
 - G. Product certificates signed by manufacturers of firestopping products certifying that their products comply with specified requirements.
 - H. Product test reports from, and based on tests performed by, a qualified testing and inspecting agency evidencing compliance of firestopping with requirements based on comprehensive testing of current products.
 - I. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.

1.6 QUALITY ASSURANCE:

A. Fire-Test-Response Characteristics:

1. Provide firestopping that complies with the following requirements and those specified under "System Performance Requirements" article:
 - a. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, Warnock Hersey, or another agency performing testing and follow-up inspection services for firestop systems that is acceptable to authorities having jurisdiction.
 - b. Information on drawings referring to specific design designations of through-penetration firestop systems is intended to establish requirements for performance based on conditions that are expected to exist during installation. Any changes in conditions and designated systems require the Architect's prior approval. Submit documentation showing that the performance of proposed substitutions equals or exceeds that of the systems they would replace and are acceptable to authorities having jurisdiction.

1.7 INSTALLER QUALIFICATIONS:

- A. Engage an experienced Installer who has completed firestopping that is similar in material, design, and extent to that indicated for Project and that has performed successfully.

1.8 SINGLE-SOURCE RESPONSIBILITY:

- A. Obtain through-penetration firestop systems for each kind of penetration and construction condition indicated from a single manufacturer.
- B. Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy."

1.9 COORDINATING WORK:

- A. Coordinate construction of openings and penetrating items to ensure that designated through-penetration firestop systems are installed per specified requirements.

1.10 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturer's labels identifying product and manufacturer; date of manufacture, lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to project; curing time; and mixing instructions for multicomponent materials.
- B. Store and handle firestopping materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.11 PROJECT CONDITIONS:

- A. Environmental Conditions:
 - a. Do not install firestopping when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilation:
 - a. Ventilate firestopping per firestopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

PART 2 - PRODUCTS

2.1 FIRESTOPPING, GENERAL:

- A. Compatibility:
 - a. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.
- B. Accessories:
 - 1. Provide components for each firestopping system that are needed to install fill materials and to comply with "System Performance Requirements" article in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems.

2.2 APPLICATIONS:

- A. Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.
- B. Fill Materials For Through-penetration Firestop Systems
- C. Ceramic-Fiber and Mastic Coating: Ceramic fibers in bulk form formulated for use with mastic coating, and ceramic fiber manufacturer's mastic coating.
- D. Ceramic-Fiber Sealant: Single-component formulation of ceramic fibers and inorganic binders.
- E. Endothermic, Latex Compound Sealant: Single component, endothermic, latex formulation.
- F. Intumescent, Latex Sealant: Single-component, intumescent, latex formulation
- G. Intumescent Putty: Non-hardening, dielectric, water-resistant putty containing no solvents, inorganic fibers, or silicone compounds.
- H. Intumescent Wrap Strips: Single-component, elastomeric sheet with aluminum foil on one side.
- I. Job-Mixed Vinyl Compound: Prepackaged vinyl-based powder product for mixing with water at Project site to produce a paintable compound, passing ASTM E 136, with flame-spread and smoke-developed ratings of zero per ASTM E 84.
- J. Mortar: Prepackaged dry mix composed of a blend of inorganic binders, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogenous mortar.
- K. Silicone Sealant: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealant of grade indicated below.
- L. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a non-slumping/gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
- M. Grade for Horizontal Surfaces: Pourable (self-leveling) grade for openings in floors and other horizontal surfaces.
- N. Grade for Vertical Surfaces: Non-sag grade for openings in vertical and other surfaces.
- O. Solvent-Release-Curing Intumescent Sealant: Solvent-release-curing, single-component, Synthetic-polymer-based sealant of grade indicated below.

2.3 PRODUCTS:

A. Subject to compliance with requirements, provide one of the following:

1. Ceramic-Fiber and Mastic Coating:
 - a. FireMaster Bulk and FireMaster Mastic, Thermal Ceramics
2. Ceramic-Fiber Sealant:
 - a. Metacaulk 525, The RectorSeal Corporation
3. Endothermic, Latex Sealant:
 - a. Fyre-Shield, Tremco Inc.
4. Endothermic, Latex Compounds:
 - a. Flame-Safe FS500/600 Series, International Protective Coatings Corp.
 - b. Flame-Safe FS900/FST900 Series, International Protective Coatings Corp.
5. Intumescent Latex Sealant:
 - a. Metacaulk 950, The RectorSeal Corporation
 - b. Fire Barrier CP 25 WB Caulk, 3M Fire Protection Products
 - c. Fire Barrier CP 25WB Caulk, 3M Fire Protection Products
6. Intumescent Putty:
 - a. Pensil 500 Intumescent Putty, General Electric Co.
 - b. Flame-Safe FSP1000 Putty, International Protective Coatings
 - c. Fire Barrier Moldable Putty, 3M Fire Protection Products
7. Intumescent Wrap Strips:
 - a. Dow Corning Fire Stop Intumescent Wrap Strip 2002, Dow Corning Corp.
 - b. CS2420 Intumescent Wrap, Hilti Construction Chemicals, Inc.
 - c. Fire Barrier FS195 Wrap/Strip, 3M Fire Protection Products
 - d. Job-Mixed Vinyl Compound: USG Firecode Compound, United States Gypsum Co.

B. Mortar:

- a. K-2 Firestop Mortar, Bio Fireshield, Inc.
- b. Novasit K-10 Firestop Mortar, Bio Fireshield, Inc.
- c. KBS-Mortar Seal, International Protective Coatings Corp.

C. Silicone Sealants:

- a. Dow Corning Firestop Sealant 2000, Dow Corning Corp.
- b. Dow Corning Firestop Sealant SL 2003, Dow Corning Corp.
- c. Pensil 100 Firestop Sealant, General Electric Co.
- d. CS240 Firestop Sealant, Hilti Construction Chemicals, Inc.
- e. Metacaulk 835, The RectorSeal Corporation
- f. Metacaulk 880, The RectorSeal Corporation
- g. Fyre-Sil, Tremco Inc.
- h. Fyre-Sil S/L, Tremco Inc.
- i. Solvent-Release-Curing Intumescent Sealants:
- j. Biostop 500 Intumescent Firestop Caulk, Bio Fireshield, Inc.
- k. Fire Barrier CP25N/S Caulk, 3M Fire Protection Products
- l. Fire Barrier Cp25S/L Caulk, 3M Fire Protection Products

D. Fire-Resistive Elastomeric Joint Sealants:

- a. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.

E. Sealant Colors: Provide color of exposed joint sealants to comply with the following.

- a. Provide custom colors to match Architect's samples
- b. Match colors indicated by reference to manufacturer's standard designations.
- c. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.
- d. Single-Component, Neutral-Curing Silicone Sealant: Type S; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, G, A, and (as applicable to joint substrates indicated) O.

F. Additional Movement Capability:

- a. Provide sealant with the capability to withstand the following percentage changes in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated:
- b. 50 percent movement in both extension and compression for a total of 100 percent movement.

G. Multicomponent, Nonsag, Urethane Sealant:

- a. Type M; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, A, and (as applicable to joint substrates indicated) O.

H. Additional Movement Capability:

- a. Provide sealant with the capability to withstand the following percentage change in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated:
- b. 40 percent movement in extension and 25 percent in compression for a total of 65 percent movement.
- c. Single-Component, Nonsag, Urethane Sealant: Type S; Grade NS; Class 25; and Uses NT, M, A, and (as applicable to joint substrates indicated) O.

2.4 AVAILABLE PRODUCTS:

A. Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

1. PRODUCTS: Subject to compliance with requirements, provide one of the following:

- a. Single-Component, Neutral-Curing, Silicone Sealant:
- b. Dow Corning 790, Dow Corning Corp.
- c. Dow Corning 795, Dow Corning Corp.
- d. Silpruf, General Electric Co.
- e. Ultraglaze, General Electric Co.
- f. 864, Pecora Corp.
- g. Multicomponent, Nonsag, Urethane Sealant:
- h. Vulkem 922, Mameco International Inc.
- i. Dynflex, Pecora Corp.
- j. Dynatred, Pecora Corp.
- k. Dynatrol II, Pecora Corp.
- l. Sikaflex 2cn NS, Sika Corp.
- m. Sonolastic NP 2, Sonneborn Building Products Div., Chem Rex Inc.
- n. Dymeric, Tremco Inc.
- o. Single-Component, Nonsag, Urethane Sealant:
- p. Isoflex 880 GB, Harry S. Peterson Co., Inc.
- q. Isoflex 881, Harry S. Peterson Co., Inc.
- r. Vulkem 921, Mameco International Inc.
- s. Sikaflex--15LM, Sika Corp.

2. MIXING:

- a. For those products requiring mixing prior to application, comply with firestopping manufacturer's directions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce firestopping products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

A. Surface Cleaning:

1. Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements.
2. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.
3. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
4. Remove laitance and form release agents from concrete.
5. Priming:
6. Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
7. Masking Tape:
8. Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing firestopping's seal with substrates.

3.3 INSTALLING THROUGH-PENETRATION FIRESTOPS:

- A. General: Comply with the "System Performance Requirements" article in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross-sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:

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- D. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
 - E. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - F. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 INSTALLING FIRE-RESISTIVE JOINT SEALANTS:

- A. General: Comply with the "System Performance Requirements" article in Part 1, with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install joint fillers 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 and develop fire-resistance rating required.
- C. Install sealants by proven 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 width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.
- D. Tool nonsag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire-resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.5 CLEANING:

- A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.
- B. Protect firestopping 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. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to produce firestopping complying with specified requirements.

END OF SECTION 07 84 00

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. The extent of each form and type of joint sealer is indicated on drawings and by provisions of this section.
- B. The applications for joint sealers as work of this section include the following:
 - 1. Concrete construction joints.
 - 2. Interior wall/ceiling joints.
 - 3. Gasketing of assemblies.
- C. Refer to sections of Divisions 23 and 26 for joint sealers in mechanical and electrical work; not work of this section.
- D. General Performance: Except as otherwise indicated, joint sealers are required to establish and maintain airtight and waterproof continuous seals on a permanent basis, within recognized limitations of wear and aging as indicated for each application. Failures of installed sealers to comply with this requirement will be recognized as failures of materials and workmanship.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product specifications, handling/installation/curing instructions, and performance tested data sheets for each elastomeric product required.
- B. Certified Tests: With product data submit certified test reports for elastomeric sealants on aged performances as specified, including hardness, stain resistance, adhesion, cohesion or tensile strength, elongation, low-temperature flexibility, compression set, modulus of elasticity, water absorption, and resistance (aging, weight loss, deterioration) to heat and exposures to ozone and ultraviolet.

1.4 PROJECT CONDITIONS

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- A. Environmental Limitations: Do not proceed with installation of liquid sealants under unfavorable weather conditions. Install elastomeric sealants when temperature is in lower third of temperature range recommended by manufacturer for installation.

PART 2 - PRODUCTS

- A. ACCEPTABLE MANUFACTURERS:
 - 1. General: Manufacturers listed in this article include those known to produce the indicated category of prime joint sealer material, either as a nominally pure generic product or as an equivalent-performance modification thereof or proprietary product.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - 1. Manufacturers of Elastomeric Sealants (Liquid):
 - 2. Dow Corning Corp., Midland, MI
 - 3. General Electric Co., Waterford, NY
 - 4. W. R. Meadows, Inc., Elgin, IL
 - 5. Sonneborn/Contech, Inc., Minneapolis, MN
 - 6. Tremco, Inc., Cleveland, OH
 - 7. Manufacturers of Non-Elastomeric Sealants/ Caulks (Liquid/Tape):
 - 8. W. R. Meadows, Inc., Elgin, IL
 - 9. Sonneborn/Contech, Inc., Minneapolis, MN
 - 10. Tremco, Inc., Cleveland, OH
 - 11. Manufacturers of Joint Fillers/Sealant Backers:
 - 12. Dow Chemical Co., Midland, MI
 - 13. W. R. Meadows, Inc., Elgin, IL
 - 14. Sonneborn/Contech, Inc., Minneapolis, MN
 - 15. MATERIALS
- C. General Sealer Requirements: Provide colors indicated or, if not otherwise indicated, as selected by Designer from a minimum of 100 of the manufacturer's standard colors. Select materials for compatibility with joint surfaces and other indicated exposures, and except as otherwise indicated select modulus of elasticity and hardness or grade recommended by manufacturer for each application indicated. Where exposed to foot traffic, select nontracking materials of sufficient strength and hardness to withstand stiletto heel traffic without damage or deterioration of sealer system.
- D. Elastomeric Sealants:
 - 1. Multi-Component Polyurethane Sealant: Except as otherwise indicated, provide manufacturer's standard, non-modified, 2-or- more-part, polyurethane-based, elastomeric sealant; complying with either ASTM C 920 Type M Class 25, or FS TT-S-00227E Class A; self-leveling grade/type where used in joints of surfaces subject to traffic, otherwise nonsag grade/type.
 - 2. Single-Component Polyurethane Sealant: Except as otherwise indicated, provide manufacturer's standard, non-modified, one- part, polyurethane-based, air-curing, elastomeric sealant; complying with either ASTM C 920 Type S Class 25, or FS TT-S-

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- 00230C Class A; self-leveling grade/type where used in joints of surfaces subject to traffic, otherwise nonsag grade/type.
 - 3. Bituminous Modification: Where joint surfaces contain or are contaminated with bituminous materials, provide manufacturer's modified type sealant which is compatible with joint surfaces (modified with coal tar or asphalt as required).
 - 4. Single-Component Silicon Rubber Sealant: Except as otherwise indicated, provide manufacturer's standard, non-modified, one- part, silicone-rubber-based, air-curing, nonsag, elastomeric sealant; complying with either ASTM C 920 Type S Class 25 Grade NS, or FS TT-S-001543A Class A Type Non-sag.
 - 5. Sanitary Interior Type: Where indicated and where applied in high-humidity or wet service, provide manufacturer's mold/mildew- resistant, acid type sealant for application to nonporous sealant bond surfaces.
- E. Non-Elastomeric Sealants and Caulking Compounds:
- 1. Single-Component Acrylic Sealant: Provide acrylic terpolymer, solvent-based, one-part, thermo-plastic sealant compound; solids not less than 95% acrylic; recommended by manufacturer for general use as an exposed building construction sealant.
 - 2. Performance Standard: Comply with either ASTM C 920 Type S Class 12-1/2 Grade NS, or FS TT-S-00230C Class B Type Non- sag.
- F. Joint Fillers, Pavement Types:
- 1. Bituminous and Fiber Joint Filler: Provide resilient and non- extruding type premolded bituminous-impregnated fiberboard units complying with ASTM D 1751; FS HH-F-341, Type I; or AASHTO M 213.
- G. Gaskets:
- 1. Hollow Neoprene Pavement Gasket: Provide hollow or compartmentalized neoprene extrusion, designed to withstand compression to 40% of normal width without extrusion from joint, and will full recovery; with heavy, durable top member, suitable for long-term exposure to severe traffic abrasion and contamination; hardness of approximately 55 Shore A; comply with ASTM D 2628.
- 2.2 MISCELLANEOUS MATERIALS:
- A. Joint Primer/Sealer: Provide type of joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.
- B. Bond Breaker Tape: Provide polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self- adhesive tape where applicable.
- C. Sealant Backer Rod: Provide compressible rod stock of polyethylene foam, polyurethane foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable nonabsorptive material as recommended by sealant manufacturer for back-up of and compatibility with sealant. Where used with hot-applied sealant, provide heat-resistant type which will not be deteriorated by sealant application temperature as indicated.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Installer must examine substrates, (joint surfaces) and conditions under which joint sealer work is to be performed, and must notify Contractor of unsatisfactory conditions. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 JOINT PREPARATION:

- A. Clean joint surfaces immediately before installation of gaskets, sealants or caulking compounds. Remove dirt, insecure coatings, moisture and other substrates which could interfere with seal of gasket or bond of sealant or caulking compound. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer.
- B. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.
- C. Prime or seal joint surfaces where indicated, and where recommended by sealant manufacturer. Confine primer/sealer to areas of sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION:

- A. Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.
- B. Set joint filler units at depth or position in joint as indicated to coordinate with other work, including installation of bond breakers, backer rods and sealants. Do not leave voids or gaps between ends of joint filler units.
- C. Install sealant backer rod for liquid-applied sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for application indicated.
- D. Install bond breaker tape where required by manufacturer's recommendations to ensure that liquid-applied sealants will perform as intended.
- E. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.

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- F. Install liquid-applied sealant to depths as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of beads; (not applicable to sealants in lapped joints):
 - G. For sidewalks, pavements and similar joints sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures, fill joints to a depth equal to 75% of joint width, but neither more than 5/8" deep nor less than 3/8" deep.
 - H. For normal moving joints sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2" deep nor less than 1/4" deep.
 - I. For joints sealed with non-elastomeric sealants and caulking compounds, fill joints to a depth in range of 75% to 125% of joint width.
 - J. Spillage: Do not allow sealants or compounds to overflow from confines of joints, or to spill onto adjoining work, or to migrate into voids of exposed finishes. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.
 - K. Do not overheat or reheat hot-applied sealants; discard (do not use).
 - L. Recess exposed edges of gaskets and exposed joint fillers slightly behind adjoining surfaces, unless otherwise shown, so that compressed units will not protrude from joints.
 - M. Bond ends of gaskets together with adhesive or "weld" by other means as recommended by manufacturer to ensure continuous watertight and airtight performance. Miter-cut and bond ends at corners unless molded corner units are provided.
 - N. Install fire-resistant foamed-in-place filler in openings where indicated, and at thicknesses indicated. Dam bottom of vertical openings and one side of horizontal openings with temporary containment forms or, where required to achieve fire-resistance ratings, provide permanent mineral composition board forms. On horizontal penetrations, provide partial face containment forms where required for foam placement. Allow installed fillers to cure 24 hours; remove temporary forms; trim ragged edges with sharp knife; inspect and fill voids with additional filler to form uniform thickness of filler.

3.4 CURE AND PROTECTION:

- A. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability. Advise Contractor of procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of substantial completion. Cure and protect sealants in a manner which will minimize increases in modulus of elasticity and other accelerated aging effects. Replace or restore sealants which are damaged or deteriorated during construction period.

END OF SECTION 07 92 00 – JOINT SEALANTS

SECTION 08 11 19 – STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

- A. Extent of standard steel doors and frames is shown and scheduled on drawings.
- B. See Detention Section 11 19 10 Security Hollow Metal Doors and Frames

1.3 QUALITY ASSURANCE:

- A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.
- B. Manufacturer: Provide standard steel doors and frames by a single firm specializing in production of this type of work.
- C. Provide steel doors and frames by one of the following:
 - 1. Amweld Building Products Div.
 - 2. Ceco Corp.
 - 3. Curries Mfg. Inc.
 - 4. Dittco Products Div.
 - 5. Fenestra
 - 6. Mesker Industries, Inc.
 - 7. Republic Builders Prod. Corp.
 - 8. Steelcraft Mfg. Co.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications for fabrication and installation, including data substantiating that products comply with requirements.
- B. Shop Drawings: Submit for fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
- C. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory finished doors.
- B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided finish items are equal in all respects to new work and acceptable to Designer; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover. Place units on wood sills at least 4" high, or otherwise store on floors in manner that will prevent rust and damage. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.
- B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.
- C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, with ASTM A 525, G60 zinc coating, mill phosphatized.
- D. Supports and Anchors: Fabricate of not less than 18 gage galvanized sheet steel.
- E. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.

2.2 SHOP APPLIED PAINT:

- A. Primer Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints.

2.3 FABRICATION, GENERAL:

- A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, 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.
- B. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from only cold-rolled steel.
- C. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot- rolled steel (at fabricator's option).

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- D. Fabricate exterior doors, panels, and frames from galvanized sheet steel. Close top and bottom edges of exterior doors as integral part of door construction or by addition of inverted steel channels.
 - E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

2.4 FINISH HARDWARE PREPARATION:

- A. Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A 115 series specifications for door and frame preparation for hardware.
- B. For concealed overhead door closers, provide space, cutouts, reinforcing and provisions for fastening in top rail of doors or head of frames, as applicable.
- C. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
- D. Locate finish hardware as shown on final shop drawings or, if not shown, in accordance with "Recommended Locations for Builder's Hardware," published by Door and Hardware Institute.

2.5 SHOP PAINTING:

- A. Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.
- B. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
- C. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

2.6 STANDARD STEEL DOORS:

- A. Provide metal doors of types and styles indicated on drawings or schedules.

2.7 STANDARD STEEL FRAMES:

- A. Provide metal frames for doors and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated.
- B. Fabricate frames with mitered corners, welded construction for exterior applications and interior applications.
- C. Form exterior frames of hot dip galvanized steel.
- D. Door Silencers: Except on weather stripped frames, drill stops to receive 2 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames.

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- E. Manufacturer's "stick-on" silencers will be acceptable in lieu of drilled type.
 - F. Plaster Guards: Provide 26 gage steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Installer must examine substrate and conditions under which steel doors and frames are to be installed and must notify Contractor in writing of any conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION:

- A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings and manufacturer's data, and as herein specified.
- B. Placing Frames:
 1. Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames", unless otherwise indicated.
 2. Except for frames located at in-place concrete or masonry and at drywall installations, place frames prior to construction of enclosing walls and ceilings. 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. In plaster or masonry walls constructed with antifreeze additives, protect inside (concealed) faces of door frames using fibered asphalt emulsion coating. Apply approximately 1/8" thick over shop primer and allow to thoroughly dry before handling.
 4. In masonry construction, locate 3 wall anchors per jamb at hinge and strike levels. Building-in of anchors and grouting of frames is specified in Section 04 20 00 - Unit Masonry.
 5. At in-place concrete or masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.

3.3 DOOR INSTALLATION:

- A. Fit hollow metal doors accurately in frames, within clearances specified in SDI-100.

3.4 ADJUST AND CLEAN:

- A. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from pre-finished doors.

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- C. Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper condition.

END OF SECTION 08 11 19 STEEL DOORS AND FRAMES

SECTION 08 51 13 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Aluminum Window Units, and Accessories.
 2. Glass and Glazing for Aluminum Windows.

1.2 REFERENCES

- A. Aluminum Association (AA)
1. DAF-45 – “Designation System for Aluminum Finishes”
- B. American Architectural Manufacturers Association (AAMA):
1. 101 – “Voluntary Performance Specification for Windows, Skylights and Glass Doors”
 2. 502 – “Voluntary Specification for Field Testing of Newly Installed Fenestration Products”
 3. 611 – “Voluntary Specification for Anodized Architectural Aluminum”
 4. 1503 – “Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections”
 5. 2400 – “Voluntary Specification for Installation of Windows with a Mounting Flange in Stud Frame Construction”
 6. 2604 – “Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels”
- C. American National Standards Institute (ANSI) Publications
1. Z97.1 – “Performance Specifications and Methods of Test for Safety Glazing Materials Used in Buildings”
- D. ASTM International (ASTM) Publications:
1. C518 – “Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus”
 2. C1036 – “Standard Specifications for Flat Glass”
 3. D3985 – “Standard Test Method for Oxygen Gas Transmission Rate Through Plastic Film and Sheeting Using a Coulometric Sensor”
 4. E90 – “Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements”
 5. E283 – “Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen”

6. E330 – “Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference”
7. E331 – “Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference”
8. E547 – “Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Differential”
9. E774 – “Standard Specification for Sealed Insulating Glass Units”
10. F1249 – “Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor”

E. National Fenestration Ratings Council (NFRC)

F. Window and Door Manufacturers Association (WDMA) Publications:

1. ANSI/AAMA/WDMA 101/I.S.2/NAFS-02 “Voluntary Performance Specification for Windows, Skylights and Glass Doors”
2. AAMA/AAMA/WDMA/CSA 101/I.S.2/A440-08 “Standard/Specification for Windows, Doors and Unit Skylights”

1.3 SUBMITTALS

A. Submit “Letter of Conformance” with the following supporting data:

1. Product data for each type of aluminum window specified, including standard construction details, dimensions of individual components, profiles, finishes, hardware, and accessories.
2. Shop drawings for each type of window specified, including ¼-inch scale wall elevations, typical unit elevations at ¾-inch scale details, full size details of typical composite members and the following:
 - a. Panning Details
 - b. Flashing and drainage details.
 - c. Mullion details, including reinforcement and stiffeners.
 - d. Joinery details.
3. Product certificates signed by the window manufacturer certifying that window units comply with specified performance requirements.
4. Submit certified independent laboratory test reports verifying compliance with all test requirements of

1.4 DEFINITIONS

A. Performance grade number, included as part of the AAMA/WDMA/CSA 101/I.S.2/A440-08 product designation code, is actual design pressure in pounds force per square foot used to determine structural test pressure and water test pressure.

1.5 PERFORMANCE REQUIREMENTS

- A. Certify that windows have been tested in accordance with American Architectural Manufacturers Association (AAMA/WDMA) Specification for Performance Class specified complying with the following performance standards:
1. AAMA/WDMA/CSA 101/I.S.2/A440-08 Performance Requirements: Provide aluminum windows of the performance class and grade indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440-08.
 - a. Performance Class: P- AW
 - b. Performance Grade: 70
 2. Uniform Structural Properties (ASTM E330): Pressure acting inward and outward. Window to be operable with permanent deformation at a maximum of 1/175 of its span, when tested at a static air pressure difference of the following:
 - a. Class P-AW-70: 105.00 PSF
 3. Water Resistance (ASTM E331 and ASTM E547): No uncontrolled water penetration at test pressure indicated.
 - a. Class P-AW-70: 12.00 PSF
 4. Air Leakage (ASTM E283):
 - a. Fixed Windows: No air leakage when tested at a static air pressure difference of 6.24 PSF minimum.

1.6 QUALITY ASSURANCE

- A. All window units shall be manufactured by a single source.
1. All windows in any one project must be by the same manufacturer and with comparable frame depth, profile, glazing bite, and installation requirements. Manufacturer must provide a window system that can incorporate all window configurations used on the project.
 2. Standards: Requirements for aluminum windows, terminology and standard of performance, and fabrication workmanship are those specified and recommended in AAMA/WDMA/CSA 101/I.S.2/A440-08 and The Aluminum Association (AA).
 - a. All window units shall be labeled as conforming to AAMA/WDMA/CSA 101/I.S.2/A440-08. The label shall state the name of the manufacturer, the approved labeling agency and the product designation as specified in AAMA/WDMA/CSA 101/I.S.2/A440-08.
 - b. All testing shall be conducted using AAMA/WDMA/CSA 101/I.S.2/A440-08 Gateway Performance minimum specified test sizes.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Transportation and Handling: Transport products by methods to avoid product damage, deliver in undamaged condition in manufacturer's unopened containers or packaging. Provide equipment and personnel to handle products by method to prevent soiling or damage. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
- B. Storage and Protection: Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain with temperature and humidity ranges required by manufacturer's instruction.

1.8 WARRANTIES

A. Aluminum Window Warranty

- 1. Products: Submit a written warranty, executed by the window manufacturer, for the following:
 - a. Components: A period of (1) year from the date of manufacture, against defective materials and workmanship, including substantial non-compliance with applicable specification requirements and industry standards, which results in premature failure of the windows or parts, outside of normal wear.
 - b. Insulated glass units: A period of (5) years from the date of manufacture, against insulated glass seal failure unrelated to glass breakage.
 - c. In the event that windows or components are found defective, manufacturer will repair or provide replacements without charge at manufacturer's option.
 - d. Finish: Refer to Part 2, Section 2.06 "FINISHES" for warranty requirements.
 - e. Warranty for all components must be direct from the manufacturer (non- pass through) and non- prorated for the entire term. Warranty must be assignable to the non-residential owner, and transferable to subsequent owners through its length.
- 2. Installation: Submit a written warranty, executed by the window installer, for a period of (1) year from the date of substantial completion, against defective materials or workmanship, including substantial non-compliance with applicable specification requirements, which result in premature failure.
 - a. In the event that installation of windows or components is found to be defective, installer will repair or provide replacements without charge at the installer's option.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approved Manufacturers:

1. Desco Architectural, Inc.
2. Quaker Window Products Company, Inc.
3. Kawneer
4. YKK AP

B. Model / Type

1. Fixed Window: 8400TL Series (Kawneer, Basis of Design)

C. Substitutions: Only pre-approved products specified by the Architect will be acceptable. Submit the following information with proper documentation as required for pre-bid substitution requests, and at least (10) working days prior to bid date. All approved manufacturers will be identified in an addendum prior to bidding.

1. Independent test reports certifying that proposed product is in accordance with, and meets all criteria specified in Section 1.05 "PERFORMANCE REQUIREMENTS".
2. Drawing details of elevations and sections, and samples in accordance with, and as specified in Section 1.03 "SUBMITTALS".
3. Copy of manufacturer's warranty specified in accordance with, and as specified in Section 1.08 "WARRANTIES".
4. Any additional information requested by the Architect.

2.2 MATERIALS

A. Aluminum Members:

1. Extruded aluminum prime billet 6063-T6 alloy for primary components, 6063-T6, or 6061-T6 for structural components, all in accordance with (ASTM B221).

B. Thermal Break Construction:

1. Frame and sash members shall include a thermal break, applied in the manufacturer's facility, using concealed low-conductance poured-in-place polyurethane in a pre-treated cavity.
2. After proper curing, the aluminum bridge section must be removed to provide a 1/2" minimum separation between interior and exterior metal surfaces.

2.3 MANUFACTURED UNITS

- #### A.
- Principal window frame members shall have a minimum 0.090" outside wall thickness, and .078" mounting webs, and sectional flanges.

- B. Window frame depth shall be 4" (nominal).

2.4 COMPONENTS

- A. All fasteners, tools, equipment, and other materials necessary for a complete installation shall be furnished by the Contractor.
 - 1. Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by the manufacturer to be noncorrosive and compatible with all window members, cladding, trim, hardware, anchors, and other components.
- B. Thermoplastic or thermo-set plastic caps, housings, and other components to be injection-molded nylon, extruded PVC, or other suitable compound.
- C. Accessories:
 - 1. Safety Device Stops: For operable windows, provide stops to prevent opening greater than *enter opening space measurement*. Stops shall be manufacturer's standard for intended use, and provided by the manufacturer.
 - 2. Sills: Manufacturer's standard exterior sills, as shown on Drawings.
 - a. Sill Flashing: manufacturer's standard snap-on type.
 - 3. Trim: Manufacturer's standard interior snap trims.
 - 4. Mullions: Provide mullions and cover plates as shown, matching window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.
 - 5. Panning:
 - a. Provide extruded aluminum panning in accordance with (ASTM B221) by Window Manufacturer, type and size as indicated on Drawings.
 - b. Finish of Panning components shall comply with Section 2.06 "FINISHES", and color shall match Aluminum Windows.
 - 6. Receptor System / Subframe:
 - a. Provide extruded aluminum, thermally broken Receptor System with Aluminum Windows by Window Manufacturer in accordance with (ASTM B221).
 - b. Finish of Receptor System components shall comply with Section 2.06 "FINISHES", and color shall match Aluminum Windows.

2.5 GLASS MATERIALS:

- A. Coated Low Emissivity Glass: Type 1 (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), with coating type and performance characteristics complying with requirements specified below:

1. Low E Coating: Surface #2 on insulated units.
 2. Approved Manufacturers:
 - a. "LoE2- 272"; Cardinal Industries
 - b. Approved Substitution by Architect.
 3. Whole Window U-Value shall be a maximum of 0.40.
- B. Tempered Glass: Condition A (uncoated surfaces), Type 1 (transparent glass, flat), Class 1 (clear), Quality q3, clear, fully tempered safety glass (meet requirements of ANSI Z97.1).
1. All tempered glass shall conform to ASTM C1048, ANSI Z97.1, and CPSC 16 CFR Part 1201. Tempered glass shall bear permanent monogram indicating tempered quality. Fabrication marks on tempered glass shall be located to be concealed in completed installation.
- C. Insulating Glass: Manufacturer's standard units that comply with specified quality standards and coatings.
1. Provide preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space and complying with ASTM E774 for performance classification indicated as well as with other requirements specified for glass characteristics, air space, sealing system, sealant, space material, and desiccants.
 - a. Total Thickness: 1"
 - b. Exterior Pane of Glass:
 - 1) Provide tempered glass where shown on Drawings and as required by local codes and ordinances.
 - c. Insulated Unit Sealing System:
 - 1) The IG edge seal system shall provide very low permeability to water vapor ingress @ WVTR < 0.020 gm/m²/day in accordance with ASTM F 1249 and Oxygen < 0.009 cc/m²/day in accordance with ASTM D 3985 to provide a long IG service life"
 - 2) The IG edge seal system shall provide very low Thermal Conductance @ <0.127 W/m²K in accordance with ASTM C 518.

2.6 FINISHES

A. Finish of Aluminum Components

1. Finish of all exposed areas of aluminum windows and components shall be applied in accordance with the appropriate AAMA Voluntary Guide Specification shown below:
 - a. Prefinished Coating: Kynar 500
 - b. Finish Warranty Period: 20 years from date of manufacturer
 - c. Color Selection: Architect to select from Manufacturers full standard range.

2.7 FABRICATION

- A. Fabricate windows allowing for minimum clearances and shim spacing around perimeter of assembly, yet enabling installation.
- B. Rigidly fit joints and corners with heavy-duty corner keys. Accurately fit and secure corners tight. Make corner joints flush, hairline, and weatherproof. Seal corner joints with sealant.
- C. Develop drainage holes with moisture pattern to exterior.
- D. Prepare components to receive anchor devices. Fabricate anchorage items.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions:
 - 1. Verify that building substrates permit installation of windows according to the manufacturer's instructions, approved shop drawings, calculations and contract documents.
 - 2. Do not install windows until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Erection of Aluminum Windows
 - 1. Install windows with skilled tradesmen in exact accordance with approved Shop Drawings, Installation Instructions, Specifications, and in accordance with (AAMA 101/I.S.2./ A440-08).
 - 2. Windows must be installed plumb, square, and level for proper weathering and operation. Jambs must not be "sprung", bowed, or warped during installation.
 - 3. Any uncoated aluminum components of Aluminum Window shall be insulated from direct contact with steel, masonry, concrete, or other dissimilar metals by bituminous paint, zinc chromate primer, nonconductive shims, or other suitable insulating materials.

3.3 ADJUSTING AND CLEANING

- A. After completion of window installation, windows shall be inspected, adjusted, put into working order and left clean, free of labels, dirt, or other debris. Protection from this point shall be the responsibility of the General Contractor.

End of Section 08 51 13

SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Sliding doors.
 - 3. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Division 08 Section "Door Hardware Schedule".
 - 2. Division 08 Section "Hollow Metal Doors and Frames".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series
 - 2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- D. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware 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.
- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
- E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 1. Function of building, purpose of each area and degree of security required.
 2. Plans for existing and future key system expansion.
 3. Requirements for key control storage and software.
 4. Installation of permanent keys, cylinder cores and software.
 5. Address and requirements for delivery of keys.

- G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Seven years for heavy duty cylindrical (bored) locks and latches.
 - 2. Five years for exit hardware.
 - 3. Fifteen years for manual surface door closer bodies.

1.8 MAINTENANCE SERVICE

- A. 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.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
5. Manufacturers:
 - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - TA Series.

- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:
 - a. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2.3 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
 2. Furnish dust proof strikes for bottom bolts.
 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
 5. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
- B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.
 1. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
- C. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
 2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
 3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
 4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
 5. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
- C. Cylinders: Original manufacturer cylinders complying with the following:
 - 1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
 - 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
 - 4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 - 5. Keyway: Manufacturer's Standard.
- D. Patented Cylinders: ANSI/BHMA A156.5, Grade 1, certified cylinders employing a utility patented and restricted keyway requiring the use of patented controlled keys. Provide bump resistant, fixed core cylinders as standard with solid recessed cylinder collars. Cylinders are to be factory keyed where permanent keying records will be established and maintained.
 - 1. Provide a 6 pin multi-level master key system comprised of patented controlled keys and security and high security cylinders operated by one (1) key of the highest level. Geographical exclusivity to be provided for all security and high security cylinders and UL437 certification where specified.
 - a. Level 1 Cylinders: Provide utility patented controlled keyway cylinders that are furnished with patented keys available only from authorized distribution.
 - b. Level 2 Cylinders: Provide utility patented controlled keyway and side bar locking incorporating unique angled bottom pins for geographical exclusivity. Cylinders constructed to provide protection against bumping and picking.
 - c. Level 3 Cylinders: Provide utility patented controlled keyway and side bar locking incorporating unique angled bottom pins for geographical exclusivity. Cylinders to be UL437 certified and constructed to provide protection against bumping, picking, and drilling.
 - d. Refer to hardware sets for specified levels.
 - 2. Manufacturers:
 - a. Sargent Manufacturing (SA) - Degree Series.
- E. Keying System: Each type of lock and cylinders to be factory keyed.
 - 1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.

2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. New System: Key locks to a new key system as directed by the Owner.

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

G. Construction Keying: Provide construction master keyed cylinders.

H. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

I. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

- a. Lund Equipment (LU).
- b. MMF Industries (MM).
- c. Telkee (TK).

J. Key Control Software: Provide one network version of "Key Wizard" branded key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into "Key Wizard" software.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified.

1. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.
2. Locks are to be non-handed and fully field reversible.
3. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.2 requirements to 2 million cycles.
4. Manufacturers:

- a. Sargent Manufacturing (SA) – 10 Line.

2.6 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 - 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
 - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 - 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 - 4. Dustproof Strikes: BHMA A156.16.

2.7 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
 - 1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 - 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 - 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 - 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

5. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
 6. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
 7. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
 8. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
 9. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 10. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 11. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 12. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
1. Manufacturers:
 - a. Sargent Manufacturing (SA) - 80 Series.

2.8 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
 4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
 5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
1. Manufacturers:
 - a. Sargent Manufacturing (SA) - 351 Series.

2.9 ARCHITECTURAL TRIM

- A. Door Protective Trim
1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
 2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
 3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.10 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.11 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 1. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2.12 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.13 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.
- C. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. RO - Rockwood
4. SA - SARGENT
5. OT - OTHER

Hardware Sets

Set: A

Description: Classroom Function

3 Hinge	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Classroom Lock	SG T3 64 8237 ETL	US26D	SA
1 Core	6300	US15	SA
1 Closer	TB 351 P10	EN	SA
1 Kick Plate	K1050 10" x L.A.R.	US32D	RO

Set: B

Description: Office Function

3 Hinge	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Classroom Lock	SG T3 64 8205 ETL	US26D	SA
1 Core	6300	US15	SA
1 Closer	TB 351 P10	EN	SA
1 Kick Plate	K1050 10" x L.A.R.	US32D	RO
1 Wall Stop	409	US32D	RO

Set: C

Description: Institutional Privacy / Toilet

3 Hinge	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Privacy Set	SG 49 8257 ETL	US26D	SA
1 Mop Plate	K1050 4" x L.A.R.	US32D	RO
1 Wall Stop	409	US32D	RO

Set: D

Description: Institutional Privacy / Toilet (Rated, w/ Closer)

3 Hinge	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Privacy Set	SG 49 8257 ETL	US26D	SA
1 Closer	TB 351 UO	EN	SA
1 Mop Plate	K1050 4" x L.A.R.	US32D	RO
1 Wall Stop	409	US32D	RO

Set: E

Description: Mechanical/Closet, Fire-Rated

3 Hinge	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Storeroom/Closet Set	64 8204 ETL	US26D	SA
1 Closer	TB 351 UO	EN	SA

NOTE: ALL FASTENERS SHALL BE SECURITY/TAMPER RESISTANT /PIN TYPE FASTENERS.

END OF SECTION 08 71 00

SECTION 08 80 00 – GLASS AND GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

- A. Definitions: "Glass" includes both primary and fabricated glass products as described in FGMA "Glazing Manual". "Glazing" includes glass installation and materials used to install glass.
- B. Extent of glass and glazing work is indicated on drawings and schedules.
- C. Types of work in this section include glass and glazing for:
- D. Twin insulating glass as shown on Drawings.
- E. Window units, not indicated as "preglazed".
- F. Entrances and other doors, not indicated as "preglazed".

1.3 SYSTEM PERFORMANCES:

- A. Provide glass and glazing that has been produced, fabricated and installed to withstand normal temperature changes, wind loading, impact loading (where applicable), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials, and other defects in the work.

1.4 QUALITY ASSURANCE:

- A. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.
- B. Safety Glazing Standard: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials.
- C. Single Source Responsibility: Provide materials obtained from one source for each type of glass and glazing product indicated.

1.5 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical data for each glazing material and fabricated glass product required, including installation and maintenance instructions.

-
- B. Samples: Submit, for verification purposes, 12" square samples of each type of glass indicated except for clear single pane units, and 12" long samples of each color required (except black) for each type of sealant or gasket exposed to view. Install sealant or gasket sample between two strips of material representative of adjoining framing system in color.
 - C. Certificate: Submit certificates from respective manufacturers attesting that glass and glazing materials furnished for project comply with requirements.
 - D. Separate certification will not be required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authorities having jurisdiction.
 - E. Test Reports: Submit sealant-substrate adhesion and sealant compatibility test reports, including glazing sealant manufacturer's findings and recommendations.

1.6 DELIVERY, STORAGE, AND HANDLING:

- A. Protect glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

1.7 PROJECT CONDITIONS:

- A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes. Install glazing sealants only when temperatures are in middle third of manufacturer's recommended installation temperature range.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
- B. Manufacturers of Clear Float Glass and Sealed Insulating Glass Units:
 - 1. Ford Motor Co., Glass Div.
 - 2. Libbey-Owens-Ford Co.
 - 3. PPG Industries, Inc.

2.2 GLASS PRODUCTS, GENERAL:

- A. Primary Glass Standard: Provide primary glass which complies with FS DD-G-451 requirements, including those indicated by reference to type, class, quality, and form.
- B. Heat-Treated Glass Standard: Provide heat-treated glass which complies with FS DD-G-1403 requirements, including those indicated by reference to grade, style, type, quality, and class.

C. Insulating Glass Standard: Provide preassembled sealed insulating glass units which comply with ASTM E 774 requirements for classification designated below:

1. Class A.

D. Sizes: Fabricate glass to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Provide thicknesses indicated, or, if not otherwise indicated, as recommended by glass manufacturer for application indicated.

2.3 PRIMARY GLASS PRODUCTS:

A. Clear Float Glass: Type I, Class 1 (transparent), quality q3 (glazing select).

2.4 HEAT-TREATED GLASS PRODUCTS:

A. Manufacturing Process: Manufacture heat-treated glass as follows:

1. By horizontal (roller hearth) process with roll wave distortion parallel with bottom edge of glass as installed, unless otherwise indicated.

B. Clear Tempered Float Glass: Grade B (fully tempered), style I (uncoated surfaces), type I (float), quality q3 (glazing quality), class 1 (transparent).

C. Clear Heat-Strengthened Float Glass: Grade A (heat strengthened), style I (uncoated surfaces), type I (float), quality q3 (glazing select), class 1 (transparent).

2.5 SEALED INSULATING GLASS UNITS:

A. General: Provide preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space; comply with requirements indicated for glass characteristics, air space, sealing system, sealant, spacer material, corner design, and dessicant.

B. Provide heat-treated panes of grade and at locations indicated or, if not indicated, provide heat-strengthened panes where recommended by manufacturer for application indicated and tempered where indicated or where safety glass is designated or required.

C. U-values indicated are expressed in Btu/(hr x sf x °F). **U = 0.314**

1. Thickness of Each Pane: 1/4".

2. Air Space Thickness: 1/2".

3. Sealing System: Manufacturer's standard.

4. Spacer Material: Manufacturer's standard metal.

5. Dessicant: Manufacturer's standard material.

6. Corner Design: Manufacturer's standard.

7. Insulating Glass Units: Provide manufacturer's standard units complying with the following requirements:

8. Exterior Pane: Grey float glass. (match existing tinted glazing)

9. **Shading coefficient = 0.43**

10. Grade: Tempered.

11. Interior Pane of Glass: Low-E, Clear float glass.

12. Grade: Tempered.

2.6 GLAZING SEALANTS:

- A. General: Comply with recommendations of sealant and glass manufacturers for selection of glazing sealants which have performance characteristics suitable for applications indicated and conditions at time of installation.
- B. Compatibility: Select sealants with proven compatibility with surfaces contacted in the installation and under service conditions indicated, as demonstrated by testing and field experience.
- C. Colors: Provide color of exposed sealants indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.
- D. 2-Part Polysulfide Glazing Sealant: Polysulfide elastomeric sealant complying with FS TT-S-00227, Class A, Type 2; and with ASTM C 920, Type M, Grade NS, Class 25, Use G and, as applicable to use indicated, Uses A and O.
- E. Acrylic Glazing Sealant: Acrylic terpolymer or polypropenate solvent-based thermo-plastic 1-part sealant complying with FS TT- S-00230, Class B, Type II; and with ASTM C 920, Type S, Grade NS, Class 12-1/2, Use G and, as applicable to use indicated, Uses A and O.
- F. Preformed Butyl-Polyisobutylene Glazing Tape: Blend of butyl- polyisobutylene rubber with a solids content of 100%, in extruded tape form, complying with AAMA 807.1, packaged on rolls with a release paper on side, with or without continuous spacer rod as recommended by manufacturers of tape and glass for application indicated.
- G. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
- H. 2-Part Polysulfide Glazing Sealants:
 - 1. Sonolastic Two-Part; Sonneborn Building Products Div., Rexnord Chemical Products, Inc.
 - 2. Chem-Calk 100; Woodmont Products, Inc.
- I. Acrylic Glazing Sealants:
 - 1. Mono; Tremco.
 - 2. Chem-Calk 800; Woodmont Products, Inc.
- J. Preformed Butyl-Polyisobutylene Glazing Tape:
 - 1. Tremco Polyshim Tape; Tremco.
 - 2. Tremco 440 Tape; Tremco.
 - 3. SST 800 Tape; Tremco.
 - 4. Chem-Tape 40; Woodmont Products, Inc.

2.7 GLAZING GASKETS:

- A. Cellular Elastomeric Preformed Gaskets: Extruded or molded closed cell, integral-skinned neoprene of profile and hardness required to maintain watertight seal; complying with ASTM C 509, Type II; black.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

C. Manufacturers of Preformed Gaskets:

1. D. S. Brown Co.
2. Maloney Precision Products Co.
3. Tremco.

2.8 MISCELLANEOUS GLAZING MATERIALS:

- A. Compatibility: Provide materials with proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.
- D. Spacers: Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.
- E. Edge Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.
- F. Compressible Filler Rods: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5-10 psi compression strength for 25% deflection.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Require glazier to inspect work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required face or edge clearances; and for effective sealing of joinery. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

- A. Clean glazing channels and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

3.3 GLAZING, GENERAL:

- A. Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

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- B. Glazing channel dimensions as indicated in details are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.
 - C. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.
 - D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

3.4 GLAZING:

- A. Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but no closer than 6", unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.
- B. Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches, except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- C. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
- D. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- E. Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.
- F. Force sealants into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- G. Tool exposed surfaces of sealants to provide a substantial "wash" way from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.
- H. Where wedge-shaped gaskets are driven into one side of channel to presurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.
- I. Miter cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent pull away at corners; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.5 PROTECTION AND CLEANING:

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- A. Protect exterior glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.
 - B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.
 - C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits, or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.
 - D. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.
 - E. Wash glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Wash glass by method recommended by glass manufacturer.

END OF SECTION 08 80 00 – GLASS AND GLAZING

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.2 SUMMARY

- A. Section Includes:

1. Acoustical ceiling panels.
2. Exposed grid suspension system.
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):

1. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
2. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
7. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
8. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.
9. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems.
10. ASTM E 1264 Classification for Acoustical Ceiling Products.
11. ASTM E 1477 Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
12. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
13. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material.

- B. ASHRAE Standard 62.1-2004, "Ventilation for Acceptable Indoor Air Quality"
- C. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components
- D. International Code Council-Evaluation Services - Evaluation Report, ESR-1308, Fire- and Nonfire-Resistance-Rated Suspended Ceiling Framing Systems
- E. ASCE 7 Standard - American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures
- F. CISCA Seismic Zones 3 & 4 - Ceilings and Interior Systems Construction Association Guidelines for Seismic Restraint for Direct Hung Suspended Ceiling Assemblies

1.4 SYSTEM DESCRIPTION

- A. Seismic Loads: Design and size components to withstand seismic loads in accordance with the International Building Code, Section 1621 for Category D,E, and F.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
- B. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.
- C. Shop Drawings: Layout and details of acoustical ceilings. Show locations of items which are to be coordinated with, or supported by the ceilings.
- D. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.
- E. If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the Designer's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

1.6 QUALITY ASSURANCE

- A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

- B. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - 1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.
 - a. Flame Spread: 25 or less
 - b. Smoke Developed: 50 or less
- C. Seismic Performance: Provide acoustical ceiling system that has been evaluated by an independent party and found to be compliant with the 2003 International Building Code, Seismic Category D, E, and F.
 - 1. Tested per International Code Council - Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components as evidenced by International Code Council Evaluation Report, ESR-1308.
- D. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.8 PROJECT CONDITIONS

- A. Space Enclosure:
 - 1. All ceiling products and suspension systems must be installed and maintained in accordance with Armstrong written installation instructions for that product in effect at the time of installation and best industry practice. Prior to installation, the ceiling product must be kept clean and dry, in an environment that is between 32°F (0°C) and 120°F (49°C) and not subject to Abnormal Conditions.
 - 2. Abnormal conditions include exposure to chemical fumes, vibrations, moisture from conditions such as building leaks or condensation, excessive humidity, or excessive dirt or dust buildup.
 - 3. HumiGuard Plus Ceilings: Installation of the products shall be carried out where the temperature is between 32°F (0° C) and 120°F (49° C). It is not necessary for the area to be enclosed or for HVAC systems to be functioning. All wet work (plastering, concrete, etc) must be complete and dry.

4. The ceilings must be maintained to avoid excessive dirt or dust buildup that would provide a medium for microbial growth on ceiling panels. Microbial protection does not extend beyond the treated surface as received from the factory, and does not protect other materials that contact the treated surface such as supported insulation materials.

1.9 WARRANTY

- A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
 1. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.
 2. Grid System: Rusting and manufacturer's defects
 3. Acoustical Panels with BioBlock Plus or designated as inherently resistive to the growth of micro-organisms: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.
- B. Warranty Period:
 1. Acoustical panels: Thirty (30) years from date of substantial completion.
 2. Grid: Thirty (30) years from date of substantial completion.
- C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.10 MAINTENANCE

- A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
 1. Acoustical Ceiling Units: Furnish quantity of full-size units equal to 5.0 percent of amount installed.
 2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. A. Ceiling Panels:
 1. Armstrong World Industries, Inc.

2.2 ACOUSTICAL CEILING UNITS

A. Acoustical Panels Type ACT-1:

1. Surface Texture: Fine
2. Composition: Mineral Fiber
3. Color: White
4. Size: 24in X 24in X 7/8in
5. Edge Profile: Beveled Tegular Edge for interface with Prelude XL 15/16" Exposed Tee.
6. Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton, 0.80.
7. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton, 35
8. Emissions Testing: Section 01350 Protocol, < 13.5 ppb of formaldehyde when used under typical conditions required by ASHRAE Standard 62.1-2004, "Ventilation for Acceptable Indoor Air Quality"
9. Flame Spread: ASTM E 1264; Class A (UL)
10. Light Reflectance (LR): ASTM E 1477; White Panel: Light Reflectance: 0.87.
11. Dimensional Stability: HumiGuard Plus - Temperature is between 32°F (0° C) and 120°F (49° C). It is not necessary for the area to be enclosed or for HVAC systems to be functioning. All wet work (plastering, concrete, etc) must be complete and dry.
12. Antimicrobial Protection: BioBlock Plus - Resistance against the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.
13. Basis of Design Product: Subject to compliance with requirements, provide Ultima High NRC 1941, as manufactured by Armstrong World Industries; or comparable product by one of the following:
 - a. USG Corporation
 - b. CertainTeed

2.3 SUSPENSION SYSTEMS

A. Components: Main beams and cross tees In accordance with the International Building Code, Section 1621 for Category D, E and F as described in ESR-1308.

1. Structural Classification: ASTM C 635, Heavy Duty.
2. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
3. Basis of Design Product: Subject to compliance with requirements, provide Prelude XL 15/16" Exposed Tee System as manufactured by Armstrong World Industries; or comparable product by one of the following:
 - a. USG Corporation
 - b. CertainTeed

B. Attachment Devices: In accordance with the International Building Code, Section 1621 for Category D, E, and F.

- C. Wire for Hangers and Ties: In accordance with the International Building Code, Section 1621.
- D. Wall Moldings: In accordance with the International Building Code, Section 1621 for Category D, E. and F or method as described in ESR-1308.
 - 1. Nominal 7/8 inch x 7/8 inch hemmed, pre-finished angle molding (7800) (7802) (7803) (780036) (HD7801)
 - 2. Nominal 15/16 inch x 15/16 inch hemmed, pre-finished angle molding (7809)
 - 3. Nominal 15/16 inch x 15/16 inch x 1/4 inch, pre-finished shadow molding (7877)
 - 4. Nominal 15/16 inch x 15/16 inch x 3/8 inch, pre-finished shadow molding (7878)
 - 5. Nominal 15/16 inch x 15/16 inch x 1/2 inch, pre-finished shadow molding (7897)
- E. Accessories:
 - 1. BERC2 - 2 inch Beam End Retaining Clip, 0.034 inch thick, hot-dipped galvanized cold-rolled steel per ASTM A568 - used to join main beam or cross tee to wall molding.
 - 2. SJCG - Seismic Joint Clip, 5 inches x 1-1/2 inch, hot-dipped galvanized cold-rolled steel per ASTM A568. The two piece unit is designed to accommodate a seismic separation joint. The clip is compatible with 15/16 inch and 9/16 inch grid systems including Prelude, Suprafine, and Silhouette The SJCG is not suitable for use with Vector panel installations.
 - 3. SJMR15 - Seismic Joint Clip - Main Beam, 1 inch x 4 inches, commercial quality cold rolled hot dipped galvanized steel per ASTM A568, chemically cleansed.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.
- B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
 - 1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.3 INSTALLATION (Category D,E,F)

- A. Install suspension system and panels in accordance with the International Building Code, Section 1621, except as noted in Section 4.4.3.1 of ESR-1308, and with the authorities having jurisdiction.
- B. ESR-1308, Section 4.4.3.1, Alternate Seismic Design Category D,E and F Installation:
 - 1. Under this installation, the runners must be rated heavy-duty and have a minimum simple span uniform load of 16.35 pounds per lineal foot (238 N/m); maximum ceiling weight permitted is 4.0 pounds per square foot (19.5 kg/m²).
 - a. The BERC-2 clip is used to secure the main runners and cross runners on two adjacent walls to the structure and the two opposite walls to the perimeter trim, as detailed below. A nominal 7/8-inch (22 mm) wall molding is used in lieu of the 2-inch (51 mm) perimeter supporting closure angle required by Section 9.6.2.6.2.2 (b) of ASCE-7 for Seismic Design Categories D, E and F. Except for the use of the BERC-2 clip and the 7/8-inch (22 mm) wall molding and elimination of spreader bars, installation of the ceiling system must be as prescribed by the applicable code.
 - b. The BERC-2 clip is attached to the wall molding by sliding the locking lances over the hem of the vertical leg of the wall molding. Clips installed on the walls where the runners are fixed are attached to the runner by a sheet metal screw through the horizontal slot in the clip into the web of the runner.
 - c. Alternate #2:
 - 1) If acceptable to Designer, fixed attachment may be accomplished by pop-riveting the runner to the wall molding.
 - d. Clips installed on the walls where the runners are not fixed to the runner allow the terminal runner end to move 3/4 inch (19.1 mm) in both directions. BERC-2 clips installed in this manner are an acceptable means of preventing runners from spreading in lieu of spacer bars required in CISCA 3-4, which is referenced in ASCE 7, Section 9.6.2.6.2.2, which is referenced in IBC Section 1621.
- C. The SJCG Seismic Separation Joint Clip is to be installed per the manufacturer's instructions, CS-3815.
- D. The SJMR15 Seismic Joint Clip Main Beam is to be installed per the manufacturer's instructions, CS-3955.
- E. The presence of a hanger wire within 3 inches of an expansion relief joint as called for in ASTM C636 shall be required in addition to the requirements of the International Building Code, Section 16 21 .2.5 and with the authorities having jurisdiction.
 - 1. Only applies when using Prelude XL Fire Guard 15/16" x 1/2"; Prelude Plus XL Fire Guard 15/16" x 1/2"; and Suprafine XL Fire Guard 9/16" x 1/2" Exposed Tee Systems.
- F. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.

- G. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.4 ADJUSTING AND CLEANING

- A. Replace damaged and broken panels.
- B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage.
 - 1. Ceiling Touch-Up Paint, (Item #5760, 8oz. bottles) (Item #5761, quart size cans), "global white" latex paint should be used to hide minor scratches and nicks in the surface and to cover field regularized edges that are exposed to view.
- C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 65 13 – RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Resilient base.
 - 2. Resilient molding accessories.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.6 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg. F or more than 95 deg. F in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.

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3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg. F (13 deg. C) or more than 95 deg. F (35 deg. C).
 - C. Install resilient products after other finishing operations, including painting, have been completed.

1.7 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE

- A. Resilient Base:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Armstrong World Industries, Inc.
 - b. Flexco, Inc.
 - c. Johnsonite.
 - d. Roppe Corporation, USA.
- B. Resilient Base Standard: equal to Armstrong, Imperial through pattern, finish coating: Diamond 10 ASTM F 1066.
 1. Material Requirement: Type TP (rubber, thermoplastic)
 2. Manufacturing Method: Group II (layered)
 3. Style: Cove (base with toe)
- C. Minimum Thickness: 1/8" (3.2 mm)
- D. Height: 4 inches (102 mm)
- E. Lengths: Coils in manufacturer's standard length
- F. Outside Corners: Preformed.
- G. Inside Corners: Preformed.

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- H. Finish: As selected by Designer from manufacturer's full range.
 - I. Colors and Patterns: As selected by Designer from full range of industry colors.

2.2 RESILIENT MOLDING ACCESSORY (if applicable)

- A. Resilient Molding Accessory:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Flexco, Inc.
 - b. Johnsonite.
 - c. Roppe Corporation, USA.
 - d. Armstrong World Industries, Inc.
- B. Description: Joiner for differing flooring materials, Transition strips.
- C. Material: Rubber.
- D. Colors and Patterns: As selected by Designer from full range of industry colors.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
 - 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Cove Base Adhesives: Not more than 50 g/L.
 - b. Rubber Floor Adhesives: Not more than 60 g/L.
- C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

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- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
 - C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
 - 4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until they are same temperature as the space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.

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- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
 - G. Preformed Corners: Install preformed corners before installing straight pieces.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products until Substantial Completion.

END OF SECTION 09 65 13

SECTION 09 91 23 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

- A. Extent of painting work is indicated on drawings and schedules, and as herein specified.
- B. Work includes painting and finishing of interior exposed items and surfaces throughout project, except as otherwise indicated.
- C. Surface preparation, priming and coats of paint specified are in addition to shop- priming and surface treatment specified under other sections of work.
- D. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
- E. Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Designer will select these from standard colors or finishes available.
- F. Following categories of work are not included as part of field-applied finish work.
 - 1. Pre-Finished Items: unless otherwise indicated, do not include painting when factory-finishing or installer- finishing is specified for such items as (but not limited to) metal toilet enclosures, pre-finished partition systems, acoustic materials and finished mechanical and electrical equipment, including light fixtures, switchgear and distribution cabinets.
 - 2. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.
 - 3. Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.
 - 4. Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting.

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- G. Following categories of work are included under other sections of these specifications:
1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, metal fabrications, hollow metal work and similar items.
 - a. Unless otherwise specified, shop priming of fabricated components such as architectural woodwork, wood casework and shop- fabricated or factory-built mechanical and electrical equipment or accessories is included under other sections of these specifications.
- H. Mechanical and Electrical Work: Painting of mechanical and electrical work is specified in Divisions 23 and 26, respectively.
- I. Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

1.3 QUALITY ASSURANCE:

- A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.
- B. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use.
- B. Samples: Prior to beginning work, Designer will furnish color chips for surfaces to be painted. Use representative colors when preparing samples for review. Submit samples for Designer's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.
- C. On actual wood surfaces, provide two 4" x 8" samples of natural and stained wood finish. Label and identify each as to location and application.
- D. On concrete masonry, provide two 4" square samples of masonry for each type of finish and color, defining filler, prime and finish coat.

1.5 DELIVERY AND STORAGE:

- A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:
 1. Name or title of material.
 2. Fed. Spec. number, if applicable.
 3. Manufacturer's stock number and date of manufacturer.
 4. Manufacturer's name.

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5. Contents by volume, for major pigment and vehicle constituents.
 6. Thinning instructions.
 7. Application instructions.
 8. Color name and number.

- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.
- C. Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

1.6 PROJECT CONDITIONS:

- A. Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50°F (10°C) and 90°F (32°C), unless otherwise permitted by paint manufacturer's printed instructions.
- B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45°F (7°C) and 95°F (35°C), unless otherwise permitted by paint manufacturer's printed instructions.
- C. Do not apply paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.
- D. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products, which may be incorporated in the work, include, but are not limited to, the following:
 1. PPG Industries, Pittsburgh Paints
 2. Porter Paints
 3. Sherwin Williams

2.2 MATERIALS:

- A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade produce will not be acceptable.
- B. Proprietary names used to designate colors or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other manufacturers.

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- C. Federal Specifications establish minimum acceptable quality for paint materials. Provide written certification from paint manufacturer that materials provided meet or exceed these minimums.
 - D. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.
 - E. 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.
 - 1. This limitation is extended to interior surfaces and those exterior surfaces, such as stairs, decks, porches, railings, windows, and doors, which are readily accessible to children under seven years of age.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Applicator.
- B. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.
- C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

3.2 SURFACE PREPARATION:

- A. General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.
- B. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Designer in writing of any anticipated problems in using the specified coating systems with substrates primed by others.
- C. 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, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.
- D. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from the cleaning process will not fall onto wet, newly-painted surfaces.
- E. Cementitious Materials: Prepare Cementitious surfaces of concrete, concrete block, cement plaster and cement-asbestos board to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.

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1. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning if finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.
 2. Clean concrete floor surfaces, scheduled to be painted, with a commercial solution of muriatic acid, or other etching cleaner. Flush floor with clean water to neutralize acid, and allow to dry before painting.
- F. Wood: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.
1. Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, and paneling.
 2. When transparent finish is required, use spar varnish for backpriming.
 3. Seal tops, bottoms, and cut-outs of unprimed wood doors with a heavy coat of varnish or equivalent sealer immediately upon delivery to job.
- G. Ferrous Metals: Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
- H. Touch-up shop-applied prime coats wherever damaged or bare, where required by other sections of these specifications. Clean and touch-up with same type shop primer.
- I. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

3.3 MATERIALS PREPARATION:

- A. Mix and prepare painting materials in accordance with manufacturer's directions.
- B. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.
- C. 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 if necessary, strain material before using.

3.4 APPLICATION:

- A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
- B. Provide finish coats, which are compatible with prime paints used.

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- C. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform 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.
 - D. 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.
 - E. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
 - F. Paint backsides of access panels, and removable or hinged covers to match exposed surfaces.
 - G. Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.
 - H. Sand lightly between each succeeding enamel or varnish coat.
 - I. Omit first coat (primer) on metal surfaces, which have been shop-primed and touch-up painted, unless otherwise indicated.
 - J. 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.
 - K. 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.
 - L. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.
 - M. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to those items exposed in mechanical equipment rooms and in occupied spaces.
 - N. Prime Coats: Apply prime coat of material which is required to be painted or finished, and which has not been prime coated by others.
 - 1. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
 - O. 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.
 - P. Transparent (Clear) Finishes: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.
 - 1. Provide satin finish for final coats, unless otherwise indicated.

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- Q. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.5 CLEAN-UP AND PROTECTION:

- A. Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.
- B. Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- C. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Designer.
- D. Provide "Wet Paint" signs as required to protect newly- painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
- E. At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

3.6 EXTERIOR PAINT SCHEDULE

- A. General: Provide the following paint systems for the various substrates, as indicated.
- B. CONCRETE MASONRY UNITS: Lusterless (Flat) Acrylic Finish: 2 coats over filler coat with total dry film thickness not less than 2.5 mils, excluding filler coat.
1. Filler Coat:
 - a. PPG Speedhide Latex Block Filler 6-7
 - b. Porter Promaster 2000 Latex Block Fill 6223
 - c. S.W. PrepRite Latex Block Filler B25W25
 2. First and Second Finish Coats:
 - a. PPG Speedhide Ext. Latex Flat 6-610
 - b. Porter Acri-Pro 100 Latex Flat 929
 - c. S.W. A-100 Ext. Latex Flat A-6
- C. FERROUS METAL: Gloss Alkyd Enamel: 2 finish coats over primer.
1. Primer Coat (Oil Finish):
 - a. PPG Multiprime 90-689
 - b. Porter U-Prime 286
 - c. S.W. Kem Kromik Universal Primer, B50Z
 2. First and Second Coat Oil System:
 - a. PPG Industrial Enamel 7-282
 - b. Porter Industrial Enamel 2749
 - c. S.W. Industrial Enamel B54
- D. ZINC-COATED METAL: High Gloss Alkyd Enamel: 2 finish coats over primer.

1. Prime Coat:
 - a. PPG Pittech DTM 90-712
 - b. Porter DTM Primer 215
 - c. S.W. Galvite HS Metal Primer, B50WZ30
2. First and Second Coat Oil System:
 - a. PPG Industrial Enamel 7-282
 - b. Porter Industrial Enamel 2749
 - c. S.W. Industrial Enamel B54

3.7 INTERIOR PAINT SCHEDULE

- A. General: Provide the following paint systems for the various substrates, as indicated.
- B. EXPOSED DUCT/ROOF DECKING: Spray dry fog, flat finish: 2 coats sprayed over appropriate primer using recommended size airless sprayer tip at manufacturer recommend mil thickness.
 1. Primer Coat: (steel)
 - a. PPG Speedhide Int/Ext Galvanized Steel Primer
 - b. Porter Porter Guard DTM Acrylic Primer PP215
 - c. S.W. Kem-bond HS
 2. First and Second Coat:
 - a. PPG Speedhide Interior Dry-Fog Spray Paint Flat Latex 6-715 (Flat white)
 - b. Porter Porter Guard WB Spray Dry Fog PP9620 (Flat White)
 - c. S.W. Waterborne Acrylic Dryfall (B42 Series, Flat White)
- C. CONCRETE MASONRY UNITS: Semi-Gloss Latex Enamel Finish: 2 coats over filled surface with total dry film thickness not less than 3.5 mils, excluding filler coat.
 1. Filler Coat: Block Filler. Apply filler coat at a rate to ensure complete coverage with pores filled.
 - a. PPG Speedhide Latex Block Filer 6-7
 - b. Porter Promaster 2000 Latex Block Filler 6223
 - c. S.W. PrepRite Latex Block Filler B25W25
 2. Latex Finishes:
 - a. PPG Speedhide 6-500 Semi-gloss
 - b. Porter Promaster 2000 6139 Semi-gloss
 - c. S.W. ProMar 200 b31 Semi-gloss
- D. GYPSUM DRYWALL SYSTEMS:
 1. Primer Coat:
 - a. PPG Speedhide High Build 6-4
 - b. Porter Max Prime 567
 - c. S.W. Preprite 200 Wall Primer, B28W200
 2. First & Second Coat:
 - a. PPG Speedhide 6-411 Eggshell
 - b. Porter Promaster 2000 6129 Eggshell
 - c. S.W. ProMar 200 Latex Eggshell, B20-220
- E. GYPSUM DRYWALL SYSTEMS (WET AREAS):
 1. Primer Coat:
 - a. PPG Speedhide 6-2
 - b. Porter Promaster 2000 PP867
 - c. S.W. Preprite 200 Latex Primer B28W200

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2. First & Second Coat:
 - a. PPG Manor Hall Interior Pearl Alkyd 28-110
 - b. Porter Promaster 2000 Alkyd Satin Enamel PP129
 - c. S.W. ProMar Alkyd Eg-Shel Enamel B33WZ1101
- F. FERROUS METAL: Semi-Gloss Enamel Finish: 2 coats over primer, with total dry film thickness not less than 2.5 mils.
1. Prime Coat:
 - a. PPG Speedhide Int./Ext. Rust Primer 6-208
 - b. Porter Glyptex Rust Inhibitive 296
 - c. S.W. Kem Kromik Metal Primer, B50Z
 2. First & Second Coat Oil:
 - a. PPG Speedhide Speedhide S/G 6-1110
 - b. Porter Promaster 2000 S/G 149
 - c. S.W. Promar 200 Alkyd S/9 Enamel, B34-200.
- G. ZINC-COATED METAL: Semi-Gloss Finish: 2 coats over primer, with total dry film thickness not less than 2.5 mils.
1. Prime Coat:
 - a. PPG Pitt-Tech DTM Primer Finish 90-line
 - b. Porter DTM Primer Finish 215
 - c. S.W. Galvite H.S. Metal Primer, B50WZ30
 2. Oil First & Second Coats:
 - a. PPG Speedhide Speedhide S/G 6-1110
 - b. Porter Promaster 2000 Promaster S/G 149
 - c. S.W. Promar 200 Alkyd S/9 Enamel, B34-200
- H. PAINTED WOODWORK AND HARDBOARD: Semi-Gloss Enamel Finish: 3 coats.
1. Prime Coat:
 - a. PPG Speedhide Stain Kill 6-14
 - b. Porter Sta Kil 164
 - c. S.W. Preprite Wall and Wood Primer, B49W2
 2. Oil Second & Third Coats:
 - a. PPG Speedhide Speedhide S/G 6-1110
 - b. Porter Promaster 2000 S/G 149
 - c. S.W. Promar 200 Alkyd S/9 Enamel, B34-200
- I. STAINED WOODWORK: Stained - Varnish Rubbed Finish: 3 finish coats over stain plus filler on open grain wood.
1. Stain Coat: Interior Oil Stain (FS TT-S-711).
 - a. PPG 77-line Rez Stain
 - b. Porter Wood Guardian Stain
 - c. S.W. Wood Classic Interior Oil Stain, A49-200
 2. Second and Third Coats: Oil Rubbing Varnish (FS TT-V- 86).
 - a. PPG 77-line Rez Polyurethane
 - b. Porter Wood Guardian Polyurethane
 - c. S.W. Wood Classic Fast Dry Oil Varnish A66-300

END OF SECTION 09 91 23 - PAINTING

SECTION 10 44 13 – FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

- A. This Section includes the following:
 - 1. Fire extinguishers.
 - 2. Fire extinguisher cabinets.

1.3 SUBMITTALS:

- A. Product data for each type of product specified. For fire extinguisher cabinets include rough-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style, door construction, panel style, and materials.
- B. Samples for initial selection purposes in form of manufacturer's color charts showing full range of colors available for those units with factory-applied color finishes.

1.4 QUALITY ASSURANCE:

- A. Single-Source Responsibility: Obtain fire extinguishers and cabinets from one source from a single manufacturer.
- B. UL-Listed Products: Fire extinguishers UL-listed and bear UL "Listing Mark" for type, rating, and classification of extinguisher.
- C. FM-Listed Products: Fire extinguishers approved by Factory Mutual Research Corporation for type, rating, and classification of extinguisher and carry appropriate FM marking.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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1. Allenco
 2. Ansul Fire Protection, Wormald US Inc.
 3. Badger-Powhatan
 4. Bobrick Washroom Equipment, Inc.
 5. J. L. Industries.
 6. Larsen's Manufacturing Co.
 7. Modern Metal Products by Muckle
 8. Potter-Roemer, Inc.
 9. Samson Metal Products, Inc.
 10. Walter Kidde, Division of Kidde, Inc.
 11. Watrous, Inc.

2.2 FIRE EXTINGUISHERS:

- A. General: Provide fire extinguishers for each extinguisher cabinet and other locations indicated, in colors and finishes selected by Designer from manufacturer's standard, which comply with requirements of governing authorities.
- B. Abbreviations indicated below identify extinguisher types related to UL classification and rating system and not necessarily to type and amount of extinguishing material contained in extinguisher.
- C. Multipurpose Dry Chemical Type: UL-rated 4-A:60-B,C; 10-lb. nominal capacity, in enameled steel container.

2.3 FIRE EXTINGUISHER CABINETS:

- A. General: Provide fire extinguisher cabinets where indicated, of suitable size for housing fire extinguishers of types and capacities indicated.
- B. Construction: Manufacturer's standard enameled steel box, with trim, frame, door, and hardware to suite cabinet type, trim style, and door style indicated. Weld all joints and grind smooth. Miter and weld perimeter door frames.
- C. Cabinet Type: Suitable for mounting conditions indicated, of the following types:
 1. Semi-Recessed: Noted on drawings for all interior stud walls.

2.4 DOOR MATERIAL AND CONSTRUCTION:

- A. Manufacturer's standard door construction, of material indicated, coordinated with cabinet types and trim styles selected.
- B. Enameled Steel: Manufacturer's standard finish, hollow steel door construction with tubular stiles and rails.

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- C. Door Glazing: Tempered float glass complying with ASTM C 1048, Type I, Quality q3, Class as follows:
 - 1. Clear glass, Class 1 (transparent).
 - D. Identify fire extinguisher in cabinet with lettering spelling "FIRE EXTINGUISHER" applied to door. Provide lettering to comply with requirements indicated for letter style, color, size, spacing, and location or, if not otherwise indicated, as selected by Designer from manufacturer's standard arrangements.
 - E. Application Process: Silk screen.
 - F. Door Hardware: Provide manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam action latch, or door pull, exposed or concealed, and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 deg.

2.5 FINISHES FOR FIRE EXTINGUISHER CABINETS, GENERAL:

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by application of strippable, temporary protective covering prior to shipment.

2.6 STEEL FIRE EXTINGUISHER CABINET FINISHES:

- A. Surface Preparation: Solvent-clean surfaces in compliance with SSPS-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel in compliance with SSPC-SP 5 (White Metal Blast Cleaning) or SSPC-SP 8 (Pickling).
- B. Baked Enamel Finish: Immediately after cleaning and pretreatment, apply manufacturer's standard 2-coat baked enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's instructions for application and baking to achieve a minimum dry film thickness of 2.0 mils.
- C. Color and Gloss: As indicated by reference to manufacturer's standard color and gloss designations.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.

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- B. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.
 - C. Where exact location of surface-mounted cabinets and bracket-mounted fire extinguishers is not indicated, locate as directed by Designer.

END OF SECTION 10 44 13

SECTION 11 19 00 – BASIC REQUIREMENTS FOR DETENTION SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. A single pre-qualified Detention Systems Contractor (DSC) shall provide the entire scope of work specified below. None of the materials, equipment, systems or labor specified or required for the complete installation of the scope of work below shall be provided or bid as separate packages outside of the Detention Systems Contractor's subcontract.
- B. DSC shall furnish all labor, equipment, appliances, services and materials, perform work, and otherwise assume all responsibility related to procurement and installation of equipment, products and materials as indicated in the scope of work below. DSC shall self-perform installation of materials required in this scope of work. Installation sub-contractors will not be allowed.
- C. DSC shall include in its scope of work the complete security electronics integrated security control system specified in Section 11 19 80 and Section 28 00 00 Electronic Security Systems with associated Division 28 sections.
- D. DSC Shall coordinate with the Electrical Contractor all conduit, power wiring, signal cable and wiring, raceways and wireways as required for installation of all 11198 systems and equipment. (Conduit, power wire, control and signal wire and cable, wireways, wire trough, standard masonry boxes and raceways of any kind required for complete and professional installation of security systems shall be furnished and installed by the Electrical Contractor). If the DSC supplied system requires additional conduit and/or wire and cable over and above that indicated by or shown on the contract drawings, the DSC shall bring this fact to the attention of the Architect prior to bid otherwise the DSC shall be responsible for the cost of said additional conduit, wiring and cable.
- E. DSC must base its bid on the products manufactured by the manufacturers that are specified in this scope of work unless approved by Architect in addendum 7 days prior to bidding.

1.2 SECTION INCLUDES

- A. The scope of work for the DSC includes the following specification sections:
 - 1. Section 11 19 00 – Basic Requirements for Detention Systems
 - 2. Section 11 19 10 – Security Hollow Metal Doors and Frames
 - 3. Section 11 19 20 – Detention Hardware
 - 4. Section 11 19 50 – Security Metal Ceilings
 - 5. Section 11 19 80 – Integrated Security Electronic Control System
 - 6. Section 08 81 00 – Security Glazing
 - 7. Section 28 00 00 – Electronic Security System, 28 00 10- Intercom system, 28 09 50- Video Surveillance System (CCTV)
- B. Products furnished and installed under this scope of work:
 - 1. Security hollow metal doors per the door schedule and specified herein.
 - 2. Detention hardware per the security hardware schedule and specified herein.
 - 3. Security metal ceilings as indicated on the drawings and specified herein.

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4. Security glass and glazing per the glazing schedule and as indicated on the drawings and specified section 08 81 00.
 5. Security electronics systems and equipment as specified in Section 11198 and shown on the contract drawings.

C. Products furnished, but not installed under this scope of work:

1. Security hollow metal door frames, side lights, borrowed lights, windows and control room frames.
2. Steel embeds required to anchor detention equipment furnished under this scope of work to concrete or masonry.
3. Special backboxes for any ceiling speakers used on the project.
4. Intercom pedestal bases to be installed by others.

D. Related work to be performed by others:

1. Installation of embeds.
2. Installation of detention hollow metal door frames, side lights, borrowed lights, windows and control room frames.
3. Grouting of detention hollow metal frames.
4. Caulking and sealants, including detention caulking and sealants.
5. Casework and millwork.
6. Final cleaning.
7. Touch-up of primer paint.
8. Finish painting.
9. Access panels not specified in this scope of work.
10. Miscellaneous steel embedded anchoring plates, angles, channels, etc.
11. Security barriers at mechanical openings.
12. Fire safing.
13. Flashing and counter flashing.
14. Conduit, cable and wiring, wireways, wire trough and raceways of any kind for security systems.
15. Concrete bases and camera poles (if required).
16. Concrete bases for intercom pedestals.

1.3 SYSTEM DESCRIPTION

A. Design requirements:

1. Detention equipment shall be designed specifically for detention use, simple in construction and operation, and free from parts susceptible to unusual wear or maintenance requirements.

B. Performance requirements:

1. Detention equipment shall be use-proven through satisfactory performance under actual jail or prison conditions.

1.4 SUBMITTALS

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- A. Shop drawings of all materials and equipment provided in this scope of work shall be submitted for approval. They shall indicate item location, size, type of materials, construction, finishes, spacing of anchors and joinery details with adjacent work. The DSC shall extensively check each of the submittals under its scope of work, ensuring their correctness and compatibility not only with each other, but with the contract documents. It shall be the General Contractor's responsibility to coordinate the DSC's work with other trades.
- B. The security hollow metal manufacturer shall indicate any specified fire rated openings that cannot be fire labeled and reasons why they cannot. If the designer furnishes the name of an approved manufacturer who can supply the fire labeled openings in question, the manufacturer shall be required to furnish the openings with fire labels at no additional cost. However, if label openings are not available as designed, the designer shall either authorize the necessary changes in opening design, hardware, glass and/or other features which will bring the openings into compliance or drop the fire labeling requirement on openings in question. Manufacturing the openings "Label Construction" without factory applied fire labels shall be unacceptable.
- C. Upon receipt of the approved security hardware schedule, the DSC shall promptly provide the hardware manufacturer's templates to all manufacturers requiring the information prior to commencement of fabrication.
- D. Unless required otherwise in Division 1, the DSC shall submit six (6) complete sets of documentation for approval.
- E. Quality control submittals (for information only):
1. Certification that fire rated door assemblies bear UL or Warnock Hersey Label for scheduled fire rating.
 2. Certified test reports from an independent testing laboratory verifying that security hollow metal doors meet or exceed specified design criteria and that security glazing meets specification requirements.
 3. Label Construction Certification: Manufacturer's certification for oversize doors or doors not otherwise suitable for fire rating. Certify that door and frame assembly has been constructed with materials and methods equivalent to requirements for labeled openings per ASTM E152.
 4. Manufacturer's installation instructions.
- F. Contract closeout submittals:
1. Operating/Maintenance manuals:
 - a. Include the following, as applicable, for each type of detention door hardware and operating and locking device provided under this scope of work:
 - b. Operating instructions.
 - c. Wiring diagrams for locking device wiring.
 - d. Lubrication and maintenance requirements.
 - e. Spare parts list.
 2. Owner instruction reports.
 3. Warranty.
 4. Letter verifying that spare parts have been delivered.
 5. Key release form.
- G. No substitutions of materials or equipment will be permitted where specific trade names or manufacturers are listed, unless the Architect adds the proposed substitution by addendum.

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1. Materials and products specified by name of manufacturer or brand trade name shall be the basis of the bids received, unless changed by addendum prior to the bid dates.
 2. In the event a contractor wishes to use any materials or products other than those specified, a written request shall be made to the Architect within the required time frame identifying the proposed substitution and providing sufficient data for the Architect to make a determination.
 3. All additional costs resulting from the use of an approved substitution by the DSC shall be borne by the DSC without additional expense to the Owner. Such additional costs shall include necessary modifications and alterations to structures, equipment, raceways and furnishing of all additional materials required to affect the substitution.

1.5 QUALITY ASSURANCE

- A. Where equipment is specified by name and manufacturer and type number, it is intended that the designated name and number represents a standard of quality and is not intended to restrict competition. The Architect reserves the right to accept or reject each proposed substitution. All proposed substitutions **MUST** be submitted a minimum of fourteen days prior to original bid date. All proposed equipment must be submitted in accordance with the applicable section and Quality Control. Substitutions must be approved by written Addendum.
 - B. All labor and materials specified in this Section of the specifications are to be furnished by a **SINGLE** Detention Equipment Contractor (DEC) who shall assume complete responsibility for the performance, engineering, coordinating, erecting and warranty of such work.
 - C. The following are DEC's who have been approved as qualified to perform this Section:
 - U.S. Security Systems, Inc., Montgomery, AL
 - Norment Industries, Montgomery, AL
 - The G-S Company, Baltimore, MD.
 - CCC Group, Inc. San Antonio, TX
 - CML Security, LLC. San Antonio, TX
 - Cornerstone, Detention Company, Tanner AL
 - AirteQ® Systems, Montgomery, AL
 - Claborn Manufacturing, Hartselle, AL
 - MTI Montgomery Technology, Inc.
1. Any DEC other than those listed above must submit the following prequalification material a minimum of fourteen days prior to the original bid date and shall be approved by written addendum prior to bid date.
 2. A list of five projects that have been completed and operational for a minimum of five years prior to the bid date. List shall identify name and location of project, architect, contract amount and scope of work performed.
 3. A list of any jobs in which the firm has been involved in litigation within the past ten years with a city, county, state or federal government agency and the current status of the litigation.
 4. Grounds for disqualification shall exist if in the opinion of the Architect, the information submitted is inaccurate or does not satisfy the prequalification requirements.
 5. Notarized statement indicating that firm seeking pre-qualification has not filed for bankruptcy protection within the past ten (10) years.
 6. Current letter from the security lock manufacturer to be utilized on this project stating that DSC seeking pre-qualification is a factory trained, fully authorized installer of the manufacturer's complete line of products.
 7. Pre-qualification of a DSC does not relieve that DSC from the requirement to furnish all materials from the manufacturers specified herein.

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- D. The following ESS (Electronic Security System) Contractors have been approved as qualified to perform the electronic systems work for this section:
- Cornerstone Detention
 - DPS Group, LLC
 - CML Security
- E. The Architect will promptly review pre-qualification requests to determine the acceptability of each prospective DSC and Electronic Security System Contractor. Those found acceptable will be named subsequently by addendum as pre-qualified to bid and perform the scope of work under this section. Verbal approval will not satisfy this requirement.
- F. Owner and Architect reserve the right to disqualify manufacturers, equipment suppliers and contractors who do not strictly comply with requirements of this section or product substitution procedures called for in this section and Division 1. Grounds for disqualification shall exist if it is determined that the information submitted is inaccurate, or in the opinion of the Architect, does not satisfy the pre-qualification requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- A. The Construction Manager shall be responsible for the following (at no additional cost to the DSC):
1. Receive from carrier, unload and store all products and materials that are furnished-only by the DSC for installation by others.
 2. Provide temporary access openings required through walls to permit the placing of the detention equipment in the areas of the building where it is to be installed and provide use of hoist, cranes, elevators and lifts and/or cranes on regular time with qualified operators.
 3. Protect all materials during storage on the job and after installation. All protection required while working and/or cleaning adjacent materials shall be the responsibility of the General Contractor.
 4. Provide an adequate, secure, dry, lockable storage area or room in each building and floor (if high rise) for all materials specified in this section.
 5. Ensure that all embedded items are installed plumb and true.
 6. Complete all floor finish, concrete curbs, waterproofing, and other concrete work where shown or specified in connection with the detention equipment.
 7. Promptly clean and touch up any scratches or disfigurement caused by shipping or handling with a compatible rust inhibitive primer, or the shipment must be rejected at time of receiving.
 8. Remove protective materials and clean all finished surfaces using clear water and non-abrasive detergent. Any protection required to clean adjacent materials shall be the responsibility of the Construction Manager. Provide an environmentally controlled room in each building and floor for the on-site storage of all hardware and electronic devices and equipment, or the hardware and electronic devices shall be shipped to the DSC's home office where it shall be inventoried and securely stored until required at the facility for installation. In this case, the DSC shall submit a notarized list indicating exactly what has been received and stored each month and its value with the current Contractor's Monthly Pay Request. Prompt payments will be made for equipment and materials properly stored at the DSC's home office.
- B. The DSC shall be responsible for receiving, unloading and distribution of all products furnished and installed under this scope of work.

1.7 REGULATORY REQUIREMENTS

- A. All work is to be performed in compliance with latest editions of:
 - 1. Federal, state, and local codes and ordinances, or agencies having jurisdiction.
 - 2. National Electric Code, NFPA 70.
 - 3. Standard for Fire Doors and Windows, NFPA 80.
 - 4. Life Safety Code, NFPA 101.
- B. In cases where Specifications call for materials or construction of better quality or larger size than codes require, Specifications shall take preference. Codes shall govern in cases of direct conflict with Specifications or Contract Drawings.

1.8 WARRANTY

- A. Prior to final acceptance, provide Owner with written warranty covering products provided under this section for period of one (1) year from date of substantial completion. During this period, make necessary repairs and corrections to defects in the Work and replace defective parts at no cost to Owner.
- B. Warranty does not cover consequential or incidental damages. Work made necessary by abuse, misuse, accidents, or negligence of using personnel is excluded from this agreement.
- C. Provide emergency service during warranty period, including maximum twenty-four (24) hour response time for emergency calls requiring visits to facility.

1.9 MAINTENANCE MANUALS/SPARE PARTS

- A. Provide Owner with three (3) copies of operating and maintenance manuals for products furnished and installed under this scope of work. Clearly identify all parts and include manufacturer's standard part number for each component of various mechanisms.
- B. Provide spare parts per requirements of individual specification sections.

1.10 KEYS FOR LOCKS

- A. Provide safekeeping of keys for locks provided under this section. Ensure that building security is not breached through job site loss or theft of keys being used for hardware installation or "fit-up" purposes.
- B. Die-stamp each key with identification code designated on approved keying schedule. Provide key and the matching lock identification markings (like braille) for identification in dark conditions and meeting State Fire Marshall and TCI requirements.
- C. Upon completion of work and prior to final acceptance, present one (1) complete set of keys to Owner's designated representative and obtain a signed receipt. Send all keys subsequently ordered to same individual via registered mail, return receipt requested.

PART 2 - PRODUCTS

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- 2.1 The DSC shall utilize only listed approved manufacturers, component fabricators and suppliers. Any other manufacturers, component fabricators or suppliers must be approved by addendum no later than fourteen (14) days prior to bid date.
- 2.2 The DSC shall be responsible for the integration, interfacing and coordination of all products and systems with other related parties as hereinafter defined and specified.

PART 3 - EXECUTION

3.1 PREPARATION

A. DSC responsibilities:

1. Examine the areas and conditions under which installation is to occur and document conditions detrimental to the proper and timely completion of the work. Report any unsatisfactory conditions to Architect in writing. Do not proceed with installation until unsatisfactory conditions have been corrected.
2. Prior to installation, meet at project site for purpose of reviewing products and installation methods selected, procedures to be followed in performing the work and coordination with other trades.
3. Protect adjacent surfaces from damage and stains during installation of materials provided in this scope of work.
4. Ascertain location and arrangement of anchorage required for equipment supplied under this scope of work; coordinate with other trades where necessary to make provisions for installation.
5. Furnish setting drawings, diagrams, templates, instructions and directions for installation of all products. Coordinate delivery of such products to project site.
6. Distribute all items to installation locations immediately prior to installation, complying with all applicable product handling requirements. Coordinate timing of distribution.
7. Coordinate with other trades for proper location of rough-in services and service connections specified elsewhere.

B. GC responsibilities:

1. Provide openings through exterior and interior building walls to accommodate ingress of detention equipment. Coordinate sizes and locations of openings with DSC.
2. Ensure accuracy of building construction, including sizes and locations of beams and columns, concrete and masonry walls, evenness of concrete and dimensional consistency.
 - a. Concrete floors and ceilings should be level and true.
 - b. At locations where concrete is uneven, chip or grout as required for proper fit between detention equipment and concrete.
3. Broom clean, properly light and heat areas of building where detention equipment is to be installed.

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4. Prior to installation of electrical and mechanical hardware or locking and operating devices, exterior closing walls should be in place, exterior windows glazed and roof completely installed to prevent weather damage to components. Provide DSC with written notification to proceed with installation once these conditions have been met. Installation will not commence until DSC receives written notification.
 5. Provide 220 volt AC, 60-cycle, 3 phase power for use by DSC in connection with installation of detention equipment.
 - a. If permanent power service is not available within reasonable access to detention areas when installation of detention equipment begins, provide temporary power (50 amps per welding machine) and bear expense.
 - b. If sufficient temporary power is not available, reimburse DSC for extra labor and fuel required for use of gasoline welding machines.

3.2 INSTALLATION

A. General:

1. Install fixtures, materials, assemblies and equipment in strict compliance with Specifications, Contract Drawings and manufacturers' recommendations and instructions.
2. Provide necessary drawings, setting diagrams or other information required to contractor responsible for installation of DSC-furnished items to be installed by others.

B. Attachment of detention equipment:

1. Secure detention equipment permanently in place with minimum of exposed fasteners and free from warp, twists, bends, rough edges, cracks, or open joints. Exposed fasteners shall be uniform in size, spacing, and appearance and shall be tamper-resistant.
2. Punch bolt holes not more than 1/16 inch larger in diameter than bolts to be used. Accurately space and align holes to permit insertion of bolts. When bolts are used, nuts shall be tightly drawn and bolt threads battered to prevent removal.
3. Remove loose scale, rust, oil, or other foreign matter from surfaces to be welded. Welds shall show uniform cross-sections, good penetration of base metals and smoothness of weld metal with a minimum of craters, porosity and clinkers.
4. Thoroughly clean burns, welds, and welding spatter on detention equipment resulting from fabrication and installation.
5. Welds that are neat in appearance and evenly spaced shall not require grinding.

C. Supervision:

1. Work shall be performed under direct supervision of a competent, experienced, factory-trained project superintendent who shall be a full-time employee of the DSC.
2. DSC's superintendent shall be present at job site during all phases of installation of the equipment furnished and installed under this section.
3. DSC shall be responsible for conduct and performance of job site personnel and shall ensure that this scope of work progresses without serious conflict with related work being performed simultaneously by other trades.

3.3 PROTECTION AND CLEANING

- #### A.
- During installation, protect adjacent surfaces and detention equipment from damage. Work shall be free from scratches, dents, permanent discolorations and other defects.

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- B. During installation, keep storage and work areas neat, orderly and in a broom clean condition.
 - C. Whenever hardware is located in areas where it may be subject to damage during construction by other trades, GC shall ensure that hardware is adequately protected or schedule the installation to occur after the hazardous condition is eliminated.
 - D. Hardware shall be cleaned as necessary to restore correct operation, function and finish.
 - E. All final cleaning shall be the responsibility of the General Contractor.

3.4 ADJUSTMENTS

- A. Prior to final inspection, test all electric locks, sliding door locking devices and door position sensors and adjust as required to provide proper functions.
- B. Check all mechanical hardware items to ensure correct operation and function. Adjust and lubricate moving parts as required to operate smoothly and quietly without binding. Replace any items that cannot be adjusted to operate as intended for its application.

3.5 DEMONSTRATION, OPERATING INSTRUCTIONS AND TRAINING

- A. The object of the operating/maintenance manuals, training materials and instruction period shall be to communicate a total understanding of operations and maintenance of all detention equipment included in this scope of work. Submit proposed operating/maintenance materials and training materials for review, comment and approval by the Architect and Owner. Coordinate with Owner to review materials and instruction periods to assure Owner instruction and information requirements will be met. Obtain approval prior to scheduling training session.
- B. Provide representative(s) with thorough knowledge of products provided under this scope of work to the Owner for an on-site instruction and training period involving Owner's designated personnel. Representative(s) must be capable of training personnel in the adjustment and operation of detention equipment, including pertinent safety requirements, as well as instructing maintenance personnel in operation, repair and upkeep. Instruction shall be given during the first week after substantial completion, unless additional adjustments or repairs are required prior to training. In such case, training sessions are not to occur until such adjustments or repairs have been satisfactorily completed. On-site instruction and training period will not exceed five (5) consecutive eight (8) hour days.

3.6 FIELD QUALITY CONTROL

- A. Upon completion of installation of detention equipment and electronic security systems, perform and document detailed quality assurance inspection confirming proper installation and operation of equipment and systems, and provide confirmation in writing to Architect. Include written request to Architect to inspect Work.

END OF SECTION 11 19 00 – BASIC REQUIREMENTS FOR DETENTION SYSTEMS

SECTION 11 19 10 – SECURITY HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This Section includes security hollow metal products as specified and indicated in the contract documents. All security hollow metal products to be supplied under this Section are to be from the same manufacturer. The utilization of more than one manufacturer will not be allowed.
- B. Furnish and install security hollow metal doors.
- C. Furnish security hollow metal door frames, side lights, borrowed lights and windows freight-allowed to project site for installation by others.
- D. Provide all doors and frames with specified fire and/or bullet resistant ratings as shown in the Door Schedule
- E. The work under this Section is to be provided by the Detention Systems Contractor as indicated in Section 11 19 00.

1.2 RELATED SECTIONS

- A. Section 07 92 00 – Joint Sealers
- B. Section 08 81 00 – Security Glazing
- C. Section 09 91 23 – Painting
- D. Section 11 19 00 – Basic Requirements for Detention Systems
- E. Section 11 19 20 – Detention Hardware

1.3 REFERENCES

- A. ASTM A366/A366M-91, Steel, Carbon, Cold Rolled Sheet, Commercial Quality
- B. ASTM A526/A526M-85, Steel Sheet, Zinc-coated (Galvanized) by the Hot Dipped Process, Commercial Quality
- C. ASTM A569/A569M-91a, Steel, Carbon (0.15 Maximum Percent), Hot Rolled Sheet and Strip, Commercial Quality
- D. ASTM A167 and A240, Stainless Steel Type 304
- E. ASTM B117-90, Method of Salt Spray (Fog) Testing
- F. ASTM D1735-87, Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus
- G. ASTM E152-81a, Method for Fire Tests of Door Assemblies

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- H. ASTM F1450-97 (2004), Standard Test Methods for Hollow Metal Swinging Door Assemblies for Detention Facilities
 - I. ASTM F 1592-01, Standard Test methods for Detention Hollow Metal Visions Systems
 - J. NAAMM Hollow Metal Manual, Sections 801 through 863
 - K. ASTM f 2322-03 Standard Test methods for Physical Assault on Vertical Fixed Barriers for Detention and Correctional Facilities

1.4 DEFINITIONS

- A. ANSI American National Standards Institute, Inc.
11 West 42nd Street
13th Floor
New York, NY 10036
- B. ASTM American Society for Testing and Materials
100 Bar Harbor Drive
West Conshohocken, PA 19428-2959
- C. NAAMM National Association of Architectural Metal Manufacturers
8 South Michigan Avenue
Suite 100
Chicago, Illinois 60603

1.5 SUBMITTALS

- A. Manufacturer shall provide shop drawings for review and approval by Architect that include at least the following:
 - 1. Door and frame elevations and sections.
 - 2. Schedule of openings, including dimensions, gauges, anchors and label requirements.
 - 3. Manufacturer's standard instructions for frame installation and for material handling and storage.
 - 4. Location and detail of openings in frames and doors.
 - 5. Glazing types and stops.
 - 6. When a fire resistance classification is shown or scheduled for security hollow metal doors or frames, provide fire rated doors with recognized testing laboratory labels affixed. Identify openings that may not receive labels due to hardware, dimensional, or other limitations. For such openings, provide certification that the door and frame components have been constructed in accordance with the requirements of the testing laboratory.
- B. Upon request of Architect provide the following samples:
 - 1. Door: 1'0" x 1'0" corner section with hinge preparation showing top and internal construction.
 - 2. Frame: 1'0" x 1'0" corner section showing weld joint of head to jamb. Include hinge mortise, reinforcement and mortar guard in one rabbet, and glazing stop applied as specified in the opposite rabbet. Glazing stop shall be applied to both head and jamb section to show corner joint.

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3. All samples submitted shall be of the production type and shall represent in all respects the minimum quality of work to be furnished by the manufacturer. No work represented by the samples shall be fabricated until the samples are approved, and any downgrading of quality demonstrated by comparison with the samples may be cause for rejection of the work.

1.6 TESTING AND PERFORMANCE

- A. Security hollow metal doors and frames shall meet the following minimum test standards. Compliance with test requirement shall be certified by reports of independent testing agencies. Test reports shall indicate the construction of the samples tested with sufficient particularity that construction can be verified.
 1. Certification: Provide a current independent testing laboratory report and certification in compliance with ASTM F1450, ASTM 1592 and NAAMM HMMA 863, paragraph 1.06, D; HMMA 863, paragraph 1.06, E, certifying minimum performance data for manufacturer's production maximum security door panels, frames and hardware as specified and indicated.
 2. Test Specimens: Test doors shall be 3'0"W x 7'0"H (914mm x 2134mm) with 100 square inch vision panel, 4" x 25" (102mm x 635mm) clear opening, positioned generally as shown in ASTM F1450. Test doors and frames shall be prepared for hardware as specified in ASTM F1450.
 3. Door Static Load Test: Doors shall be tested in accordance with procedures outlined in ASTM F1450, 7.3 – "Door Static Load Test".
 4. Door Rack Test: Doors shall be tested in accordance with procedures outlined in ASTM F1450, 7.4 – "Door Rack Test".
 5. Door Assembly Impact Test: Two 3'0" x 7'0" (914mm x 2134mm) doors shall be constructed in accordance with section 2.01, with 100 square inch (64 516mm²) vision panel, 4 in. x 25 in. (102mm x 635mm) clear opening positioned generally as shown in ASTM F 1450, Figure 3. Two frames shall be constructed in accordance with Section 2.03. Test doors and frames shall be prepared and furnished with hardware, installed and tested in accordance with ASTM-F 1450, Section 6, "Specimen Preparation" and Section 7.2 "Door Assembly Impact Test".
 6. Glass Stop Test: A rectangular view window test frame shall be constructed with a glass opening size of 28" x 33" (± 1 ") (711mm x 838mm ± 25 mm). The frame shall be constructed of commercial quality steel meeting ASTM standard A366 or A569, 12 gauge (2.66mm) maximum. Refer to HMMA 863, Figure 5, for test frame configuration. A steel plate of 3/8" (9.5mm) minimum thickness shall be glazed in place using the specified glass stop. The test frame assembly shall then be rigidly fixed in the vertical position with the removable glass stop on the opposite side of the 3/8" (9.5mm) plate from the impact ram. A target on the side of the 3/8" (9.5mm) plate shall be marked in one corner no more than 6" away from the stops. Using the door ram pendulum system specified in ASTM F1450, Figure 2 deliver four hundred (400) impacts of 200 Ft-lbs. each, on the target area. Removable glass stops and the 3/8" (9.5mm) plate shall remain firmly in place so that removal cannot be accomplished without removing the retaining screws. There shall be no more than one (1) broken screw in the assembly after impact test.
 7. Door Edge Crush Test: Two (2) doors constructed identical to each of the test doors required in the "Door Assembly Impact Test", 3'0" x 7'0" (914mm x 2134mm), with 4 in. x 25 in. (102mm x 635mm) vision panel, and with hardware preparations shall be tested in accordance with ASTM F 1450, Paragraph 7.7 "Door Edge Crush Test".
 8. Bullet Resistance Test: Where specified on individual openings, bullet resistance shall be certified by the application of the laboratory bullet resistance rating label on the door for the opening indicating compliance with the testing procedure described in UL Standard 752, and consistent with ASTM-F 1450, Section 6, "Specimen Preparation" and Paragraph 7.1 "Bullet Penetration". The bullet resistance rating shall be Level 3.

1.7 QUALITY ASSURANCE

A. Products: Provide security hollow metal work as manufactured by one of the following:

1. Slate Security Systems - Hartselle, Alabama
2. Trussbilt, Inc. – St. Paul, Minnesota
3. Habersham Metal Products – Atlanta, Georgia
4. Willow Products Company – Decatur, Alabama

B. Any other manufacturer seeking approval as a security hollow metal supplier shall submit the following information to the architect at least fourteen (14) days prior to bid date. If approved, notification shall be by addendum.

1. Evidence that the firm has a minimum of ten (10) years successful experience in manufacturing detention grade hollow metal products and completing projects of similar scope and magnitude with products similar to those specified herein.
2. A list of completed projects including not fewer than five (5) that have been successfully in operation for at least (5) years, including contacts at each facility with addresses and phone numbers.
3. A list of all projects in the past five (5) years as to which the proposed supplier has been involved in litigation with a city, state or federal government agency, describing the status of result of such litigation.
4. Copies of all test reports required elsewhere in this Section.
5. The following samples:
 - a. Door: 1'-0" x 1'-0" corner sample with hinge mortise and reinforcement showing construction and a 6" x 6" sample of interior door construction without edge or other reinforcing.
 - b. Frame: A 1'-0" x 1'-0" corner section showing joint of head to jamb. Include hinge mortise, reinforcement and grout guard in one rabbet. Apply glazing stop on the opposite rabbet including corner joint.
 - c. All samples submitted shall be of the production type and shall represent in all respects the minimum quality of work to be furnished by the manufacturer. No work represented by the samples shall be fabricated until the samples are approved, and any downgrading of quality demonstrated by the samples can be cause for rejection of the work.
6. Evidence of ISO 9001 certification.
7. Due to the critical nature of the security hollow metal products to the facility, manufacturer must demonstrate a financial net worth of at least \$1 million.
8. No manufacturer qualification shall be deemed acceptable if it is based upon the experience or assets of a bankrupt or insolvent former or related company, nor if it was established under other trade name or names.

C. Quality Criteria

1. All door and frame construction shall be in accordance with construction of assemblies that meet the requirements of specifications above.
2. Fabrication methods and product quality shall meet standards set by the Hollow Metal Manufacturers Association, HMMA, a division of the National Association of Architectural Metal Manufacturers, NAAMM, as set forth in these specifications.
3. Fire rated doors and frames shall be provided for those openings indicated in the schedule as requiring fire protection ratings. Such doors and frames shall be constructed as tested in accordance with ASTM E 152 and approved by a recognized testing agency having a factory inspection service.
4. If any door or frame specified in the contract documents to be fire rated cannot qualify for appropriate labeling because of its design, hardware or any other reason, fabrication of the

affected item shall not begin until the issue is satisfactorily resolved and the resolution is approved.

5. At the Owner's option, a door at the job site shall be selected at random and sawed in half or otherwise taken apart as deemed necessary for verification that construction is in accordance with these specifications. The manufacturer shall include the cost of the replacement door in its quotation. If the door construction does not conform to these specifications the non-conforming doors shall be repaired or replaced at the manufacturer's expense.

1.8 WARRANTY

- A. Products supplied under this Section shall be warranted by the manufacturer to be free from defects in material or workmanship for a period of one (1) year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SECURITY HOLLOW METAL DOORS

A. Door Materials

1. Doors shall be constructed of commercial quality, level, cold-rolled steel conforming to ASTM A 366/A 366M or hot rolled, pickled and oiled steel conforming to ASTM A 569/A 569M. The steel shall be free of scale, pitting, coil breaks or other surface blemishes. The steel shall also be free of buckles, waves or any other defects caused by the use of improperly leveled sheets.
2. Exterior Doors:
 - a. Face sheets shall be 14 gauge or 12 gauge minimum thickness as indicated in the schedule.
 - b. Face sheets shall be galvanized or have a zinc coating applied by the hot-dip process conforming to ASTM A 653/A 653M-97 Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot Dip Process.
3. Interior Doors:
 - a. Face sheets shall be 14 gauge or 12 gauge minimum thickness, as indicated in the schedule.
 - b. For areas subject to severe corrosion (shower areas, etc.) face sheets shall be 14 or 12 gauge minimum thickness as indicated in the schedule and shall be galvanized or have a zinc coating applied by the hot-dip process conforming to ASTM A 653/A 653M-97 Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot Dip Process.

B. Door Construction

1. Manufacturer's door reinforcements and fabrication techniques shall be consistent with, or more substantial than, the construction employed in doors tested to demonstrate compliance with the performance requirements herein.
2. Doors shall be internally reinforced with one of the following systems:
 - a. Continuous steel truss design core material, 28 gauge minimum, having truncated triangular sections extending continuously from one door face to the other, spot

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- welded to each face 2-3/4" (19mm) oc horizontally and 3" (76.2mm) oc vertically. Core material to extend full height and width of door.
- b. Rolled or formed 1/8" (3.2mm) steel channels extending from top to bottom of door and continuous from one door face to the other, spaced not more than 4" (101.6mm) oc and spotwelded to door faces not more than 3" (76.2mm) oc vertically.
 - c. Continuous vertical hat sections, one such hat section welded to each face of the door, 16 gauge minimum, with vertical webs no more than 4" (101.6mm) apart, spot welded to faces no more than 3" (76.2mm) oc vertically. Hat sections shall be welded to each other at least every 6" (152.4mm) oc both sides in order to prevent door separation. An additional full height edge stiffener in the form of a 1/8" (3.17mm) channel shall be installed and welded to both faces not more than 4" (101.6mm) oc.
3. Door edges shall be provided with additional reinforcing to prevent prying or compression attacks on the door edge. The thickness of the door edge, including this reinforcing, shall be not less than 5/32" (3.97mm). This reinforcing must be welded directly to the door edge, and the edge seams shall be fully welded, leaving a visible smooth, continuous weld at door edge.
 4. Top and bottom of the door shall be closed with a 14 (1.90mm) gauge formed channel. Top and bottom closing channels shall be welded to the edge reinforcing. Top and bottom of doors shall be finished flush with an additional inverted channel of not less than 14 (1.90mm) gauge.
 5. Hinge reinforcements shall be minimum 3/16" (4.76mm) thick of the size and shape utilized in testing. They shall be projection welded to the door edge, and after installation additionally electrically spot welded to the door edge. In addition, a backup channel stiffener of not less than 14 (1.90mm) gauge shall be welded to each hinge reinforcing and to each door face, to prevent rocking failure of the hinge reinforcing.
 6. Swing door edges shall be beveled 1/8" (3.17mm) in 2" (50mm). Sliding doors shall have square edges.
 7. Doors shall be reinforced, drilled, tapped and prepared for templated mortised hardware only, in accordance with a final approved hardware schedule and templates provided by the hardware supplier. Where surface hardware is to be applied, doors shall be reinforced only. Reinforcing dimensions shall be as follows:
 - a. Surface Mounted Hinges – Minimum 3/8" (9.53mm) reinforcing
 - b. Mortised Hinges and Pivots – 3/16" (4.76mm)
 - c. Internal Reinforcing for Other Hardware – 12 (2.78mm) gauge
 8. Louvers (if required) shall be of the inverted Y type with blades formed from 12 gauge minimum material and positioned so that no rigid flat object can be passed through them.
 9. Speaking devices shall consist of a rectangular pattern of round holes, not exceeding 1/4" (6.35mm) in diameter in both face sheets. The hole pattern shall be at least 4" (101.6mm) by 5" (127mm). The space between the hole patterns shall be baffled with steel sections of not less than 18 (1.21mm) gauge so that objects cannot be passed through.
 10. Glass moldings and stops:
 - a. Where specified, doors shall be provided with steel moldings to secure glazing by others in accordance with glass sizes and thicknesses shown on approved submittal drawings.
 - b. Fixed glass molding shall be not less than 0.093 in. (2.3mm), and shall be spot welded to both face sheets 5.0 in. (127mm) o.c. maximum.
 - c. In glass openings where security glazing is specified and where shown on the approved submittal drawings, pressed steel angle glazing stops, no less than 0.093 in. (2.3mm) thickness, shall be provided. Angle stops shall be mitered or notched and tight fitting at the corner joints, and secured in place using 1/4 – 20 or 1/4 – 28 button head tamper resistant machine screws with spacing necessary to satisfy the performance criteria outlined in Section 1.06A spaced 2 in. (51mm) maximum from each end and 9 in. (230mm) o.c. maximum.

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11. Food Pass/Cuff Port Openings:
 - a. The food pass opening shall be fabricated using 10 gauge (3.42mm) interior channels securely welded to the inside of both face sheets. Reinforcing for food pass locks and hinges shall be 10 gauge (3.42mm) channel. The clear opening shall be as shown on the architectural drawings. The four corner seams shall be continuously arc welded. The finished opening shall be of such construction that it cannot be dismantled or otherwise affected by tampering or scraping.
 - b. The food pass shutter shall be constructed from 10 gauge (3.42mm) steel plate. The overall shutter size shall overlap the opening by 1/2" (12.7mm) minimum on all sides.
 - c. The shutters shall be chemically treated for maximum paint adhesion and primed in accordance with the requirements of this Section. Shutters and food pass hardware shall be factory installed.
 12. Doors shall have the Architect's mark number permanently stamped on the 2nd hinge from the bottom hinge reinforcement for swing doors and on sliding doors with vision lite on fixed glazing channel, with no vision on bottom filler channel.
 13. If directed by the architect, the Installer shall destroy a randomly selected security hollow metal door by sawing it in half (horizontally). When examination disclosed door construction at variance with the details shown in performance test reports, the door manufacturer shall replace all non-conforming doors shipped to the project with doors constructed in conformance with construction of doors tested. Under conditions of non-conformity, the door manufacturer shall pay for the destroyed door and related labor. When examination proves that the door construction is consistent with tested doors, the owner will pay to replace the destroyed door and related labor.

2.2 SECURITY HOLLOW METAL INFILL PANELS

- A. Security hollow metal infill panels shall be of the same materials, construction, and finish as specified for security hollow metal doors.

2.3 SECURITY HOLLOW METAL FRAMES

A. Frame Materials

1. Frames shall be constructed of commercial quality, cold rolled steel conforming to ASTM A 366/A 366M or hot rolled, pickled and oiled steel conforming to ASTM A 569/A 569M. The steel shall be free of scale, pitting, coil breaks or other surface defects.
2. Exterior openings: Steel for these openings shall be 12 gauge minimum thickness galvanized or shall have a zinc coating applied by the hot-dip process conforming to ASTM A 653/A 653M-97 Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot Dip Process.
3. Interior openings: Steel for these openings shall be 12 gauge minimum thickness. Where scheduled, interior frames shall be galvanized or have a zinc coating conforming to ASTM A 653/A 653M-97 Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot Dip Process.

B. Frame Construction

1. All frames shall be 12 gauge (2.66mm). All frames shall be formed of hot or cold rolled steel produced in accordance with ASTM A569 or ASTM A366. Frames scheduled as galvanized shall be in accordance with ASTM A653 (A60). Frames shall be straight, neat in appearance, and free of warpage and buckling. All frame joints shall be welded, except

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- where overall size of frame precludes shipment or erection in which case appropriate splices shall be provided for field erection by others.
2. Jamb, head and sill profiles shall be as scheduled or shown in architectural drawings. Stop height for frames shall be 1-1/4"(31.75mm) for glass openings and 5/8"(15.87mm) for door openings.
 3. Corner joints shall have all contact edges closed tight with faces mitered and stops butted or mitered. Corner joints shall be continuously welded and the use of gussets or splice plates is unacceptable.
 4. Frames for multiple openings shall have mullion members which are closed tubular shapes conforming to profiles shown on drawings and which have no visible seams or joints.
 5. Frames shall have the architect's door number permanently stamped in the center hinge reinforcement. Where frames do not receive hinge preparation, number shall be stamped in a prominent location, where it will not be visible after installation.
 6. Frames shall be mortised, reinforced, drilled and tapped for all templated mortised hardware only, in accordance with the final approved hardware schedule and templates provided by the hardware manufacturer. Where surface mounted hardware is to be applied, frames shall be reinforced only - all drilling and tapping shall be done by the erector.
 7. Mortised hinge and pivot reinforcement shall be a minimum of 3/16" (4.76mm) thick, 1-1/2" (38.1mm) wide and 10" (254mm) long. Reinforcements shall be projection welded to the frame and shall be MIG welded to the frame at top and bottom of each reinforcing. The top hinge shall be additionally reinforced with a 3/16" (4.76mm) thick formed angle welded both to hinge reinforcing and frame face.
 8. Drilling and tapping of frames for surface mounted hinges shall be by field erector, after door is fitted plumb and true into frame.
 9. The following applications shall be reinforced as indicated:
 - a. Lock Bolt Opening Backup: 12 gauge minimum (2.66mm)
 - b. Surface Mount Closers: 12 gauge minimum (2.66mm)
 - c. Concealed Closers: 3/16" minimum (4.76mm)
 - d. Strike Mounting Clips: 3/16" minimum (4.76mm)
 10. Floor Clips shall be provided of same gauge as the frame and shall be welded in place at the bottom of each jamb. They shall have two holes for anchoring to floor. If so scheduled, adjustable floor clips shall be provided.
 11. Frames shall be caulked in order to limit leakage of grout into frame openings.
 12. Masonry Jamb Anchors: Provide a minimum of three (3) "T" type corrugated masonry anchors for each jamb mounted in masonry up to 84" (2,134mm) in height. Anchors shall have holes in them permitting insertion of reinforcing bar. For longer jambs, provide sufficient anchors to permit maximum spacing of 24". Where dictated by fire rating testing laboratory procedures, supply anchors complying with such requirements.
 13. Grout Guards of not less than 24 gauge (0.61mm) steel shall be welded in place at all hardware mortises on frames to be set in masonry or concrete. Guards for closers shall be 18 gauge minimum (1.21mm)
 14. All frames shall be provided with two temporary steel spreaders welded to the feet of the jambs to serve as bracing during shipping and handling only. These shall be removed prior to installation and are not to be used for setting of proper frame tolerances.

2.4 CLEARANCES AND TOLERANCES

A. Edge clearances for swinging doors shall not exceed the following:

1. Between doors and frames at head and jambs: 1/8"
2. Between edges of pairs of doors: 1/8"
3. At door sills where a threshold is used: 3/8"
4. At door sills where no threshold is used: 3/4"

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5. Between door bottom and nominal surface of floor coverings as provided in NFPA 80 -1992, Paragraph 2-2.7: 1/2" (Note: Finished floor is defined as the top surface of floor, except when resilient tile or carpet is used, when it is the top of the concrete slab.)

B. Manufacturing tolerance shall be maintained within the following limits:

1. Frames for single or pair of doors:
 - a. Width measured between rabbets at the head: Nominal opening width $+1/16"$, $-1/32"$.
 - b. Height (total length of jamb rabbet): Nominal opening height $\pm 3/64"$.
 - c. Cross sectional profile dimensions:
 - 1) Face: $\pm 1/32"$
 - 2) Stop: $\pm 1/32"$
 - 3) Rabbet: $\pm 1/32"$
 - 4) Depth: $\pm 1/32"$
 - 5) Throat: $\pm 1/16"$. Frames overlapping walls to have throat dimension $1/8"$ greater than dimensioned wall thickness to accommodate irregularities in wall construction.
2. Doors:
 - a. Width: $\pm 3/64"$
 - b. Height: $\pm 3/64"$
 - c. Thickness: $\pm 1/16"$
 - d. Hardware cutout dimensions: Template dimensions $+0.015"-0"$
 - e. Hardware location: $\pm 1/32"$
 - f. Bow/Flatness: $\pm 1/8"$

2.5 HARDWARE LOCATIONS

- A. The location of hardware on doors and frames shall be as listed below. All dimensions except the hinge locations are referenced from the finished floor. When hollow metal frames only are specified for use with doors to be furnished by others, the hardware preparation on the door is to be governed by its location on the frame. The door supplier is responsible for coordinating hardware locations.
- B. Hinges:
 1. Top: 5" from frame head to top of hinge
 2. Bottom: 10" from finished floor to bottom of hinge
 3. Intermediate: centered between top and bottom hinges
- C. Unit and integral type locks and latches: 40-5/16" to centerline of strike
- D. Deadlocks: 48" to centerline of strike
- E. Exit hardware: 38" to centerline of cross bar
- F. Door pulls: 42" to centerline of grip
- G. Push/pull bars: 42" to centerline of bar
- H. Arm pulls: 47" to centerline

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- I. Push plates: 48" to centerline of plate

2.6 FINISH

- A. After fabrication, all tool marks and surface imperfections shall be filled and sanded as required to make exposed surfaces smooth and free from irregularities.
- B. After appropriate metal preparation, all exposed surfaces shall receive a rust inhibitive primer that meets or exceeds ASTM B 117 Salt Spray for 150 hours.

PART 3 - EXECUTION

3.1 SITE STORAGE AND PROTECTION OF MATERIALS

- A. The contractor responsible for installation shall remove wraps or covers from doors and frames upon delivery at the building site. The contractor responsible for installation shall see that any scratches or disfigurement caused in shipping or handling are promptly sanded smooth, cleaned and touched up with a compatible rust inhibitive primer.
- B. The contractor responsible for installation shall see that materials are properly stored on planks in a dry location. Doors shall be stored in a vertical position and spaced by blocking. Materials shall be covered to protect them from damage but in such a manner as to permit air circulation.

3.2 INSTALLATION

A. Security Hollow Metal Frames

1. Frames shall be delivered to the project site by the DSC for installation by others. Contractor responsible for installation of frames shall perform the following in accordance with HMMA 840:
 - a. Prior to installation, all frames shall be checked for size, swing, and with temporary spreaders removed, corrected for squareness, alignment, twist and plumbness. Permissible installation tolerances shall not exceed the following:
 - 1) Squareness: $\pm 1/16$ " measured on a line, 90 degrees from one jamb, at the upper corner of the other jamb.
 - 2) Alignment: $\pm 1/16$ " measured on jambs on a horizontal line parallel to the plane of the wall.
 - 3) Twist: $\pm 1/16$ " measured on jambs on horizontal lines perpendicular to the plane of the wall.
 - 4) Plumbness: $\pm 1/16$ " measured on the jamb at the floor.
 - b. These tolerances provide a guideline for proper installation of hollow metal frames. The cumulative affect of the tolerances at their maximum levels will result in sufficient misalignment to prevent the door from functioning properly. Installers should take care not to create a tolerance buildup. Tolerance buildup occurs when more than one dimension is at or near its maximum tolerance.
2. Frame jambs shall be fully grouted by contractor responsible for grouting to provide added security and protection against battering, wedging, spreading and other means of forcing open the door. Jamb mounted lock preparations, grout guards for hardware preparations, glazing stop screws and junction boxes are intended to protect hardware mortises, tapped

mounting holes and exposed removable screws from masonry grout of 4" maximum slump consistency which is hand troweled in place. If a light consistency grout (greater than 5" slump when tested in accordance with ASTM C 143) is to be used, special precautions shall be taken in the field by the installation contractor to provide protection from grout.

3. Frames shall not be used as forms for grout or concrete. Grouting of hollow metal frames shall be done in "lifts" or precautions shall be otherwise taken by the grouting contractor to insure that frames are not deformed or damaged by this process.
4. All grout or other bonding material shall be cleaned off of frames or doors by the responsible contractor immediately following installation. Frame and door surfaces shall be kept free of grout, tar, or other bonding material or sealer.

B. Security Hollow Metal Doors

1. Maintain proper door clearances in accordance with these specifications, except for special conditions otherwise noted.
2. Where necessary, metal hinge shims are acceptable to maintain clearances.

C. Finish

1. Primed or painted surfaces that have been scratched or otherwise marred during installation (including field welding) and/or cleaning shall promptly be finished smooth, cleaned, treated for maximum paint adhesion and touched up with a rust inhibitive primer comparable and compatible to shop applied primer.
2. Painting contractor shall finish paint security hollow metal doors and frames in accordance with requirements of Division 9. Incidental paint damage occasioned by installation of hardware items shall be corrected by the firm having responsibility for finish painting under Division 9.

END OF SECTION 11 19 10 – SECURITY HOLLOW METAL DOORS AND FRAMES

SECTION 11 19 20 – DETENTION HARDWARE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Furnish and install detention hardware as specified and scheduled.
- B. The work under this section is to be provided by the Detention Systems Contractor as indicated in Section 11190.

1.2 RELATED SECTIONS

- A. Section 11 19 00 – Basic Requirements for Detention Systems
- B. Section 11 19 10 – Detention Steel Doors and Frames

1.3 REFERENCES

- A. ASTM F1577-96 Test Methods for Detention Locks for Swing Doors
- B. ASTM F1643-95 Test Methods for Detention Sliding Door Locking Device Assembly
- C. National Electrical Code, Latest Edition (for internal electrical requirements for hardware)

1.4 SUBMITTALS:

- A. Submit manufacturers' product literature for each type of hardware item indicating compliance with specified requirements.
- B. Submit detention hardware schedule in vertical format with detention hardware organized into sets.
 - 1. Indicate manufacturer's name, product type, style, function, size, locations and finish of each hardware item.
 - 2. List terminology, abbreviations and symbols used in schedule with explanations.
 - 3. Cross reference hardware schedule with specified products. Use same reference designation indicated on Contract Drawings in preparing schedule.
 - 4. Include wiring diagrams for electric operated locks and devices.
- C. Templates for Fabrication:
 - 1. Furnish hardware templates along with final reviewed detention hardware schedule to detention steel door and frame manufacturer and other manufacturers of related work requiring detention hardware installation for use in fabrication.

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2. Coordinate submittals to avoid delay in fabrication work and to prevent improper preparation for hardware installation.

D. Locking Device Shop Drawings:

1. Indicate layout plans of each opening at 1/2" = 1'-0" minimum scale, show anchorage and accessory items, dimensions and finishes. Note: Complete housing module plans can be drawn at 1/4" = 1'-0" minimum, with typical enlarged plans.
2. Indicate complete details of internal components of sliding door locking mechanisms located in mechanism housings and jambs.

E. Closeout Submittals: Furnish three copies of Operating/Maintenance Manuals including parts lists for detention locks and locking devices.

F. Keying Meeting: DSC shall coordinate a detention keying meeting with the Architect and Owner in a timely manner in order to avoid delay in the manufacture and delivery of the required detention hardware.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Detention hardware installer shall have minimum 10 years experience in the successful completion of work similar in scope and complexity as required for this Project. If requested by Architect, submit references for projects completed and occupied within the past three years. Include qualification statements and current audited financial statement indicating capability to fulfill contractual obligations.

B. Supplier Qualifications: Supplier shall be regularly engaged in furnishing detention hardware by specified manufacturers and have an experienced Architectural Hardware Consultant (AHC) whose services shall be available for reviewing prepared hardware schedules, keying, consulting with Architect and Owner, coordinating with other trades, and for on-site inspections to ensure coordination and proper installation of hardware.

C. Welder Qualifications:

1. Welders employed for this project shall be qualified in accordance with AWS B2.1-84 or D1.1-96 test procedures for welding work required and shall have passed qualification tests current within the past twelve (12) months.
2. Contractor shall require any welder to re-take qualification test when, in the opinion of the Architect, the welder's work creates a reasonable doubt as to the proficiency of the welder. Re-taking of qualification tests shall be conducted at no additional expense to the Owner. Evidence of recertification shall be submitted to Architect after welder in question has passed qualification test.

D. Regulatory Requirements:

1. Comply with requirements of NFPA 80, "Standard for Fire Doors and Windows" and NFPA 101, "Life Safety Code," current editions, in providing hardware for fire rated openings.

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2. Comply with the Americans with Disabilities Act (ADA), 28-CFR Part 36, Appendix A, "Accessibility Guidelines for Buildings and Facilities" for hardware required to be accessible to the physically disabled.
- E. Single Source Requirements: Hardware items of the same type shall be products of a single manufacturer.
- F. Product Standards:
1. Electric Locking Mechanisms and Related Devices: Comply with UL 1034-87, "Burglary Resistant Electric Locking Mechanisms."
 2. Key Cylinders: Comply with UL 437-86, "Key Locks."
 3. Hinges, Mortise Locks and Latches, Closers, Thresholds, Trim, Finishes and Auxiliary Hardware: Comply with ANSI/BHMA A156 series standards listed below applicable to specified hardware and finishes.
 - a. ANSI/BHMA A156.1-2000, "Butts and Hinges."
 - b. ANSI/BHMA A156.4-2000, "Door Controls-Closers."
 - c. ANSI/BHMA A156.5-1992, "Auxiliary Locks and Associated Products."
 - d. ANSI/BHMA A156.6-2001, "Architectural Door Trim."
 - e. ANSI/BHMA A156.7-1997, "Template Hinge Dimensions."
 - f. ANSI/BHMA A156.13-1994, "Mortise Locks and Latches."
 - g. ANSI/BHMA A156.15-1995, "Closer/Holder/ Release Devices."
 - h. ANSI/BHMA A156.16-1997, "Auxiliary Hardware."
 - i. ANSI/BHMA A156.18-2000, "Materials and Finishes."
 - j. ANSI/BHMA A156.21-1996, "Thresholds."
 4. Detention Hinges: Comply with ASTM F1758-96, "Test Methods for Detention Hinges Used on Detention-Grade Swinging Doors," for performance level specified.
 5. Detention Locks: Complying with ASTM F1577-96, "Test Methods for Detention Locks for Swinging Doors," for performance level specified.
- G. Welding Standards:
1. AWS D1.1-98, "Structural Welding Code-Steel."
 2. AWS D1.3-89, "Structural Welding Code-Sheet Steel."
 3. AWS D9.1-90, "Sheet Metal Welding Code."
 4. AWS B2.1-84, "Welding, Procedures and Performance Qualifications."
- H. Standard of Quality: Products listed in hardware schedule shall serve as the standard of quality in evaluating specified products by other manufacturers submitted for use on this project, where permitted. Substitute hardware products submitted shall include components, accessories and finishes matching those specified in hardware schedule. Acceptance of other submitted products shall be subject to Architect's review and determination of equivalency.

1.6 DELIVERY, STORAGE AND HANDLING:

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- A. Deliver detention hardware to project site in manufacturer's original packaging with labels intact and legible.
 - 1. Packaging shall be marked with hardware set numbers and door numbers corresponding with final reviewed hardware schedule identifying correct locations for installation.
 - 2. Include manufacturer's printed installation instructions, fasteners and installation tools.
 - 3. Ship in cartons marked "DETENTION HARDWARE" for identification at job site.
 - B. Inventory hardware upon delivery to verify order and quantity with final reviewed hardware schedule.
 - C. Store hardware indoors in a clean, dry, secured storage area. Provide lockable storage areas to protect hardware.
 - D. Control handling and installation of hardware products that are not immediately replaceable so that the completion of work will not be delayed by hardware losses, both before and after installation.
 - E. Deliver all keys in one shipment by secure carrier (hand carrier or registered mail) from manufacturer directly to authorized representative of the Owner, or as directed by the Architect. Include transmittal and forward copy to the Architect.

1.7 COORDINATION, SEQUENCING AND SCHEDULING

- A. Verify hardware compatibility with locking control system. Review and coordinate wiring diagrams prepared by locking control system manufacturer for proper connections, conductors, monitoring requirements and lock operation.
- B. Review and coordinate detention steel door and frame shop drawings with detention hardware submittals to ensure proper preparation and installation. Modifications made to doors and frames during construction to facilitate proper hardware operation as a result of improper preparation or lack of coordination shall be performed at no additional cost to the Owner.
- C. Schedule and sequence installation of detention hardware with locking control system work to cause no delay in construction of project to provide for a secure operable facility.
- D. Coordinate tagging, indexing and installation of key control system for keys. DSC shall be responsible for maintaining security of key distribution during construction and if required, replacement of locks or re-keying as specified.

1.8 WARRANTY

- A. Detention Hardware shall be warranted by manufacturer to be free of defects in materials and workmanship for a period of minimum one (1) year beginning at Date of Substantial Completion.

PART 2 - PRODUCTS (Reference Hardware Sets Part 3)

2.1 MANUFACTURERS

- A. Products by the manufacturers listed below are the basis of design for the detention hardware products indicated and specified in this Section:

<u>Product</u>	<u>Pre-Approved Manufacturers</u>
Detention Locks	R. R. Brink Locking Systems
Sliding Door Locking Devices	R. R. Brink Locking Systems, Willo Products Co., Inc.
Hinges	Southern Hardware
Door Pulls	Midland Portland Hardware
Escutcheons	R. R. Brink Locking Systems
DPSs	R. R. Brink Locking Systems
Door Closers	LCN
Door Stops	Midland Portland Hardware
Push/Pulls	Rockwood
Thresholds	Pemko
Weather-stripping	Pemko
Seals	Pemko

- B. Other manufacturers seeking approval shall do so in writing no later than fourteen (14) days prior to the bid date and he must receive written approval by addendum. The following are requirements for approval for each type of product listed.

1. Manufacturers qualifications:
 - a. Provide detention hardware from manufacturers who have been actively engaged in the production of detention hardware for a minimum of ten (10) years, and have successfully completed projects of equal scope and magnitude with products as herein specified. This evidence shall consist of a list of ten (10) projects that have been complete and operational for a minimum of five (5) years. For each facility, list the name and location of installation, value of contract, scope of work provided, date of occupancy by Owner, Owner's representative to contact and telephone number, Construction Manager or General Contractor, and Architect. Indicate length of delivery after receipt of approved submittals.
 - b. The manufacturer shall now be actively engaged in the design and manufacture of detention locks, locking devices and miscellaneous detention hardware and products. All locks, locking devices and related detention hardware shall be manufactured and supplied by the same manufacturer.
2. Provide five (5) copies of manufacturer's product specifications and catalog cut sheets and detail and performance data for each type product listed in this section.

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3. Provide data substantiating that products being proposed for this project comply with the requirements stated herein. Provide detailed explanation of the differences of proposed products and the specified products.
 4. List of projects under construction.
 5. List of completed projects.
 6. List of major suppliers.

2.2 SCREWS, FASTENERS AND TOOLS

- A. Furnish exposed fasteners to match item fastened. Make fastener of the same metal as item fastened, except use plated brass or stainless steel for all aluminum items. Provide one hundred (100) spares of each type of fastener used for anchoring hardware.
- B. Provide torx-head (star design with center pin) security fasteners for exposed fasteners on all detention hardware, regardless of manufacturer. Furnish six (6) tool holders and six (6) bits for each different size screw. Holders and bits shall be left at project after installation and become property of the user.

2.3 MISCELLANEOUS DETENTION HARDWARE

- A. Key cylinders and tumbler sets:
 1. Mogul pin tumbler cylinder shall be brass, 2 inches in diameter, with stainless steel pin tumblers and tumbler-engaging balls. Cylinders to comply with UL437 and be labeled by nationally recognized independent testing laboratory.
- B. Mogul keys:
 1. Material: Silicon bronze/copper alloy with tensile strength of 40,000 psi, yield strength of 18,000 psi, and Rockwell hardness of B-73/75.
 2. Stamp with key code as directed.
 3. Furnish one hundred fifty (150) keys.
- C. Mortised institutional hinge: RR Brink #4-1/2, or approved equal.
 1. Full mortised, 3/16 inch thick cast stainless steel leaves with integral security stud.
 2. Stainless steel ball bearings.
 3. Non-removable stainless steel hinge pin.
- D. Food pass hinge: RR Brink #3FP, or approved equal.
 1. Built-in stop to hold the food pass door in a horizontal position for use as a shelf.
 2. 3" H x 2-3/4" W, 1/4" thick steel leaves
 3. Cold rolled, case hardened steel pin
 4. Drilled and countersunk for screws standard
- E. Door position indicator switch: RR Brink #201030, or approved equal.

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1. Mortised into door and frame.
 2. Maximum swing of 180 degrees.
 3. Eccentric stud on control arm provides fine adjustment.

F. Door pull: RR Brink #300021, or approved equal.

1. Material: Cast brass.606 Satin brass finish
2. Size: 8-11/16" L x 1-3/4" W x 2-3/8" Projection.
3. Type: Standard loop type.

G. Door pull: RR Brink #300011, or approved equal.

1. Material: Cast brass.
2. Size: 5" H x 4" W x 1" D
3. Type: Standard flush type.

H. Door stop: Portland Hardware #760, or approved equal.

1. Silicone rubber body threaded steel shank.
2. 2" diameter x 3-1/2" long bumper, 5/8" diameter x 2-1/2" long shank.
3. Wall or floor mounted.

2.4 ELECTRIC DETENTION LOCKS

A. Solenoid operated electro-mechanical gate lock: RR Brink #8050, or approved equal.

1. Fence post mounted 120VAC, continuous-duty solenoid actuated.
2. Deadlocks automatically when gate is closed.
3. Bolt is retracted electrically by push button at control panel and remains retracted until door is opened.
4. Bolt is retracted mechanically with key from either side.
5. Internal switches monitor deadlocked condition of the deadbolt.
6. Provide with interlock feature as required.
7. Galvanized case and cover.

B. Solenoid operated electro-mechanical deadlatch: RR Brink #7050S, or approved equal.

1. Frame mounted, 115 VAC continuous duty solenoid operated
2. Internal switches monitor bolt status to show deadlocked and unlocked conditions
3. Bolt retracted manually by paracentric key
4. Bolt remains retracted until door is opened
5. Lock operates in a fail secure mode
6. Bolt throw 1" flush when retracted
7. Galvanized case and cover
8. U.L. listed for use on 3 hour fire door
9. Standard Functions:

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- a. Electric - Remote switch activates a solenoid which retracts the latchbolt. Latchbolt remains retracted until door is opened approximately 2", then it releases, automatically latches and deadlocks when the door is closed.
 - b. Mechanical - Latchbolt is retracted by a paracentric key at the door and remains retracted until door is opened approximately 2", then it releases, automatically latches and deadlocks when the door is closed.
 - c. Automatic deadlatch feature is suspended when paracentric key is rotated to mechanical key hold-back position. Normal function is resumed when key is returned to deadlocked position.
- C. Motor operated electro-mechanical deadlatch: RR Brink #7050M, or approved equal.
- 1. Frame mounted, 115 VAC motor operated.
 - 2. Internal switches monitor bolt status to show deadlocked and unlocked conditions
 - 3. Bolt retracted manually by paracentric key
 - 4. Bolt remains retracted until door is opened.
 - 5. Lock operates in a fail secure mode
 - 6. Bolt throw 1" flush when retracted
 - 7. Galvanized case and cover.
 - 8. U.L. listed for use on 3 hour fire door
 - 9. Standard Functions:
 - a. Remote switch activates a motor which retracts the latchbolt. Latchbolt remains retracted until door is opened approximately 2", then it releases, automatically latches and deadlocks when the door is closed.
 - b. Mechanical - Latchbolt is retracted by a paracentric key at the door and remains retracted until door is opened approximately 2", then it releases, automatically latches and deadlocks when the door is closed. Automatic deadlatch feature is suspended when paracentric key is rotated to mechanical key hold-back position. Normal function is resumed when key is returned to deadlocked position.
- D. Solenoid operated electro-mechanical deadlatch: RR Brink #5020S, or approved equal.
- 1. Frame mounted, 115 VAC continuous duty solenoid operated.
 - 2. Internal switches monitor status of bolt to show deadlocked and unlocked conditions.
 - 3. Lock operates in a fail secure mode.
 - 4. Bolt throw 1" flush when retracted.
 - 5. Galvanized case and cover
 - 6. U.L. listed for use on 3 hour fire door.
 - 7. Standard Functions:
 - a. Electric- Remote switch activates a solenoid which retracts the latchbolt. Latchbolt remains retracted until door is opened approximately 2", then it releases, automatically latches and deadlocks when the door is closed.
 - b. Mechanical - Latchbolt is retracted with a mogul key at the door, and remains retracted until door is opened approximately 2", then it releases and automatically latches and deadlocks when the door is closed.
- E. Motor operated electro-mechanical deadlatch: RR Brink #5020M, or approved equal.

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1. Frame mounted, 115 VAC motor operated.
 2. Internal switches monitor status of bolt.
 3. Lock operates in a fail secure mode.
 4. Bolt throw 1" flush when retracted
 5. Galvanized case and cover
 6. U. L. listed for use on fire door.
 7. Standard Functions:
 - a. Electric - Remote switch activates a motor which retracts the latchbolt. Latchbolt remains retracted until door is opened approximately 2", then it releases, automatically latches and deadlocks when the door is closed.
 - b. Mechanical - Latchbolt is retracted with a mogul key at the door, and remains retracted until door is opened approximately 2", then it releases and automatically latches and deadlocks when the door is closed.

F. Motor operated electro-mechanical deadlatch: RR Brink #3520-300, or approved equal.

1. Frame mounted, high torque 24 V DC motor with operation range and overload protection.
2. Indication switch monitors mechanism to show deadlocked and unlocked conditions.
3. Lock shall operate in a fail-secure mode
4. Bolt throw 3/4" flush when retracted
5. One piece stainless steel body, stainless steel deadbolt, deadlock actuator, face plate and strike
6. U.L. listed for use on 3 hour fire door.
7. Standard Functions:
 - a. Electric - Remote switch activates a motor which retracts the latchbolt. Latchbolt remains retracted until door is opened approximately 2", then it releases, automatically latches and deadlocks when the door is closed. Specify "MCLH-M".
 - b. Mechanical - Latchbolt is retracted with a builder's hardware key at the door, and remains retracted until door is opened approximately 2", then it releases and automatically latches and deadlocks when the door is closed.
8. Optional Features as specified in the hardware schedule:
 - a. Half Cycle Holdback - Remote two-position maintained contact switch is required for this function. Latchbolt is retracted electrically when switch is in open position. When remote switch is returned to locked position, latch bolt will extend when door is opened approximately 2". Specify "MSLH". U.L. listing is not available with this function.
 - b. No Latchbolt - Latchbolt remains retracted as long as control switch is activated. Latchbolt extends when power is removed. Specify "MCLH-E."
 - c. Local Electric Change Keyswitch - Day key provides local electric operation only and may be disabled from remote control point. Master key provides both electric and mechanical operation. Specify "CKS".

2.5 CYLINDERS, KEYS AND KEYING

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- A. The detention locks will incorporate two (2) separate keying systems; one for lever tumbler (paracentric key cylinder) one for pin tumbler (mogul key cylinder). Each keying system's keys shall be dye stamped for identification corresponding to the hardware supplier's final schematic keying chart.
 - B. Lever tumbler locks shall be keyed alike or different as directed. Provide cut keys as required.
 - C. Mogul cylinder locks shall be master keyed as directed. Provide cut change keys and master keys as required.
 - D. A complete, detailed schematic chart of the keying system will be required. The hardware supplier will also be required to enter the key symbols for all doors on additional floor plans supplied by the Architect. Two (2) copies of the schematic keying chart and architectural floor plans shall be turned over to the user at the completion of the project. The cost for this service shall be included with the cost of materials at the time of bidding.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All hardware shall be installed by technicians who are factory trained and certified in the installation of detention hardware.
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Securely fasten all parts to be attached. Fit faces of mortised parts snug and flush. Make sure all operating parts move freely and smoothly without binding, sticking or excessive clearance.
- C. At exterior doors and elsewhere as indicated, set thresholds in a bed of sealant to completely fill concealed voids and exclude moisture from every source. Do not plug drain holes or block weeps. Remove excess sealant.
- D. After installation, representative templates, instruction sheets and installation details shall be provided to the Owner with project close-out documents. Include at least five (5) each of any special adjusting and/or installation tools furnished with the hardware by the manufacturers.

3.2 ADJUSTMENT AND REPAIRING

- A. Adjust and check each operating item of hardware to ensure correct operation and function. Units which cannot be adjusted to operate as intended for the application made shall be replaced.
- B. Wherever hardware is installed more than one month prior to building acceptance or occupancy of a space or area, the installer shall return to the work during the month prior to acceptance or occupancy and make final check and adjustment of all hardware items.

3.3 PROTECTION AND CLEANING

- A. Whenever hardware is located in areas where it may be subject to damage during construction by other trades, the General Contractor shall ensure that hardware is adequately protected or schedule the installation to occur after the hazardous condition is eliminated.
- B. Hardware shall be cleaned as necessary to restore correct operation, function, and finish.

3.4 HARDWARE SETS

DETENTION HARDWARE SET DH-1 (Sallyport -*check function)

3 ea	Hinges	4 ½ "BB Institutional	SS	R.R Brink
1 ea	E/M Deadlatch	AC5026M x MCLH-M	GLV	R.R. Brink
1 ea	Raised Pull	300021	606	R.R. Brink
1 ea	Flush Pull	300011-C	606	R.R. Brink
1 ea	Closer	2215/DPS	689	LCN
1 ea	Stop	760	RUB	Midland Portland Hdwe
1 ea	Gasketing	S88D	RUB	Pemko

DETENTION HARDWARE SET DH-2 (Exterior)

3 ea	Hinges	4 ½ "BB Institutional	SS	R.R Brink
1 ea	E/M Deadlatch	AC5026M x MCLH-E	GLV	R.R. Brink
2 ea	Raised Pull	300021	606	R.R. Brink
1 ea	Closer	2215/DPS	689	LCN
1 ea	Stop	760	RUB	Midland Portland Hdwe
1 ea	Threshold	2005AV	AL	Pemko
1 ea	Weather-stripping	297AV	AL	Pemko

END OF SECTION 11 19 20 – DETENTION HARDWARE

SECTION 11 19 50 –SECURITY METAL CEILINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Section includes security acoustical and non-acoustical pan and plank metal ceilings including installation as scheduled in the contract drawings and as specified herein.
- B. Products Provided Under This Section:
 - 1. Minimum [Grades 1 & 2] security suspended pan type acoustical and non-acoustical ceiling systems.
 - 2. Medium [Grades 3 & 4] security single skin plank type acoustical and non-acoustical ceiling systems.
- C. The work under this Section is to be provided by the Detention Systems Contractor as indicated in Section 11190.

1.2 RELATED SECTIONS

- A. Section 09 91 23 – Painting
- B. Section 11 19 00 – Basic Requirements for Detention Systems
- C. Division 23 – Mechanical
- D. Division 26 – Electrical

1.3 REFERENCES

- A. ASTM A 1008/A 1008M-00, Specification for Steel, Sheet and Strip, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability
- B. ASTM A 1011/A 1011M-00, Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability
- C. ASTM A 653/A 653M-97, Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dipped Process (Commercial Steel)
- D. ASTM A 666-96b, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar
- E. ASTM C 635-00, Standard Specification for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- F. ASTM C 423, Standard Test Method for Sound Absorption and Sound Absorption Coefficient by the Reverberation Room Method

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- G. ASTM F 2322 Standard Test Methods for Physical Assault on Vertical Fixed Barriers for Detention and Correctional Facilities
 - H. ASTM E-84-04, Standard Test Method for Surface Burning Characteristics of Building Materials.
 - I. AWS D1.3 Structural Welding Code for Sheet Metal
 - J. ISO 9001 International Standards Organization – Standards for Quality Management
 - K. CISCA Guidelines

1.4 TESTING AND PERFORMANCE

- A. Security grades for each security ceiling type shall be indicated on the reflected ceiling plan.
- B. Acoustical Performance
 - 1. Suspended pan type ceiling system shall provide a Noise Reduction Coefficient (NRC) of not less than .80 when tested in accordance with ASTM C 423 and in an E-400 mounting as defined in ASTM E 795.
 - 2. Single skin plank ceiling system shall provide a NRC of not less than .90 when tested in accordance with ASTM C 423.
 - 3. Acoustical fill flame spread index shall not exceed 15 with smoke developed value not exceeding 5 when tested in accordance with ASTM C 84.
- C. Procedures
 - 1. Ceiling Assembly Impact Testing
 - a. Impact testing under this section is performed using the methods and testing equipment described in ASTM F 2322.
 - b. Scope: These tests are designed to evaluate a ceiling assembly's ability to resist repetitive impact forces at the designated critical areas. The same assembly used for the static load tests may be reused for this test, or another assembly may be used if so desired.
 - c. Significance of use: This test method is intended to closely simulate a sustained battering ram-style attack and provide an evaluation of the assembly's capability to prevent, delay and frustrate forced exit. This impacting simulates a person using a sledgehammer or another battering implement to escape or exit through the ceiling system.
 - d. Apparatus: The test fixture described in paragraph 1.05.B.2 and shown in Figure 1 shall be used in this test.
 - 1) Ram: The ram shall be a pendular system with a steel weight capable of delivering horizontal impact of up to 200 ft. lbf. The weight of the ram shall be 80 lb. +/- 0.25 lb. The striking nose of the ram shall be made from C1010-1020 carbon steel, the striking surface area of which shall be 4.0 +/- 0.04 in sq. Refer to Figure 5 Steel Impact Ram found in ASTM F 2322.
 - e. Procedure: Subject each location on the sample ceiling to the number of blows at the required impact energy found in Table 1 and Figure 2. The impactor shall deliver the required impacts at the specified foot pounds per impact. Repeatability of impact location during each series shall be no more than +/- 2 inches horizontally and vertically from the designated impact target. Testing shall take no longer than 60 minutes. Specimen fails if a 5" x 5" x 8" rectangular box can pass through the wall following impacts.

2. Static Load Testing (uplift)
 - a. Scope: This test is designed to evaluate the capability of a ceiling assembly to resist a steadily increasing force applied at corner points, joints between ceiling panels, and the ceiling assembly's central point.
 - b. Significance of Use: This test method is intended to simulate a ceiling assembly's resistance to uplift at vulnerable locations.
 - c. Apparatus: The test fixture and wall described in paragraph 1.05.B.1 shall be used in this test.
 - 1) A hydraulic ram and pump equipped with a gauge or load cell shall be used to provide the static load. The pump ram and gauge shall be calibrated by the testing laboratory and a chart provided that converts pounds-force per square-inch gauge (kilograms per square meter) to pounds-force (Newton's). If a load cell is used, it shall be certified by the testing laboratory prior to use. (See figure 3 Static Load Apparatus)
 - d. Procedure: Apply static load to the attack side of the component at the locations and magnitude appropriate to the security rating desired in accordance with that specified in Table 1. Specimen fails when the desired load cannot be achieved without physical failure or the ability for egress.
 - e. Record the pass / fail results at 100 lb. increments to produce a graph, static load versus failure. Increase the load until target loads for each sample are reached.

TABLE 1

Static Load (up lift) Test				Impact Test				
Security Grade	Panel Material Thickness	@ Corner Lbs / in ²	@ Joint Lbs / in ²	@ Center of Panel @ Center of Room Lbs / in ²	Impact Energy of Each Blow Ft. Lbs.	@ Corner Number of Blows	@ Panel Joint Number of Blows	@ Center of Panel @ Center of Room Number of Blows
1	0.042	600	600	600	60	10	10	10
2	0.053	800	800	800	90	20	20	20
3	0.053	800	800	800	120	75	75	75
4	0.067	1000	1000	1000	150	100	100	100
5	0.053	2000	2000	2000	200	200	200	200
6	0.067	3000	3000	3000	200	400	400	400

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Manufacturer shall provide evidence of having personnel and plant equipment capable of fabricating ceiling assemblies of the type specified herein. Manufacturer shall provide current documentation of the number of employees, a listing of their production equipment, and a description of their manufacturing facility.
2. Manufacturers shall be ISO 9001:2000 certified and shall be required to present their Certificate of Registration upon request. The manufacturer's registrar shall be nationally recognized and shall provide the manufacturer with periodic factory follow up audits reaffirming the manufacturer's continuing compliance with their written quality program.
3. Manufacturer's production welders shall be qualified under AWS D1.3 and upon request shall provide copies of Welders Certifications in accordance with AWS D1.3.
4. Manufacturers shall have a minimum of five (5) years experience successfully producing security ceiling systems of the types and sizes required in the contract documents. Upon

request the manufacturer shall provide a list of successfully completed projects and the dates they were completed.

5. Manufacturers shall have written test reports of their having passed the testing requirements of section 1.05 and using their current materials and production processes.

B. Quality Criteria

1. All ceiling construction shall be in accordance with construction of assemblies which meet the testing requirements of Section 1.05.
2. Fabrication methods and product quality shall meet standards specified herein.

1.6 SUBMITTALS

A. Submittal Drawings

1. Submit in accordance with Division 1.
2. Provide detailed drawings including: layout of ceiling systems, details of construction, gauges of metal, anchoring details, conditions at openings, installation details and methods, and other data pertinent to the installation, including illustration of sequence of installation to accomplish interlocking panels.
3. Do not begin fabrication of material until shop drawings have been reviewed by the architect.

B. Samples (if required)

1. Supply a 1'-0" x 1'-0" section of each ceiling system being supplied showing wall mounting members and panel sections.
2. All samples submitted shall be of the production type and shall represent in all respects the minimum quality of work to be furnished by the manufacturer. No work represented by the samples shall be fabricated until the samples are approved, and any downgrading of quality demonstrated by the samples can be cause for rejection of the work.

C. Test Report

1. Manufacturer shall submit to the architect, ten (10) days prior to bid date, an independent testing laboratory report certifying that ceiling assemblies meet the performance requirements of Paragraph 1.05 and are constructed in accordance with Paragraphs 2.01 of these specifications.

D. Qualifications

1. Manufacturer shall submit to the architect, ten (10) days prior to bid date, his qualifications as described in section 1.06.A.

1.7 WARRANTY

- A. All ceiling systems work shall be warranted from defects in workmanship and quality for a period of one (1) year from shipment.

PART 2 - PRODUCTS

2.1 SECURITY CEILING SYSTEMS

A. Acceptable Manufacturers

1. Security Grade 1 and 2 suspension pan type ceiling systems as manufactured by **Trussbilt, LLC** under the **SecureDek** trade name. (Basis of Design).
2. Security Grade 3 and 4 single skin inter-locking plank ceiling systems as manufactured by **Trussbilt, LLC** under the **BarrierDek** trade name. (Basis of Design)
3. Products other than those specified or approved will be considered if the following items are submitted to the Architect at least ten (10) days prior to bid due date:
 - a. Catalog and technical information
 - b. Notarized certification that the product conforms to the requirements, quality, and durability of the products specified herein
 - c. Notarized certification that manufacturer conforms to the manufacturer's qualifications required in this specification

B. Materials

1. Panel face sheet thicknesses shall be for [Grade 1 - 0.042 in.; Grade 2 - 0.053 in.; Grade 3 - 0.053 in.; Grade 4 - 0.067 in.; Grade 5 - 0.053 in.; and Grade 6 - 0.067 in.] minimum thickness.
2. Panel face sheets shall be made of commercial quality, level, cold-rolled steel conforming to ASTM A 1008 / A 1008M CS Type B and shall have a zinc coating applied by the hot-dip process conforming to ASTM A 653/A653M Commercial Steel (CS), coating designation A40. The steel shall be free of scale, pitting, coil breaks or other surface blemishes. It shall also be free of buckles, waves or any other defects caused by the use of improperly leveled sheets.
3. For severely corrosive conditions and where specified, face sheets and components shall be stainless steel conforming to ASTM A 666, Type 304.

C. Construction

1. Suspended Metal Pan Ceiling – Security Grades 1 and 2
 - a. Ceiling pans: Shall be nominally 24" x 48" x 1" deep with sloping vertical legs on all four sides. All ceiling pans shall be factory formed and shall be perforated with .080" diameter holes on .220" staggered 45 degree centers.
 - b. When installed, the face of the pans shall rest on the inside surface of the exposed horizontal flanges of the main runner and cross tees. The sloping vertical legs of the pans shall snap-in and lock positively and continuously under the bottom surface of the rectangular bulb of the tee sections, and lock into the perimeter channel by a 20 gauge galvanized hold-down clip, thereby providing a visual concealment barrier without the use of exposed clips or fasteners.
 - c. Main runners and cross tees: Shall conform to the requirements of a system wide, duty classification in accordance with ASTM C635. They shall be a roll-formed double web with rectangular bulb, using A40 galvanized steel, minimum .018" thick, to an overall height of 1½" with a flange width of 15/16". The structural member will incorporate double lateral rotary stitching to provide a more homogeneous component exhibiting increased columnar and torsional strength. The cross tee shall provide a positive mechanical lock into the main runners and locking splice. When assembled, the system shall carry performance characteristics in keeping with those necessary to achieve a Zone 4 seismic rating.

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- d. Hangers: The main runners shall be supported from the structural ceiling by 12 gauge galvanized, pre-stretched, soft annealed, steel wire hung at points not exceeding 48" on center.
 - e. Compression Struts: Shall be composed of telescoping 1/2" diameter and 3/4" diameter steel tubing. The 3/4" diameter tube shall extend down to rest on the bulb of the main runner. At the other end, a length of 1/2" diameter tube is to be telescoped into the top portion of the 3/4" diameter tube and screw fastened to it with two (2) No.10 x 1 1/4" screws so the top of the 1/2" diameter tube bears on the structure above and the bottom of the 3/4" diameter tube fits snugly upon the bulb of the main runner. A compression strut is required at each hanger wire at a maximum of 48" on center.
 - f. Wall Perimeter channels: Exposed wall perimeter channel shall be of the same material and have the same finish as the suspension system runners. The perimeter channel shall also be roll-formed into a "C" profile to accommodate a 20 gauge hold-down clip, thereby providing a concealed fastener system. Each hold-down clip shall be locked onto perimeter channel with two spring clips.
 - g. Fasteners: Any exposed fasteners shall be a minimum No.10 size, pin Torx®, tamper-proof security screws. Fasteners for securing the wall moldings to the wall shall be furnished by the ceiling manufacturer.
 - h. Acoustical material: The inside surface of all perforated ceiling pans shall be covered with a Class "A" poly-encapsulated fiberglass insulation of sufficient thickness and density to provide the acoustical requirements as outlined in Section 1.05 of this specification. Fire Rated Class – Material.
 - i. Lights, HVAC: All light and air units are to be sized to fit into and trim off full module openings and shall be independently supported from above by the trade requiring the opening.
 - j. Finish: All components of the panel and suspension system visible from the floor side shall have a factory applied finish. Prior to painting, all surfaces shall be cleaned of rust, oil and other impurities by receiving a multi stage pre-treatment consisting of degrease and phosphate coating, clear water rinse and non-chromate sealer and rinse, to condition the surface of the metal to resist and inhibit corrosion and promote paint adhesion. Finish to be applied after perforation to insure coating of the perforated holes. Panels shall be coated with DuPont TGIC Polyester or equal, white powder coat, applied at a minimum of 2 mils thickness (dry). The main runners, cross tees, and wall perimeter channels shall be coated with epoxy white powder matching the ceiling panels
2. Single Skin inter-locking plank ceiling system – Security Grades 3 and 4
 - a. Ceiling planks: Shall be 24 in. wide and supplied in manufacturer's standard lengths of 8 ft., 10 ft., and 12 ft. All ceiling planks shall have factory formed inter-locking edges and shall be perforated with 0.125 in. diameter holes, staggered .218 in. on center for a 29% open area.
 - b. Wall perimeter angles: Shall be formed angles 0.123 in. minimum thickness and punched 16 in. on center for 3/8 in. expansion anchors. Panels shall be secured to the wall angles using 12 ga. concealed angle clips.
 - c. Interim Tee supports: Tee supports shall be two wall mounting angles bolted back-to-back using 3/8 – 16 bolts, 24 in. on center.
 - 1) Suspension for Tee supports shall be 3/8 in. galvanized threaded rod, bolted to the above structure and the Tee support, 36 in. on center.
 - d. Fasteners: Any exposed fasteners shall be a minimum No.10 size, pin Torx®, tamper-proof security screws or blind rivets. Wall anchor bolts shall be 3/8 in diameter (Rawl 5015 or equivalent) and shall be placed 16 in. on center. Anchors for securing the wall moldings to the wall shall be furnished by the ceiling manufacturer.
 - e. Acoustical material: The inside surface of all perforated ceiling pans shall be covered with a Class "A" poly-encapsulated fiberglass insulation of sufficient

thickness and density to provide the acoustical requirements as outlined in Section 1.05 of this specification.

- f. Lights, HVAC: All light and air units are to be sized to fit into and trim off to full panel width openings and shall be independently supported from above by the trade requiring the opening.
- g. Finish: All components of the panel and suspension system visible from the floor side shall have a factory applied finish. Prior to painting, all surfaces shall be cleaned of rust, oil and other impurities by receiving a multi-stage pre-treatment consisting of degrease and phosphate coating, clear water rinse and non-chromate sealer and rinse, to condition the surface of the metal to resist and inhibit corrosion and promote paint adhesion. Finish to be applied after perforation to insure coating of the perforated holes. Panels and components shall be coated with DuPont TGIC Polyester or equal, white powder coat, applied at a minimum of 2 mils thickness (dry).

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

- A. Protect panels from damage during transit to job storage.
- B. Inspect panels upon delivery for damage. Minor damage may be repaired provided finish items are equal in respect to new work and acceptable to Architect/Engineer. Otherwise, remove and replace with new material.

3.2 INSTALLATION

A. General

- 1. Install ceiling system using the approved submittal drawings and contract documents. Install using the manufacturer's installation instructions.
- 2. Accurately locate partitions, holes, cut outs and verify locations with other trades.
- 3. Set closures and steel supports with anchors to suit condition.
- 4. Erect true and level with close fitting tolerances.
- 5. Bearing at ends shall be a minimum of 1 in.

B. Fastenings

- 1. Fasten supporting members to each other and to building construction as detailed or as otherwise required to provide a secure, permanent installation.
- 2. Where fastening spacings and sizes are not shown, use spacings and sizings of bolts, screws and welds which will develop the full strength of the members before failure occurs in the fastenings.

C. Touch-up Painting

- 1. Immediately after installation, areas where prime or finish coat has been damaged and where welding has occurred shall be sanded smooth and touched up with same primer or finish touch up paint as applied by the manufacturer.
- 2. Remove rust before touch up primer is applied.

3.3 FIELD QUALITY CONTROL

- A. Hold a meeting with other trades to review installation procedures and workmanship with a special emphasis on unusual conditions to ensure correct installation procedures.
- B. Security panel system shall be installed in place under the supervision of a qualified supervisor, trained and furnished by installer.

END OF SECTION 11 19 20 – SECURITY METAL CEILINGS

SECTION 11 19 80 – INTEGRATED ELECTRONIC SECURITY SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. A single pre-approved Detention Equipment Contractor (DEC) shall be responsible for the engineering, coordination, fabrications, assembly and installation of a fully operational and functional **Electronic Security System as specified in Electronic Section 28 00 00**. The DEC may hire a separate Electronic Security System Contractor herein after referred to as (ESSC) from the pre-approved list of **ESSC** as noted in Section 28 00 00 Electronic Security Systems.
The work of this section as well as all other Division 11 sections and Division 28 00 00 shall be provided as a complete security package from the list of pre-approved Contractors.
- B. There will be a single sub-contract between the General Contractor and one approved DEC / ESSC contractor for all systems and equipment as noted in Section 11190. For quality assurance reasons it will not be acceptable to contract with multiple contractors to provide and install the work of the overall security package including all Division 11 and Division 28 sections.
- C. The responsibilities of the ESSC shall include but not be limited to the following;
1. Coordinate and review all camera positions and view angles and monitor images with owners representative / Sheriff prior to final mounting. The viewing area of all CCTV monitors shall be cropped to avoid viewing of areas of the opposite sex without approval by Owner / TCI.
 2. Coordination of all conduit and wire for all Section 28 00 00 systems and equipment. Security system conduit, wire-ways and raceways, power wire and control signal cable for all Section 11198 systems shall be furnished and installed by the Division 26 Electrical Contractor per system design drawings provided by the ESSC. If the ESSC supplied system requires additional conduit and/or wire and cable over and above that indicated or shown on the contract drawings, the ESSC shall bring this fact to the attention of the Architect prior to bid, otherwise this additional conduit, wire or cable will be the responsibility of the ESSC. Termination of all wiring, testing, Training, Warranty to Section 28 00 00 Electronic Security Systems.

1.2 DETENTION LOCK CONTROL

- A. Electronic Security Contractor shall integrate new electronic locks into existing security system with emergency release, intercom and cameras. Provide switching relays and devices as needed to provide full locking functions for new detention doors.

1.3 RELATED SECTIONS

- A. Section 11 19 20 – Detention Hardware
- B. Division 28 – Electrical – 28 00 00 Electronic Security Systems and the following sections:
- 28 08 00, Intercom system
 - 28 09 50, Video Surveillance System (CCTV)

1.4 WIRING SYSTEMS AND CONDUIT

- A. All conduit and raceway systems including wire trough and gutters in equipment rooms and control rooms required for work of this section will be furnished and installed by the electrical contractor.
- B. All power wiring, control and signal cable for Division 11 systems shall be furnished and installed by the Electrical Contractor per the information indicated in the specifications and shown on the contract drawings.
- C. Any additional conduit which is not shown or indicated on the contract drawings but that is required by the ESSC system shall be brought to the attention of the Architect prior to Bid.
- D. Separate conduit systems must be installed by the D.E.C. for door control, intercom, video visitation and C.C.T.V. respectively.

1.5 DEVICE AND SYSTEMS WIRING

- A. All systems wiring shall be furnished and installed by the Division 16 contractor in accordance with Section 16120 wires and cables.
- B. All systems wiring and cable will be installed in accordance with the National Electric Code.
- C. The intercom system will require shielded audio cable for noise immunity. A continuous shield will be installed through all junction box splices isolated from the conduit system or earth ground; terminate shield to the intercom ground at the intercom head end rack.
- D. Provide all necessary transient protection on all lines leaving or entering the buildings.

1.6 EQUIPMENT AND DEVICE INSTALLATION

- A. The ESSC shall furnish all necessary equipment, labor and installation to provide complete operating systems as specified in this section.
- B. Install all fixtures, materials, assemblies and equipment as specified herein and as indicated on the drawing in strict accordance with manufacturer's recommendations.
- C. ESSC shall furnish and install flexible "Greenfield" from wall/ceiling junction boxes to C.C.T.V. system installations.
- D. Exposed (free air) cable will not be allowed unless approved by the Architect for administrative areas and other areas that are in accessible to inmates.

END OF SECTION 11 19 00 – REQUIREMENTS FOR DETENTION SYSTEMS - INTEGRATED ELECTRONIC SECURITY SYSTEMS

SECTION 28 00 00 - ELECTRONIC SECURITY SYSTEMS GENERAL

PART 1 - GENERAL

1.1 DESCRIPTION

- a. The work covered by this Section of the Specifications shall include all labor, equipment, materials and services to furnish and install, calibrate, adjust, document, and test the total system as required herein and on the drawings. All materials and labor specified under this Specification Section shall be furnished by a single pre-qualified Electronic Security System Contractor (ESSC), who shall assume responsibility for the detailing, coordinating, supplying, installing, programming, performance and warranty of this work, in accordance with this specification section. This project consists of providing, installing, start-up, testing, and training of Owner personnel in the use of new Electronic Security System equipment.
- b. The system shall be computer based and shall seamlessly integrate the following security systems into a single unified system with a common Touch screen control interface.
- c. All interconnections between systems shall be data connections only and shall be coordinated by the programmable logic controller (PLC) and software. All operations shall be as herein described and as shown on the drawings.

1.2 SUMMARY

- a. The ESSC scope of work shall consist of, but shall not be limited to the following as defined in the details of this division of the specifications and as shown on the plans:
 1. Electronic Security Systems, General
 2. Touch Screen Control System
 3. Programmable Logic Controller
 4. Relay Control System
 5. Intercommunication System
 6. Closed Circuit Television System
- b. Coordination
 1. The successful ESSC shall notify the Owner that he is to call a coordination meeting for Electronic Security Systems prior to the submittal of manufacturer's cut sheets and shop drawings. The meeting shall include all related trades and sub-contractors. Notify the Owner at least two weeks prior to the meeting. This meeting will be to coordinate with all other related trades to ensure that all work under this section is carried out in an orderly, complete and coordinated fashion.

1.3 PERMITS AND APPROVALS

- a. Permits necessary for installation of the work shall be obtained prior to the commencement of work. All permit costs and inspections fees shall be included by the ESSC as part of the required work.

- b. All applicable portions of the National Electrical Code shall be implicitly followed, in particular with regard to material type and quality, circuitry extensions from and connections to outlet and junction boxes, panel boards and similar appurtenances.

1.4 CONTRACTOR PRE QUALIFICATION REQUIREMENTS

- 1) Any contractor wishing to submit a bid under this section must be prequalified and listed herein or in a pre-bid addendum.

- 2) Contractors not listed herein who wish to bid the project must meet the following requirements and must request approval and submit the following qualification information in writing to the Owner:
 1. The Electronic Security System Contractor shall be a company specializing in the provision and installation of Detention Control Systems. The Contractor must have been in business using the same name for a minimum period of Ten (10) years, providing security control equipment of similar scope and complexity as this project.

 2. Provide a company history.

 3. Provide a "Company Profile" describing the type and scope of the work of the installing company.

 4. Provide a list of at least ten (10) projects of equal (or larger) size and scope as this project. Include: general contractor name and contact, electrical contractor name and contact, owner's name and contact (name of person in charge of maintenance is preferred). Include address and phone numbers of all.

 5. Provide a list of at least ten (10) projects of equal (or larger) size and scope as this project. Include: general contractor name and contact, electrical contractor name and contact, owner's name and contact (name of person in charge of maintenance is preferred). Include address and phone numbers of all.

 6. The ESSC shall be a security systems contractor familiar with the installation of Detention Control Systems and an authorized and certified dealer or distributor in good standing with all sub system manufacturers. All of the ESSC's employees who work on project must hold current manufacturer certification for the type of system being installed.

 7. Provide evidence of authorized dealer status for control system manufacturer, such as a current dealer license.

8. Provide evidence that all installers hold current manufacturer's certification as installers or technicians.
 9. Where the contractor is a branch office or other division of a larger organization, the qualifications of the branch office or other division shall meet the requirements of the Contract Documents.
 10. The installer shall provide a project manager/ coordinator/ superintendent for the overall management and supervision of the work. The manager/coordinator/ superintendent shall have the following qualifications:
 - i. Provide resume for the individual including at least five (5) projects of the same size and complexity of this one.
 - ii. Individual must be a full time employee of the installer.
 - iii. Individual must be minimally certified as an installer/technician by the system manufacturers.
- 3) Applications for approval will not be considered unless they are complete. Partial or incomplete applications will be rejected without comment.
 - 4) Approval of a contractor does not alleviate the contractor from any of the requirements of the contract drawings or documents or nullify any terms or conditions contained herein unless explicitly set forth in an addendum.
 - 5) The Owner reserves the right to disqualify contractors who do not comply with the requirements of this section of the specifications.
 - 6) The application must be received no later than twenty one (14) days prior to the bid. Requests received after this time will not be considered under any condition. Verbal approval will not satisfy this requirement.
 - 7) If approved, the firm will be listed in a pre-bid addendum.

1.5 ACCEPTABLE CONTRACTORS

- a. All materials and labor specified under this Specification Section shall be furnished by a single pre-qualified ESSC, (Electronic Security System Contractor), who shall assume responsibility for the detailing, coordinating, supplying, installing, programming, performance and warranty of this work, in accordance with this specification section. Refer to Section 111900 for list of pre-qualified ESSC's.
- b. Pre Approval of the contractor does not alleviate the contractor from any of the requirements of the contract drawings or documents or nullify any terms or conditions contained herein unless explicitly set forth in an addendum.

1.6 SUBMITTALS

- a. Provide descriptive literature, catalog cut sheets, illustrations, schematics, technical

data sheets, and test data necessary for the owner to ascertain that the proposed equipment and materials comply with the specifications requirements. Include manufacturer's name, model, and catalog or part numbers. Catalog cuts shall letter size (8.5" x 11") and shall be legible and clearly identify specific equipment being submitted.

- b. Provide load calculations for all electrical and electronic equipment provided under this division of the specifications.
- c. Provide system one line drawings, device layout drawings, device riser drawings equipment schedules, cabinet layout mounting details and other system design drawings in ARCH E1 (30" x 42") format. Organize drawings by specification section.
- d. Provide seven (7) sets of touch screen layouts in color.
- e. Provide seven (7) submittal sets.
- f. Provide a complete set of submittals. Partial or incomplete submittals will be rejected.
- j. Provide detailed drawings of the security equipment cabinets including exact layout of all components.
- k. Provide description of operation of each system similar to that provided in this specification, to include any and all exceptions, variances, or substitutions listed at the time of bid. Any such exceptions, variances or substitutions which were not listed at the time of bid and are identified in the submittal, shall be grounds for immediate disapproval.

1.7 DEMONSTRATION

- a. Upon completion of the submittal process a system demonstration and test shall be performed by the Systems Integrator. All systems integrators cost for this demonstration shall be borne by the Systems Integrator. The System Integrator will be responsible for the costs of (4) representatives of the Owner to observe the test and provide input for any changes to the software deemed necessary. Provide for all subsistence and travel costs for four individuals from the owner's staff. The complete security control and monitoring system shall be demonstrated. Upon acceptance of the tested system all changes or corrections to the software shall be completed within two weeks of the demonstrations test.

1.8 MAINTENANCE MANUALS

- a. Provide five (5) hard copy sets of a complete operation and maintenance manual and updated As-built installation drawings prior to the final inspection. Also include five (5) sets of the Operation and Maintenance manual and As-built drawings on CD's in Adobe Acrobat .PDF file format. Include the most current version of the Adobe Acrobat

viewing software on the CD's. All letter size drawings shall be compiled in a single file, and shall be catalogued and bookmarked for convenient navigation. Provide bookmarks for each section heading as well as for each sub section. Also provide an index or outline page that lists the contents of the manual, with links to each section and sub section of the manual.

- b. The following information shall be inscribed on the cover of the manuals:
 - 1. "OPERATION AND MAINTENANCE MANUAL"
 - 2. Building location.
 - 3. The name, address, and phone number of the Contractor.
- c. The manual shall be legible, well organized and easily read. Included in the manual shall be product operation manuals, software manuals, circuit drawings, wiring and control diagrams and shop drawings with data to explain detailed operation and control of each item of equipment and a control sequence describing start up instructions. Also included shall be installation instructions, maintenance instructions, safety precautions, test procedures, performance data, and other necessary documentation.
- d. A copy of the system certification and final tests results, as specified in Part 3 .5 of this section of specifications, shall be included in this manual.
- e. Upon completion of the installation of the Electronic Security System equipment, the ESSC shall provide to the Owner a signed written statement, substantially in form as follows:
 - 1. "The undersigned, having been engaged as the Locking control system installer on the (NAME AND ADDRESS OF THE PROJECT), confirms that the Touch screen control system was installed in accordance with the wiring diagrams, instructions and directions provided by the manufacturer and the manufacturer has provided an acknowledgement of proper installation and operation; a copy of which is herein attached."

1.10 WARRANTY

- a. For a period of one (1) year from the date of final acceptance, the system shall be under full warranty (at no cost to the owner for materials or labor). Service technicians and replacement components for the system specified shall be provided by service representatives. During the one (1) year warranty period reported problems shall be responded to within two (2) hours by phone and within four (4) hours on site if deemed necessary. Replacement components or spare parts replacement shall be delivered and installed within three (3) days of determination of the problem.
- b. The ESSC shall provide a single source warranty for all of the equipment provided under this division of the specifications. The ESSC shall warrant equipment regardless of the respective product manufacturer's warranty.
- c. Any products with original equipment manufacturer warranties exceeding the requirements of these specifications shall be transferred to the owner at the end of

the warranty period.

1.11 SPARES

- a. See subsections for spare parts requirements for each system.

PART 2 - PRODUCTS

2.1 SYSTEM WIRING

- a. Existing wiring for the electronic security systems shall be replaced if found to be faulty, shorted, water damaged, or corroded.
- b. All Lock and low voltage system wiring shall be installed and terminated by ESSC.
- c. All Lighting and power circuit wiring shall be provided and installed by a licensed Electrical contractor. The ESSC must either be properly licensed or subcontract the work to a licensed Electrical contractor.
- d. Coordinate with Owner for access to existing door lock wiring.
- e. Wiring that extends from the electronic control relay terminal strips to the locks, lights, etc. shall be class 1, 2, or 3 as defined by Article 725 of the National Electric Code.
- f. All conductors to locks, doors, position switches, or gates shall be stranded wire and shall be a minimum number 14 THHN or THWN, 600 volt rated, and shall be installed in raceways and equipment enclosures with other conductors, within limitations defined by Article 725 of the National Electric Code.
- g. See subsections of this division for additional requirements.

2.2 CONDUIT AND RACEWAY

- a. All conduit, raceway and standard boxes and fittings shall be provided and installed by a licensed Electrical contractor. The ESSC must either be properly licensed or subcontract the work to a licensed Electrical contractor.
- b. Specialty boxes and equipment racks shall be provided by the ESSC and installed by an Electrical contractor as a subcontractor of the ESSC unless the ESSC is properly licensed to perform the work themselves.

2.3 PROTECTION OF EQUIPMENT

- a. Materials and equipment excepting wire shall be stored in a protected environment and must be protected from harmful conditions such as extreme temperature, moisture, humidity, and dirt.
- b. Repair or replace any damaged equipment or components prior to substantial completion.

- c. Remove temporary tags coverings, and construction debris from interior and exterior surfaces of equipment.
- d. Clean internal air filters, grills, and fans before substantial completion.

2.4 EQUIPMENT ENCLOSURES

- a. Provide floor mounted enclosed 19" racks and wall mounted NEMA 1 hinged door enclosures to house control equipment.
- b. Provide ventilation fans as required to maintain adequate air flow and recommended temperature threshold for electronic equipment.

2.5 UPS SYSTEMS

- a. Provide a UPS for all electronic equipment to protect the connected equipment for a minimum of thirty (30) minutes under "worst case" conditions in the event of a utility power failure.
- b. All UPS systems must have a connected equipment warranty that covers at least 150% of the value of all connected equipment. All original warranty documentation for each UPS shall be turned over to the owner along with the operation and maintenance manuals.
- c. UPS systems manufactured by Liebert, Tripp Lite and APC shall be acceptable.

PART 3 - EXECUTION

3.1 GENERAL

- a. The entire system shall be installed in a workmanlike manner, in accordance with approved manufacturer's instructions. All wiring shall be of the type and quantity recommended by the controls manufacturer, and hardware manufacturer, and approved by the local authority having jurisdiction.
- b. The Contractor shall comply with the current edition of the following codes and standards as applicable:
 - 1. National Electrical Code (NEC)
 - 2. National Fire Alarm Codes (NFAC)
 - 3. Uniform Building Code (UBC)
 - 4. All State, County, and local codes and ordinances
 - 5. American National Standards Institute (ANSI)
 - 6. American Society for Testing and Materials (ASTM)
 - 7. Electronics Industry Association (EIA)
 - 8. Federal Communications Commission (FCC)
 - 9. National Electrical Manufacturers Association (NEMA)
 - 10. National Fire Protection Association (NFPA)
 - 11. Occupational Safety Health Act (OSHA)
 - 12. Underwriter's Laboratories (UL)

- c. Install all equipment in accordance with the manufacturer's recommendations, and accepted shop drawings.
- d. Install all equipment in compliance with NEC requirements, NECA's "Standard of Installation" and recognized industry practices.

3.2 WIRING

- a. All wiring shall be installed in dedicated conduit throughout. Conductors routed to the individual device shall be continuous from the head end cabinet to the device; it is not permitted to use a common wire either neutral or phase wire to a chase to power multiple devices.
- b. All Lock and low voltage system wiring shall be installed and terminated by the ESSC.
- c. All Lighting and power circuit wiring shall be provided and installed by a licensed Electrical contractor. The ESSC must either be properly licensed or subcontract the work to a licensed Electrical contractor.
- d. Each lockset must work independent from the other locksets. All home runs from field devices shall be continuous: there shall be no splices in wiring between the control equipment and the door locks, position switches, gates, etc.
- e. All wiring shall be clearly identified and labeled according to the device it controls. Where possible, use architectural door numbers to identify groups of wires.
- f. All penetrations of floor slabs and fire walls shall be fire stopped in accordance with local fire codes. All wiring shall be color coded throughout, to National Electrical Code standards.

3.3 EQUIPMENT ENCLOSURES

- a. Maintain 3-foot working clearances on each side of equipment or equipment racks where access is required to inspect, service or adjust.
- b. All equipment cabinets, boxes, enclosures or racks shall be clearly labeled and identified. Use identifiers and abbreviations defined in the Drawings wherever possible. Use plain designation for labeling, unless indicated otherwise.
- c. Check equipment against available mounting space indicated on the drawings. Coordinate location of equipment with other devices to minimize interference. Any conflicts or clearance problems shall be brought to the attention of the architect.

3.4 GROUNDING

- a. Furnish and install a #6 AWG bare ground from the grounding lug in the equipment cabinet(s) to the building ground system.
- b. Connect the ground in each set of field wires to the ground terminal in the control equipment for that field device.

3.5 FIELD QUALITY CONTROL/TESTING

- a. The system shall be installed and fully tested under the supervision of a technician, trained and certified by the manufacturer as a master technician for the said system.
- b. The system shall be demonstrated to perform all of the functions shown on the plans and as specified herein.
- c. Document all test procedures and protocols and provide a copy of test results for each system to the owner at project closeout.

3.6 TRAINING

- a. The ESSC shall provide on-site training for a period of up to twenty (20) hours, during normal business hours, to instruct the Owner's designated personnel on the operation and maintenance of the entire system.

END OF SECTION 28 00 00 – ELECTRONIC SEC. SYSTEMS GEN.

SECTION 28 00 10 – TOUCH SCREEN CONTROL SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- a. The Touch screen Control System (TCS) shall provide the Human to Machine Interface (HMI) for control of all electrically controlled hardware, motorized gates and doors, and other devices as indicated, including, but not limited to, electric locks, lighting circuits, water valves, inmate telephones, inmate televisions, CCTV camera switching and Intercom . The system shall monitor and annunciate the status condition of electrically equipped hardware, doors, gates, control conditions, security conditions, Intercom calls, call-in signals, Panic alarm signals, and shall provide on screen CCTV Camera ICON'S for Camera switching and other functions as described herein and on the drawings. The system shall perform logic functions to provide operational characteristics as described herein. The system shall interface with other systems for control and annunciation including, but not limited to, the electrical and mechanical.

1.2 INTEGRATORS QUALIFICATIONS

- a. Manufacturers desiring to provide equipment under this section must be pre-qualified and listed herein.
- b. Manufacturers not listed herein who wish to provide equipment for this project must request approval and submit the same qualifications listed in Division 28 00 00 section 1.5
- c. The Touch screen Control System manufacturer shall be a company specializing in the design and manufacture of Detention Control Systems. The manufacturer must have been in business using the same name for a minimum period of Ten (10) years, providing security control equipment of similar scope and complexity as this project.
 - a. Applications for approval will not be considered unless they are complete. Partial or incomplete applications will be immediately rejected without comment.
 - b. Approval of the Manufacturer does not alleviate the Manufacturer from any of the requirements of the contract drawings or documents or nullify any terms or conditions contained herein unless explicitly set forth in an addendum.
 - c. The Architect reserves the right to disqualify manufacturers who do not comply with the requirements of this section of the specifications.
 - d. The application must be received no later than twenty-one (21) days prior to the bid. Requests received after this time will not be considered under any condition. Verbal approval will not satisfy this requirement.
 - e. If approved, the firm will be listed in a pre-bid addendum.

1.3 SYSTEM ARCHITECTURE

- a. The Touch screen control system shall be located in the facility as shown on the drawings and communicates to the Programmable Logic Controller through TCP/IP communication utilizing hub and spoke topology.
- b. Each Touch Screen shall be independent of other touch screens.
- c. The touch screens shall display the floor plan of the area being controlled.
- d. Control and navigation icons shall be clearly identified and differentiated by symbol and color.
- e. All touch screens are capable of controlling any part of the facility, however each station will have predefined primary screens.

1.4 SYSTEM FUNCTIONS

- a. Door Unlock - Mechanical re-lock hardware. Where doors are equipped with solenoid, or motor operated locks, the following operation shall apply. Momentarily pressing the ICON shall provide an unlock output to the hardware. If the hardware is provided with a mechanical hold-open feature, the pulse shall be of sufficient duration to bring the hardware to full unlock. If the hardware is not provided with a mechanical hold-open feature, then the pulse shall be sufficient to provide an adjustable 2 to 10 second unlock period. MULTIPLE PRESSES OF THE UNLOCK ICON IN RAPID SUCCESSION SHALL NOT CAUSE THE LOCK TO ACTIVATE IN RAPID SUCCESSION OR CHATTER. Activation of the ICON is annunciated by a change in state of the ICON and an audible beep. The ICON shall function as an indicator for each door to indicate the status of the door. A portion of the ICON shall be green or gray when the door is closed and locked (secure). A portion of the ICON shall be red when the door is open and unlocked (unsecure). The ICON shall only display green when the door hardware gives positive indication of secure status.
- b. Door Unlock - Electrical re-lock hardware. Where doors are equipped with Motor operated locks, requiring one output to cycle the lock to the unlocked state and a second operation to cycle the lock to the locked state, the following operation shall apply. Momentarily pressing the ICON shall provide an unlock output to the hardware. The unlock pulse shall be of sufficient duration to bring the hardware to full unlock. The system shall allow the hardware to remain unlocked for three (3) seconds and shall automatically send the relock output. Output times shall be adjusted to match the requirements of the lock manufacturer. Activation of the ICON is annunciated by a change in state of the ICON and an audible beep. The ICON shall function as an indicator for each door to indicate the status of the door. A portion of the ICON shall be green or gray when the door is closed and locked (secure). A portion of the ICON shall be red when the door is open and unlocked (unsecure). The ICON shall only display green when the door hardware gives positive indication of secure status.
- c. Interlock and Interlock Override - Where two or more doors or gates with electric hardware form a sally port or where interlocks between hardware sets are indicated on the plans, the operation of the individual hardware sets shall be as specified elsewhere with the following modifications. Each door within the interlock group shall have a yellow interlock active indicator. The indicators in the group shall not be visible unless the group is interlocked. The controls shall allow only one of the hardware sets in the interlock group to be un-secure at any given time unless the interlock override function is activated. The interlock override

function shall be activated by pressing the interlock override ICON. Interlock override shall then latch on until reset by the pressing the interlock override reset button. Activating the interlock override function shall allow the operator to control all hardware with no interlock restrictions. All Touch screen control stations controlling interlocked doors shall have the interlock override ICON'S and annunciator provisions. The yellow interlock active ICON'S over the interlocked doors shall illuminate on all Touch screens controlling hardware in a given interlock scheme. One and only one unsecured door shall cause a hardware set to become interlocked. Emergency release or Fire release shall override all interlock restrictions. The interlock shall not prevent the authorized door from operating multiple times in both open and closed functions, provided all other doors in the interlock scheme are secure.

- d. Motorized Doors and Gates, Vehicle Sally-Ports & Cell Sliders - Where motor operated doors and gates are installed, the following operation shall apply. Pressing the "open" ICON shall cause the door or gate to travel to the open position. Pressing the "close" ICON shall cause the door or gate to travel to the locked, closed position. Pressing the "stop" ICON while the door is traveling in either direction shall stop the door. Operating the door from "open" to "close" or "close" to "open", without pressing "stop" shall stop the door for a minimum of 1 (one) second and then reverse the direction of travel. There shall be an ICON indicator for each door to indicate the status of the door. The indicator shall illuminate green or gray when the door is closed and locked (secure). The indicator shall illuminate red anytime the door is open or unlocked (un-secure).
- e. Monitored Only Door Status - There shall be an ICON indicator for each door that is equipped with monitoring hardware to indicate the status of the door. This shall be the case even for doors that do not have electrically operated locks but are equipped with a door position switch or a bolt position switch. The indicator shall illuminate green when the door is closed and locked (secure). The indicator shall illuminate red anytime the door is open or unlocked (un-secure). The ICON shall only display green when the door hardware provides positive indication of secure status.
- f. Provide a screen that appears after pressing the release ICON that prompts the user to verify if they are sure that they want to activate emergency release. If the user selects "NO" return to normal operation. If the user selects "YES" the system will activate emergency release function. Coordinate with the Owner to define which doors will be emergency released.
- g. Lighting and Power Control - Lighting circuits, as shown on the plans, shall be switched by relays with 20 amp contacts, UL rated for lighting control applications. Relays shall be controlled by ICON'S Touch screen control station. Activating the ICON shall turn on the lights and cause the ICON to change state to indicate that the light is on. Activating the ICON again shall turn off the lights and cause the ICON to return to its initial state. Activation of the ICON is annunciated by a change in the ICON'S state and an audible beep. The lighting control relay panel shall be provided by this section.
- h. CCTV Cameras - CCTV cameras shall be represented on the Touch screen Control Stations by distinct ICON'S. Each camera is further identified with its number adjacent to the CCTV camera symbol location. Activating the camera ICON shall cause the selected camera to be switched to a viewing monitor in the control room.
- i. Intercom stations - Intercom sub stations shall be represented on the Touch screen Control Stations by distinct ICON'S. Each Intercom station or paging zone shall further be identified

with its number adjacent to the intercom ICON symbol. When a call is received, the ICON shall flash and an audible beep shall sound. If the operator is not viewing the page where the call originated, then a flashing intercom ICON shall appear on the screen navigation bar over the link for the screen where the call is. Selecting the ICON shall open the talk path and allow the operator to listen. Pressing the PTT (Push To Talk) ICON shall allow the operator to talk to the selected station. Selecting the station ICON shall reset that station.

- j. Auto Switching - Provide automatic CCTV camera switching when the select button of an Intercom station that is in direct view of a CCTV camera is pressed. This shall take place without action required by the operator. When the select button on the intercom button is pressed, the associated CCTV camera shall be automatically switched to a "spot" monitor located at the control desk.

1.5 GRAPHIC USER INTERFACE (GUI)

- a. The Touch screen Control Station shall provide an ICON for each door lock, lighting circuit, intercom station, Paging speakers, CCTV camera, or other devices, as designated on the plans or indicated by the specifications.
- b. ICON'S for different functions shall be clearly distinguished by color and by design. Use symbols to graphically represent the type of hardware being controlled by each ICON such as a speaker symbol for intercom stations, or a lock for door control. Screens shall reflect a graphic layout of each area that is being controlled.
- c. The Touch screen shall provide audible feedback for any touch activation unless specified otherwise.
- d. Unless necessary to a specific function ICON'S shall not activate on the "touch" but on the "release". This means that when an operator presses the ICON, no action will occur. Only when the operator removes their finger will the action take place. If an operator presses an ICON unintentionally, simply sliding their finger off of the ICON to an empty part of the screen and then releasing it shall prevent any action from taking place.
- e. The Touch screen shall offer easy navigability from any screen to any screen and shall always display which screen is currently being viewed. Provide a navigation bar that will allow one- touch navigation to any of the other screens that the operator is authorized to view. Also provide a "Global" ICON that displays the floor plan of the area that the operator can control. Touching any area of the Floor plan shall load the page that controls that area.
- f. The maximum time permitted for page turns shall be 100 ms.. The maximum time permitted for the execution of a command (the time between the activation of an ICON and when the selected function takes place) shall be 250 ms.

PART 2 - PRODUCTS

2.1 TOUCH SCREEN

- a. Provide the touch screens at designated locations as shown on the plans.

2.2 WORKSTATION COMPUTER

- a. Provide at each touch screen control location a industrial grade type computer manufactured for harsh environments which shall meet these minimum requirements:
 - 1. 2.13 Ghz Intel Pentium Core 2 Duo or Dual Core processor

2. 5 Gb RAM
3. 250 Gb Solid State hard drive
4. High resolution video graphics card
5. 10/100/1000 Mbps Ethernet card
6. 3 button mouse
7. Keyboard
8. Microsoft Windows 10 Professional operating system or newer.
9. Touch screen HMI / GUI software and necessary license and software key.

2.3 TOUCH SCREEN SOFTWARE

- a. Provide a licensed copy of all necessary GUI (Graphic User Interface) software for each Touch Screen Computer.
- b. The software will convey a Graphic floor plan for all areas that require display on the LCD displays. The software will utilize the maximum resolution and colors of the display to enhance and simplify the displayed control and status information. Fast orientation and ergonomics will be the goal of all system displays.
- c. The following GUI Software providers shall be acceptable
 1. Rockwell Automation
 2. Indusoft
 3. Wonderware

2.4 NETWORK EQUIPMENT

- a. Provide a 100/1000 Mbps Base T Ethernet system (IEEE 802.3u), for communication between Touch screen Workstations and Programmable Logic Controllers, and other connectable devices to be installed under this section of work within a given section of the facility (less than 300 feet).
- b. The 100/1000 Mbps Base T Ethernet switches shall be as manufactured by Cisco Systems, MOXA, or approved equal. Provide the quantity of nodes as required to accommodate the equipment to be connected.
- c. Ethernet cabling shall be Category 5e minimum. End-of-line terminations at PLC's shall be to eight-pin (RJ-45 style) connectors.
- d. Provide a Fiber Optic (50/125 Multi-Mode) backbone connection between PLC systems. This is required due to the distance and possible EMF interference along cable path.

PART 3 - EXECUTION

3.1 INTERCOM SYSTEM INTERFACE

- a. The Touch screen system shall communicate with the Intercom system through a data interface.
- b. Provide any data converters, or extenders as required.

3.2 CCTV SYSTEM INTERFACE

- a. The CCTV system shall communicate with the Touch screen system through a data interface.

- b. Provide any data converters, or extenders as required.

3.3 OWNER REVIEW MEETING

- a. See Division 28 00 00 section.

3.4 PROTECTION

- a. Deliver each piece of equipment in durable shipping containers. Maintain cartons through shipping, storage and handling as required to prevent damage and eliminate dirt and moisture. Wrap all equipment in heavy packing cellophane for moisture protection.
- b. All equipment MUST be stored in a climate-controlled environment. On site storage trailers or containers that are not climate controlled are strictly prohibited.

3.5 TESTING

- a. All equipment shall be factory tested prior to delivery to the jobsite.
 - b. The system shall be fully field tested under the supervision of a technician, trained and certified by the manufacturer as a master technician for the said system. The system shall be demonstrated to perform all of the functions shown on the plans and as specified herein.
- a. Verify that related conditions, including equipment that has been installed under other sections, are acceptable for product installation in accordance with the manufacturer's recommendations.
 - b. All devices connected to equipment specified in this section shall near the UL, Cul or CSA label and comply with all applicable National Electrical Code (NEC) standards.

3.7 INSTALLATION

- a. The ESSC shall furnish all equipment, tools, labor, system setup and other services necessary for the proper installation and testing of the products and system as described herein and shown on the drawings.
- b. Install in accordance with manufacturers handling and installation instructions.
- c. Install in accordance with all NEC, local and applicable codes and regulations.
- d. All ladder logic, HMI files, and any other custom developed software or configuration files shall be delivered on CD's to the owner at the project closeout.
- e. All software licenses shall be transferred to the Owner at completion of the project. This shall include but not be limited to all original installation disks, software manuals, equipment manuals, etc.; all project specific application software shall be transferred at the end of warranty period.

3.8 WARRANTY

- a. See Division 28 00 00 section 1.10 for warranty requirements.

3.9 SPARE PARTS

- a. Provide to the owner at project closeout the following spare parts:

- i. Provide one (1) complete spare touch screen.

END OF SECTION 28 00 10 – TOUCH SCREEN CONTROL SYSTEM

SECTION 28 00 20 - PROGRAMMABLE LOGIC CONTROLLER

PART 1 - GENERAL

1.1 SUMMARY

- a. Provide a distributed installation of Programmable Logic Controllers (PLC) to interface the Touch screen Workstation with the field wire interface equipment that is hardwired to the end-of-line devices that are to be controlled and / or monitored.
- b. The PLC shall provide all control and monitoring functions for systems ad described herein and on the drawings.

1.2 DESCRIPTION

- a. The PLC (s) shall be located in Electronic Equipment Rooms and shall be installed inside the same metal control cabinets or racks as the electronic control relays.
- b. The PLC shall perform all necessary logic functions, timing, functions, input points, output points and communication necessary to meet all of the requirements of these specifications.
- c. The PLC shall be a standard off-the-shelf, commercially available PLC. Proprietary, custom controllers are not acceptable.

1.3 MANUFACTURER QUALIFICATIONS

- a. Manufacturers desiring to provide equipment under this section must be pre qualified and listed herein or in a pre bid addendum.
- b. Manufacturers not listed herein who wish to provide equipment for this project must request approval and submit qualifications.
- c. The Programmable Logic Controller manufacturer shall be a company specializing in the design and manufacture industrial grade PLC equipment with national and international distribution. The manufacturer must have been in business using the same name for a minimum period of twenty (20) years and have an ISO9001 certification.
- d. Approval of the Manufacturer does not alleviate the Manufacturer from any of the requirements of the contract drawings or documents or nullify any terms or conditions contained herein unless explicitly set forth in an addendum.
- e. The Owner reserves the right to disqualify manufacturers who do not comply with the requirements of this section of the specifications.

1.4 ACCEPTABLE MANUFACTURORS

- a. The following Manufacturers are pre-qualified to provide equipment under this section:

1. Allen Bradley
2. GE Fanuc
3. Omron

1.5 RELATED SECTIONS

- a. Section 08 00 00 - Door Hardware
- b. Section 26 00 00 – Basic Electrical Requirements
- c. Section 28 00 00 - Electronic Security System General
- d. Section 28 00 10 - Touch Screen Control System
- e. Section 28 00 30 - Relay Control System
- f. Section 28 08 00 - Intercom System
- g. Section 28 09 50 – Video Surveillance System

1.6 WORK INCLUDED

- a. Provide and install a complete PLC system to perform all logic, control and monitoring of all electronically operated devices including but not limited to:
 1. Door locks
 2. Door status switches
 3. Roll up vehicular doors
 4. Sliding vehicular gates
 5. Lighting circuits
 6. CCTV camera switching
 7. Intercom station call and answer
- b. Provide all programming, configuration, testing and setup to provide a complete PLC system as described herein and shown on the plans.
- c. Provide all programming and equipment necessary to interface with other systems and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- a. Except as otherwise specified, herein, or in the General Conditions, the equipment and materials of this Section shall be products of the following manufacturers, subject to compliance with specification requirements and provided each manufacturer meets all requirements of the Quality Assurance Section of this specification. Non-industrial type PLC Control Units shall not be acceptable. PLC Control Units must be nonproprietary and have a minimum of two (2) authorized dealers in each State, and a minimum of two hundred (200) authorized dealers nationwide, and a minimum of five hundred (500) authorized worldwide.
- b. The processor shall contain all programs necessary to control the system. The program shall be stored in a non-volatile memory unit. The processor shall communicate with all I/O points directly across the PLC back plane, or communicate to local or remote I/O via Ethernet network, RS422 or RS485.
- c. All microprocessor-based equipment supplied shall be certified by the manufacturer to meet or exceed the following environmental operating specifications:

1. Ambient Temperature - Operational 0 to 60 C.
 2. Storage 40 to +80 C.
 3. Ambient Humidity - 50 to 95%, RH non-condensing
- d. All local and remote I/O points must be addressed directly from the processor. Systems requiring data/communication hardwired cable to each I/O card will not be acceptable. All I/O cards must be interchangeable without requiring addressing or re-addressing to be moved from one card slot to another card slot. I/O cards requiring dipswitch addressing will not be acceptable.
 - e. All I/O devices shall be equipped with system self-diagnostic capabilities.
 - f. The processor shall, on a regular time interval not to exceed three seconds, perform a diagnostic test of all I/O points. This diagnostic test shall be a software test requiring all I/O points to report back to the processor. This test will annunciate any communication or I/O card failure.
 - g. Programming of the programmable controller shall be accomplished utilizing a high level language that utilizes ladder logic for all programs. The software shall be capable of converting all functions associated with locking, Lighting, CCTV and intercom control features and a completely automated method.
 - h. Programmable Logic Controllers manufactured by the following manufacturers shall be acceptable:
 1. Allen Bradley
 2. GEFanuc
 3. Omron
 - i. Custom or proprietary PLC's, controllers, or custom software drivers such as those provided by MTI, Com-tec, Trentech, or Icotech are not acceptable.

2.2 PROGRAMMING SOFTWARE

- a. Utilize PLC programming software to accomplish all functions as described herein and as shown on the plans.
- b. The software will be programmed and tailored to the specified functions and features described herein and shown on the drawings.
- c. PLC programming and development software provided by the following manufacturers is acceptable:
 1. Allen Bradley
 2. GE Fanuc
 3. Omron

PART 3 - EXECUTION

3.1 PROTECTION

- a. Deliver each piece of equipment in durable shipping containers. Maintain cartons through shipping, storage and handling as required to prevent damage and eliminate dirt and moisture. Wrap all equipment in heavy packing cellophane for moisture protection.
- b. All equipment MUST be stored in a climate-controlled environment. On site

storage trailers or containers that are not climate controlled are strictly prohibited.

3.2 TESTING

- a. All equipment shall be factory tested prior to delivery to the jobsite.
- b. The system shall be fully field tested under the supervision of a technician, trained and certified by the manufacturer as a master technician for the said system. The system shall be demonstrated to perform all of the functions shown on the plans and as specified herein.

3.3 EXAMINATION

- a. Verify that related conditions, including equipment that has been installed under other sections, are acceptable for product installation in accordance with the manufacturer's recommendations.
- b. All devices connected to equipment specified in this section shall bear the UL , cUL or CSA label and comply with all applicable National Electrical Code (NEC) standards.

3.4 INSTALLATION

- a. The ESSC shall furnish all equipment, tools, labor, system setup and other services necessary for the proper installation and testing of the products and system as described herein and shown on the drawings.
- b. Install in accordance with manufacturers handling and installation instructions.
- c. Install in accordance with all NEC, local and applicable codes and regulations.
- d. All ladder logic, HMI files, and any other custom developed software or configuration files shall be delivered on CD's to the owner at the project closeout.
- e. All software licenses shall be transferred to the Owner at completion of the project. This shall include but not be limited to all original installation disks, software manuals, equipment manuals, etc.; all project specific application software shall be transferred at the end of warranty period.

3.5 WARRANTY

- a. See Division 28 00 00 section 1.10 for warranty requirements.

3.6 SPARE PARTS

- a. Provide to the owner at project closeout the following spare parts:
 1. Input module (one of each type used)
 2. Output Module (one of each type used)
 3. Power Supply (one of each type used)
 4. Processor (one of each type used)
 5. Ethernet communication module (one of each type used)

END OF SECTION 28 00 20 – PROGRAMMABLE LOGIC CONTROLLER

SECTION 28 00 30 – RELAY CONTROL SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- a. Provide a relay control system to operate all electronically controlled hardware as shown on the plans and specified herein.
- b. The relay control system shall be mounted in NEMA 1 hinged door enclosures or 19” EIA enclosed racks as shown on the plans.

1.2 DESCRIPTION

- a. The relay control system provides for the conversion of low level Input and output signals from the PLC to high energy power switching to the field device load.

1.3 MANUFACTURER QUALIFICATIONS

- a. Manufacturers desiring to provide equipment under this section must be pre-qualified and listed herein or in a pre-bid addendum.
- b. The manufacturer must have been in business using the same name for a minimum period of Twenty (20) years, providing security control equipment of similar scope and complexity as this project.
- a. Applications for approval will not be considered unless they are complete. Partial or incomplete applications will be immediately rejected without comment.
- b. Approval of the Manufacturer does not alleviate the Manufacturer from any of the requirements of the contract drawings or documents or nullify any terms or conditions contained herein unless explicitly set forth in an addendum.
- c. The Owner reserves the right to disqualify manufacturers who do not comply with the requirements of this section of the specifications.
- d. The application must be received no later than twenty-one (21) days prior to the bid. Requests received after this time will not be considered under any condition. Verbal approval will not satisfy this requirement.
- e. If approved, the firm will be listed in a pre-bid addendum.

1.4 ACCEPTABLE MANUFACTURERS

- a. The following Manufacturers are pre-qualified to provide equipment under this section:
 1. Allen Bradley
 2. Phoenix Contact
 3. IDEC

1.5 RELATED SECTIONS

- a. Section 08 00 00 - Door Hardware
- b. Section 26 00 00 – Basic Electrical Requirements
- c. Section 28 00 00 - Electronic Security System General
- d. Section 28 00 10 - Touch Screen Control System
- e. Section 28 00 20 - Programmable Logic Controller
- f. Section 28 08 00 - Intercom System
- g. Section 28 09 50 – Video Surveillance System

1.6 WORK INCLUDED

- a. Provide and configure all relays, sockets, terminals, wiring, mounting assemblies, power supplies, cabinetry, ground facilities, and other appurtenances as necessary to furnish a complete system as described herein and shown on the drawings.
- b. Provide all interconnections to the PLC I/O for logical control of all equipment.

1.7 COORDINATION

- a. Consult device manufacturers published product data for each controlled and/or monitored device including but not limited to:
 - h. Door locks
 - ii. Door Status switches
 - iii. Gates
 - iv. Light ballasts
- b. Consult PLC manufacturers published product data for Input modules and output modules and match relay and terminal equipment to input and output electrical characteristics.

PART 2 - PRODUCTS

2.1 MATERIALS

a. LOCKING CONTROL RELAYS

1. All outputs/inputs shall have an interposing relay interface. Relays shall be sized for highest load imposed on the relay. Relays shall be individual socket base type mounted on din rail within the security equipment cabinet.

- a. Relays mounted on any type of circuit board are not acceptable.
- b. Provide diodes across relays to protect contacts from counter EMF of lock sets where required (such as on 24 VDC lock sets.).
- c. Provide individual circuit breaker for each relay output.

2. The device control relays shall be electromechanical type that are rated for at least 50% more current capacity than required for any given control function, but in no case less than 10 amps. The relays shall be operated at an input voltage of 24VDC, and the output shall be capable of switching any voltage up to 140 VAC, at the rated output current.

3. Solid State or optically isolated solid-state relays are not acceptable. The following requirements must be met for all locking control relays:

- i. Coil indication must be given at the relay location.
- ii. Each relay is to be fused in such a way as to meet National Electric Code distribution requirements and to protect the relay and other circuitry from a short circuit failure at the lock.
- iii. Each relay shall be socketed to facilitate easy field replacement.
- iv. All relays and terminations are to be labeled clearly to show all field terminations.
- v. All relay sockets and terminal strips shall be DIN rail mounted

b. LIGHTING CONTROL RELAYS

1. The lighting control relays shall be designed for insertion into a metal partition providing for separation of the high voltage circuit to be controlled and the controlling low voltage wiring.

2. The lighting control relay shall be a latching mechanical contact rated at a minimum of 20 amps. The following requirements must be met for all lighting control relays:

- i. The relay must provide an auxiliary status contact that will be monitored by the control system for indication on the touch screen. The touch screen shall indicate actual relay status.
- ii. Each relay shall be rated with a minimum of a 20-amp contact and shall be rated for the line voltage controlled.
- iii. The lighting control relay shall be U.L. recognized.
- iv. The relay mounting shall be constructed in such a way that a metal partition shall separate the high voltage contacts and the low voltage switching circuitry.

c. CONTROL RELAY SOCKETS

- 1. Provide plug in type sockets for all locking control relays.
- 2. Control relay sockets shall have captive clamp type screw terminals.

d. POWER SUPPLIES

- 1. Provide logic power supplies as necessary to operate all relays and electronic equipment.
- 2. Power supplies shall be regulated, filtered switching type power supplies meeting the following minimum requirements:
 - i. Nominal Input voltage 120VAC
 - ii. Nominal Output voltage 24 VDC
 - iii. Output current 10 Amps
 - iv. MTBF >500,000 Hours
 - v. Ambient temperature operating range -25C to 70C.
 - vi. Din rail mountable
 - vii. Enclosed frame
- 3. Size power supplies to accommodate 150% of the maximum load that could ever be

imposed at any given time but in no case less than 10 amps output.

e. WIRE TERMINALS

1. Provide Din rail mountable terminals for all field wire connections.
2. Terminals shall have captive clamp or compression type screw terminals and shall be rated for 20 amps per circuit minimum.
3. Provide buss bars as necessary.

f. FUSE HOLDERS

1. Provide Din rail mounted fuse holders for each door lock.
2. All incoming power circuits shall be fused.

g. FUSES

1. Fuse all door locks and other devices using Littlefuse 3AG or Bussman AGC series replicable glass fuses.
2. Size fuses in accordance with lock manufacturers recommendations.

h. ENCLOSURES AND RACKS

1. Wall mounted equipment shall be installed in NEMA 1 hinged door enclosures with a removable steel mounting plate.
 2. Size enclosures in accordance with the number of relays and terminals required for the project.
 3. Cabinets shall be ANSI 61 gray polyester powder coated. Mounting plates shall be painted white.
 4. Provide adequate ventilation in enclosures and racks to dissipate excess heat.

i. WIRE MANAGEMENT

1. All wiring shall be routed in wire way or finger type wire duct. Provide snapping type covers for all wire ducts.

j. LABELING

1. Label all components clearly with a consistent labeling scheme. Labels shall be cross referenced to wiring schematics for easy reference.
2. Label all relays, terminal points, fuse holders, I/O modules, circuit breakers, power supplies and any other control equipment.

PART 3 - EXECUTION

3.1 MANUFACTURERS INSTRUCTIONS

- a. Comply with all manufacturers published product data including product bulletins, installation instructions, diagrams, schematics and mounting details.

3.2 PROTECTION

- a. Deliver each piece of equipment in durable shipping containers. Maintain cartons through shipping, storage and handling as required to prevent damage and eliminate dirt and moisture. Wrap all equipment in heavy packing cellophane for moisture protection.
- b. All equipment MUST be stored in a climate-controlled environment. On site storage trailers or containers that are not climate controlled are strictly prohibited.

3.3 ALL TESTING

All equipment shall be factory tested prior to delivery to the jobsite. The system shall be fully field tested under the supervision of a technician, trained and certified by the manufacturer as a master technician for the said system. The system shall be demonstrated to perform all of the functions shown on the plans and as specified **herein**.

3.4 EXAMINATION

- a. Verify that related conditions, including equipment that has been installed under other sections, are acceptable for product installation in accordance with the manufacturer's recommendations.
- b. All devices connected to equipment specified in this section shall bear the UL, cUL or CSA label and comply with all applicable National Electrical Code (NEC) standards.

3.5 INSTALLATION

- a. The ESSC shall furnish all equipment, tools, labor, system setup and other services necessary for the proper installation and testing of the products and system as described herein and shown on the drawings.
- b. Install in accordance with manufacturers handling and installation instructions.
- c. Install in accordance with all NEC, local and applicable codes and regulations.
- d. All wiring diagrams, schematics, layout drawings, system drawings and other documentation shall be provided to the owner at project closeout. See Division 28 00 00 section 1.0 for additional requirements.

3.6 WARRANTY

- a. See Division 28 00 00 section 1.10 for warranty requirements.

3.7 SPARE PARTS

- a. Provide to the owner at project closeout the following spare parts:
 - i. (5) relays of each type used
 - ii. (25) fuses of each type and value used
 - iii. (1) Power supply of each type used

END OF SECTION 28 00 30 – RELAY CONTROL SYSTEM

SECTION 28 08 00 – INTERCOM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the documents apply to this section.
- B. The Division 28 series of specifications describe systems that are integrated and/or connected together to provide coordinated operations; therefore, individual sections do not stand alone. The installation and operation of any given system may be determined only by review of the total series of Division 28 specifications, as well as other referenced specifications.

1.2 DESCRIPTION

- A. Provide and install a complete IP based digital duplex intercom system as described and shown on the plans. System shall include, but not be limited to, fully electronic digital central exchange(s), expansion modules, amplifiers, power supplies, paging interface/amplifiers, detention grade intercom stations, paging speakers and horns as necessary to provide a complete operating system. Provide programming of system stations and features as necessary to meet specification requirements. These systems shall be interconnected to provide the operations specified. The intercom and public address system will utilize the Security Monitoring and Control System local area network and network switches to facilitate its operation.
- B. Provide head-end equipment in Security Electrical room racks as designated on the plans. Provide central and remote equipment to provide for:
 - 1. Intercom call-in
 - 2. Intercom two-way voice communications
 - 3. Public address and monitoring
 - 4. Interface to the Security Monitoring and Control Systems
 - 5. Interface to the Video Surveillance System for camera call-up.
 - 6. Interface to the Touchscreen control stations.
- C. Provide public address in zones as shown on the drawings.
- D. The systems shall be provided with 20% expansion capacity for future needs from all equipment locations.
- E. The headend equipment shall provide for intercom stations and public address zones, plus capacity for 20 percent spares including spare ports on the Security Monitoring and Control network. Provide all equipment as part of this project.
- F. The system shall provide operation from Central Control Touchscreen workstations and Central Control touchscreen control stations via the Security Monitoring and Control System.
- G. The system shall be integrated with the Programmable Logic Controller of the Security

Monitoring and Control System.

- H. The intercom and paging system talk paths between systems associated with workstations shall be of sufficient capacity to provide the operations specified plus 20% spare (rounded up). The physical implementation of the intercom talk paths shall be voice over IP via CAT 6a cabling and devices and #18 AWG shielded pair cabling. For the Public Address system, copper conductors and balanced network of speakers/horns is required. Provide conduit for wire routing or utilize specified cable tray system. Use of fiber conductors for digital communication is also permissible.
- I. The intercom system shall provide workstation to workstation communications.
 - 1. There shall be no limit to the number of intercom calls that may be placed to a workstation except the practical limit of total intercom stations on the project.
 - 2. Except as noted below, no touchscreen work stations shall receive a busy condition.
 - a. Touchscreen control posts other than Central Control posts shall have access to all intercom stations on their current active screen.
 - b. Central Control workstations shall have access to all intercom stations at all times
 - 1) Optionally, the SI may limit the access to intercom stations connected to a single given remote intercom system to one Central Control workstation at a time.
 - c. A busy signal will be given to a workstation if they are attempting to connect to an intercom station currently connected to another workstation.
 - 3. Local communication at each exchange shall be standalone.
- J. Related work specified elsewhere:
 - 1. Conduit System
 - 2. Security Monitoring and Control System
 - 3. PLC Controls
 - 4. Video Surveillance System
 - 5. Wiring
- K. Provide programming and devices to enable monitoring of paging zone area audio by the Public Address system. Monitoring audio from the Public Address zones by the Security Monitoring and Control System shall be limited to inmate housing areas. Monitored audio will be automatically recorded to the security systems server.

1.3 ACCEPTABLE MANUFACTURERS

- A. Equipment and systems shall conform to this section of the specifications. Approved manufacturers are Harding Instrument Company, Jeron Electronic Systems, Inc., and Tech Works.

1.4 SYSTEM OPERATION

- A. The Intercommunication System shall consist of remote stations with call-in annunciation to the Security Monitoring and Control System for two-way voice communications. Provide desk top microphone, push to talk switch button, and integral speaker master station for

communication at work stations.

- B. Workstation master station functions shall have the ability to:
 - 1. Place and answer calls
 - 2. Make group calls and zoned public address announcements
 - 3. Monitor intercom stations
 - 4. Receive intercom station audio level alarms
 - 5. Adjust intercom volume level
 - 6. Adjust monitor volume level
 - 7. Allow for sequencing between monitored stations and adjust step rate for sequencing.
- C. Intercom Station function with workstation:
 - 1. Actuating the intercom station push button shall place a call request in the queue of the workstation master assigned to receive calls from that station. All calls will be displayed on the touchscreen graphic regardless of their priority or time of arrival.
 - 2. Calls not answered within a programmed time limit will be transferred to an assigned secondary workstation.
 - 3. Calls may be cancelled by the workstation operator without having answered the call.
 - 4. The workstation operator may answer any call by selecting the associated call icon on the touchscreen. Doing so will activate the interface between the Security Monitoring and Control and VSS networks to automatically call up cameras assigned to that intercom station for assessment.
 - 5. The workstation operator may select an individual or pre-assigned group of intercom stations for monitoring. Group monitoring may be by sequencing through a series of individual stations or by simultaneously monitoring up to four stations.
- D. The Workstation master station shall be able to be placed in unmanned mode automatically switching call handling functions to a pre-determined secondary workstation.
- E. The public address and monitoring zones shall be selected through the Security Monitoring and Control touchscreen control stations.
- F. The Public Address and Intercommunication System shall have its own speakers, push-to-talk buttons, microphones, and volume controls for monitoring speakers at each of the touchscreen workstation and locking control panels. Fire Alarm speakers shall not be used for PA and Intercommunication Systems.
- G. All Intercommunication and Public Address System equipment shall be remotely located in equipment cabinets as indicated on plans or specified.
- H. Provide amplification equipment, switching equipment, and interface equipment for a complete and fully operational system.
- I. Local Intercom
 - 1. See Security Monitoring and Control System for sequence of operation and additional information.
- J. Public Address
 - 1. See Security Monitoring and Control System for sequence of operation and

additional information.

- K. Provide separate amplifiers for the intercom and public address systems.
- L. Provide any required software and programming for the system. Software licensing costs must be included in the installation and the license must be perpetual. Periodic software upgrades as deemed necessary or advantageous to the operator will be provided by the manufacturer at no cost to the owner.

PART 2 - PRODUCTS

2.1 PUBLIC ADDRESS SPEAKERS

- A. All speakers in inmate spaces shall be two-way speaker/microphone type for use as audio monitoring devices as well as public address speakers. Each speaker installation shall be complete, including, where applicable, drivers, matching transformers, mounting brackets, acoustically treated back boxes and security (abuse resistant) baffles selected with audio characteristics and physical construction compatible with the total system.
- B. Speakers installed in inmate areas and housing dayrooms shall be full range, low-distortion, coaxial transducer suitable for voice announcements and area monitoring in areas of high ambient noise level. Speakers shall be suitable for indoor use and shall conform to the following:
 - 1. Continuous Power Rating 16 Watts
 - 2. Frequency Response 50-14,000 Hz
 - 3. Dispersion 120 degrees
 - 4. Sound Pressure 96 dB at 4 ft. on Axis with Rated Input
 - 5. Impedance Range 8 Ohms
 - 6. Mounting Recessed at lay-in ceilings; surface-mounted boxes in areas with no ceiling. Surface-mounted boxes shall have white finish and shall be surface-mounted on hard ceilings in inmate areas.
 - 7. Area Use Indoor
 - 8. Speaker Diam. (inches) Nom. 200 mm
- C. Flush-mounted speakers in non-inmate areas (Administration and Lobby areas, only) shall be mounted in acoustically treated type backbox and shall be provided with high impact square plastic baffle attached to back box with spanner head bolts. Speakers shall conform to the following:
 - 1. Continuous Power Rating 15 Watts
 - 2. Frequency Response 60 to 15000 Hz
 - 3. Speaker Diameter Nom. 200 mm
- D. Where shown on the drawings, provide Sound Sphere Q-CS Series (min 35w – calculate for environment) omni-directional speakers. Where mounted below 12' 0" AFF provide security screen protective guard for the Sound Sphere speakers.
- E. Speakers installed on the exterior of buildings, including recreation yards, shall be a dual re-entrant horn suitable for voice announcements and area monitoring in areas of high ambient noise level. Speakers shall be suitable for outdoor use and shall conform to the following:

- | | | |
|----|----------------------|---|
| 1. | Continuous Power | 30 Watts |
| 2. | Frequency Response | 225-14,000 Hz |
| 3. | Dispersion | 100 degrees |
| 4. | Sound Pressure Level | 4 ft. on Axis with rated input 125 dB SPL |
| 5. | Impedance Range | 45 to 2500 Ohms |
| 6. | Mounting | Universal 3 way adj. |
| 7. | Area Use | Indoor/Outdoor |

2.2 SECURITY BAFFLE

- A. Speakers shall be installed in security type enclosures in inmate areas with ceilings under 12 feet in height and be flush-mounted or surface-mounted. Baffle shall consist of high tensile strength (40,000 PSI) cast aluminum alloy outer ring and stainless steel woven wire mesh speaker screen spun over and attached to subplate mounting assembly.
- B. Baffle shall be securely mounted from the inside to a surface mounted 11 gauge tempered, aluminum plate, housing, rolled into cylindrical shape and heliarc welded. Installation shall include an 11 gauge aluminum ring for support of speaker/baffle. All components shall be attached with tamperproof, flush screws. The security baffles shall be attached to the mounting recessed boxes with tamperproof stainless steel screws.

2.3 AMPLIFIERS

- A. Power amplifier(s) shall be rack-mounted. Where mounted in same location as other audio equipment, all such equipment shall be mounted in a common rack. Power amplifier(s) shall be solid state type for use with two-way public address and monitoring system or public address system only. Power amplifier(s) shall contain circuit breaker for overload protection; high temperature automatic reset protection, and electronic output protection. The power amplifier(s) shall conform to the following:

- | | | |
|-----|--|------------------|
| 1. | Audio Power Output (E.I.A. Spec. Watts Rms.) | 60 watts |
| 2. | Distortion (E.I.A. Spec.) | 5% |
| 3. | Frequency Response | 20 to 20,000 Hz |
| 4. | Noise Level (below raised output) | 75 dB |
| 5. | Load Impedance/ | 100 ohms |
| 6. | Volts | 70 |
| 7. | Load Impedance/ | 12.5 ohms |
| 8. | Volts | 25 |
| 9. | Power Required at Rated Output | 125 watts |
| 10. | Mounting | Rack 140 mm high |

- B. Pre-amplifier shall be solid state for use with the power amplifier(s) specified and shall be rack-mounted. Pre-amplifier shall be provided with power on-off switch and monitor volume control. Pre-amplifier shall conform to the following:

- | | | |
|----|--------------------|------------------------------|
| 1. | Power Output | Compatible with power |
| 2. | Frequency Response | + dB from 20 to 20,000 hertz |
| 3. | Noise Level | -50 dB |
| 4. | Distortion | Less than 5% |

- C. Booster amplifier(s) shall be solid state type incorporated into total system to amplify audio signal from central power amplifier(s). Booster amplifier shall be rack mounted and

shall conform to the following:

- | | |
|-----------------------|-----------------|
| 1. Power Output | 15 Watts |
| 2. Peak Power Output | 25 Watts |
| 3. Frequency Response | 20 to 12,000 Hz |
| 4. Noise Level | -50 dB |
| 5. Distortion | Less than 5% |

2.4 WIRING

A. Intercommunication System

1. Wiring for the Intercom Systems shall be CAT 6a cabling and devices. CAT 6a shall be utilized for IP local circuits. CAT 6 cabling and ports for the intercom system will be grey in color. Multi-mode 50 micron fiber and appropriate transmission devices shall be utilized where installation distances exceed maximum copper UTP installation distances as specified in EIA/TIA standards.
2. Networking between central exchanges shall be via CAT 6a cabling and devices. Multi-mode 50 micron fiber will be used at distances exceeding EIT/TIA standards for copper UTP installation. Audio trunk wiring (where required) shall be per manufacturer's recommendations but not less than minimum #18 AWG shielded jacketed cables.
3. All CAT 6a wiring and ports shall be color coded gray and terminated to EIS/TIA standards via RJ45 connectors.
4. All wiring shall be installed in concealed conduit or, where indicated, cable tray. No exposed conduit is allowed except in the security equipment rooms.

B. Wiring Between Headend Equipment and Remote Units

1. Provide copper or fiber wire as required by the system manufacturer.
2. The configuration of the communication (data) between the headend equipment and remote units shall be in a star configuration with multiple talk paths.

C. Public Address System Wiring

1. Wiring shall be installed in conduit or cable tray.
2. The minimum size cable shall be #18 AWG shielded jacketed cables, constructed as required by the system manufacturer.

2.5 SPEAKER BACKBOXES

- A. Acoustically treated back boxes for flush mounted ceiling speakers shall be mounted with two 21mm x 21mm twelve gauge galvanized channel attached to ceiling support system with galvanized tie wire.
- B. Acoustically treated back boxes for surface-mounted back boxes shall be attached with a minimum of four supports. Back boxes shall be securely attached to the mounting surface.

2.6 INTERCOM STATIONS

- A. Movement intercom stations shall be wall or frame mounted and shall be of correctional grade high security construction provided by the manufacturer of the intercom system. All hardware shall be security type. The stations shall resist liquids. The station shall provide a

call button.

- B. Staff stations at work-stations will be small desktop station with gooseneck electret microphone, speaker with adjustable volume and push to talk switch.
- C. Handset utilized at two station IC station shall be heavy duty plastic with armored cable devised to reduce the opportunity for its use as a weapon or for hanging.

PART 3 - EXECUTION

3.1 VOLUME LEVELS

- A. The Intercommunication and Public Address Systems shall be balanced to provide sufficient and uniform volume levels throughout the facility.
- B. The contractor acknowledges that the detention facility presents a challenging audio environment. However, the contractor will design the audio system to eliminate feedback, adjust for proper volume and intelligibility.

END OF SECTION 28 08 00 – INTERCOM SYSTEM

SECTION 28 09 50 - VIDEO SURVEILLANCE SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

- A. CCTV: Closed-circuit television.
- B. DVR: Digital video recorder.
- C. NVR: Network video recorder.
- D. VMC: Virtual matrix controller.
- E. VI: Video intelligence.
- F. SMS: Security management/access control system.

1.3 SUBMITTALS

- A. Product Data: Include detailed manufacturer's specifications for each component specified. Include data on features, ratings, and performance.
- B. Shop Drawings:
 - 1. Include dimensioned plan and elevation views of components and enclosures and details of control panels. Show access and workspace requirements.
 - 2. Wiring Diagrams: Power, signal, and control wiring. Differentiate between manufacturer- installed and field-installed wiring.
- C. Coordination Drawings: Plans drawn to scale and coordinating locations of television equipment. Show the following:
 - 1. Ceiling suspension assembly members.
 - 2. Method of attaching hangers to building structure.
 - 3. Location of items requiring installation coordination, including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and other architectural features.
- D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements of installed systems.
- E. Maintenance Data: Include the following:
 - 1. Detailed operating instructions covering operation of stored video retrieval and long term storage of video recordings.
 - 2. Routine maintenance requirements for system components.
 - 3. Lists of spare parts and replacement components recommended to be stored at the site for ready access.

1.4 QUALITY ASSURANCE

A. Installer

Qualifications:

1. The Video Surveillance System Installer shall be licensed and shall meet all applicable regulations. The Contractor shall be a firm normally employed in the low voltage and video cabling industry.
 2. The Contractor must be certified by the manufacturer of the products, adhere to the engineering, installation and testing procedures and utilize the authorized manufacturer components and distribution channels.
 3. The Contractor shall be certified by the manufacturing company in all aspects of design, installation and testing of the products described herein. Each Contractor shall furnish with their submittal, a letter from the manufacturer indicating they are a dealer in good standing.
 4. The Contractor shall be experienced in all aspects of this work and shall be required to demonstrate direct experience on recent systems of similar type and size. The Contractor shall own and maintain tools and equipment necessary for successful installation and testing of video surveillance distribution systems and have personnel who are adequately trained in the use of such tools and equipment. A resume of qualifications shall be submitted with the Contractor's proposal indicating the following:
 - a. A list of five recently completed projects using the product proposed of similar type and size with contact names and telephone numbers for each.
 - b. A list of test equipment proposed for use in verifying the installed integrity of metallic cable systems on this project.
 - c. A technical resume of experience for the Contractor's Project Manager and on-site installation supervisor who shall be assigned to this project.
 - d. A list of technical product training attended by the Contractor's personnel that shall install the video surveillance system shall be submitted.
 - e. Any subcontractor who shall assist the video surveillance Contractor in * performance of this work shall have the same training and certification as the video surveillance Contractor.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of television equipment and are based on the specific system indicated. Other manufacturers' products complying with requirements may be considered. Refer to Division 1 Section "Substitutions." Systems that are manufactured and installed by a factory office and are not available through multiple distribution channels will not be accepted.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with NFPA 70.
- E. Comply with 47 CFR 15, 17, and 76.

1.5 PROJECT REQUIREMENTS

- A. Provide a complete and operable video surveillance system consisting of IP digital cameras, NVR components and software to store 30 days of recorded video. Stored video shall have 7.5 FPS @ native camera resolution and 15 FPS motion figure 35% motion.
- B. The video surveillance system shall integrate with the touch screen security control system for instant live video viewing from selection of icons on the touch screen control system.
- C. Service Conditions for Outdoor Equipment: Equipment shall be rated for

continuous operation under the following environmental conditions, unless otherwise indicated:

1. Temperature: -22° F to 122° F.
2. Relative Humidity: 0 to 95 percent.
3. Weather: Enclosure housings to prevent entry of moisture due to melting ice build-up or driven rain or snow.

D. Service Conditions for Indoor Equipment: Equipment shall be rated for continuous operation under the following environmental conditions, unless otherwise indicated:

1. Temperature: 32° F to 122° F.
2. Relative Humidity: 0 to 95 percent.

1.6 COORDINATION

- A. Coordinate layout and installation of video surveillance equipment and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.
- B. Contractor is responsible for all work required on this project for connection of NVR, cameras and power supplies. Contractor shall be responsible for the complete installation of all security cameras. The camera system shall have a complete and seamless integration with the Electronic Security System.

1.7 WARRANTY

- A. Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.*
 1. Written warranty, signed by manufacturer and installer agreeing to correct system deficiencies and replace components that fail in materials or workmanship for a period of one (2) years following date of substantial completion. This warranty shall be in addition to, and not limiting, other rights Owner may have under other provisions of the Contract Documents.
 2. Warranty shall include all parts and components of the Closed Circuit Television System.

1.8 EXTRA MATERIALS

- A. Furnish extra materials as described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Provide not less than one of each item listed below. Deliver extra materials to Owner.
 1. Fuses: One for every 10; each type and rating.
 2. Cameras: One for every 10; each type and focal length installed.

2.1 GENERAL

- A. The cabling shall be installed per requirements of the manufacturer and the Project Documents, utilizing material meeting all applicable standards. The Contractor is responsible for providing all incidental and/or miscellaneous hardware not explicitly specified below as required for a complete and operational system.
- B. Materials shall be as listed or shall be approved equivalent products of other manufacturers meeting the intent and quality level of the specifications. All approved equivalent products shall be published by addendum twenty one days prior to proposal for Architect/Engineer review.
- C. Testing: All installed cabling shall be tested 100% at specified performance after installation by the Contractor.
- D. All equipment and materials used shall be standard components, regularly manufactured, regularly utilized in the manufacturer's system.
- E. All systems and components shall have been thoroughly tested and proven in actual use.
- F. Network Video Recording Software shall be from an original equipment manufacturer with extensive experience in the Analog and Digital Video Surveillance.
- G. All systems and components shall be provided with the availability of a toll free 24-hour technical support phone number from the manufacturer. The phone number shall allow for immediate technical assistance for either the dealer/installer or the end user at no charge.
- H. All systems and components shall be provided with an explicit manufacturer warranty.

2.2 DATA CLOSET (MDF/IDF) TERMINATION HARDWARE

- A. Security Contractor shall provide where required one 2-post, open rack at building headend closet location to receive video management system. Rack shall be black in color and have vertical management on both sides of rack. Coordinate rack location with other technology racks being installed in room. Coordinate rack location with owner prior to installation to confirm mounting is acceptable. Mount rack securely to floor and overhead tray.
- B. Security Contractor shall provide one (1) - 23" High Definition monitor at each closet location to be able to view DVR/NVRA/MCA/I server(s) display.
- C. Security Contractor shall provide combination keyboard/monitor shelf at each NVR location.
- D. Security Contractor is responsible to coordinate with owner's technology department on acquiring network connections as well as any network configuration information such as IP numbers that will be required to connect NVR servers to owner network.
- E. Video Surveillance System should not depend on owner's network. Security Contractor is responsible for new video system network cabling, network switches of sufficient size and capability to support NVRs, Workstations, IP Cameras, IP Servers (VMC) or other video surveillance components.
- F. Security Contractor shall provide 4000VA UPS unit at each rack (4 servers) or 1000VA per server location to support VMC equipment. Contractor shall only install devices to a maximum fill of no more than 80% of capacity and allow one (1) RU between devices. Any additional servers at one location will require another rack. Security Contractor is required to subcontract a licensed Electrical Contractor to provide 120VAC electrical power at locations where UPS's are installed.
- G. Contractor shall provide and install one infrastructure protection camera in each IDF and MDF room where Video Surveillance System equipment is installed. Infrastructure

protection cameras shall be provided even if not identified on plans.

1. In NVR only IDF/MDF installations, Contractor shall install specified IP mini-dome camera.
2. Infrastructure protection cameras shall be programmed to record when motion is sensed and with 30 seconds of pre-alarm recording.

2.3 CABLE AND INSTALLATION

- A. The Contractor shall provide and install all CAT6 cabling for signal and POE power to each camera.
- B. Power circuits for UPS equipment dedicated to Video Equipment shall be the responsibility of the security contract. Power circuits are to be installed by a licensed electrical contractor subcontracted by the security contractor.

2.4 NETWORK VIDEO RECORDERS

- A. The Network Video Recorder (NVR) shall enable the user to record based upon surveillance recording needs. It shall all continuous, motion detection, schedule or event-based recording. The NVR shall feature an event log, event search, along with event notification that can send an email or alert when an event occurs.
- B. The NVR shall support H.264 to reduce file size requirements.
- C. The NVR camera selection and recording shall be integrated with the touch screen security control system to allow camera image call-up upon selecting a camera icon or an intercom icon on the touch screen monitor.
- D. The NVR software shall be capable of being loaded on any connected workstation on the network and centrally manage all the NVR and camera functions. The software shall enable viewing of up to 64 live cameras on a single screen and support up to 256 devices with a maximum of 1,024 channels.
- G. All NVR equipment shall include a three year parts and labor warranty.

2.5 CAMERAS

- A. **Camera Mounting Brackets and Hardware:** Contractor shall provide all mounting hardware and brackets appropriate to mount cameras, and camera support equipment. Where plans indicate type, Contractor shall provide indicated type. Where not indicated, Contractor shall provide mount that is physically and aesthetically appropriate. All camera mounts shall be provided from camera manufacturer to match finish and style of attached camera.
- B. **Pan/Tilt/Zoom Cameras:** IP PTZ camera with 2.1 Megapixel resolution minimum. The system shall provide the capability of controlling and viewing pan- tilt-zoom cameras over the network as well as allowing on site viewing and control. Tamper resistant with all movable parts enclosed behind a protective cover.
 1. Integrated dome.
 2. POE+ or 24 VAC operation.
 3. Operating temperature range -22° F to 140° F.
 4. Day/night camera with 23X optical zoom (min.) and 16X digital zoom.
 5. Smart auto tracking that can detect and track progressively moving objects within the camera's coverage area.
 6. 1920 x 1080 (1080p) 2.1 Megapixel resolution (minimum) full IP digital camera.
- C. **Fixed Position Indoor/Outdoor Dome Cameras:**
 1. The fixed camera dome shall be an IP camera with 4.0 Megapixel resolution as a

minimum. The camera shall be Vandal proof and include WDR and IR illumination in total darkness up to 65 feet.

2. The camera position shall have a three direction adjustment, allowing for adjustment of pan, tilt and lens rotation (roll), for any angle of view required. The cameras shall have PoE (802.3af) capability.
3. The camera dome shall meet or exceed the following design and performance specifications.

Megapixel	4.0
Day/Night/Function	True D/N w/Mechanical Cut Filter
Digital Noise Reduction	3D DNR
Electronic Shutter	1/3 – 1/10,000 sec
Flip	Digital Horizontal/Vertical
IR Array Range (ft)	65
Lux (B/W)	0.0
Lux (Color)	0.1
Wide Dynamic	Yes
Video Streaming	Dual
Pan Angle	0 Deg – 355 Deg
Tilt Angle	0 Deg – 75 Deg
Outdoor rating	IP66 minimum
Vandal-proof rating	IK10 minimum
POE	802.3af
Warranty	3 years

PART 3-EXECUTION

3.1 EXAMINATION

- A. Examine pathway elements intended for cable. Check raceways, cables trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.
- B. Examine walls, floors, roofs, equipment bases, and roof supports for suitable conditions where video equipment is to be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Outdoor Installation: Comply with ANSI C2, "National Electrical Safety Code."
- B. Install surge suppressors where power-operated devices are not protected against voltage transients by integral surge suppressors specified in UL 1449. Install surge suppressors at the devices' power-line and signal terminals. **All exterior building cameras shall include surge suppressors at the cable entrance or at the**

termination location closest to the cable entrance to the building.

- C. Wiring Method: Install cables in raceways and as otherwise indicated. Conceal raceways and wiring except in unfinished spaces.
- D. Fire Wall Penetrations: The Contractor shall avoid penetration of fire rated walls and floors wherever possible. Contractor shall also seal all floor, ceiling and wall penetrations in fire or smoke barriers and in the wiring closet.
- E. Wall Penetrations: Where penetrations are necessary, they shall be sleeved with metallic conduit and resealed with an Underwriter Laboratories (UL) approved sealant. Provide three sided pre-finished metal hood and seal to wall where conduit penetrates exterior wall.
- F. Do not install wall mounted cameras into metal fascia. Ensure they are mounted into brick, and sealed top and sides (not bottom).
- G. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
- H. Pulling Cable: Do not exceed manufacturer's recommended pulling tensions. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
- I. Splices, Taps, and Terminations: For power and control wiring, use numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- J. Grounding: Provide independent signal circuit grounding recommended by manufacturer.

3.3 WIRING INSTALLATION

- A. General:
 - 1. Cabling between wiring closet and camera locations shall be made as individual home runs. No intermediate splices may be installed or utilized between the wiring closet and the camera location.
 - 2. All cable must be handled with care during installation so as not to change performance specifications.
- B. Placement: All cabling and associated hardware shall be placed so as to make efficient use of available space. All cabling and associated hardware shall be placed so as not to impair the Owner's efficient use of their full capacity.
- C. Cable Routes: All cabling placed in ceiling areas must be in conduit. Cable supports shall be permanently anchored to building structure or substrates. Provide attachment hardware and anchors designed for the structure to which attached and that are suitably sized to carry the weight of the cables to be supported. Attaching cable to pipes or other mechanical items is not permitted.

3.4 EQUIPMENT RACK CONFIGURATION

- A. Cable Placement: Cable installation in the wiring closet must conform to the Project Drawings. All cabling shall be routed so as to avoid interference with

any other service or system, operation, or maintenance location. Avoid crossing areas horizontally just above or below any riser conduit. Lay and dress cables to allow other cables to enter the conduit/riser without difficulty at a later time by maintaining a working distance from these openings.

- B. Cable shall be routed as closely as possible to the ceiling, floor or corners to ensure that adequate wall or backboard space is available for current and future equipment. All cable runs within the wiring closet shall be horizontal or vertical within the constraints of minimum cable bending radii. Minimum bend radius shall be observed. Cables shall not be tie-wrapped to electrical conduit or other equipment.
- C. All incoming cables shall be routed on the cable tray if available and neatly dressed down to the patch panels.

3.5 VIDEO SURVEILLANCE SYSTEM INSTALLATION

- A. Install cameras at final locations defined by camera location tests. Install cameras with 84-inch (2134-mm) minimum clear space below cameras and their mountings. Change type of mounting to achieve required clearance. Contractor shall coordinate with Owner if this minimum clearance cannot be achieved in location identified on plans.
- B. Set pan unit and pan-and-tilt unit stops to suit final camera position and to obtain the field of view required for camera.
- C. Install power supplies and other auxiliary components at control stations. Do not install such items near the devices they serve, unless otherwise indicated.
- D. Camera Adjustment and Testing
 - 1. For each fixed camera, adjust the auto iris level and focus for max video out while having good video in both light and dark conditions.
 - 2. Adjust field of view per Owner's direction.
 - 3. At each camera location, eliminate or minimize camera vibration caused by either wind in outdoor settings or by general vibration at the camera.

3.6 OWNER COORDINATION

- A. The Owner shall assist in establishing procedural guidelines and in defining terminology and conditions unique to the Owner's operation.

3.7 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals according to Division 16 Section "Electrical Identification."
- B. Labels: The Contractor shall label all outlets using permanent machine engraved labels approved by the Owner. Label patch panels in the wiring closet to match those on corresponding camera locations. The font shall be at least one-eighth inch (1/8") in height, block. All labels shall correspond to as-builts and to final test reports.
- C. Clean CCTV system components, including camera-housing windows, lenses, and monitor screens, using methods and materials recommended by manufacturer.

3.8 END-USER TRAINING

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain camera equipment.

1. Train Owner's personnel on procedures and schedules for camera viewing, recorded video play back, motion recording adjustment, troubleshooting, servicing, and maintaining equipment.
2. Demonstrate methods of determining optimum alignment and adjustment of components and settings for system controls.
3. Schedule training with Owner, with at least seven days advance notice.
4. Conduct a minimum of six hours training as specified in instructions to Owner's employees in Division 1 Section "Contract Closeout."

3.9 ON-SITE ASSISTANCE

- A. Occupancy Adjustments: When requested by Owner, provide on-site assistance in tuning and adjusting the system to suit actual occupied conditions and to optimize performance. Provide up to two adjustments at Project site for this purpose, without additional cost.

END OF SECTION 28 09 50 – VIDEO SURVEILLANCE SYSTEM

SECTION 02110 - SITE CLEARING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

See drawings for Grading and Drainage Plans.

1.02 DESCRIPTION OF WORK:

- A. Extent of site clearing is shown on Contract Documents as the area designated within Construction Limits.
- B. Site clearing work includes, but is not limited to:
 - 1. Removal of trees and other vegetation.
 - 2. Asphalt.
 - 3. Concrete.
 - 4. Gravel.
 - 5. Light pole.
 - 6. Fencing.
 - 7. Storm drainage
 - 8. Water system
 - 8. Topsoil stripping.
 - 9. Clearing and grubbing.
 - 10. Stockpile stripping in Owner designated areas.
 - 11. Removing off-site rubble found within Construction Limits.

1.03 JOB CONDITIONS:

A. Traffic:

Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without written permission from authorities having jurisdiction.

- B. Provide protection necessary to prevent damage to existing trees and improvements that are to remain in place.
 - 1. Protect improvements on adjoining properties and on Owner's property.
 - 2. Restore damaged improvements to their original condition, as acceptable to parties having jurisdiction.
 - 3. Ensure the utilities within the site serving adjacent properties are located prior to construction and protected from damage during construction. All services to existing properties shall remain in service except for Owner approved interruptions for tie-in of new services.
 - 4. Protect trees on adjacent property and trees outside limits of construction from damage during construction. Contractor shall be responsible for replacing any damaged trees.

PART 2 - PRODUCTS

NOT APPLICABLE TO WORK OF THIS SECTION

PART 3 - EXECUTION

3.01 SITE CLEARING:

A. General:

Remove trees, shrubs, grass, and other vegetation, improvements, or obstructions interfering with installation of new construction. Remove such items off-site or elsewhere on site or premises as specifically indicated by the Owner. Removal includes digging out stumps and roots.

B. Clearing and Grubbing:

Clear site of trees, shrubs, and other vegetation, except for those indicated to be left standing.

1. Completely remove stumps, roots, and other debris protruding through ground surface.
2. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated. Place fill material in horizontal layers not exceeding six [6"] inches loose depth, and thoroughly compact to a herein specified density.

3.02 DISPOSAL OF WASTE MATERIAL AND EXISTING ON-SITE RUBBLE:

- A. DO NOT burn materials or debris on the premises without written consent of Owner and then only under supervision and permit of local fire agency.
- B. Remove waste materials and unsuitable and excess topsoil from Owner's property and dispose of off-site in legal manner.

END OF SECTION

SECTION 02200 - EARTHWORK

PART 1 – GENERAL

1.01 SCOPE:

Furnish all labor, materials, tools, and equipment necessary for excavation, filling, and grading work as herein specified, shown on the drawings, or reasonably implied to complete the construction.

A. **Extent of Work:**

Earthwork, including but not necessarily limited to the following:

1. Excavation, filling and backfilling, preparation of subgrade, and rough and finish grading in conjunction with building pad and paving.
2. Disposal of excavated materials not required for fills.
3. Protection of underground utilities.
4. Keeping excavations and site free of standing water.
5. Shoring, bracing, piling, planking, and cribbing as required; removal of same.
6. Erosion and sediment control.

B. See the following sections for scope of work described therein:

1. ***Section 02220 - Trenching, Backfilling, and Compaction.***
2. ***Section 02513 – Asphaltic Concrete Paving.***
3. Excavation and backfilling in conjunction with mechanical and electrical work: **DIVISIONS 15 and 16.**
4. ***Section 02010 - Subsurface Explorations.***
5. ***Section 02234 – Roadway Bases, Sand/Limerock.***
6. ***Section 02238 – Roadway Bases, Soil Cement.***

1.02 QUALITY ASSURANCE:

- A. See ***Section 01400 - Quality Control*** of this Project Manual for soil quality control.
- B. See ***Section 01022 - Inspection Testing Services*** of this Project Manual for earthwork services.
- C. Laboratory and geotechnical engineer shall prepare a written report of services performed and distribute these reports to the Architect and Contractor.

PART 2 – MATERIALS

2.01 FILL MATERIALS:

- A. Suitable materials for areas not requiring specific compaction densities are earth, stone, gravel, or other material of acceptable quality that are free of debris, roots, organic matter,

frozen matter, and free of stones greater than 2-1/2" in diameter.

- B. Unsuitable materials are materials that contain debris, roots, organic matter, frozen matter, stones greater than 2-1/2" in diameter, and other materials that are determined by the soil engineer as too wet or otherwise unsuitable for providing a stable subgrade or stable foundation for structures.
- C. **Structural Fill for Areas Requiring Specific Compaction Densities:**
 - 1. Materials with liquid limit not exceeding 45 and plastic limit not exceeding 25.
 - 2. Excavated materials in classification SP and SM, in accordance with the Unified Soil Classification System, may be used if specified densities are obtained.
 - 3. Materials shall not contain any unsuitable matter.
- D. "**Topsoil**" shall be defined as fertile agricultural soil typical of locality and capable of sustaining vigorous plant growth from well drained site that is free of flooding; free of admixture subsoil, slag or clay, stones, lumps, line plants and their roots, sticks, and other extraneous matter. Excavated existing sandy loam topsoil may be used if conforming to foregoing specified requirements.

PART 3 – EXECUTION

3.01 SITE PREPARATION FILL REQUIREMENTS:

- A. To prepare for construction it is recommended that all topsoil, vegetation, roots, and any soft soils in the building area be stripped from the ground surface and either wasted or stockpiled for later use in landscaping. Utilities should be located and re-routed as necessary. After stripping (and excavating to the proposed subgrade level as required), the building area should be proof-rolled with a moderately heavy pneumatic-tired vehicle such as a 15 to 20 ton dump truck or scraper. Soils which are observed to rut or deflect excessively under the moving load should be undercut and replaced with properly compacted fill. All proof-rolling and undercutting should be witnessed by a qualified geotechnical engineer and should be performed during a period of dry weather.
- B. If the soil test borings were made during the rainy season the surficial soils may be somewhat soft and saturated. If grading work is performed while the upper soils are very moist some undercutting on the order of one to two [1'-0" to 2'-0"] feet may be required prior to filling the site. Typical construction traffic (dump trucks, concrete trucks, etc.) will pump or rut wet soils, thus requiring the soils to be stabilized or replaced. However, if the grading work is performed during an extended period of dry weather (i.e., the summer months), undercutting may not be required.
- C. After stripping, excavating where required, and proof-rolling, but prior to placing fill, the exposed soils should be scarified and then processed to a moisture content between three [3] percentage points below and two [2] percentage points above the standard Proctor optimum. The subgrade should be recompacted to a dry density of at least 95 percent of the standard Proctor maximum dry density for depths of at least six [6"] inches below the surface.
- D. After subgrade preparation and inspection have been completed, fill placement may begin. Fill materials should be free of organic or other deleterious materials have a maximum particle size of three [3"] inches, liquid limit less than 45, and a plasticity index less than 25. If a fine-grained (silt or clay) soil is used for fill very close moisture content control will be required to achieve the recommended degree of compaction.
- E. Fine-grained structural fill should be compacted to at least 95 percent of the standard

Proctor maximum dry density as determined by ASTM Designation D698. Granular soils should be compacted to at least 100 percent of the standard Proctor density. If the granular soils are of a free draining type (i.e., less than about twelve [12%] percent fines) for which impact compaction will not produce a well defined moisture-density relationship curve, they should be compacted to at least 70 percent relative density as determined by ASTM Designations D4523 and D4254.

- F. Fine-grained fill should be placed in maximum lifts of eight [8"] inches of loose material and should be compacted within the range of two [2] percentage points above to three [3] percentage points below the optimum moisture content as determined by the standard Proctor test. If water must be added it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying.
- G. The fill should extend outward from the exterior perimeter of the building a distance equal to the height of fill or five [5'-0"] feet, whichever is greater.
- H. Each lift of compacted soil should be tested by the geotechnical engineer or his representative prior to placement of subsequent lifts. As a guideline it is recommended that field density tests be taken at a frequency of no less than one [1] test per 2,500 sq. ft. of surface area per lift of fill in the building area.

3.02 EXCAVATIONS:

After opening, footings should be inspected and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. If it is required that footing excavations be left open for more than one [1] day they should be protected to reduce evaporation or entry of soil moisture. Adequate protection against sloughing of soil should be provided for workers and inspectors entering the footing excavations, utility trenches, and undercut areas (this protection should meet the requirements of OSHA and applicable building codes).

3.03 DRAINAGE:

Water should not be allowed to collect near the foundations or floor slab areas of the building either during or after construction. Proper drainage should be provided by sloping the ground surface away from the structure. Splash blocks may be helpful in directing water away from the foundations.

3.04 WEATHER CONDITIONS:

During wet weather periods increases in moisture can cause significant reduction in the soil strength and support capabilities. In addition, soils which become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction during dry weather.

3.05 DISCOVERY OF DEFECTS:

The Contractor will, upon becoming aware of subsurface or latent physical conditions differing from those disclosed by the original soil investigation work, promptly notify the Owner verbally and in writing to permit verification of the conditions and the nature of the differing conditions. No claim by the Contractor for any conditions differing from those anticipated in the plans and specifications and disclosed by the soil studies will be allowed unless the Contractor has so notified the Owner, verbally and in writing as required above, of such differing conditions.

END OF SECTION

SECTION 02210 - EROSION CONTROL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and **General Provisions of the Contract**, including **General** and **Supplementary Conditions** and all **DIVISION 1** sections apply to the work of this section.
- B. Ground cover (seeding or sod).

1.02 DESCRIPTION:

- A. This work consists of furnishing all materials, equipment, supervision, and labor necessary to provide erosion control measures as shown or reasonably implied in the drawings.
- B. The Contractor shall have soils analysis performed to determine fertilizer application rates necessary for the site.
- C. Portions of the erosion control measures will be in place when work begins. It is the responsibility of this contractor to maintain all new erosion control measures until project is completed.
- D. Erosion Control:
 - 1. The Contractor shall install and maintain erosion control devices in general conformance to the Erosion Control Plan. The Erosion Control Plan is provided to indicate minimum erosion control measures required of the Contractor and does not take into account the Contractor's sequence of construction. Additional erosion control measures shall be undertaken by the Contractor as required to minimize impacts to adjacent properties and the drainage system downstream of the site, at no additional cost.
 - 2. Provide temporary silt fences between the project site, including the borrow area, and the adjacent drainage system for the purpose of erosion control.
 - 3. The temporary silt fence shall consist of woven wire fence attached to posts with geotextile fabric attached to the upper grade side of the fence. The geotextile fabric shall be anchored to the soil.
 - 4. Riprap for miscellaneous erosion control measure, such as energy dissipation at pipe outlets and stone check dams, shall be dumped or hand placed, in locations indicated on the plans or as directed by the Engineer. Filter fabric for riprap shall be considered incidental to the installation of the riprap.
 - 5. Seeding for erosion control shall be placed in accordance with **Section 02270 – Erosion Control Seeding** on ditch slopes, pond slopes and other areas, as directed by the Engineer.
 - 6. Erosion control structures shall be maintained in satisfactory condition until an approved cover of grass is established to prevent erosion, for the duration of the project, or until removal is approved, whichever occurs first.
 - 7. Detention ponds indicated on the plans shall serve as silt basins during the construction. Silt shall be removed from these basins periodically during the construction as to maintain the erosion control capabilities of the silt basins. Removal of the silt shall be

considered incidental to the earthwork operations. Below ground sediment traps (100-2000 square feet 1' – 3' deep) may be required as part of the erosion control plan. No separate payment will be made for these in that they shall be considered incidentals to the earthwork operations.

8. The Contractor shall provide erosion control measures necessary to satisfy the governing jurisdictional agencies Tennessee Department of Environment and Conservation.
9. The Contractor shall be listed as responsible entity on the "Storm Water Pollution Prevention Plan", SWPPP. The Engineer shall prepare the SWPPP for signature. The Contractor shall be required to sign, as responsible entity on the Notice of Intent (N.O.I.).
10. Any fines or penalties resulting from the discharge of sediment to waters of the State, or inadequate erosion control shall be paid for the Contractor. This applies to actions taken by local authorities, State agencies and Federal Agencies, and includes action taken against the Owner or Contractor.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 CONSTRUCTION SCHEDULE:

- A. A construction schedule shall be an integral part of the plan. It shall establish a sequence of construction operations which will facilitate the control of erosion. Among the factors to be considered are:
 1. Limiting initiation of work to minimum area necessary to execute work, leaving soil cover on other areas undisturbed.
 2. Completing work on individual areas as quickly as possible to permit installation of planned temporary and permanent erosion control measures.
 3. Whenever land-disturbing activity is undertaken, a ground cover sufficient to restrain erosion must be planted or otherwise provided within 30 working days on that portion of the tract upon which further active construction is not being undertaken.

3.02 TEMPORARY SOIL EROSION MEASURES:

Site grading operation of preparation shall not commence until immediate and temporary soil erosion measures are installed. These temporary measures shall be as indicated on the plans or as required by the local authorities.

END OF SECTION

SECTION 02220 - TRENCHING, BACKFILLING, AND COMPACTION

PART 1 - GENERAL

1.01 SCOPE:

This Contractor shall furnish all labor and materials and perform all work to complete the following:

- A. Excavation for under ground piping.
- B. Provide necessary sheeting, shoring, and bracing.
- C. Prepare trench bottom with appropriate materials.
- D. Remove water from excavation, as required.
- E. Place and compact granular beds, as required, and backfill.

1.02 RELATED WORK:

- A. See **Section 02200 - Earthwork**.
- B. See **Section 03300 - Cast-in-Place Concrete**; concrete work

1.03 PRECAUTIONS:

- A. Notify utility companies when it is necessary to disturb existing facilities and abide by their requirements for repairing and replacing.
- B. Protect all vegetation and other features to remain.
- C. Protect all benchmarks and survey points.
- D. When the trench is to be located within a right-of-way or easement, the Contractor shall acquaint himself with the requirements and shall continue all work elements within the limits of the right-of-way or easement. Provide barriers, warning lights, and other protective devices at all trenches to protect the public welfare.
- E. Provide for the movement and protection of traffic, both vehicular and pedestrian, including flagmen where required.

1.04 REGULATORY AGENCY:

- A. All open excavation made in the Earth's surface shall comply with subpart "P", **Excavations**, of OSHA's 29 CFR, Part 1926.
- B. All excavations more than twenty [20'-0"] feet in depth must be designed by a registered engineer. Submit plans, sealed by a professional engineer, of these excavations to the Architect for approval.

PART 2 - MATERIALS

2.01 BEDDING AND BACKFILL MATERIALS:

A. **Class A Material:**

Continuous concrete cradle constructed in conformity with details shown on drawings, consisting of concrete as specified in **Section 03000 - Cast-in-Place Concrete**.

B. **Class B Material:**

Sand or natural sandy soil, all passing a three-eighths [3/8"] inch sieve with not more than ten [10%] percent passing a No. 200 sieve; or stone, gravel, chert or slag.

C. **Class C Material:**

Natural ground or compacted embankment at a depth of at least ten [10%] percent of the outside vertical pipe diameter.

D. In rock cuts or other areas where free drainage bedding or backfill materials are required, use crushed stone, slag, or washed gravel.

E. For crushed stone pavement and shoulder replacement, use crushed stone.

PART 3 - EXECUTION

3.01 PREPARATION:

A. Install barriers and other devices to protect areas adjacent to construction.

B. Protect and maintain all benchmarks and other survey points.

3.02 EXCAVATION TRENCHES:

A. Perform in such a manner as to form a suitable trench in which to place the pipe and so as to cause the least inconvenience to the public.

B. Maximum width at the crown of the pipe shall be two [2'-0"] feet plus the nominal diameter of the pipe.

C. Cut pavement along neat, straight lines with either a pavement breaker or pavement saw.

D. Trench depth for lines shall be as shown on the plans or as specified.

E. Align trench as shown on the plans unless a change is necessary to miss an unforeseen obstruction.

F. Whenever the trench bottom is in unstable soil, it shall be undercut. The depth of the undercut shall be sufficient so that when backfilled with foundation material, the trench bottom shall be stable enough to accommodate foot traffic without shoving or pumping. The foundation material shall be clean sand meeting with requirements of this section.

G. Whenever, due to neglect or error, the excavation is carried below grade, it shall be backfilled to the desired grade with select granular bedding material or other material acceptable to the Architect. The backfill material shall be compacted in accordance with **Section 02200 - Earthwork**.

H. Excavated material suitable for backfill shall be preserved in an orderly manner and at locations that will not overload sides of the excavation. Material that is not required for

backfill shall be removed by this Contractor to such disposal areas as may be provided by the Owner and directed by the Architect.

3.03 SHEETING, SHORING, AND BRACING:

- A. When necessary or when directed by the engineer, furnish, put in place, and maintain such sheeting, bracing, etc., as may be required to support the sides of the excavation and to prevent movement to provide protection for workmen, the work, adjoining structure(s), and pavement. Comply with local regulations or, in the absence thereof, refer to the "**Manual of Accident Prevention in Construction**," published by the Associated General Contractors of America, Inc.
- B. Take care to prevent voids outside the sheeting.
- C. If voids are formed, fill and ram them immediately to the satisfaction of the engineer.
- D. Devise plans for performing this work, subject to the approval of the engineer.
- E. Unless adjacent facilities will be injured, remove all sheeting, shoring, and bracing after backfill has been placed to a depth of eighteen [18"] inches over the pipeline.
- F. Cut shoring off at the top of the pipe and leave the lower section in the trench.

3.04 DISPOSAL OF EXCAVATED MATERIAL:

Satisfactorily dispose of all excess excavated material that is not suitable for embankments.

3.05 UNAUTHORIZED EXCAVATION:

- A. All excavations outside or below the proposed lines and grades shown on the plans or directed by the engineer are considered unauthorized.
- B. Backfill areas of unauthorized excavation with the type material necessary (earth, rock or concrete) to ensure the stability of the structure of construction involved.
- C. Unauthorized excavation or backfill to replace same shall not be a pay item.

3.06 REMOVAL OF WATER:

- A. Keep excavated areas free of water while work is in progress.
- B. Well-pointing shall be performed, if required.
- C. Take particular precautions to prevent the displacement of structures or pipelines as a result of accumulated water.

3.07 OBSTRUCTIONS:

- A. Obstructions shown on the plans are for information purposes only and do not guarantee their exact locations, nor that other obstructions are not present.

- B. When utilities or obstructions are not shown on the plans but are present off the roadway at the location of the proposed pipeline route, the Contractor may request relocation of the pipeline in the roadway, if necessary, to avoid disturbing the utility or obstructions.
- C. Exercise due care in excavating adjacent to existing obstructions and do not disturb same unless absolutely necessary.

3.08 BEDDING MATERIALS:

- A. Use Class A, B, or C bedding, as shown on the plans. If Class is not indicated, Class C bedding is to be used.
- B. Construction Class B bedding is to be used in a trench cut in natural ground or compacted embankment.
 - 1. Bed pipe on six [6"] inches of Class B material and sufficient additional Class B material accurately shaped by a template to fit the lower part of the pipe exterior.
 - 2. Ram and tamp in layers not over six [6"] inches in loose thickness around the pipe to a minimum depth of that shown on the plans.
 - 3. When bell and spigot pipe is to be placed, dig recesses in the bedding material of sufficient width and depth to accommodate the bell.
- C. Construction Class C Bedding is to be used in a Shallow Trench
 - 1. Shape the bedding to fit the lower pipe exterior for the specified embedment.
 - 2. When bell and spigot pipe is to be placed, dig recesses of sufficient width and depth to accommodate the bell.

3.09 BACKFILLING - GENERAL:

- A. Backfill shall be thoroughly compacted with a heavy rammer or an approved mechanical tamper or, if the soil is of granular nature, by puddling with hose and long pipe nozzle after the trench is backfilled, provided that under the location of pavement and other surfacing, the backfill shall be compacted solidly with mechanical tampers in layers not more than six [6"] inches thick, measured loose.
- B. All backfilling of trenches or other excavation shall be accomplished in a manner approved by the engineer to ensure, in the opinion of the engineer, the following compaction: A ninety-five [95%] percent compaction standard proctor within the building area.

3.10 INITIAL BACKFILLING:

- A. Do not begin backfilling before the engineer has inspected the grade and alignment of the pipe, the bedding of the pipe, and the joints between the pipes. If backfill material is placed over the pipe before an inspection is made, reopen the trench so that inspection can be made. Locations of all piping shall be recorded on the record drawings.
- B. Perform backfilling by hand, together with tamping, until fill has progressed to eighteen [18"] inches above the top of the pipe.
 - 1. Deposit Class I granular material (where required) or loose soil, free of lumps, clods,

frozen material, or stones in layers approximately six [6"] inches thick.

2. Compact by hand or with a manually operated machine tamper actuated by compressed air or other suitable means.
3. Use taps and machines of suitable type which do not crush or otherwise damage the pipe.

3.11 FINAL BACKFILLING:

A. After backfill has reached a point of eighteen [18"] inches or more above the top of the pipe, perform final backfilling as needed due to the location of the work and danger from subsequent settlement.

B. Backfilling in Unimproved Areas:

1. Dispose of all soft or yielding material which is unsuitable for trench and replace backfill with suitable material.
2. Deposit backfill to the surface of the ground by dragline, bulldozer, or other suitable equipment in such a manner so as not to disturb the pipe.
3. Neatly round sufficient surplus excavated material over the treatment so as to compensate for settlement afterward.
4. Dispose of all surplus excavated material.
5. Prior to final acceptance, remove all mounds to the elevation of the surrounding terrain.

END OF SECTION

SECTION 02281 - TERMITE CONTROL

PART 1 - GENERAL

1.01 SECTION INCLUDES:

Furnishing all labor, equipment and materials, and installing the termite control system specified below.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

A. DIVISION 3 - CONCRETE:

1.03 QUALITY ASSURANCE:

A. Applicator Qualifications:

1. Registered or licensed, where required by State, County, or City jurisdictions.
2. Submit evidence that applicator has been engaged in the successful termite control applications for at least five [5] years. Submit the design application and manufacturer's mixing and application instructions to the Architect for approval prior to application.
3. A complete and accurate record of all applications and testing reports shall be furnished to the Engineer. The records shall indicate the chemical manufacturer, applicator's name and signature, locations dispensed, chemicals used and the proportion/mix of each, and quantities dispensed over what area.

B. Testing:

Samples shall be taken from each 500 sq.ft. area of work for solution analysis of chemical concentration by the Contractor's testing laboratory.

NOTE: Testing is not required when the chemical applicator provides a bonded or insured contract which cannot be canceled by any concerned parties except the Owner.

1. Test each sample for the proper proportion as specified herein.
2. All areas shall be retreated if the test results average is less than 90 percent of the listed minimum concentration(s).
3. Take one [1] sample of each tank truck load or drum of each working solution for analysis of chemical concentration.

1.04 GUARANTEE:

- A. Upon completion of soil treatment and as a condition of final acceptance and payment, the Contractor shall provide the Owner with a written five [5] year guarantee.
- B. The guarantee shall state that the application was made at the concentrations, rates, and methods which comply with these specifications.
- C. The effectiveness of the treatment is guaranteed for not less than five [5] years at no additional cost to the Owner.
- D. At the end of the five [5] year period, the Owner shall be offered a renewable contract (guarantee) on a year-to-year basis, at the Owners option, at an agreed upon annual fee.

- E. Damage to the building caused by termites shall be corrected at no cost to the Owner up to a value of \$10,000.00.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Toxicants:

Use only EPA approved water-based emulsion soil chemicals such as the following:

1. **Premise® 75 Insecticide In Water Soluble Packets** by Bayer Environmental Science
2. Other proprietary chemicals may be used if:
 - a. They meet a five [5] year field test conducted by the US Forest Service.
 - b. Proof shall be provided that no toxic effects to humans or beneficial plant and animal life will result from their use.
 - c. Approved by EDA and Federal Insecticide, Fungicide, and Rodenticide Act, and with the appropriate State agency (State Chemist, State Department of Agriculture, and State and local Health Departments).

B. Handling and Storage:

1. Handle and open container in a manner as to prevent spillage. Use only in area provided with appropriate exhaust ventilation.
2. Protect from freezing.
3. Store in a cool, dry place and in a such a manner as to prevent cross contamination with other crop protection products, fertilizers, food and feed. Store in original container and out of the reach of children, preferably in a locked storage area.
4. The 30-day storage temperature average must not exceed the recommended maximum.
5. Wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, using the toilet or applying cosmetics.
6. Wash thoroughly and put on clean clothing. Remove soiled clothing immediately and clean thoroughly before using again.
7. Remove Personal Protective Equipment (PPE) immediately after handling this product. Before removing gloves clean them with soap and water. Wash thoroughly and put on clean clothing.
8. Recommended maximum transport/storage temperature: 38° C / 100° F.

C. EXPOSURE CONTROLS / PERSONAL PROTECTION:

1. Train employees in safe use of the product. Follow all label instructions. Do not allow children or pets to enter the treated area until it has dried.

2. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and warm/tepid water. Keep and wash PPE separately from other laundry.
3. Wear tightly fitting safety goggles, chemical resistant nitrile rubber gloves, long sleeved shirt and long pants and shoes plus socks.

PART 3 - EXECUTION

3.01 SOIL TREATMENT:

A. Concrete Slab-On-Grade or Basements:

1. Apply an overall treatment to the entire surface of soil or other substrate to be covered by the slab including areas to be under carports, porches, basement floor and entrance platforms. Apply at the rate of 1 gallon of solution to accurately and uniformly cover 10 square feet. If fill under slab is gravel or other coarse aggregate, apply at the rate of 1.5 gallons or sufficient volume of solution, to accurately and uniformly cover 10 square feet. In addition, apply 4 gallons of solution (see APPLICATION VOLUME) per 10 linear feet to provide a uniform treated zone in soil at critical areas such as along the inside of foundation walls, and around plumbing, bath traps, utility services, and other features that will penetrate the slab.
2. After of grading, make an application by trenching or trenching and rodding around the slab or foundation perimeter. Rodding may be done from the bottom of a shallow trench. When rodding, rod holes must be spaced in a manner that will allow for a continuous chemical treated zone, not to exceed 12 inches, to be deposited along the treated area. Rod holes must be extended below the footing. Apply 4 gallons of solution (see APPLICATION VOLUME) per 10 linear feet, per foot of depth to provide a uniform treated zone. When trenching, the trench along the outside foundation should be about 6 inches in width and 6 inches in depth. Use a low-pressure spray (not to exceed 25 psi at the treatment tool when the valve is open) to treat soil which will be placed in the trench after rodding. Mix the spray solution with soil as it is being placed in the trench. When treating voids in hollow masonry units, use 2 gallons of solution per 10 linear feet of wall. Apply solution so it will reach the footing by injecting into the lower areas of the wall just above the floor or footing.
3. When treating foundations deeper than 4 feet, apply the termiticide as the backfill is being replaced, or if the construction contractor fails to notify the applicator to permit this, treat the foundation to a minimum depth of 4 feet after the backfill has been installed. The applicator must trench and rod into the trench or trench along the foundation walls and around pillars and other foundation elements, at the rate prescribed from grade to a minimum depth of 4 feet. When the top of the footing is exposed, the applicator must treat the soil adjacent to the footing to a depth not to exceed the bottom of the footing. However, in no case treat a structure below the footing.
4. Rodding in trench followed by flooding of trench and treatment of backfill may provide a better opportunity to achieve a continuous chemical treated zone than using soil rodding alone to establish a vertical termiticide treated zone.

B. Crawl Spaces:

Application must be made by trenching or trenching and rodding downward along the inside and outside of foundation walls, around piers, interior supports in contact with the soil, plumbing and utility services. Apply 4 gallons of solution (see APPLICATION VOLUME) per 10 linear feet per foot of depth to provide a uniform treated zone. Rodding may be done from the bottom of a shallow trench to top of the footing or a minimum of 4 feet. When

rodding, rod holes must be spaced in a manner that will allow for a continuous chemical treated zone to be deposited along the treated area. Rod holes must not extend below the footing. When trenching, the trench should be about 6 inches wide and 6 inches deep. Use a low-pressure spray to treat soil which will be placed in the trench, mixing the spray solution with soil as it is being placed in the trench.

C. Hollow Block Foundations or Voids:

1. Hollow block foundations or voids in masonry resting on the footing may be treated to provide a continuous chemical treated zone in the voids at the footing. Apply 2 gallons of solution per 10 linear feet to the lower part of the void so that it reaches the top of the footing or soil.
2. Treatment of voids in block or rubble foundation walls must be closely examined. Applicators must inspect areas of possible runoff as a precaution against application leakage in the treated areas. Some areas may not be treatable or may require mechanical alteration prior to treatment.
3. All leaks resulting in the deposition of termiticide in locations other than those prescribed on this label must be cleaned up prior to leaving the application site (refer to Precautionary Statements).

D. Application Technique:

1. Do not make treatments when soil is excessively wet, or immediately after rains to avoid surface flow of intoxicant from application site.
2. Unless treated soil is to be promptly covered with membrane vapor barrier, take adequate protection to prevent disturbance and human or animal contact with treated soil.

3.02 ECOLOGICAL INFORMATION:

- A. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate surface or ground water by cleaning equipment or disposal of wastes, including equipment wash water. Do not allow to get into surface water, drains and ground water.
- B. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

3.03 DISPOSAL CONSIDERATIONS:

- A. Pesticide, spray mixture or rinse water that cannot be used according to label instructions may be disposed of on site or at an approved waste disposal facility.
- B. Completely empty container into application equipment, then dispose of empty container in a sanitary landfill, by incineration or by other procedures approved by state/provincial and local authorities. If burned stay out of smoke.
- C. Characterization and proper disposal of this material as a special or hazardous waste is dependent upon Federal, State and local laws and are the user's responsibility. RCRA classification may apply.

END OF SECTION

SECTION 02500 - SITE DRAINAGE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes furnishing all labor, materials, equipment, operations, and incidentals necessary for installation of the storm drainage system shown on the drawings and herein specified, including but not limited to storm drainage pipe, manholes, inlets, headwalls, etc.
- B. The following items of related work are specified in other sections:
 - 1. **Section 02200 – Earthwork**
 - 2. **Section 02221 – Trenching, Backfilling, and Compacting**
 - 3. **Section 03300 - Cast-In-Place Concrete**

1.02 COORDINATION:

Coordinate, carefully, the work specified in this section with underground utility installations specified under other sections of these specifications. Notify the Architect promptly of any conflict between work of this section and that of other trades. Field verify all drainage inverts and promptly notify Architect of any conflicts between information shown on the drawings and existing conditions.

1.03 UTILITIES:

- A. The locations of existing underground utilities, such as electric lines, gas lines, sewer lines, water lines, etc., as may or may not be shown on the Contract Drawings, have been determined from the most available information furnished by local government or utility agencies or taken from the Owner's records. The Owner, however, does not assume responsibility for the possibility that, during construction, utilities other than those shown may be encountered, or that the actual location of those shown may be different from the location designated on Contract Drawings.
- B. When encountered in work, or as indicated, protect existing active sewer, water, gas, electric, telephone, and other utility services and structures. Where required for proper execution of the work, relocate them as directed. If existing, active services are not indicated but are encountered and require protection or relocation, request in writing for the Architect's determination or decision. Do not proceed without written instructions from the Architect.

1.04 SCHEDULING:

- A. Construction of new drainage systems shall proceed as early in construction program as possible. Maintain adequate drainage of the project area at all times. Prevent flooding of adjacent roads and private properties.
- B. Wherever possible, new drain lines and inlets to serve the various drainage areas shall be constructed and placed in service. Where this is not possible, temporary drainage facilities shall be provided, as required. These may include temporary ditches, slope drains, temporary connections into completed drain lines, or such other means as required.

PART 2 – PRODUCTS

2.01 PIPE:

- A. Reinforced concrete pipe and fittings shall be reinforced concrete culvert, storm drainage pipe conforming to the latest requirements of ASTM Standard Specifications, Serial Designation C76. Pipe shall be Class IV, unless noted otherwise.
- B. Any pipe, which has been broken, cracked, or otherwise damaged before or after delivery shall be removed from the site of the work and shall be used therein.
- C. All pipe and special fittings shall be new materials, which have not been previously used.
- D. PVC SDR-35 pipe and fittings shall comply with the requirements of ASTM F-679 or D-3034.

2.02 HIGH DENSITY POLYPROPYLENE PIPE

- A. Material: ADS N-12 HP Pipe (per ASTM F2736 & ASTM F288 and AASHTO MP-21-11) shall be High Density Polypropylene Pipe shall be corrugated with smooth interior and annular exterior corrugations.
- B. Joints shall be watertight joints, gasketed integral bell & spigot according to the requirements of ASTM D3212. Gaskets shall meet the requirements of ASTM F2736 & F2881.
- C. Installation shall be per manufacturer's recommendations and as shown on the drawings.

2.03 HIGH DENSITY POLYETHYLENE PIPE

- A. Material: ADS N-12 WT IB Pipe (per ASTM F2648) shall be High Density Polyethylene Pipe shall be corrugated with smooth interior and annular exterior corrugations.
- B. Joints shall be watertight joints according to the requirements of ASTM D3212. Gaskets shall meet the requirements of ASTM F477.
- C. Fittings shall conform to ASTM F2306. Bell and Spigot connections shall utilize a spun-on or welded bell and valley or saddle gasket meeting the watertight joint performance requirements of ASTM F2306.
- D. Installation shall be per manufacturer's recommendations and as shown on the drawings.

2.04 CONCRETE: Concrete for use in inlets and other appurtenances shall be 4000 psi concrete as specified in ***Cast-In- Place Concrete Section***.

2.05 REINFORCEMENT: All reinforcing steel shall be Grade 60 as specified in ***Cast-In- Place Concrete Section***.

2.06 INLETS: Installed as directed on the Contract Documents.

2.07 APPURTENANCE MATERIAL

- A. Clay or shale brick shall comply with ASTM C32 for sewer brick and manhole brick. Grade as selected.
- B. Concrete masonry units shall comply with ASTM C139.

- C. Mortar shall comply with ASTM C270, Type M, for pipe joints and manhole and inlet brickwork.

2.08 CASTINGS:

- A. Gray iron, Class 30, AASH 70 M.108 Standard.
- B. Castings shall be **Memphis Machine Works No. 11** rim and grating, **Memphis Standard 6-72** frame, grate, and cover, and **Memphis Machine Works No. 7A** “drain” manhole rim and cover, or approved equals. (frames shall be bolted down for security purposes)
- C. Bituminous paint finish shall not be affected by hot or cold weather.

2.09 RIP-RAP (If Required):

Stone for dumped rip-rap shall be processed in such a manner as to produce quarry run material including rock fines. The largest pieces of material shall have a volume not to exceed two (2) cu. ft., weigh at least 125 lbs., and shall comprise about 35% of the mass. The remainder of the material shall be well graded down to the finest sizes. No less than five (5.0%) percent or more than twenty-five (25%) percent rock fines will be allowed. Rock fines are defined as material passing No. 4 sieve. Broken concrete may not be used. See **Section 02370 – Riprap.**

PART 3 - EXECUTION

3.01 GENERAL:

- A. Prior to laying pipe, prepare a suitable bedding according to **Section 02210 – Excavating, Filling and Grading.**
- B. Before placing pipe in the trench, field inspect for cracks or other defects; remove defective pipe from the construction site.
- C. Swab the interior of the pipe to remove all undesirable material.
- D. Prepare the bell end and remove undesirable material from the gasket and gasket recess.
- E. All pipe will be laid in an open trench of dimensions given below. No projecting pipe conditions will be allowed.
- F. Lengths of storm drain pipe shown on the drawings are approximate distances center to center of structures. The Contractor shall install pipe based on actual field measurements.

3.02 TRENCHING, BACKFILL, AND COMPACTION:

- A. Refer to **Section 02221 – Trenching, Backfilling and Compaction** for details of trenching, backfill, and compaction.
- B. Excavation shall be by open cut. The top portion of trenches may be excavated as required by the Contractor to any width, which will not cause damage to adjacent structures. The lower portion of the trench, to a height of one (1'-0") foot above the top of the pipe shall not exceed the following:

PIPE SIZE:	15"	18"	21"	24"	30"	36"
TRENCH WIDTH:	3'-0"	3'-3"	3'-6"	3'-10"	4'-5"	5'8"

- C. When sheeting or shoring is used, these widths may be increased by the thickness of the timbers.
- D. All bedding shall be **Class B** as specified in Section 31 23 16, herein, or as recommended by the pipe manufacturer (install according to most stringent requirements).

3.03 INSTALLING STORM SEWER PIPE:

- A. Lay pipe in a straight line on a uniform grade from structure to structure with the bell or groove end up grade.
- B. Firmly support each section throughout its length and form a close concentric joint with the adjoining pipe.
- C. Make junctions and turns with standard or special fittings.
- D. Do not open up more trench at any time than pumping facilities are able to de-water.
- E. Whenever the work ceases, close the end of the pipe with a tight fitting plug or cover.
- F. Close all openings provided for future use and abandoned pipe with a tight fitting plug sealed to avoid leakage.
- G. When the pipe connects with structures, the exposed ends shall be placed or cut off flush with the interior face of the structure and satisfactory connections made.
- H. Any pipe which is not in good alignment or which shows any undue settlement or damage shall be taken up and re-laid without additional compensation
- I. Laying pipe and sealing joints shall be a continuous operation. Seal all joints the same day in which the pipe is laid. Construct the joints in such a manner that a water tight joint will result.
- J. Joints for Rigid Pipe: Rubber gaskets; or other types of joints recommended by the pipe manufacturer and approved.
- K. Install rubber ring gaskets to form a flexible watertight seal.
- L. When other type joints are permitted, install or construct in accordance with the recommendation of the manufacturer.
- M. Inspect the pipe before any backfill is placed.
- N. As the work progresses, clean the interior of all pipe in place.
- O. Make connections by constructing catch-basins, other structures, or by installing wyes or tees as shown on the plans. Wyes and tees, for future connections, shall be installed as indicated.

3.04 PIPE LAYING:

- A. Pipe laying shall proceed upgrade where practicable. Pipe shall be laid true to grade and line with a straight and uniform invert. Pipe shall not be laid in a wet or muddy trench. Trenches shall be de-watered as required, and the pipe bed shall be firm, smooth, and properly shaped as specified.

- B. Joints for reinforced concrete shall be made up with O-ring rubber gaskets, must comply with ASTM C443, and be installed in accordance with the pipe manufacturer's instructions using lubricants and equipment recommended by the manufacturer.

3.05 APPURTENCES AND DRAINAGE STRUCTURES:

- A. Contractor shall furnish and install drainage structures as shown in detail on the drawings. Drainage structures shall have shaped inverts.
- B. All mortar joints shall be filled full. Joints shall be tooled.
- C. All pipe, where cut at face of structure wall, shall be cut and ground smooth with the face of the wall.
- D. All joints around pipe and structure wall at the face of the wall shall be packed full with mortar.
- E. Bottom of drainage structures shall be clean of all debris and walls shall be wiped clean of mortar as work progresses.
- F. The castings, gratings, and fillings shall be placed as indicated on plans, or otherwise directed, to line and grade and in such a manner that subsequent adjustments will not be necessary.
- G. Castings and gratings shall be set firm and snug, shall not rattle, shale, or move unnecessarily. All metals in contact shall touch or be in contact throughout the entire length or width of the casting, grating, or metal, as the case may be.
- H. All structures over four (4'-0") feet deep shall have cast iron steps installed 15" on center in a vertical direction. Cast iron steps and manhole rings and covers shall meet ASTM A48 specifications.

3.06 CAST-IN-PLACE CONCRETE CATCH BASINS:

- A. Perform all concrete construction in accordance with ***Cast-in-Place Concrete Section***.
- B. **Inverts** shall be of concrete; shapes and sizes as indicated on the plans.

3.07 CATCH BASINS - INLET AND OUTLET PIPES:

Extend inlet and outlet pipes through the walls of catch basins, for a sufficient distance beyond the outside surface to allow for connections, cut off flush with the wall on the inside surface, unless otherwise directed.

3.08 CASTINGS AND FITTINGS:

- A. Handle in a manner that will prevent damage. Reject all damaged castings and fittings.
- B. Place all castings and fittings in the positions indicated on the Plans and set true to line and grade.
- C. If castings are to be set in concrete or cement mortar, place all anchors or bolts and position before the concrete or mortar. The casting shall not be disturbed until the mortar or concrete has set.
- D. When castings are to be placed upon previously constructed masonry, the bearing surface of masonry shall be brought true to line and grade and present an even bearing surface in order that the entire face or back of the casting will come in contact with the masonry. Castings shall be set in mortar beds or anchored to the masonry as indicated on the plans.

- E. All castings shall be set firm and snug and shall not rattle.

3.09 CLEAN-UP:

- A. Drainage systems shall be left clean and free from mud and debris of any kind. When looked through, each line between structures shall show a full circle of light; otherwise, the Contractor shall be required to remove and replace the defective portion of the work at his own expense.
- B. Upon completion remove all excess materials, debris, etc. resultant from operations of this section of work from Owner's property in a legal manner.

END OF SECTION

SECTION 02700 - PIPED UTILITIES

PART 1 - GENERAL

1.01 SCOPE OF WORK:

Furnish all labor, materials, equipment, and services required for the completion of the following work:

- A. Gas utility system including tap, meter, and testing, if required.
- B. Water utility system including tap, meter, backflow prevention devices, and testing, if required.
- C. Sanitary sewer system including piping, manholes, grease traps, clean-outs, and connections to city services, if required.

1.02 REGULATORY AGENCIES:

The above work and materials must strictly conform to:

- A. Requirements of local city utility authority for gas service.
- B. City or County standards for sewer service.
- C. Local utility authority for water service.

PART 2 - PRODUCTS

2.01 MATERIALS:

All materials for the above work must strictly conform to the specifications of the regulatory agencies in paragraph 1.02.

PART 3 - EXECUTION

3.01 INSTALLATION:

The installation of all work must strictly conform to the specifications of the regulatory agencies in paragraph 1.02.

END OF SECTION