

Project Manual - VOLUME I

**SKILLED NURSING CARE / MENTAL HEALTH UNIT / HIV - AIDS UNIT &
RENOVATION OF RELATED SUPPORT FACILITIES FOR**

ELAYN HUNT CORRECTIONAL CENTER

LA STATE PROJECT NO. 08-413-97B-1, Part 7

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with 03/24/05 revisions

Division	Section Title	Pages
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Volume One

SERIES 0 BIDDING REQUIREMENTS AND CONTRACT FORMS

Advertisement for Bids	2
Instructions to Bidders	7
Bid Form	3
Bid Bond	1
General Conditions to the Contract (AIA 201, 1997 Edition)	-
Supplementary Conditions	18
Contract between the Owner and Contractor & Performance and Payment Bond	2
Affidavit	1
Roofing Guarantee R1	3
Roofing Guarantee R2	3
Roofing Guarantee R3	2
Schedule of Values	4
Change Order	4
Partial Occupancy	1
Recommendation of Acceptance	1
Certificate of Compliance	1

DIVISION 1 - GENERAL REQUIREMENTS

01050 Field Engineering	2
01100 Summary	2
01140 Work Restrictions	1
01230 Alternates	2
01250 Contract Modification Procedures	2
01290 Payment Procedures	4
01310 Project Management And Coordination	3
01320 Construction Progress Documentation	3
01330 Submittal Procedures	6
01400 Quality Requirements	5
01410 Testing Laboratory Services	2
01420 References	2
01500 Temporary Facilities And Controls	9
01600 Product Requirements	3
01700 Execution Requirements	6
01770 Closeout Procedures	6

DIVISION 2 - SITE CONSTRUCTION

02100 Clearing And Preparing Site	2
02200 Excavation, Filling And Grading	6
02201 Earthwork	8
02230 Site Clearing	3
02282 Termite Control	3
02362 Type "C" Lime Treatment	3

02459	..... Timber Piles	4
02515	..... Manholes, Wet Wells, Inlets And Catch Basins	2
02550	..... Culverts And Storm Drains	3
02552	..... Gas Pipe Lines	4
02556	..... Water Lines	8
02611	..... Aggregate Surface Course	2
02612	..... Asphaltic Concrete Mixtures	10
02730	..... Sanitary Sewer	7
02731	..... Sanitary Sewer Force Main	6
02733	..... Top Mounted Lift Stations	4
02733pt2	.. Smith & Loveless, Inc. Wet Well Mounted Sewage Lift Station #1	6
02733pt3	.. Gorman-Rupp Duplex Pumps-Wet Well Mounted Sewage Lift Station #1	14
02831	..... Chain Link Security Fencing	8
02930	..... Seeding, Fertilizing, And Watering	3
 DIVISION 3 - CONCRETE		
03300	..... Cast-in-Place Concrete	15
03301	..... Concrete Pavement	4
 DIVISION 4 - MASONRY		
04200	..... Unit Masonry Assemblies	14
04270	..... Glass Unit Masonry Assemblies	3
 DIVISION 5 - METALS		
05120	..... Structural Steel	7
05400	..... Cold-formed Metal Framing	6
05410	..... Pre-Fabricated Light-Gauge Steel Trusses	5
05500	..... Metal Fabrications	8
05511	..... Metal Stairs	7
 DIVISION 6 - WOOD AND PLASTICS		
06100	..... Miscellaneous Carpentry	4
06402	..... Interior Architectural Woodwork	6
 DIVISION 7 - THERMAL AND MOISTURE PROTECTION		
07210	..... Building Insulation	4
07311	..... Asphalt Shingles	6
07620	..... Sheet Metal Flashing And Trim	5
07841	..... Through-penetration Firestop Systems	5
07920	..... Joint Sealants	6
 DIVISION 8 - DOORS AND WINDOWS		
08111	..... Standard Steel Doors And Frames	5
08211	..... Flush Wood Doors	4
08305	..... Access Doors	4
08331	..... Overhead Coiling Doors	5
08410	..... Aluminum Entrances And Storefronts	7

08500	Security Steel Windows.....	5
08710	Finish Hardware	10
08800	Glass And Glazing.....	4

DIVISION 9 - FINISHES

09200	Lath And Plaster.....	2
09250	Gypsum Board Assemblies	13
09300	Tile.....	8
09510	Acoustical Ceilings	4
09511	Acoustical Panel Ceilings	6
09660	Resilient Tile Flooring.....	4
09678	Resilient Wall Base And Accessories.....	4
09680	Carpet.....	4
09700	Seamless Flooring Specification	5
09800	Acoustical Ceilings (Cementitious Wood Fiber Ceilings)	5
09900	Painting	12

DIVISION 10 - SPECIALTIES

10155	Toilet Compartments	4
10441	Interior Signs –incast Plaques.....	4
10522	Fire Extinguishers, Cabinets, And Accessories.....	2
10530	Extruded Aluminum Walkway Covers	4
10800	Toilet And Bath Accessories	3

DIVISION 11 - EQUIPMENT

11190	Detention Equipment.....	17
11191	Detention Furnishings	4
11192	Electronic Controls	21
11193	Detention Windows Fixed.....	5
11194	Security Glazing	4
11199	Operable Detention Windows.....	3
11200	Detention Sliding Cell And Corridor Doors	10
11450	Television And Video Monitor Supports	2

DIVISION 12 - FURNISHINGS

NOT APPLICABLE

DIVISION 13 - SPECIAL CONSTRUCTION

13120	Metal Building Systems	10
-------------	------------------------------	----

DIVISION 14 - CONVEYING SYSTEMS

NOT APPLICABLE

Volume Two

DIVISION 15 - MECHANICAL

15000	Mechanical Systems	6
15010	Basic Materials and Methods	14
15020	Sheet Metal Work.....	11
15021	Round and Flat Oval Duct Fittings	9
15025	Medical Gas Systems.....	16
15030	Piping Systems.....	5
15040	Piping Materials.....	9
15050	Equipment and Specialties.....	18
15060	Temperature Controls	32
15070	Plumbing Fixtures and Accessories	11
15080	Fire Protection System	7

DIVISION 16 - ELECTRICAL

16010	General Provisions.....	7
16030	Testing.....	7
16060	Electrical Demolition for Remodeling	2
16100	Basic Materials and Methods	16
16115	600V Cable Bus	2
16120	15KV Power Cable	6
16163	Distribution Panel Boards.....	3
16164	Branch Circuit Panel Boards	3
16200	Power Generation	20
16310	Electrical Substations.....	3
16312	Underground Distribution System Termination	4
16320	15KV Switchgear.....	8
16350	Precast Concrete Manholes	2
16401	Overhead Electric Service.....	6
16402	Underground Electric Service.....	2
16403	Wood Poles, Timbers and Cross arms.....	5
16450	Grounding Systems.....	4
16510	Interior and Exterior Lighting Fixtures	4
16720	Fire Alarm Network and Monitoring System.....	20
16740	Telephone System	2
16741	Computer Network System	2
16742	MATV	2
16920	Motor Control Center.....	6

Original Geotechnical Engineering Recommendations	62
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Facility Planning & Control Advertisement for Bids

May 19, 2004

The advertisement for bids will be prepared by Facility Planning & Control and given to the designer to include in the bid documents. The following is typical of the wording used in these advertisements. Other provisions may be included such as instructions for alternative methods of plan distribution, requirements for pre-qualification of contractors for historic preservation projects or mandatory pre-bid conferences. The use of mandatory pre-bid conferences is discouraged and may be called for only with the approval of Facility Planning and Control.

ADVERTISEMENT FOR BIDS

Sealed bids will be received for the State of Louisiana by the Division of Administration, Office of Facility Planning and Control, Claiborne Office Building, 1201 North Third Street, Conference Room 1-145, Post Office Box 94095, Baton Rouge, Louisiana 70804-9095 until 2:00 P.M

ANY PERSON REQUIRING SPECIAL ACCOMMODATIONS SHALL NOTIFY FACILITY PLANNING AND CONTROL OF THE TYPE(S) OF ACCOMMODATION REQUIRED NOT LESS THAN SEVEN (7) DAYS BEFORE THE BID OPENING.

FOR:

Sample - Insert Copy Here

PROJECT NUMBER:

Complete Bidding Documents may be obtained from:

PHONE () -

upon deposit of \$_____ for each set of documents. Deposit on the first two sets are fully refundable to all bonafide prime Bidders upon return of the documents, in good condition, no later than ten (10) days after receipt of bids. **Fifty percent of** the deposit of all other sets of documents will be refunded upon return of documents as stated above.

All bids must be accompanied by bid security equal to five percent (5%) of the sum of the base bid and all alternates, and must be in the form of a certified check, cashier's check or Facility Planning and Control Bid Bond Form written by a surety company licensed to do business in Louisiana, signed by the surety's agency or attorney-in-fact. Surety must be listed on the current U.S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater than the amount for which it obligates itself in the Bond, or must be a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A.M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the amount of the Bond may not exceed ten percent of policyholders' surplus as shown in the latest A.M. Best's Key Rating Guide.

The Bid Bond shall be in favor of the State of Louisiana, Office of Facility Planning and Control, and shall be accompanied by appropriate power of attorney. No Bid Bond indicating an obligation of less than five percent (5%) by any method is acceptable.

The successful Bidder shall be required to furnish a Performance and Payment Bond written by a company licensed to do business in Louisiana, in an amount equal to 100% of the Contract amount. Surety must be listed currently on the U. S. Department of Treasury Financial Management Service List (Treasury List) as approved for an amount equal to or greater than the contract amount, or must be an insurance company domiciled in Louisiana or owned by Louisiana residents. If surety is qualified other than by listing on the Treasury list, the contract amount may not exceed fifteen percent of policyholders' surplus as shown by surety's most recent financial statements filed with the Louisiana Department of Insurance and may not exceed the amount of \$500,000. However, a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A. M. Best's Key Rating Guide shall not be subject to the \$500,000 limitation, provided that the contract amount does not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide nor fifteen percent of policyholders' surplus as shown by surety's most recent financial statements filed with the Louisiana Department of Insurance. The Bond shall be signed by the surety's agent or attorney-in-fact.

A PRE-BID CONFERENCE WILL BE HELD

at time on day, date at location

Attendance at this conference is not required but bidders are advised that they will be required to state on the bid form that they have personally inspected and are familiar with the project site.

Bids shall be accepted from Contractors who are licensed under LA. R.S. 37:2150-2163 for the classification of_____. Bidder is required to comply with provisions and requirements of LA R.S.38:2212 (A)(1)(c). No bid may be withdrawn for a period of thirty (30) days after receipt of bids, except under the provisions of LA. R.S. 38:2214.

The Owner reserves the right to reject any and all bids for just cause. In accordance with La. R.S. 38:2212 (A) (1)(b), the provisions and requirements of this Section, those stated in the advertisement bids, and those required on the bid form shall not be considered as informalities and shall not be waived by any public entity.

When this project is financed either partially or entirely with State Bonds, the award of this Contract is contingent upon the granting of lines of credit, or the sale of bonds by the Bond Commission. The State shall incur no obligation to the Contractor until the Contract Between Owner and Contractor is fully executed.

STATE OF LOUISIANA
DIVISION OF ADMINISTRATION
FACILITY PLANNING AND CONTROL
JERRY W. JONES - DIRECTOR

INSTRUCTIONS TO BIDDERS

COMPLETION TIME:

The Bidder shall agree to fully complete the contract within 720 consecutive calendar days, subject to such extensions as may be granted under Paragraph 8.3, in the General Conditions and the Supplementary Conditions, and acknowledges that this construction time will start on or before the date specified in the written "Notice to Proceed" from the Owner.

LIQUIDATED DAMAGES:

The Bidder shall agree to pay as Liquidated Damages the amount of one thousand Dollars (\$ 2500.00) for each consecutive calendar day for which the work is not complete, beginning with the first day beyond the completion date stated on the "Notice to Proceed".

ARTICLE 1

DEFINITIONS

1.1 The Bidding Documents include the following:

Advertisement for Bids
Instructions to Bidders
Bid Form
Bid Bond
General Conditions of the Contract for Construction,
AIA Document A201, 1997 Edition
Supplementary Conditions
Contract Between Owner and Contractor and Performance and Payment Bond
Affidavit
User Agency Documents (if applicable)
Change Order Form
Partial Occupancy Form
Recommendation of Acceptance
Asbestos Abatement (if applicable)
Other Documents (if applicable)
Specifications & Drawings
Addenda issued during the bid period and acknowledged in the Bid Form

1.2 All definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

1.3 Addenda are written and/or graphic instruments issued by the Architect prior to the opening of bids

which modify or interpret the Bidding Documents by additions, deletions, clarifications, corrections and prior approvals.

1.4 A bid is a complete and properly signed proposal to do the work or designated portion thereof for the sums stipulated therein supported by data called for by the Bidding Documents.

1.5 Base bid is the sum stated in the bid for which the Bidder offers to perform the work described as the base, to which work may be added, or deleted for sums stated in alternate bids.

1.6 An alternate bid (or alternate) is an amount stated in the bid to be added to the amount of the base bid if the corresponding change in project scope or materials or methods of construction described in the Bidding Documents is accepted.

1.7 A Bidder is one who submits a bid for a prime Contract with the Owner for the work described in the proposed Contract Documents.

1.8 A Sub-bidder is one who submits a bid to a Bidder for materials and/or labor for a portion of the work.

1.9 Where the word "Architect" is used in any of the documents, it shall refer to the Prime Designer of the project, regardless of discipline.

ARTICLE 2

PRE-BID CONFERENCE

2.1 A Pre-Bid Conference shall be held at the project site at least 10 days before the date for receipt for bids. The Architect shall coordinate the setting of the date, time and place for the Pre-Bid Conference with the User Agency and shall invite in writing the Owner, User Agency, and all who have received sets of the Bidding Documents to attend.

The purpose of the Pre-Bid Conference is to familiarize Bidders with the requirements of the Project and the intent of the Contract Documents, and to receive comments and information from interested Bidders. If the Pre-Bid Conference is stated in the Advertisement for Bids to be a Mandatory Pre-Bid Conference, bids shall be accepted only from those bidders who attend the Pre-Bid Conference. Contractors who are not in attendance for the **entire** Pre-Bid Conference will not be considered to have attended.

2.2 Any revision of the Bidding Documents made as a result of the Pre-Bid Conference shall not be valid unless included in an addendum.

ARTICLE 3

BIDDER'S REPRESENTATION

3.1 Each Bidder by making his bid represents that:

3.1.1 He has read and understands the Bidding Documents and his bid is made in accordance therewith.

3.1.2 He has visited the site and has familiarized himself with the local conditions under which the work is to be performed.

3.1.3 His bid is based solely upon the materials, systems and equipment described in the Bidding Documents as advertised and as modified by addenda.

3.1.4 His bid is not based on any verbal instructions contrary to the Contract Documents and addenda.

3.2 The Bidder must be fully qualified under any State or local licensing law for Contractors in effect at the time and at the location of the work before

submitting his bid. In the State of Louisiana, Revised Statutes 37:2150, et seq. will be considered, if applicable.

The Contractor shall be responsible for determining that all of his Sub-bidders or prospective Subcontractors are duly licensed in accordance with law.

ARTICLE 4

BIDDING DOCUMENTS

4.1 Copies

4.1.1 Bidding Documents may be obtained from the Architect for a deposit as stated in the Advertisement for Bids. The deposit will be refunded as stated in the Advertisement for Bids. No deposits will be refunded on Bidding Documents returned later than ten days after receipt of bids.

4.1.2 Complete sets of Bidding Documents shall be used in preparing bids; neither the Owner nor the Architect assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

4.1.3 The Owner or Architect in making copies of the Bidding Documents available on the above terms, do so only for the purpose of obtaining bids on the work and do not confer a license or grant for any other use.

4.2 Interpretation or Correction of Bidding Documents

4.2.1 Bidders shall promptly notify the Architect of any ambiguity, inconsistency or error which they may discover upon examination of the Bidding Documents or of the site and local conditions.

4.2.2 Bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to the Architect, to reach him at least seven days prior to the date for receipt of bids.

4.2.3 Any interpretation, correction or change of the Bidding Documents will be made by addendum. Interpretations, corrections or changes of the Bidding Documents made in any other manner will

not be binding, and Bidders shall not rely upon such interpretations, corrections and changes.

4.3 Substitutions

4.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution. No substitutions shall be allowed after bidding.

4.3.2 No substitution will be considered unless written request for approval has been submitted by the Proposer and has been received by the Architect at least seven (7) working days prior to the date for receipt of bids. (RS38:2295C) Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including model numbers, drawings, cuts, performance and test data and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or work that incorporation of the substitute would require shall be included. It shall be the responsibility of the proposer to include in his proposal all changes required of the Contract Documents if the proposed product is used. Prior approval is given contingent upon supplier being responsible for any costs which may be necessary to modify the space or facilities needed to accommodate the materials and equipment approved.

4.3.3 If the Architect approves any proposed substitution, such approval will be set forth in an addendum. Bidders shall not rely upon approvals made in any other manner.

4.4 Addenda

4.4.1 Addenda will be mailed or delivered to all who are known by the Architect to have received a complete set of Bidding Documents.

4.4.2 Copies of addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

4.4.3 Except as described herein, addenda shall not be issued within a period of seventy-two (72) hours prior to the advertised time for the opening of bids,

excluding Saturdays, Sundays, and any other legal holidays. If the necessity arises of issuing an addendum modifying plans and specifications within the seventy-two (72) hour period prior to the advertised time for the opening of bids, then the opening of bids shall be extended at least seven days, but not to exceed twenty-one (21) days, with the requirement of re-advertising. Facility Planning shall be consulted prior to issuance of such an addendum and shall approve such issuance. The revised time and date for the opening of bids shall be stated in the addendum.

4.4.4 Each Bidder shall ascertain from the Architect prior to submitting his bid that he has received all addenda issued, and he shall acknowledge their receipt on the Bid Form.

4.4.5 The Owner shall have the right to extend the bid date by up to (30) thirty days without the requirement of re-advertising. Any such extension shall be made by addendum issued by the Architect.

ARTICLE 5

BIDDING PROCEDURE

5.1 Form and Style of Bids

5.1.1 Bids shall be submitted on the forms provided by the Architect.

5.1.2 All blanks on the Bid Form shall be filled in by typewriter or manually in ink.

5.1.3 Bid sums shall be expressed in both words and figures, and in case of discrepancy between the two, the written words shall govern.

5.1.4 Any interlineation, alteration or erasure must be initialed by the signer of the bid or his authorized representative.

5.1.5 Bidders are cautioned to complete all alternates should such be required in the Bid Form. Failure to submit alternate prices will render the proposal informal and shall cause its rejection.

5.1.6 Bidder shall make no additional stipulations on the Bid Form nor qualify his bid in any other manner.

5.1.7 The bid shall include the legal name of Bidder and shall be signed by the person or persons legally authorized to bind the Bidder to a Contract.

The authority of the signature of the person submitting the bid shall be deemed sufficient and acceptable under any of the following conditions:

(a) Signature on bid is that of any corporate officer or member of a partnership or partnership in commendam listed on most current annual report on file with Secretary of State.

(b) Signature on bid is that of authorized representative of corporation, partnership, or other legal entity and bid is accompanied by corporate resolution, certification as to the corporate principal, or other documents indicating authority.

(c) Corporation, partnership, or other legal entity has filed in the records of the Secretary of State, an affidavit, resolution or other acknowledged or authentic document indicating the names of all parties authorized to submit bids for public contracts. A bid submitted by an agency shall have a current Power of Attorney attached certifying agent's authority to bind Bidder. The name and license number on the envelope shall be the same as on the Bid Form.

5.1.8 On any bid in excess of fifty thousand dollars (\$50,000.00), the Contractor shall certify that he is licensed under R.S. 37: 2150-2173 and show his license number on the bid above his signature or his duly authorized representative.

5.2 Bid Security

5.2.1 No bid shall be considered or accepted unless the bid is accompanied by bid security in an amount of not less than five percent (5%) of the base bid and all alternates.

The bid security shall be in the form of a certified check or cashier's check drawn on a bank insured by the Federal Deposit Insurance Corporation, or a Bid Bond written by a surety company licensed to do business in Louisiana and signed by the surety's agent or attorney-in-fact. The Bid Bond shall be written on the Facility Planning and Control Bid Bond Form, and the surety for the bond must meet the qualifications stated thereon. The Bid Bond shall be in favor of the State of Louisiana, Office of Facility Planning and Control, and shall be accompanied by appropriate power of attorney. The Bid Bond must be signed by both the bidder/principal and the surety in the space provided

on the Facility Planning and Control Bid Bond Form. Failure by the bidder/principal or the surety to sign the bid bond shall result in the rejection of the bid.

Bid security furnished by the Contractor shall guarantee that the Contractor will, if awarded the work according to the terms of his proposal, enter into the Contract and furnish Performance and Payment Bonds as required by these Contract Documents, within ten (10) days after written notice that the instrument is ready for his signature.

Should the Bidder refuse to enter into such Contract or fail to furnish such bonds, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as penalty.

5.2.2 The Owner will have the right to retain the bid security of Bidders until either (a) the Contract has been executed and bonds have been furnished, or (b) the specified time has elapsed so that bids may be withdrawn, or (c) all bids have been rejected.

5.3 Submission of Bids

5.3.1 The Bid shall be sealed in an opaque envelope. The bid envelope shall be identified on the outside with the name of the project, and the name, address, and license number of the Bidder. The envelope shall contain **only one bid form** and will be received until the time specified and at the place specified in the Advertisement for Bids. It shall be the specific responsibility of the Bidder to deliver his sealed bid to Facility Planning and Control Department at the appointed place and prior to the announced time for the opening of bids. Late delivery of a bid for any reason, including late delivery by United States Mail, or express delivery, shall disqualify the bid.

If the bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "Bid Enclosed" on the face thereof. Such bids shall be sent by Registered or Certified Mail, Return Receipt Requested, addressed to:

Facility Planning and Control,
P. O. Box 94095
Baton Rouge, Louisiana, 70804-9095.

Bids sent by express delivery shall be delivered to:
Facility Planning and Control
Suite 7-160
Claiborne Office Building

1201 North Third Street
Baton Rouge, Louisiana 70804

5.3.2 Bids shall be deposited at the designated location prior to the time on the date for receipt of bids indicated in the Advertisement for Bids, or any extension thereof made by addendum. Bids received after the time and date for receipt of bids will be returned unopened.

5.3.3 Bidder shall assume full responsibility for timely delivery at location designated for receipt of bids.

5.3.4 Oral, telephonic or telegraphic bids are invalid and shall not receive consideration. Owner shall not consider notations written on outside of bid envelope which have the effect of amending the bid. Written modifications enclosed in the bid envelope, and signed or initialed by the Contractor or his representative, shall be accepted.

5.4 Modification or Withdrawal of Bid

5.4.1 A bid may not be modified, withdrawn or canceled by the Bidder during the time stipulated in the Advertisement for Bids, for the period following the time and bid date designated for the receipt of bids, and Bidder so agrees in submitting his bid, except in accordance with R.S. 38:2214 which states, in part, "Bids containing patently obvious mechanical, clerical or mathematical errors may be withdrawn by the Contractor if clear and convincing sworn, written evidence of such errors is furnished to the public entity within forty-eight hours of the Bid Opening excluding Saturdays, Sundays and legal holidays".

5.4.2 Prior to the time and date designated for receipt of bids, bids submitted early may be modified or withdrawn only by notice to the party receiving bids at the place and prior to the time designated for receipt of bids.

5.4.3 Withdrawn bids may be resubmitted up to the time designated for the receipt of bids provided that they are then fully in conformance with these Instructions to Bidders.

5.4.4 Bid Security shall be in an amount sufficient for the bid as modified or resubmitted.

ARTICLE 6

CONSIDERATION OF BIDS

6.1 Opening of Bids

6.1.1 The properly identified Bids received on time will be opened publicly and will be read aloud, and a tabulation abstract of the amounts of the base bids and alternates, if any, will be made available to Bidders.

6.2 Rejection of Bids

6.2.1 The Owner shall have the right to reject any or all bids and in particular to reject a bid not accompanied by any required bid security or data required by the Bidding Documents or a bid in any way incomplete or irregular.

6.3 Acceptance of Bid

6.3.2 It is the intent of the Owner, if he accepts any alternates, to accept them in the order in which they are listed in the Bid Form. Determination of the Low Bidder shall be on the basis of the sum of the base bid and the alternates accepted. However, the Owner shall reserve the right to accept alternates in any order which does not affect determination of the Low Bidder.

ARTICLE 7

POST-BID INFORMATION

7.1 Submissions

7.1.1 At the Pre-Construction Conference, the Contractor shall submit the following information to the Architect.

7.1.1.1 A designation of the work to be performed by the Contractor with his own forces.

7.1.1.2 A breakdown of the Contract cost attributable to each item listed in the Schedule of Values Form (attached). No payments will be made to the Contractor until this is received.

7.1.1.3 The proprietary names and the suppliers of principal items or systems of material and equipment proposed for the work.

7.1.1.4 A list of names and business domiciles of all Subcontractors, manufacturers, suppliers or other persons or organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the work. It is the preference of the Owner that, to the greatest extent possible or practical, the Contractor utilize Louisiana Subcontractors, manufacturers, suppliers and labor.

7.1.2 The Contractor will be required to establish to the satisfaction of the Architect the reliability and responsibility of the proposed Subcontractors to furnish and perform the work described in the sections of the Specifications pertaining to such proposed Subcontractor's respective trades. The General Contractor shall be responsible for actions or inactions of Subcontractors and/or material suppliers.

The General Contractor is totally responsible for any lost time or extra expense incurred due to a Subcontractor's/or Material Supplier's failure to perform. Failure to perform includes, but is not limited to, a Subcontractor's financial failure, abandonment of the project, failure to make prompt delivery, or failure to do work up to standard. Under no circumstances shall the Owner mitigate the General Contractor's losses or reimburse the General Contractor for losses caused by these events.

7.1.3 Subcontractors and other persons and organizations selected by the Bidder must be used on the work for which they were proposed and shall not be changed except with the written approval of the Owner and the Architect.

7.1.4 The lowest responsible bidder shall submit to the Architect and the Owner prior to award of the contract a letter/letters from the manufacturer stating that the manufacturer will issue the roof system guarantee complying with the requirements of Facility Planning and Control based on the specified roof system and include the name of the applicator acceptable to the manufacturer at the highest level of certification for installing the specified roof system. This manufacturer shall be one that has received prior approval or is named in the specifications.

ARTICLE 8

PERFORMANCE AND PAYMENT BOND

8.1 Bond Required

8.1.1 The Contractor shall furnish and pay for a Performance and Payment Bond written by a company licensed to do business in Louisiana, which shall be signed by the surety's agent or attorney-in-fact, in an amount equal to 100% of the Contract amount. Surety must be listed currently on the U. S. Department of Treasury Financial Management Service List (Treasury List) as approved for an amount equal to or greater than the contract amount, or must be an insurance company domiciled in Louisiana or owned by Louisiana residents. If surety is qualified other than by listing on the Treasury list, the contract amount may not exceed fifteen percent of policyholders' surplus as shown by surety's most recent financial statements filed with the Louisiana Department of Insurance and may not exceed the amount of \$500,000. However, a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A. M. Best's Key Rating Guide shall not be subject to the \$500,000 limitation, provided that the contract amount does not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide nor fifteen percent of policyholders' surplus as shown by surety's most recent financial statements filed with the Louisiana Department of Insurance. The Bond shall be signed by the surety's agent or attorney-in-fact. The Bond shall be in favor of the State of Louisiana, Office of Facility Planning and Control.

8.2 Time of Delivery and Form of Bond

8.2.1 The Bidder shall deliver the required bond to the Owner simultaneous with the execution of the Contract.

8.2.2 Bond shall be in the form furnished by Facility Planning and Control, entitled CONTRACT BETWEEN OWNER AND CONTRACTOR AND PERFORMANCE AND PAYMENT BOND, a copy of which is included in the Contract Documents.

8.2.3 The Bidder shall require the Attorney-in-Fact who executes the required bond on behalf of the surety to affix thereto a certified and current copy of his power of Attorney.

ARTICLE 9

FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

9.1 Form to be Used

9.1.1 Form of the Contract to be used shall be furnished by Facility Planning and Control , a copy of which is bound in the Bidding Documents.

9.2 Award

9.2.1 Before award of the Contract, the successful Bidder shall furnish to the Owner a copy of a Disclosure of Ownership Affidavit stamped by the Secretary of State, a certified copy of the minutes of the corporation or partnership meeting which authorized the party executing the bid to sign on behalf of the Contractor.

9.2.2 In accordance with Louisiana Law, when the Contract is awarded, the successful Bidder shall, at the time of the signing of the Contract, execute the Non-Collusion Affidavit included in the Contract Documents

9.2.3 When this project is financed either partially or entirely with State Bonds, the award of this Contract is contingent upon the sale of bonds by the State Bond Commission. The State shall incur no obligation to the Contractor until the Contract Between Owner and Contractor is duly executed.

BID FORM

BID DATE: _____

TO: Facility Planning and Control
Division of Administration
State of Louisiana
Post Office Box 94095
Baton Rouge, Louisiana 70804-9095

PROPOSAL FOR: Elayn Hunt Correctional Center
St. Gabriel, LA
State Project No. 08-413-97B-1, Part 7

THE BIDDER: _____

Acknowledges receipt of the following:

ADDENDA: No. _____ Dated: _____ No. _____ Dated: _____
No. _____ Dated: _____ No. _____ Dated: _____

BID SECURITY: Attached is the bid security in the sum of 5% of total base bid and all alternates. The bid security is to become the property of the Owner if the event the Contract and bond are not executed within the time set forth, as Liquidated Damages for the delay and additional work caused thereby.

If the bid security attached to this proposal is a Bond, then such Bond shall be submitted on the Bid Bond Form included in the specifications, identified at the bottom of the page as "B-4" and Surety shall meet the qualifications set forth therein. Any Bond submitted other than on this bond form shall cause the bid to be rejected.

THE BIDDER: hereby declares and represents that he; a) has carefully examined the Bidding Documents, b) has a clear understanding of the Bidding Documents, c) has not received, relied on, or based his bid on any verbal instructions contrary to the Contract Documents or any addenda, d) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of afore referenced project, all in accordance with the Contract Documents as prepared by Coleman & Partners, Architects in association with Grace and Hebert Architects and dated March 31, 2000.

BASE BID: For all work required by the Contract Documents (except alternates) the lump sum of
(\$ _____) _____
_____ Dollars

ALTERNATES: For all work required by the Contract Documents for:

Alternate No. 1: Contractor shall build-out the shell space on the second floor of the Mental Health Unit as noted on sheets _____ and Section 01230 - Alternates. For Alternate No. 1, add the lump sum of:

(\$ _____) _____
_____ Dollars

Alternate No. 2 Contractor shall renovate Building Three in accordance with sheets _____ and Section 01230 – Alternates. For Alternate No. 2, add the lump sum of:

(\$ _____) _____
_____ Dollars

Alternate No. 3 Contractor shall install the perimeter fencing, extruded aluminum walkway covers and razor ribbon in accordance with sheets _____ and Section 01230 – Alternates. For Alternate No. 2, add the lump sum of:

(\$ _____) _____
_____ Dollars

COMPLETION TIME: The Bidder hereby agrees to commence work under this contract on a date specified in a written "Notice to Proceed" by the Owner and to fully complete the project within **720** consecutive calendar days thereafter, or within the time as may be extended as stipulated in the Contract Documents.

LIQUIDATED DAMAGES: The Bidder hereby also agrees to pay as Liquidated Damages the sum of One Thousand Dollars (\$1000) for each consecutive calendar day, which the work is not complete, beginning with the first day beyond the completion time stated above.

AWARD AND EXECUTION OF CONTRACT: When this project is financed either partially or entirely with State Bonds, the award of this Contract is contingent upon the sale of bonds by the State Bond Commission. The State shall incur no obligation to the Contractor until the Contract Between Owner and Contractor is duly executed.

If the Bidder is notified of the acceptance of the bid within thirty (30) days after the opening of bids, he agrees to execute and deliver the "Contract Between Owner and Contractor and Performance and Payment Bond," a copy of which is attached to the Contract Documents, within ten (10) days after notice from the Owner that the instrument is ready for signature.

If the Bidder fails to complete all requirements for executing the "Contract Between Owner and Contractor and Performance and Payment Bond" within ten (10) days after notification, the Owner may reject the Bid, retain the Bid Bond, call in the surety for payment, and award the contract to the next lowest bidder.

REJECTION OF BIDS: The Bidder understands that the Owner reserves the right to reject any or all bids for just cause. In accordance with La. R.S.38:2212 (A)(1)(b), the provisions and requirements of this Section, those stated in the advertisement for bids, and those required on the bid form shall not be considered as informalities and shall not be waived by any public entity.

WITHDRAWAL OF BIDS: The Bidder agrees that this bid shall be good and may not be withdrawn for a period of thirty (30) calendar days after the scheduled closing time for receiving bids, except in accordance with the provisions of R.S.38:2214. This bid may be withdrawn at any time prior to the scheduled time for opening of bids or any authorized postponement thereof.

LICENSE CERTIFICATION: The Bidder certifies that he meets all licensing requirements of this State and is duly and currently licensed under R.S. 37:2150-2173 of the State of Louisiana. The name of the bidder shown below shall correspond with the official name on the license.

NAME OF BIDDER: _____

LOUISIANA CONTRACTORS LICENSE NUMBER: _____

BY: _____

TITLE: _____

ADDRESS: _____

DATED: _____

BID BOND
FOR
FACILITY PLANNING AND CONTROL PROJECTS

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That _____ of _____, as Principal, and _____, as Surety, are held and firmly bound unto the State of Louisiana, Division of Administration, Office of Facility Planning and Control (Obligee), in the full and just sum of five (5%) percent of the total amount of this proposal, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater than the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

PRINCIPAL (BIDDER)

SURETY

BY: _____
AUTHORIZED OFFICER-OWNER-PARTNER

BY: _____
AGENT OR ATTORNEY-IN-FACT(SEAL)

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions modify, change, delete from or add to the General Conditions of the Contract for Construction, AIA Document A201, 1997 Edition. Where any Article of the General Conditions is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these supplements, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.

Articles, Paragraphs, Subparagraphs or Clauses modified or deleted have the same numerical designation as those occurring in the General Conditions.

ARTICLE 1

GENERAL PROVISIONS

1.1 DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

In Subparagraph 1.1.1 delete the third sentence, and add the following sentence:

"The Contract Documents shall include the Bidding Documents as listed in the Instructions to Bidders and any modifications made thereto by addenda."

1.6 OWNERSHIP AND USE OF ARCHITECT'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS [R.S.38:2317]

1.6.1 In the third sentence: delete the remainder of the sentence starting with "and unless otherwise indicated ..."

ARTICLE 2

OWNER

2.2.1 Delete this paragraph.

2.2.2 In the first sentence, delete: all before "the Owner shall secure"

2.4.1 In the first sentence, delete: all after "the owner" to the end
In the second sentence, delete: all before "the owner may"

ARTICLE 3

CONTRACTOR

3.4.2 Delete this paragraph

3.7 PERMITS, FEES AND NOTICES (R.S. 40:1724[A])

Delete Subparagraph 3.7.1 and 3.7.2 and add the following Subparagraph 3.7.2

The Contractor shall comply with and give notices required by laws, rules, ordinances, regulations and lawful orders of state authorities bearing on performance of the Work.

3.8 ALLOWANCES

Delete Subparagraph 3.8.1, 3.8.2 and 3.8.3 in their entirety and add the following new Subparagraph 3.8.1:

3.8.1 Allowances shall not be made on any of the Work.

3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

3.10.1 Add the following: For projects with a contract sum greater than \$1,000,000.00, the Contractor shall include with the schedule, for the Owner's and Architect's information, a network analysis to identify those tasks which are on the critical path, i.e. where any delay in the completion of these tasks will lengthen the project timescale, unless action is taken.

ARTICLE 4

ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

Delete Subparagraph 4.1.1 and substitute the following:

4.1.1 "The term Architect, when used in the Contract Documents, shall mean the prime Designer (Architect, Engineer or Landscape Architect), or his authorized representative, lawfully licensed to practice architecture, engineering or landscape architecture in the State of Louisiana, identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number."

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

4.2.10 Add the following sentence to the end of Subsection 4.2.10:

"There will be no restriction on the owner having a Representative."

4.3. CLAIMS AND DISPUTES

Delete paragraph 4.3.7.2 and substitute the following:

If adverse weather conditions are the basis for a claim for additional time, the Contractor shall document that weather conditions had an adverse effect on the scheduled construction. An increase in the contract time due to weather shall not be cause for an increase in the contract sum.

4.3.7.3 Add the following Subparagraph:

The following are considered reasonably anticipated days of adverse weather on a monthly basis:

January	<u>11</u> days	May	<u>5</u> days	September	<u>4</u> days
February	<u>10</u> days	June	<u>6</u> days	October	<u>3</u> days
March	<u>8</u> days	July	<u>6</u> days	November	<u>5</u> days

April 7 days August 5 days December 8 days

The Contractor shall ask for total adverse weather days, the Contractor's request shall be considered only for days over the allowable number of days stated above.

Note: Contract is on a calendar day basis.

4.4.1 In the second sentence, delete the words "mediation, arbitration or"

4.4.5 In the second sentence, delete all after "the parties"

4.4.6 Delete paragraph

4.4.8 In the first sentence, delete "by mediation or by arbitration."

4.5 MEDIATION

Delete Article 4.5

4.6 ARBITRATION

Delete Article 4.6

ARTICLE 5

SUBCONTRACTORS

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

Delete Subparagraph 5.2.1, and substitute the following:

5.2.1 Unless otherwise required by the Contract Documents, the Contractor shall furnish at the Pre-Construction Conference, to the Owner and the Architect, in writing, the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the work. No Contractor payments shall be made until this information is received."

Delete Subparagraph 5.2.2 and substitute the following:

5.2.2 The Contractor shall be solely responsible for selection and performance of all subcontractors. The Contractor shall not be entitled to claims for additional time and/or an increase in the contract sum due to a problem with performance or non-performance of a subcontractor.

Delete Subparagraph 5.2.3 and 5.2.4 and add the following:

5.2.3 The contractor shall notify the owner when a subcontractor is to be changed and substituted with another subcontractor.

5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

Delete Subparagraph 5.4.1 and 5.4.2.

ARTICLE 7

CHANGES IN THE WORK

7.1 GENERAL

Add the following paragraph:

7.1.4 As part of the pre-construction conference submittals, the contractor is to submit the following prior to the commencement of work.

Fixed job site overhead cost itemized with documentation to support daily rates.
Bond Premium Rate with supporting information from the General Contractor's carrier.
Labor Burden by trade for both Subcontractors and General Contractor.
Internal Rate Charges for all significant company owned equipment.

7.2 CHANGE ORDERS

Delete Subparagraph clauses 7.2.1, and 7.2.2, and substitute the following paragraphs:

7.2.1 "A Change Order is a written order to the Contractor signed by the Owner and the Architect, issued after execution of the Contract, authorizing a change in the work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum or the Contract Time."

7.2.2 "Cost of the Work" for the purpose of Change Orders shall be costs required to be incurred in performance of the work and paid by the Contractor and Subcontractors which shall consist of:

1. Wages paid direct labor personnel, delineating a labor burden markup for applicable payroll taxes, worker's compensation insurance, unemployment compensation, and social security taxes.
2. Cost of all materials and supplies, including the identification of each item and its cost.
3. Identify each necessary piece of machinery and equipment and its individual cost.
4. Other documented direct costs.

Credit will not be required for overhead and profit.

7.2.3 "Overhead and profit" The Contractor and Subcontractor shall be due job-site and home office fixed overhead and profits on the Cost of the Work, but shall not exceed a total of 25% of the direct cost of any portion of work:

The credit to the Owner resulting from a change in the work shall be the sum of those items above, except credit will not be required for overhead and profit. Where a change results in both credits to the Owner and extras to the Contractor for related items, overhead and profit will only be computed on the net extra cost to the Contractor.

7.2.4 The cost to the Owner resulting from a change in the work shall be the sum of:

"Cost of the Work" (as defined at 7.2.2) and "Overhead and profit" (as defined at 7.2.4), and shall be computed as follows:

7.2.4.1 When all of the work is General Contract work; 15% markup on the Cost of the Work.

7.2.4.2 When the work is all Subcontract work; 15% markup on the Cost of the Work for Subcontractor's Overhead and Profit, plus 10% markup on the Cost of the Work, not including the Subcontractor's Overhead and Profit markup, for General Contractor's Overhead and Profit.

7.2.4.3 When the work is a combination of General Contract work and Subcontract work; that portion of the direct cost that is General Contract work shall be computed per 7.2.4.1 and that portion of the direct cost that is subcontract work shall be computed per 7.2.4.2

Bond premiums may be included, but after the markup is added to the cost of the work.

7.2.4.4 "Subcontract cost shall consist of the items in 7.2.2 above plus overhead and profit as defined in 7.2.4."

7.2.5 "Before a Change Order is prepared, the Contractor shall provide and deliver to the Architect the following information concerning the Cost of the Work, not subject to waiver, within a reasonable time after being notified to prepare said Change Order:

A detailed itemized list of labor, material and equipment costs for the General Contractor's work including quantities and unit costs for each item of labor, material and equipment.

An itemized list of labor, material and equipment costs for each Subcontractor's and/or Sub-Subcontractor's work including quantities and unit costs for each item of labor, material, and equipment.

7.2.6 "After a Change Order has been approved, no future requests for extensions of time or additional cost shall be considered for that Change Order."

7.2.7 The Contractor will be due extended fixed job-site overhead for time delays only when complete stoppage of work occurs causing a contract completion extension, and the Contractor is unable to mitigate financial damages through replacement work. The stoppage must be due to acts or omissions solely attributable to the Owner. In all cases the Contractor is to notify the Designer in writing as required by article 4.3.2. Reasonable proof may be required by the architect that alternate work could not be preformed. Reasonable proof may be required by the architect that the stoppage affected the Completion Date.

7.2.8 "Cost of the work whether General Contract cost or Subcontract cost shall not apply to the following:

Salaries or other compensation of the Contractor's personnel at the Contractor's principal office and branch offices.

Any part of the Contractor's capital expenses, including interest on the Contractor's capital employed for the work.

Overhead and general expenses of any kind or the cost of any item not specifically and expressly included above in cost of the work.

Cost of supervision not specifically required by the Change Order.

7.2.9 "When applicable as provided by the Contract, the cost to Owner for Change Orders shall be determined by quantities and unit prices. The quantity of any item shall be as submitted by the Contractor and approved by the Architect. Unit prices shall cover cost of Material, Labor, Equipment, Overhead and Profit."

7.3.3 At the end of the first sentence add:

“, but not to exceed a specified amount.”

7.3.6 replace the five cost of work descriptions with the following four:

1. Wages paid direct labor personnel, with a labor burden markup for applicable payroll taxes, worker’s compensation insurance, unemployment compensation, and social security taxes.
2. Cost of all materials and supplies.
3. Cost of necessary machinery and equipment.
4. Other documented direct costs.

7.3.8 Delete the second and third sentences.

ARTICLE 8

TIME

8.1 DEFINITIONS

Add the following:

8.1.5 The Contract Time shall not be changed by the submission of a schedule that shows an early completion date unless specifically authorized by change order.

8.2 PROGRESS AND COMPLETION

Delete Subparagraph 8.2.1 and substitute the following:

"Time is of the essence and completion of the work must be within the Time for Completion stated in the Agreement, subject to such extensions as may be granted under Section 8.3. The Contractor agrees to commence work not later than fourteen (14) days after the transmittal date of Written Notice to Proceed from the Owner and to substantially complete the project within the time stated in the Contract. The Owner will suffer financial loss if the project is not substantially complete in the time set forth in the Contract Documents. The Contractor and the Contractor's Surety shall be liable for and shall pay to the Owner the sum stated in the Contract Documents as fixed, agreed and liquidated damages for each consecutive calendar day (Saturdays, Sundays, and holidays included) of delay until the work is substantially complete. The owner shall be entitled to the sum stated in the Contract Documents. Such Liquidated Damages shall be withheld by the owner from the amounts due the Contractor for progress payments

Delete Subparagraph 8.2.2.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 in the first sentence after the words “owner pending” delete the words “mediation and arbitration” and add the word “litigation” and delete the last word “determine” and add the following:

"recommend, subject to Owner's approval of Change Order. If the claim is not made within the limits of paragraph 4.3, all right for future claims for that month are waived."

ARTICLE 9

PAYMENTS AND COMPLETION

9.2 SCHEDULE OF VALUES

Delete Subparagraph 9.2.1 and substitute the following:

9.2.1 At the Pre-Construction Conference, the Contractor shall submit to the Owner and the Architect a Schedule of Values prepared as follows:

9.2.1.1 The attached Schedule of Values Format shall be used. If applicable, the cost of work for each section listed under each division, shall be given. The cost for each section shall include labor, materials, overhead and profit.

9.2.1.2 The Total of all items shall equal the Total Contract Sum. This schedule, when approved by the Architect, shall be used only as a basis for the Contractor's Applications for Payment."

9.3 APPLICATIONS FOR PAYMENT

Delete Subparagraph 9.3.1 and clause 9.3.1.1 and 9.3.1.2 and substitute the following:

9.3.1 "Monthly, the Contractor shall submit to the Architect an Application & Certificate for Payment on the AIA Document G702-1992, accompanied by AIA Document G703-1992, and supported by any additional data substantiating the Contractor's right to payment as the Owner or the Architect may require. Application for Payment shall be submitted on or about the first of each month for the value of labor and materials incorporated into the work and of materials, suitably stored, at the site as of the twenty-fifth day of the preceding month, less normal retainage as follows, per R.S.38:2248:

9.3.1.1 Projects with Contract price up to \$500,000.00 - 10% of the Contract price.

9.3.1.2 Projects with Contract price of \$500,000.00, or more - 5% of the Contract price.

The normal retainage shall not be due the Contractor until after substantial completion and expiration of the forty-five day lien period and submission to the Architect of a clear lien certificate and invoice for retainage."

Delete Subparagraph 9.3.2 and substitute the following:

9.3.2 "Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. Payments for materials or equipment stored on the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, including applicable insurance."

9.6 PROGRESS PAYMENTS

Delete Subparagraph 9.6.1 and substitute the following:

9.6.1 "After the Architect has issued a Certificate for Payment, the Owner shall make payment within twenty days."

9.6.2 After the end of the second sentence, add the following:

"R.S. 9:2784 (A) and (C) requires a Contractor or Subcontractor to make payment due to each Subcontractor and supplier within fourteen (14) consecutive days of the receipt of payment from the Owner. If not paid, a penalty in the amount of 1/2 of 1% per day is due, up to a maximum of 15%, from the expiration date until paid. The contractor or subcontractor, whichever is applicable, is solely responsible for payment of a penalty."

9.6.4 Add the following:

Pursuant to La. R.S. 38:2242, when the Owner receives any claim of nonpayment arising out of the Contract, the owner shall deduct 125% of such claim from the Contract Sum. The Contractor, or any interested party, may deposit security, in accordance with La. R.S. 38:2242.2, guaranteeing payment of the claim with the recorder of mortgages of the parish where the Work has been done. When the Owner receives original proof of such guarantee from the recorder of mortgages, the claim deduction will be added back to the Contract Sum.

9.7 FAILURE OF PAYMENT

Delete Subparagraph 9.7.1.

9.8 SUBSTANTIAL COMPLETION: Delete this section and substitute the following:

9.8 SUBSTANTIAL COMPLETION

9.8.1 Substantial Completion is the stage in the progress of the Work when the Work is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The Architect shall determine if the project is substantially complete in accordance with this Subparagraph.

9.8.2 When the Contractor considers that the Work is Substantially Complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work is substantially complete. A prerequisite to the work being accepted as substantially complete, is the Owner's receipt of the executed Roofing Contractor's and Roofing Manufacturer's guarantees, where roofing work is part of the Contract. Prior to inspection by the Architect, the Contractor shall notify the Architect that the project is ready for inspection by the State Fire Marshal's office. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use, the Contractor shall, before acceptance of the work as Substantially Complete, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

- 9.8.4 When the Architect determines that the project is Substantially Complete, he shall prepare a “punch list” of exceptions and the dollar value related thereto. The monetary value assigned to this list will be the sum of the cost estimate for each particular item of work the Architect develops based on the mobilization, labor, material and equipment costs of correcting the item and shall be retained from the monies owed the contractor, above and beyond the standard lien retainage. The cost of these items shall be prepared in the same format as the schedule of values. At the end of the 45 day lien period payment shall be approved for all punch list items completed up to that time. After that payment, none of the remaining funds shall be due the contractor until all punch list items are completed and are accepted by the Architect. If the dollar value of the punch list exceeds the amount of funds, less the retainage amount, in the remaining balance of the Contract, then the Project shall not be accepted as substantially complete. If funds remaining are less that that required to complete the work, the Contractor shall pay the difference.
- 9.8.5 When the “punch list” is complete the Architect shall prepare a Recommendation of Acceptance” incorporating the punch list and submit it to the Owner. Upon approval of the Recommendation of Acceptance, the Owner may issue a Notice of Acceptance of Building Contract which shall establish the Date of Substantial Completion. The Contractor will record the Notice of Acceptance with the Clerk of Court in the Parish in which the work has been performed. If the Notice of Acceptance has not been recorded seven (7) days after issuance, the owner may record the acceptance at the Contractor's expense.
- 9.8.6 Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work unless otherwise agreed to in writing by the Owner and Contractor. Unless otherwise agreed to in writing by the Owner and Contractor, security, maintenance, heat, utilities, damage to the Work not covered by the punch list and insurance shall become the Owner's responsibility on the Date of Substantial Completion.
- 9.8.7 If all punch list items have not been completed by the end of the forty-five (45) day lien period, through no fault of the Architect or Owner, the Owner may hold the Contractor in default. If the Owner finds the Contractor is in default, the Surety shall be notified. If within forty-five (45) days after notification, the Surety has not completed the punch list, through no fault of the Architect or Owner, the Owner may, at his option, contract to have the balance of the work completed and pay for such work with the unpaid funds remaining in the Contract sum. Finding the Contractor in default shall constitute a reason for disqualification of the Contractor from bidding on future state contracts. If the surety fails to complete the punch list within the stipulated time period, the Owner may not accept bonds submitted, in the future, by the surety.

9.9 Partial Occupancy or Use

- 9.9.1 Delete paragraph and substitute the following:

"Partial Occupancy is that stage in the progress of the Work when a designated portion of the Work is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the designated portion of the Work for its intended use. The Owner may occupy or use any substantially completed portion of the Work so designated by separate agreement with the Contractor and authorized by public authorities having jurisdiction over the Work. Such occupancy or use may commence provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers the designated portion substantially complete the Contractor shall prepare and

submit a list to the Architect as provided under Subparagraph 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonable withheld."

9.10 FINAL COMPLETION AND FINAL PAYMENT

9.10.1 After the first sentence, add the following:

If the Architect does not find the work acceptable under the Contract Documents, the Architect shall make one additional inspection; if the work is still not acceptable, the Architect, and each of the Architect's principal consultants, shall be paid \$100.00/hour for their time at the project site, for each additional inspection, to be withheld from the unpaid funds remaining in the Contract sum. The payment shall be made by the owner and deducted from the construction contract funds.

Add the following clause 9.10.6:

9.10.6 In response to Federal Arbitrage regulations: If such compliance has not been effected within 90 days of the date of acceptance, the contract shall be terminated and no further opportunity will be granted the Contractor and no further payments will be made on this contract.

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.2, In the first sentence, between the words "bearing on" and "safety", add the words "the health and",

10.3.1 In the first sentence after "(PCB)" add "or lead"

10.3.2 After the first sentence, delete all after "Unless .."
Add at the end "The Contract time shall be extended appropriately."

Delete Subparagraph 10.3.3

Delete Subparagraph 10.6.1 and substitute the following:

10.6.1 "In an emergency affecting the safety of persons or property, the Contractor shall notify the Owner and Architect immediately of the emergency, simultaneously acting at his discretion to prevent damage, injury, or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 4.3 and Article 7."

ARTICLE 11

Delete all of Paragraphs 11.1 and 11.2 and substitute the following:

INSURANCE REQUIREMENT FOR NEW CONSTRUCTION AND RENOVATIONS

11.1 STANDARDIZED INSURANCE REQUIREMENTS FOR ALL STATE CONTRACTS

11.1.1 This paragraph not used.

11.1.2 All policies and certificates of insurance of the Contractor/Subcontractor shall contain the following clauses:

11.1.2.1 The Contractor/Subcontractor's insurer will have no right of recovery or subrogation against the Owner, it being the intention of the parties that the insurance policies so affected shall protect both parties and the primary coverage for any and all losses covered by the below described insurance.

11.1.2.2 The Owner shall be named as an additional insured as regards negligence by the contractor (ISO Forms CG 20 10, Current form approved for use in Louisiana).

11.1.2.3 The insurance companies issuing the policy or policies shall have no recourse against the Owner for payment of any premiums or for assessments under any form of policy.

11.1.2.4 Any and all deductibles in the below described insurance policies shall be assumed by and be at the sole risk of the Contractor or Subcontractor.

11.1.3 INSURANCE:

The Contractor/Subcontractor, prior to commencing work, shall provide at his own expense, proof of the following insurance coverages required by the contract to the Owner in insurance companies authorized in the State of Louisiana. Insurance is to be placed with insurers with an A. M. Best's rating of no less than A-:VI. This rating requirement will be waived for the workers' compensation coverage and policies written through Lloyds of London or Institute of London Underwriter (ILU) companies.

Thirty days prior notice of cancellation shall be given to the Owner by registered mail, return receipt requested, on all of the required coverage provided to the Owner. All notices will name the Contractor/Subcontractor and identify the contract number.

Insurance coverage specified in the GENERAL CONDITIONS (AIA Document A 201, 1997 Edition) to be provided by the Contractor, and any other insurance described below shall be furnished with the following minimum limits:

11.1.3.1 Workers' Compensation - Statutory - in compliance with the Compensation Law of the State. Exception: Employers liability to be \$1,000,000 when work is to be over water and involves maritime exposures.

11.1.3.2 Commercial General Liability Insurance with a combined single limit per occurrence for bodily injury and property damage. This insurance shall include coverage for bodily injury and property damage, and indicate on the Certificate of Insurance which of the seven (7) coverages required below are not included in the policy, if any:

- | | |
|--|---|
| 1 Premises - Operations; | 5 Personal Injury; |
| 2 Broad Form Contractual Liability; | 6 Broad Form Property Damage; |
| 3 Products and Completed Operations; | 7 Explosion, Collapse and Underground (XCU) Coverage. |
| 4 Use of Contractors and Subcontractors; | |

NOTE: On the certification of insurance, under the description of operations, the following wording is required: THE AGGREGATE LOSS LIMIT APPLIES TO EACH PROJECT, or a copy of ISO form CG2503 (Current form approved for use in Louisiana) shall be submitted.

COMBINED SINGLE LIMIT (CSL) - AMOUNT OF INSURANCE REQUIRED

Type of Construction	Projects Under <u>\$100,000</u>	Projects \$100,001 - <u>\$1,000,000</u>	Projects Over <u>\$1,000,000</u>
----------------------	------------------------------------	--	-------------------------------------

New Buildings:

-Each Occurrence/ Minimum Limit	\$500,000	\$1,000,000	\$3,000,000
-Aggregate (Applicable to this Contract ONLY)	\$500,000	\$1,000,000	\$3,000,000

Renovations: *The building(s) value for this Project is: \$* _____

-Each Occurrence/ Minimum Limit	\$500,000*** (Depends On Building Value)	\$1,000,000*** (Depends On Building Value)	\$3,000,000*** (Depends On Building Value)
-Aggregate (Applicable to this Contract ONLY)	\$500,000*** (Depends On Building Value)	\$1,000,000*** (Depends On Building Value)	\$3,000,000*** (Depends On Building Value)

***While the minimum combined single limit of \$500,000 is required for all renovations, the value of a building shall be multiplied by 10% and insurance requirements will be increased at \$1,000,000 intervals and rounded to the nearest \$1,000,000. Example: Renovation on \$33,000,000 building would require \$3,000,000 minimum combined single limit of coverage. Maximum limit required is \$5,000,000.00 regardless of building value.

11.1.3.3 Business Automobile Liability Insurance with a combined single limit of \$1,000,000 per occurrence for bodily injury and property damage, unless otherwise indicated. This insurance shall include for bodily injury and property damage the following coverages:

- 1 Owned automobiles;
- 2 Hired automobiles;
- 3 Non-owned automobiles.

11.1.3.4 An Umbrella Policy may be used to meet minimum requirements.

11.1.4 All property losses shall be made payable to and adjusted with the Owner.

11.1.5 All policies of insurance shall be approved by the contracting Owner prior to the inception of any work.

11.1.6 Other insurance required is as follows:

11.1.6.1 Owner's Protective Liability Insurance shall be furnished by the Contractor and naming the State of Louisiana as the Insured.

	Projects Under <u>\$100,000</u>	Projects \$100,001- <u>\$1,000,000</u>	Projects Over <u>\$1,000,000</u>
CSL - Each Occurrence	\$500,000	\$1,000,000	\$3,000,000

11.1.6.2 Asbestos Abatement Liability

(required when asbestos abatement is included in the work)

The contractor or subcontractor who will be doing the asbestos abatement as outlined in this contract shall obtain and maintain such liability coverage for the asbestos abatement hazard and exposure with minimum limits of \$1,000,000 per occurrence for the duration of the project. The policy shall name the State of Louisiana, all State departments, agencies, boards and commissions as an additional insured for the project. The policy shall be written on an "occurrence" form without a sunset clause. Claims-made coverage is unacceptable. The insurance company shall have an A.M. Best rating of at least A-:VI or better or written through Lloyds of London or Institute of London Underwriter (ILU) companies.

11.1.7 If, at any time, any of the said policies shall be or become unsatisfactory to the Owner, as to form or substance, or if a company issuing any such policy shall be or become unsatisfactory to the Owner, the Contractor/Subcontractor shall promptly obtain a new policy, submit the same to the Owner for approval and submit a certificate thereof as hereinabove provided.

Upon failure of the Contractor/Subcontractor to furnish, deliver and maintain such insurance as above provided, this contract, at the election of the Owner, may be forthwith declared suspended, discontinued or terminated. Failure of the Contractor/Subcontractor to take out and/or to maintain or the taking out and/or maintenance of any required insurance, shall not relieve the Contractor/Subcontractor from any liability under the contract, nor shall the insurance requirements be construed to conflict with the obligations of the Contractor/Subcontractor concerning indemnification. The Owner reserves the right to require complete, certified copies of all required insurance policies, at any time.

11.1.8 RISKS AND INDEMNIFICATIONS ASSUMED BY THE CONTRACTOR Neither the acceptance of the completed work nor payment therefor shall release the Contractor/Subcontractor from his obligations from the insurance requirements or indemnification agreement.

11.1.8.1 Additional insurance may be required on an individual basis for extra hazardous contracts and specific service agreements.

If such additional insurance is required for a specific contract, that requirement will be described in the "Special Conditions" of the contract specifications.

11.1.8.2 If any of the Property and Casualty insurance requirements are not complied with at their renewal dates, payments to the Contractor/Subcontractor will be withheld until those requirements have been met, or at the option of the Owner, the Owner may pay the Renewal Premium and withhold such payments from any monies due the Contractor/Subcontractor.

11.1.8.3 All property losses shall be made payable to and adjusted with the Owner.

11.1.8.4 All policies and certificates of insurance shall be approved by the contracting agency prior to the inception of any work.

11.1.8.5 If at any time any of the foregoing policies shall be or become unsatisfactory to the Owner, as to form or substance, or if a company issuing any such policy shall be or become unsatisfactory to the Owner, the Contractor/Subcontractor shall, upon notice to that effect from the Owner, promptly obtain a new policy, submit the same to the Owner for approval and submit a certificate thereof as hereinabove provided. Upon failure of the Contractor/Subcontractor to furnish, deliver and maintain such insurance as above provided, this Contract, at the election of the Owner, may be forthwith declared suspended, discontinued or terminated. Failure of the Contractor/Subcontractor to take out and/or maintain or the taking out and/or maintenance of any required insurance, shall not relieve the Contractor/Subcontractor from any liability under the

Contract, nor shall the insurance requirements be construed to conflict with or otherwise limit the obligations of the Contractor/Subcontractor concerning indemnification. The Owner reserves the right to require complete, certified copies of all required insurance policies, at any time.

11.1.9 SUBCONTRACTORS

Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates from each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.

11.1.10 CERTIFICATE OF INSURANCE

Contractor shall furnish the Owner with certificates of insurance affecting coverage required by this clause. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificates of insurance must also contain the following in the "Description of Operations" section:

If the contractor is a General Contractor, then so state.

If the contractor is a specialty contractor, then so state and provide the list of specialties for which the contractor is insured.

The certificates are to be received and approved by the Owner before work commences. The Owner reserves the right to require complete, certified copies of all required insurance policies, at any time.

11.2 INSURANCE REQUIREMENTS FOR CONTRACTORS

Contractor shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees or subcontractors. The cost of such insurance shall be included in the Contractor's bid.

11.2.1 MINIMUM SCOPE OF INSURANCE

Coverage shall be at least as broad as:

11.2.1.1 Insurance Services Office Commercial General Liability coverage ("occurrence") form CG 0001. (Current form approved for use in Louisiana.) "Claims Made" form is unacceptable. The "occurrence form" shall not have a "sunset clause".

11.2.1.2 Insurance Services Office form number CA 0001 (Current form approved for use in Louisiana.) covering Automobile Liability. The policy shall provide coverage for owned, hired, and non-owned coverage. If an automobile is to be utilized in the execution of this contract, and the vendor/contractor does not own a vehicle, then proof of hired and non-owned coverage is sufficient.

11.2.1.3 Workers' Compensation insurance as required by the Labor Code of the State of Louisiana, including Employers Liability insurance.

11.2.2 MINIMUM LIMITS OF INSURANCE

Contractor shall maintain limits no less than:

11.2.2.1 Commercial General Liability: \$500,000 combined single limit per occurrence for bodily injury, personal injury and property damage (or higher limits depending on size of contract.)

11.2.2.2 Automobile Liability: \$500,000 combined single limit per accident, for bodily injury and property damage(or higher limits depending on size of contract).

11.2.2.3 Workers Compensation and Employers Liability: Workers' Compensation limits as required by the Labor Code of the State of Louisiana and Employers Liability coverage. Exception: Employers liability limit is to be \$1,000,000 when work is to be over water and involves maritime exposure.

11.2.3 DEDUCTIBLES AND SELF-INSURED RETENTIONS

Any deductibles or self-insured retentions must be declared to and approved by the Owner. At the option of the Owner, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Owner, its officers, officials, employees and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

11.2.4 OTHER INSURANCE PROVISIONS

The policies are to contain, or be endorsed to contain, the following provisions:

11.2.4.1 General Liability and Automobile Liability Coverages

11.2.4.1.1 The Owner, its officers, officials, employees, Boards and Commissions and volunteers are to be added as "additional insureds" as respects liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor, premises owned, occupied or used by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the Owner, its officers, officials, employees or volunteers.

It is understood that the business auto policy under "Who is an Insured" automatically provides liability coverage in favor of the State of Louisiana.

11.2.4.1.2 Any failure to comply with reporting provisions of the policy shall not affect coverage provided to the Owner, its officers, officials, employees, Boards and Commissions or volunteers.

11.2.4.1.3 The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

11.2.4.2 Workers' Compensation and Employers' Liability Coverage

The insurer shall agree to waive all rights of subrogation against the Owner, its officers, officials, employees and volunteers for losses arising from work performed by the Contractor for the Owner.

11.2.4.3 All Coverages

Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to the Owner.

11.2.5 ACCEPTABILITY OF INSURERS

Insurance is to be placed with insurers with an A.M. Best's rating of no less than A-:VI. This rating requirement will be waived for the workers' compensation coverage.

11.2.6 VERIFICATION OF COVERAGE

Contractor shall furnish the Owner with certificates of insurance effecting coverage required. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificates of insurance must also contain the following in the "Description of Operations" section:

If the contractor is a General Contractor, then so state.

If the contractor is a specialty contractor, then so state and provide the list of specialties for which the contractor is insured.

The certificates are to be received and approved by the Owner before work commences. The Owner reserves the right to require complete, certified copies of all required insurance policies, at any time.

11.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE

Delete Subparagraphs 11.3.1, 11.3.2, & 11.3.3

11.4 PROPERTY INSURANCE

Delete all Subparagraphs 11.4.1 through 11.4.10 and substitute the following:

11.4.1 Unless otherwise provided, the Owner shall purchase and maintain property insurance upon the entire work at the site to the full insurable value equal to the contract sum and any amendments.

The State of Louisiana is to provide Builder's Risk Insurance to protect the Owner, Contractor, and Sub-Contractors as their interests may appear. The policy is subject to the following deductibles, which will be paid by the Contractor:

All covered causes of loss, except flood	\$1,000 deductible per occurrence
Flood cause of loss	\$5,000 deductible per occurrence

The policy insures against "all risk" of direct physical loss or damage subject to certain exclusions and limitations. A copy of the current policy can be found at the Office of Risk Management at the address shown below or on their website at the address shown below. It is the Contractor's responsibility to review this policy and, if additional insurance is determined to be needed, to purchase the additional insurance to protect the Contractor and Sub-Contractor interest in the project.

Inquiries concerning the Owner's insurance policy shall be sent to the address shown below. In the event of a loss or claim, please notify the Office of Risk Management at the telephone number shown below, with confirmation in writing to the address shown below, providing all pertinent information, such as date of loss, type of loss, approximate extent of damage, location, and project number.

Division of Administration
Office of Risk Management
Post Office Box 91106
Baton Rouge, LA, 70821-9106.

(225) 342-8500

<http://www.doa.louisiana.gov/orm/uw.htm>

Add the following Subparagraph 11.5.3:

11.5.3 RECORDATION OF CONTRACT AND BOND[38:2241A(2)]

"The Owner shall record within thirty (30) days the Contract Between Owner and Contractor and Performance and Payment Bond with the Clerk of Court in the Parish in which the work is to be performed."

ARTICLE 12

UNCOVERING AND CORRECTION OF WORK

12.2.2.1 At the end of the paragraph add the following sentences: "If the Contractor fails to correct Work identified as defective and covered by warranties, the Owner may hold the Contractor in default. If the Owner finds the Contractor is in default, the Surety shall be notified. Finding the Contractor in default shall constitute a reason for disqualification of the Contractor from bidding on future state contracts.

ARTICLE 13

MISCELLANEOUS PROVISIONS

13.2.1 In the second sentence, Delete "Except as.....13.2.2"

Delete paragraph 13.2.2

Add the following clause 13.4.3.

13.4.3 The Nineteenth Judicial Court in and for the Parish of East Baton Rouge, State of Louisiana shall have sole jurisdiction and venue in any action brought under this contract.

13.5 TESTS AND INSPECTIONS

In Subparagraph 13.5.1 delete the second sentence and substitute the following:

"The Contractor shall make arrangements for such tests, inspections and approvals with the Testing Laboratory provided by the Owner, and the Owner shall bear all related costs of tests, inspections and approvals."

Delete the last sentence of Subparagraph 13.5.1.

13.6 INTEREST

Delete Paragraph 13.6.

13.7 COMMENCEMENT OF STATUTORY LIMITATION PERIOD

Delete paragraph 13.7. (R.S.38:2189)

ARTICLE 14

TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

Delete clause 14.1.1.4.

14.2 TERMINATION BY THE OWNER FOR CAUSE

Add the following clause:

14.2.1.5 "Failure to complete the punch list within the lien period as provided in 9.8.2.3."

14.2.3 Add the following sentence:

"Termination by the Owner shall not suspend assessment of liquidated damages against the surety."

14.2.5 Add the following Subparagraph:

"If an agreed sum of liquidated damages has been established, termination by the Owner under this Article will not relieve the Contractor and/or surety of his obligations under the liquidated damages provisions and the Contractor and/or surety shall be liable to the Owner for per diem liquidated damages."

ARTICLE 15

Add the following as Article 15:

EQUAL OPPORTUNITY

- 15.1 The Contractor and all Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of nondiscrimination.
- 15.2 The Contractor and all Subcontractors shall, in all solicitations or advertisement for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin.

CONTRACT BETWEEN OWNER AND CONTRACTOR
AND PERFORMANCE AND PAYMENT BOND

This agreement entered into this _____day of _____, 20____, by _____, hereinafter called the "Contractor", whose business address is _____, and the State of Louisiana Division of Administration, herein represented by the contracting officer executing this contract, hereinafter called the "Owner".

Witnesseth that the Contractor and the Owner, in consideration of premises and the mutual covenants; consideration and agreement herein contained, agree as follows:

Statement of Work: The contractor shall furnish all labor and materials and perform all of the work required to build, construct and complete in a thorough and workmanlike manner:

State ID

in strict accordance with Contract Documents prepared by:

It is recognized by the parties herein that said Contract Documents including by way of example and not of limitation, the Drawings and Specifications dated _____, Addenda number(s) _____, the Instruction to Bidders, Bid Form, General Conditions, Supplementary Conditions, any Addenda thereto, impose duties and obligations upon the parties herein, and said parties thereby agree that they shall be bound by said duties and obligations. For these purposes, all of the provisions contained in the aforementioned Construction Documents are incorporated herein by reference with the same force and effect as though said Construction Documents were herein set out in full.

Time for Completion: The work shall be commenced on a date to be specified in a written order of the Owner and shall be completed within _____ consecutive calendar days from and after the said date.

Liquidated Damages: Contractor shall be assessed Liquidated Damages in the amount of _____ per day for each consecutive calendar day which work is not complete beginning with the first day beyond the completion time.

Compensation to be paid to the Contractor: The Owner will pay and the Contractor will accept in full consideration for the performance of the contract the sum of _____ Dollars, (\$ _____) which sum represents the Base Bid.

Performance and Payment Bond: To these presents personally came and intervened _____, herein acting for _____, a corporation organized and existing under the laws of the State of _____, and duly authorized to transact business in the State of Louisiana, as Surety, who declared that having taken cognizance of this contract and of the Construction Documents mentioned herein, he hereby in his capacity as its Attorney in Fact obligates his said company, as Surety for the said Contractor, unto the said Owner, up to the sum of _____. By issuance of this bond, the Surety acknowledges they are in compliance with R.S. 38:2219 and Article 8 of the Instructions to Bidders.

The condition of this performance and payment bond shall be that should the Contractor herein not perform the contract in accordance with the terms and conditions hereof, or should said Contractor not fully indemnify and save harmless the Owner, from all cost and damages which he may suffer by said Contractor's non-performance or should said Contractor not pay all persons who have and fulfill obligations to perform labor and/or furnish materials in the prosecution of the work provided for herein, including by way of example workmen, laborers, mechanics, and furnishers of materials, machinery, equipment and fixtures, then said Surety agrees and is bound to so perform the contract and make said payment(s).

Provided, that any alterations which may be made in the terms of the contract or in the work to be done under it, or the giving by the Owner of any extensions of time for the performance of the contract, or any other forbearance on the part of either the Owner or the Contractor to the other shall not in any way release the Contractor or the Surety from their liability hereunder, notice to the Surety of any such alterations, extensions or other forbearance being hereby waived.

The Contractor agrees to abide by the requirements of the following as applicable: Title VI and VII of the Civil Rights Act of 1964, as amended by the Equal Opportunity Act of 1972, Federal Executive Order 11246, the Federal Rehabilitation Act of 1973, as amended, the Vietnam Era Veteran's Readjustment Assistance Act of 1974, Title IX of the Education Amendments of 1972, the Age Act of 1972, and contractor agrees to abide by the requirements of the Americans with Disabilities Act of 1990.

Contractor agrees not to discriminate in its employment practices, and will render services under this contract without regard to race, color, religion, sex, national origin, veteran status, political affiliation, disabilities, or in accordance with EWE 92-7 because of an individual's sexual orientation.

Any act of discrimination committed by Contractor, or failure to comply with these statutory obligations when applicable shall be grounds for termination of this contract.

In Witness whereof, the parties hereto on the day and year first above written have executed this agreement in seven (7) counterparts, each of which shall, without proof or accountancy for the other counterparts, be deemed an original thereof.

WITNESSES:

STATE OF LOUISIANA
DIVISION OF ADMINISTRATION
OWNER

BY: _____
Jerry W. Jones

BY: _____
SURETY:

BY: _____
ATTORNEY IN FACT

ADDRESS

TELEPHONE NUMBER

STATE OF LOUISIANA
PARISH OF _____

PROJECT NO. _____
NAME: _____
LOCATION: _____

AFFIDAVIT

Before me, the undersigned authority, duly commissioned and qualified within and for the State and Parish aforesaid, personally came and appeared _____ representing who, being by me first duly sworn deposed and said that he has read this affidavit and does hereby agree under oath to comply with all provisions herein as follows:

PART I

Section 2224 of Part II of Chapter 10 of Title 38 of the Louisiana Revised Statutes, as amended.

(1) That affiant employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course of their duties for affiant; and

(2) That no part of the Contract price received by affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the Contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for affiant.

PART II

Section 2190 of Part I of Chapter 10 of Title 38 of the Louisiana Revised Statutes, as amended.

That affiant, if an architect or engineer, or representative thereof, does not own a substantial financial interest, either directly or indirectly, in any corporation, firm, partnership, or other organization which supplies materials for the construction of a public work when the architect or engineer has performed architectural or engineering services, either directly or indirectly, in connection with the public work for which the materials are being supplied.

For the purposes of this section, a "substantial financial interest" shall exclude any interest in stock being traded on the American Stock Exchange or the New York Stock Exchange.

That affiant, if subject to the provisions of this section, does hereby agree to be subject to the penalties involved for the violation of this section.

SWORN TO AND SUBSCRIBED BEFORE ME
THIS _____ DAY OF _____, 20____.

AFFIANT

NOTARY

ROOFING GUARANTEE R1

OWNER: STATE OF LOUISIANA

ADDRESS: OFFICE OF FACILITY PLANNING AND CONTROL
POST OFFICE BOX 94095 CAPITOL STATION
BATON ROUGE, LOUISIANA 70804-9095

WHEREAS _____

Address _____

Telephone (____)_____,
herein called the "Roofing Contractor", has performed roofing and flashing in accordance with the Contract Documents for Project No. _____, Part No. _____ (hereinafter called the "Work") under a

Subcontract with _____

General Contractor on the Following Project: _____

Name of Project: _____

User Agency: _____

Location/Address: _____

Name and Type of Building(s): _____

_____ Building I.D. _____

Type(s) of Roof Deck(s): _____

Total Roof Area: _____ SF; Flashing, Edge: _____ LF; Base: _____ LF

Date of Acceptance: _____ Guarantee Period: 2 Years

Date of Expiration: _____

AND WHEREAS the Roofing Contractor has contracted (as a Subcontractor) to guarantee said work against water entry from faulty or defective materials and workmanship for the designated Guarantee period;

AND WHEREAS the General Contractor, by its acceptance of the Contract for the above described project, has jointly assumed with the Roofing Contractor the obligations to the Owner of said guarantee against leaks and faulty or defective materials and workmanship;

NOW THEREFORE the Roofing Contractor and the General Contractor jointly and severally guarantee, subject to the terms and conditions herein set forth, that during the Guarantee Period they will at their own cost and expense, make or cause to be made with approved procedures and materials such repairs to or replacements of said work resulting from water entry or faults or defects of said Work as are necessary to correct faulty and defective work and as are necessary to maintain said Work in watertight conditions and further to respond on or within two (2) working days upon written notification of leaks or defects by the Owner/User Agency. Furthermore, they will at their own cost and expense maintain the roof for (2) years after acceptance, in accordance with the current edition of the Roof Maintenance Manual published by the Roofing Industry Educational Institute. The roof shall be inspected a minimum of twice each year, and a report prepared documenting the conditions observed at each inspection. These inspections shall be made once during the months of April or May and once during the months of September and October. Two copies of each report shall be forwarded to the Owner and User Agency.

This Guarantee is made subject to the following terms and conditions:

1. Specifically excluded from this guarantee are damages to the Work, other parts of the building and building contents caused by: A) lightning, and storm (includes hurricanes and tornadoes), hailstorm, earthquakes and other unusual phenomena of the elements; B) fire; and C) structural failures causing excessive roof deck, edgings and related roof components movement. When the Work has been damaged by any of the foregoing causes, the Guarantee will be null and void until such damage has been repaired by the Roofing Contractor, and until the cost and expense thereof has been paid by the Owner or another responsible party so designated.
2. During the Guarantee Period, if the Owner/User Agency allows alteration of the Work by anyone other than a Contractor approved in writing by the Roofing Subcontractor, General Contractor, and Roofing Material Manufacturer prior to the work being performed, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on the roof, this Guarantee shall become null and void upon the date of said alterations. If the Owner/User Agency engages the Roofing Contractor to perform said alterations, the Guarantee shall not become null and void, unless the Roofing Contractor, prior to proceeding with said work, shall have notified the Owner/User Agency in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the Work, thereby reasonably justifying a termination of this Guarantee.
3. During the Guarantee Period, if the original use of the roof is changed and it becomes used for, but for which it was not originally designed or specified, as a promenade, work deck, spray-cooled surface, flooded basin, or other use of service more severe than originally specified, this Guarantee shall become null and void upon the date of said change.
4. During the Guarantee Period, if any building or area of a building is changed to uses creating extremes of interior temperature and/or humidity, but for which it was not originally designed and specified, without provisions and alterations made to the building which effectively contain or control these conditions, this guarantee shall become null and void upon the date of said change.
5. The Owner/User Agency shall promptly notify the Roofing Contractor in writing of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the Roofing Contractor to inspect the Work, and to examine the evidence of such leaks, defects or deterioration.
6. This Guarantee is recognized to be the only guarantee of the General and Roofing Contractor on said work, and shall not operate to restrict or cut off the Owner from other remedies and recourses lawfully available to him in case of roofing failure. Specifically, this Guarantee shall not operate to relieve the

Roofing Contractor of his responsibility for performance of the original work, regardless of whether the Contract was a Contract directly with the Owner or a Subcontract with the Owner's General Contractor.

IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, 20____.

Roofing Contractor's Signature: _____

Typed Name: _____

Representing: _____

Telephone Number: _____

And has been countersigned by the General Contractor issuing the Roofing Contractor's Subcontract for said work:

Name of General Contractor: _____

Date: _____ Authorized Signature: _____

Representing: _____

Typed Name: _____

Telephone Number: _____

WITNESS: _____

Telephone Number: _____

Witness: _____

ROOFING GUARANTEE R2

OWNER: STATE OF LOUISIANA

ADDRESS: OFFICE OF FACILITY PLANNING AND CONTROL
POST OFFICE BOX 94095 CAPITOL STATION
BATON ROUGE, LOUISIANA 70804-9095

WHEREAS _____

Address _____

Telephone,(____)_____

herein called the "Roofing Contractor", has performed roofing and flashing in accordance with the Contract Documents for Project No. _____,Part No. _____ (hereinafter called the "Work") under a Contract with the Owner.

Name of Project: _____

User Agency: _____

Location/Address: _____

Name and Type of Building(s): _____

_____ Building I.D. _____

Type(s) of Roof Deck(s): _____

Total Roof Area: _____ SF; Flashing, Edge: _____ LF; Base: _____ LF

Date of Acceptance: _____ Guarantee Period: 2 Years

Date of Expiration: _____

AND WHEREAS the Roofing Contractor has contracted to guarantee said work against water entry from faulty or defective materials and workmanship for the designated Guarantee period;

NOW THEREFORE the Roofing Contractor as the General Contractor guarantees, subject to the terms and conditions herein set forth, that during the Guarantee Period he will at his own cost and expense, make or cause to be made with approved procedures and materials such repairs to or replacements of said work resulting from water entry or faults or defects of said Work as are necessary to correct faulty and defective work and as are necessary to maintain said Work in watertight conditions and further to respond on or within

two (2) working days upon written notification of leaks or defects by the Owner/User Agency. Furthermore, he will at his own cost and expense maintain the roof for (2) years after acceptance, in accordance with the current edition of the Roof Maintenance Manual published by the Roofing Industry Educational Institute. The roof shall be inspected a minimum of twice each year, and a report prepared documenting the conditions observed at each inspection. These inspections shall be made once during the months of April or May and once during the months of September and October. Two copies of each report shall be forwarded to the Owner and User Agency.

This Guarantee is made subject to the following terms and conditions:

1. Specifically excluded from this guarantee are damages to the Work, other parts of the building and building contents caused by: A) lightning, windstorm (includes hurricanes and tornados), hailstorm, earthquakes and other unusual phenomena of the elements; B) fire; and C) structural failures causing excessive roof deck, edgings and related roof components movement. When the Work has been damaged by any of the foregoing causes, the Guarantee will be null and void until such damage has been repaired by the Roofing Contractor, and until the cost and expense thereof has been paid by the Owner or another responsible party so designated.
2. During the Guarantee Period, if the Owner/User Agency allows alteration of the Work by anyone other than a Contractor approved in writing by the Roofing Subcontractor, General Contractor, and Roofing Material Manufacturer prior to the work being performed, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on the roof, this Guarantee shall become null and void upon the date of said alterations. If the Owner/User Agency engages the Roofing Contractor to perform said alterations, the Guarantee shall not become null and void, unless the Roofing Contractor, prior to proceeding with said work, shall have notified the Owner/User Agency in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the Work, thereby reasonably justifying a termination of this Guarantee.
3. During the Guarantee Period, if the original use of the roof is changed and it becomes used for, but for which it was not originally designed or specified, as a promenade, work deck, spray-cooled surface, flooded basin, or other use of service more severe than originally specified, this Guarantee shall become null and void upon the date of said change.
4. During the Guarantee Period, if any building or area of a building is changed to uses creating extremes of interior temperature and/or humidity, but for which it was not originally designed and specified, without provisions and alterations made to the building which effectively contain or control these conditions, this Guarantee shall become null and void upon the date of said change.
5. The Owner/User Agency shall promptly notify the Roofing Contractor in writing of observed, known or suspected leaks, defects or deterioration and shall afford reasonable opportunity for the Roofing Contractor to inspect the Work, and to examine the evidence of such leaks, defects or deterioration.
6. This Guarantee is recognized to be the only guarantee of the General and Roofing Contractor on said work, and shall not operate to restrict or cut off the Owner from other remedies and recourses lawfully available to him in case of roofing failure. Specifically, this Guarantee shall not operate to relieve the Roofing Contractor of his responsibility for performance of the original work, regardless of whether the Contract was a Contract directly with the Owner or a Subcontract with the Owner's General Contractor.

IN WITNESS THEREOF, this instrument has been duly executed this _____
day of _____, 20_____.

Roofing Contractor's Signature: _____

Typed Name: _____

Representing: _____

Telephone Number: _____

WITNESS _____

Telephone Number: _____

Witness: _____

ROOFING GUARANTEE R-3 (Metal)

OWNER: STATE OF LOUISIANA OFFICE OF FACILITY PLANNING AND CONTROL
POST OFFICE BOX 94095 CAPITOL STATION
BATON ROUGE, LOUISIANA 70804-9095

Whereas _____

Address _____ Telephone: (____) _____
herein called the Contractor, has provided pre-formed, pre-finished metal roofing, flashing, accessories and miscellaneous items required for a complete roof system installation in accordance with the Contract Documents for the PROJECT:

Name of Project: _____

Project Number _____, Part No. _____

User Agency: _____

Location/Address: _____

Name and Type of Building(s): _____ Bldg. I.D. _____

Type of System: (Standing Seam, SR, Flat Seam, etc. _____

Total Roof Area: _____ SF; Total Length of Ridge _____ LF ;

Total Length of Valley: _____ LF: Total Length of gutter/fascia trim: _____

Date of Acceptance _____ Two year Guarantee Expiration _____

AND WHEREAS the Contractor has contracted to guarantee said work against water entry from faulty or defective materials and workmanship for the designated Guarantee period of TWO (2) YEARS from the date of the Final acceptance of the Project;

NOW THEREFORE the Contractor guarantees, subject to the terms and conditions herein set forth, that during the Guarantee Period the Contractor will at his own cost and expense, make or cause to be made with approved procedures and materials such repairs to or replacements of said work (including any wetted thermal insulation) resulting from water entry or faults or defects of said Work as are necessary to maintain said Work in watertight conditions and further, respond on or within TWO (2) working days upon written notification of leaks or defects by the Owner/User Agency.

This Guarantee is made subject the following terms and conditions

1. Specifically excluded from this guarantee are damages to the Work, other parts of the building(s) and building contents caused by: A) lighting; windstorm (including hurricanes and tornadoes), hailstorm, earthquake and other unusual phenomena of the elements; B) fire; and C) structural failures causing excessive roof deck, edges and related roof component movement. When the Work has been damaged by any of the foregoing causes, the Guarantee will be suspended until such time as the damage has been repaired, and until the cost and expense thereof has been assigned or paid by the Owner or the responsible party. The guarantee shall be reinstated upon Final Acceptance of the damage repair Work by both the Owner & Contractor.

2. During the Guarantee Period, if the Owner/ User Agency allows alteration of the Work by anyone other than a Contractor approved in writing by the original Contractor and/or Roofing Material Supplier prior to the work being performed, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything (i.e. signs) onto the roof, this Guarantee shall become null and void as of the date of said alterations. If the Owner/ User Agency engages the original Contractor for said alterations, the Guarantee shall be maintained in force unless the Contractor presents written notification to the Owner that the intended work will likely damage or cause deterioration of the base work, thereby justifying a termination of the original Guarantee.

3. The Owner/User Agency shall promptly notify the Contractor in writing of observed, known or suspected leaks, defects or condition deterioration and shall afford a reasonable opportunity for the Contractor to inspect the work and examine evidence of such leaks, defects or deterioration .

4. This Guarantee is recognized to be the only guarantee of the Contractor of said work, and shall not operate to restrict or cut-off the Owner from any other remedies and recourse lawfully available to him in case of roofing failure to any cause or degree. Specifically, this Guarantee shall not operate to relieve the Contractor of his responsibility for the performance of the original work.

IN WITNESS THEREOF, this instrument has been duly executed
this _____ day of _____, 19____.

Contractor's Signature: _____

Typed Name: _____

Telephone Number _____

WITNESS: _____

And if applicable, is countersigned by the following Sub Contractor, Installer, or other party (as indicated) who acted as agent or represented the Contractor during the performance of the work:

Countersignee Name: _____

(Type or Print)

Date: _____ Signature: _____

Representing: _____

Address: _____

Telephone Number: _____

Witness: _____

SCHEDULE OF VALUES

The Contractor is to use the following format. The total Contract Cost is to be itemized in each Subsection listed (as applicable)

	Quantity	Cost
DIVISION 1 – GENERAL REQUIREMENTS		
01000 General Requirements	_____	_____
	TOTAL	
DIVISION 2 – SITEWORK		
02010 Subsurface Investigation	_____	_____
02050 Demolition	_____	_____
02100 Site Preparation	_____	_____
02140 Dewatering	_____	_____
02150 Shoring and Underpinning	_____	_____
02200 Earthwork	_____	_____
02350 Piles and Caissons	_____	_____
02500 Paving and Surfacing	_____	_____
02660 Water Distribution	_____	_____
02700 Sewerage and Drainage	_____	_____
02800 Site Improvements	_____	_____
02900 Landscaping	_____	_____
	TOTAL	
DIVISION 3 – CONCRETE		
03100 Concrete Formwork	_____	_____
03200 Concrete Reinforcement	_____	_____
03250 Concrete Accessories	_____	_____
03300 Cast-in-place Concrete	_____	_____
03400 Precast Concrete	_____	_____
03500 Cementitious Decks	_____	_____
03700 Concrete Restoration and Cleaning	_____	_____
	TOTAL	
DIVISION 4 – MASONRY		
04100 Mortar	_____	_____
04150 Masonry Accessories	_____	_____
04200 Unit Masonry	_____	_____
04500 Masonry Restoration and Cleaning	_____	_____
	TOTAL	
DIVISION 5 – METALS		
05050 Metal Fastening	_____	_____
05100 Structural Metal Framing	_____	_____
05200 Metal Joists	_____	_____
05300 Metal Decking	_____	_____
05500 Metal Fabrications	_____	_____
05580 Sheet Metal Fabrications	_____	_____
05800 Expansion Control	_____	_____
	TOTAL	

DIVISION 6 – WOOD & PLASTICS

	Quantity	Cost
0650 Fasteners and Adhesives	_____	_____
06100 Rough Carpentry	_____	_____
06130 Heavy Timber Construction	_____	_____
06170 Prefabricated Structural Wood	_____	_____
06200 Finish Carpentry	_____	_____
06400 Architectural Woodwork	_____	_____
06600 Plastic Fabrications	_____	_____
	TOTAL	_____

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

07100 Waterproofing	_____	_____
07150 Dampproofing	_____	_____
07190 Vapor and Air Retarders	_____	_____
07200 Insulation	_____	_____
07250 Fireproofing	_____	_____
07300 Shingles and Roofing Tiles	_____	_____
07400 Preformed Roofing and Cladding/Siding	_____	_____
07500 Membrane Roofing	_____	_____
07570 Traffic Topping	_____	_____
07600 Flashing and Sheet Metal	_____	_____
07700 Roof Specialties and Accessories	_____	_____
07900 Joint Sealers	_____	_____
	TOTAL	_____

DIVISION 8 – DOORS AND WINDOWS

08100 Metal Doors and Frames	_____	_____
08200 Wood and Plastic Doors	_____	_____
08300 Entrances and Storefronts	_____	_____
08500 Metal Windows	_____	_____
08600 Wood and Plastic Windows	_____	_____
08650 Special Windows	_____	_____
\08700 Hardware	_____	_____
08800 Glazing	_____	_____
08900 Glazed Curtain Walls	_____	_____
	TOTAL	_____

DIVISION 9 – FINISHES

09200 Lath and Plaster	_____	_____
09250 Gypsum Board	_____	_____
09300 Tile	_____	_____
09400 Terrazzo	_____	_____
09500 Acoustical Treatment	_____	_____
09540 Special Surfaces	_____	_____
09550 Wood Flooring	_____	_____
09600 Stone Flooring	_____	_____
	SUB-TOTAL	_____

DIVISION 9 – FINISHES (CONTINUED)

	Quantity	Cost
09630 Unit Masonry Flooring	_____	_____
09650 Resilient Flooring	_____	_____
09680 Carpet	_____	_____
09700 Special Flooring	_____	_____
09780 Floor Treatment	_____	_____
09800 Special Coatings	_____	_____
09900 Painting	_____	_____
09950 Wall Coverings	_____	_____
	TOTAL	_____

DIVISION 10 – SPECIALTIES

10100 Chalkboards and Tackboards	_____	_____
10150 Compartments and Cubicles	_____	_____
10240 Grilles and Screens	_____	_____
10260 Wall and Corner Guards	_____	_____
10270 Access Flooring	_____	_____
10400 Identifying Devices	_____	_____
10500 Lockers	_____	_____
10520 Fire Protection Specialties	_____	_____
10650 Operable Partitions	_____	_____
10670 Storage Shelving	_____	_____
10800 toilet and Bath Accessories	_____	_____
	TOTAL	_____

DIVISION 11 – EQUIPMENT

11020 Security and Vault Equipment	_____	_____
11050 Library Equipment	_____	_____
11060 Theater and Stage Equipment	_____	_____
11110 Commercial Laundry and Dry Cleaning Equipment	_____	_____
11130 Audio-Visual Equipment	_____	_____
11190 Detention Equipment	_____	_____
11200 Water Supply and Treatment Center	_____	_____
11300 Fluid Waste Treatment and Disposal Equipment	_____	_____
11400 Food Service Equipment	_____	_____
11460 Unit Kitchens	_____	_____
11470 Darkroom Equipment	_____	_____
11480 Athletic, Recreational and Therapeutic Equipment	_____	_____
11600 Laboratory Equipment	_____	_____
11700 Medical Equipment	_____	_____
	TOTAL	_____

DIVISION 12 – FURNISHINGS

12300 Manufactured Casework	_____	_____
12500 Window Treatment	_____	_____
12600 Furniture and Accessories	_____	_____
	TOTAL	_____

DIVISION 13 –SPECIAL CONSTRUCTION

Quantity

Cost

13090 Radiation Protection	_____	_____
13120 Pre-engineered Structures	_____	_____
13150 Pools	_____	_____
13180 Site Constructed Incinerators	_____	_____
13800 Building Automation Systems	_____	_____
13900 Fire Suppression and Supervisory Systems	_____	_____
	TOTAL	_____

DIVISION 14 – CONVEYING SYSTEMS

14200 Elevators	_____	_____
14400 Lifts	_____	_____
14600 Hoist and Cranes	_____	_____
14800 Scaffolding	_____	_____
	TOTAL	_____

DIVISION 15 – MECHANICAL

15100 Building Services Piping	_____	_____
15250 Mechanical Insulation	_____	_____
15300 Fire Protection Piping	_____	_____
15400 Plumbing	_____	_____
15500 Heat Generation Equipment	_____	_____
15600 Refrigeration Equipment	_____	_____
15700 Heating, Ventilation and Air Conditioning	_____	_____
15800 Air Distribution	_____	_____
15900 HVAC Instrumentation and Controls	_____	_____
15950 Testing, Adjusting and Balancing	_____	_____
	TOTAL	_____

DIVISION 16 – ELECTRICAL

16100 Wiring Methods	_____	_____
16200 Electrical Power	_____	_____
16300 Transmission and Distribution	_____	_____
16400 Low-Voltage Distribution	_____	_____
16500 Lighting	_____	_____
16600 Special Systems	_____	_____
16700 Communications	_____	_____
16800 Sound and Video	_____	_____
	TOTAL	_____

GRAND TOTAL

Facility Planning & Control CHANGE ORDER

PROJECT NAME: _____

CHANGE ORDER NO: _____

PROJECT NUMBER: _____

CONTRACTOR: _____

CONTRACT DATE: _____

SITE CODE: _____ STATE ID: _____

CMFS No. _____

You are directed to make the following change(s) in this contract: *(attach itemized breakdown)*. Also, please give brief description of change(s) below.

The Original Contract Sum	\$	
Total Changes by Previous Change Order(s)	\$	
Current Contract Sum	\$	
Contract Sum, will be (increased) (decreased) (unchanged) by this Change Order	\$	
New Contract Sum	\$	
The Original Contract Time and Completion Date		DAYS
Total Time extended by Previous Change Order(s)		DAYS
Contract Time will be (increased) (decreased) (unchanged) by this Change Order		DAYS
Revised Contract time and new Contract Completion Date		DAYS
Added Building Area		(Sq. Ft.)

NOTE: No additional increase in time or money will be considered for a Change Order item after it has been reviewed and executed.

RECOMMENDED

ACCEPTED

APPROVED

Designer's Name
Address

Contractor's Name
Address

Project Manager
Facility Planning & Control
(Owner)State of Louisiana

By _____

By _____

By: _____

Date: _____

Date: _____

Date: _____

FACILITY PLANNING AND CONTROL USE ONLY

TYPE "O" _____, **"E"** _____, **"M"** _____, **"R"** _____.

"O" = Omission* "E" = Error* "M" = Miscellaneous "R" = Owner Requested

*See Section 5.2.3 of the Louisiana Capital Improvement Projects Procedure Manual for Design and Construction, 1985 Edition

REMARKS:

State of Louisiana
Division of Administration/Facility Planning and Control
Construction Contract Order Pricing Schedule
Instructions to Change Order Forms

Facility Planning & Control (“FP&C”) has created this Standard Change Order form to facilitate preparation of contract change orders in conformity with construction contract requirements. The forms have been prepared to comply with contract requirements presented in the General Conditions of the Contract for Construction, AIA Document A201, 1997 Edition, as modified by the State’s Supplementary Conditions.

The forms shall be used by the General Contractor in presenting his cost associated with planned changes. In addition, the forms shall be used by all Subcontractors in preparing their cost estimates for inclusion with the General Contractor in submittals to the State. Where necessary, copies of the forms shall be made to accommodate additional detail information. Refer to Articles 7.1, 7.2 and 7.3 of Supplementary Conditions.

A. Contractor’s Direct Cost of the Work:

1. Direct Labor – Include the “wages paid” hourly direct labor and/or foreman necessary to perform the required change. “Wages paid” is the amount actually paid the employee, not the fully burdened charge rate used in the bid, T&M, etc. “Assigned Personnel or Work Crews” should be stated by trade or type of work performed not by name of person or company title. For example carpenter, mason, backhoe operator, etc. Supervisory personnel in district or home office shall not be included. Supervisory personnel on the job-site, but with broad supervisory responsibility and paid as salaried personnel, shall not be included as Direct Labor

2. Direct Material – Include the acquisition cost of all materials directly required to perform the required change. Examples of “Unit of Measure” include square feet, cubic yards, linear feet, days, gallons, etc.

3. Equipment – Include the rental cost of equipment items necessary to perform the change. For company-owned equipment items, include documentation of internal rental rates. For equipment rented from outside independent sources, include at least two actual quotes or invoices to document rental rates. Charges for small tools, and craft specific tools are not allowed.

B. Subcontractor’s Direct Cost:

For each subcontractor required to perform the proposed change, attach Direct Cost Worksheets showing each item of labor, material, and equipment necessary. For Direct Labor, show the hourly wage rate paid, and labor burden add-on rate. For Direct Materials and Equipment, show the units required, associated unit costs and taxes rate. Where subcontractors use other subcontractors to perform required task, the total overhead and profit mark-up for all parties cannot exceed 25% of the direct cost of performing the task (see Article 7.2.3 and 7.2.4).

C. Bond Premiums

The Contractor’s actual documented bond premium rate shall be added to all direct and indirect costs of the proposed change.

PROJECT NAME: _____ PROJECT No. : _____

CONTRACTOR OR SUBCONTRACTOR NAME: _____
 DESCRIPTION OF WORK : _____

A. DIRECT COST OF WORK:

1. LABOR (Attach Direct Cost Worksheets as Necessary)
Assigned Personnel or Work Crews

HOURLY WAGE RATE PAID	HOURS WORKED

ADD LABOR BURDEN @ _____ %

TOTAL COST

LABOR TOTAL

--

2. Material (Attach Direct Cost Worksheets as Necessary)
MATERIAL REQUIRED FOR CHANGE

UNIT PRICE	UNIT OF MEASURE	REQUIRED UNITS

ADD TAX @ _____ %

TOTAL COST

MATERIAL TOTAL

--

3. EQUIPMENT (Attach Direct Cost Worksheets as Necessary)
EQUIPMENT REQUIRED FOR CHANGE

UNIT PRICE	UNIT OF MEASURE	REQUIRED UNITS

ADD TAX @ _____ %

TOTAL COST

EQUIPMENT TOTAL

--

DIRECT COST (SUM A 1,2,3)

--

CONTRACTOR/SUBCONTRACTOR'S 15% OVERHEAD AND PROFIT (TOTAL DIRECT COST x15% MAXIMUM)

--

TOTAL COST

--

B. SUBCONTRACTOR'S DIRECT COST: (Attach Supporting Direct Cost Worksheets)

- 1. Direct Labor with Labor Burden Add-on _____
 - 2. Direct Materials With Sales Tax _____
 - 3. Company Owned and Rented Equipment with Applicable Sales Tax _____
- TOTAL** _____

--

Subcontractor's Overhead and Profit on Direct Cost (Direct Cost x OH&P) (15% Maximum) _____

--

Contractor's Overhead and Profit on Direct Cost (Direct Cost x OH&P) (10% Maximum) _____

--

TOTAL

--

C. BOND PREMIUMS (Total Contractor and Subcontractor Cost @ _____ %)

--

TOTAL COST OF PROPOSED CHANGE ORDER ITEM

--

TOTAL CONTRACT DAYS ADDED/DELETED FROM PROJECT SCHEDULE

(Attach supporting data such as meteorological reports)

--

STATE OF LOUISIANA

C.O. # _____

Facility Planning and Control

Construction Contract Change Order Summary

Contractor's or Subcontractor's Direct Cost Worksheet

Cost of the Work: Contractors and Subcontractors shall use this worksheet to provide detail listings of additional labor, material, or equipment direct cost items required by contract changes. In addition this worksheet shall be used to document individual cost elements comprising fixed jobsite overhead.

Description of Additional Cost Item	Unit Price	Unit of Measure	Required Units	Additional Cost
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

❖ NOT FOR RECORDATION PURPOSES ❖

Facility Planning & Control
PARTIAL OCCUPANCY

PROJECT NAME
AND NUMBER:

CMFS No.

CONTRACTOR:

USER AGENCY:

The below described portion of subject project is, to the best of my knowledge and belief, complete to a point where the User desires to use in according with the Contract Documents.

DATE OCCUPIED: _____ .

WARRANTY items covered by Occupancy:

_____	_____
Designer	Date
_____	_____
Contractor	Date
_____	_____
Facility Planning and Control	Date

Punch List: Attached

None

c: User Agency

❖ NOT FOR RECORDATION PURPOSES ❖

❖ NOT FOR RECORDATION PURPOSES ❖

Facility Planning & Control
RECOMMENDATION OF ACCEPTANCE

TO: FACILITY PLANNING AND CONTROL
P.O. Box 94095
Baton Rouge, LA 70804-9095

FROM: _____

Design Firm Name and Address

DATE: _____

PROJECT NAME & NUMBER: _____

SITE CODE: _____ STATE ID: _____ CFMS: _____

CONTRACTOR: _____

ORIGINAL CONTRACT AMOUNT: \$ _____

FINAL CONTRACT AMOUNT: \$ _____

FINAL BUILDING AREA (SQ. FEET): _____

I certify that, to the best of my knowledge and belief, this project is substantially complete in accordance with the Plans and Specifications to the point where it can be used for the purpose which was intended. It is recommended that it be accepted.

DATE OF ACCEPTANCE: _____

CONTRACT DATE OF COMPLETION: _____

NUMBER OF DAYS (OVERRUN) (UNDERRUN) (As of Acceptance Date) _____

LIQUIDATED DAMAGES PER DAY STIPULATED IN CONTRACT \$ _____

VALUE OF PUNCH LIST \$ _____ *(Attach punch list)*

Was part of project occupied prior to Acceptance?

PORION OCCUPIED: *(Attach Partial Occupancy Forms)*

ROOF GUAR-MANUF: _____ START DATE: _____ END DATE: _____

ROOFER: _____ START DATE: _____ END DATE: _____

Signed: _____
DESIGNER

FOR USE OF PROJECT MANAGER:

Signed: _____
PROJECT MANAGER

c: User Agency

❖ NOT FOR RECORDATION PURPOSES ❖

FOR RECORDATION

CERTIFICATE OF COMPLIANCE
with
Americans with Disabilities Act Accessibility Guidelines

TO: FACILITY PLANNING AND CONTROL
P.O. Box 94095
Baton Rouge, LA 70804-9095

FROM: _____

Design Firm Name and Address

PROJECT NAME: _____

PROJECT No.: _____

SITE CODE: _____ STATE ID: _____

DATE OF ACCEPTANCE: _____

I, _____ certify that, to the best of my knowledge and belief, this project has been constructed in compliance with the Americans with Disabilities Act Accessibility Guidelines as reviewed by the fire marshal.

Designer Signature Date: _____

NOTE: LA R.S. 40:1739 requires that, prior to final acceptance, the designer to sign a certificate stating that the building has been constructed in compliance with ADAAG standards and that the certificate be recorded.

SECTION 01050 - FIELD ENGINEERING

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

- A. Contractor shall provide the services of a Registered Land Surveyor for laying out lines and establishing elevations of structures and improvements including all piping, equipment and foundation elevations.
- B. The Surveyor shall locate benchmarks and other reference points necessary to establish location, limits and extent of work.

1.2 SITE WORK

- A. Perform instrumental readings as follows:
 - 1. Verify grade elevations.
 - 2. Following filling and grading operations, but not earlier than two (2) weeks before Final Inspection, to certify that final grade elevations comply with grade elevations indicated on Drawings and are within tolerances specified.
- B. Perform instrumental readings at established grade points indicated on Drawings.

1.3 RECORDS

- A. Submit written records or readings to Designer before Final Inspection.
- B. Include documentation of location and elevation of monument.
- C. The Surveyor shall certify to the Owner that locations and elevations are in compliance with the Contract Documents.
- D. A record (location and elevation) of all the following items shall be submitted by the Contractor to the Designer prior to Substantial Completion. (Contractor shall fill out and submit records in table form.)
 - 1. Slab Elevations
 - 2. Sewer Cleanouts and Manholes
 - 3. All Intersections of Pipe Lines
 - 4. Lift Station Locations
 - 5. Inverts of Sewer Manholes, Piping and Lift Stations
 - 6. Inverts of Storm Sewer Catch Basins and Piping
 - 7. Force Main & Underground Piping

8. Spot elevations within the area of construction to include roads, drives, sidewalks, ditches and grounds. The number of spot elevations should be sufficient to establish compliance with final grade elevations indicated on project plans and drawings.

END OF SECTION

SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Project consists of the construction and/or renovation of six buildings and associated site and utility work.
 - 1. Project Location: St. Gabriel, LA
 - 2. Owner: State of Louisiana
- B. Architect Identification: The Contract Documents, dated December 15, 2004, were prepared for the Project by Coleman & Partners Architects, 3377 North Blvd, Baton Rouge, LA in association with Grace & Hebert Architects, 9332 Bluebonnet Blvd, Baton Rouge, LA.

1.3 CONTRACT

- A. Project will be constructed under a general construction contract.

1.4 USE OF PREMISES

- A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Phasing: Contractor shall have substantial completion and Owner's acceptance on all buildings (HRDC, Infirmary, Mental Health Unit, Chronic Care Unit, Central Plant, Guard Tower) before any work shall commence on Building Three.
- C. Coordination: **Contractor is required to coordinate all penetrations through any existing fence with the Owner in order to meet with the Owner's security requirements.**

1.5 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat" numbering system.
 - 1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred, as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100

SECTION 01140 - WORK RESTRICTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 USE OF PREMISES

- A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.
 - 1. Limits: Confine construction operations to areas indicated on the drawings. Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
 - 2. Owner Occupancy: Allow for Owner occupancy of site and use by the public.
 - 3. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Use of Existing Building: Maintain existing building in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

1.3 OCCUPANCY REQUIREMENTS

- A. Partial Owner Occupancy: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
 - 1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
 - 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
 - 3. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will provide, operate, and maintain mechanical and electrical systems serving occupied portions of building.
 - 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01140

SECTION 01230 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: Contractor shall provide a price to build-out the shell space on the second floor of the Mental Health Unit as noted on the following sheets:

- A2.50r - 2nd Floor Plan
- A2.53r - Reflected Ceiling Plan
- A3.50r - Finish Schedule / Door Schedule
- A4.51r - Building Section
- A7.50r - Security Plan
- A7.51r - Main Control Plan

- B. Alternate No. 2: Contractor shall renovate Building Three as noted on the following sheets:

- A2.30 - Demolition Plan
- A2.31 - Floor Plan
- A2.32 - Reflected Ceiling Plan
- A3.30 - Finish Schedule / Door Schedule

- C. Alternate No. 3: Contractor shall provide a price to build-out the Inmate Processing half of the HRDC Building as noted on the following sheets:

- A2.10 ALT3 – Floor Plan
- A2.11 ALT3 – Roof Plan
- A2.12 ALT3 – Life Safety/Wall Types Etc. Plan
- A2.13 ALT3 – Reflected Ceiling Plan
- A3.10 ALT3 – Door/Finish Schedule
- A4.10 ALT3 – Exterior Elevations
- A4.11 ALT3 – Building Sections

END OF SECTION 01230

SECTION 01250 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within 10 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

- a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
- b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
- c. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
5. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01250

SECTION 01290 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - 2. Submit the Schedule of Values to Architect at the Pre-Construction Conference.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. State's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Change Orders (numbers) that affect value.
 - d. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
8. Schedule Updating: Update and resubmit the Schedule of Values with each Applications for Payment. Schedule shall maintain baseline schedule, as well as, current status of the work including Change Orders or Construction Change Directives that result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
- C. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect may return incomplete applications without action.
 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- D. Transmittal: Submit **3** signed and notarized original copies of each Application for Payment to Architect. Each copy shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- E. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
 1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
 2. When an application shows completion of an item, submit final or full waivers.

3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
- F. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment or as outlined in the Supplementary Conditions include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final).
 4. Products list.
 5. Schedule of unit prices.
 6. Submittals Schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.
 15. Data needed to acquire Owner's insurance.
- G. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- H. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01290

SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Administrative and supervisory personnel.
 - 3. Project meetings.

1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.

1.4 SUBMITTALS

- A. Staff Names: At the Pre-Construction Meeting, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list address and telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

1.5 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. The Owner and Architect will schedule the monthly meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within **3** days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than **15** days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
- D. Progress Meetings: The owner and architects will set progress meetings at monthly intervals. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how

construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01310

SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Daily construction reports.
 - 3. Field condition reports.

1.3 SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- B. Contractor's Construction Schedule: Submit printed copies of initial schedule, one a reproducible print and one a blue- or black-line print, large enough to show entire schedule for entire construction period.
- C. Daily Construction Reports: Submit copies at monthly intervals.
- D. Field Condition Reports: Submit copies at time of discovery of differing conditions.

1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 - 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 - 4. Startup and Testing Time: Include necessary days for startup and testing.
 - 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 - 1. Phasing: Arrange list of activities on schedule by phase.
 - 2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 - 3. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 1 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

2.2 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. List of separate contractors at Project site.
 - 3. Approximate count of personnel at Project site.
 - 4. High and low temperatures and general weather conditions.
 - 5. Accidents.
 - 6. Meetings and significant decisions.

7. Unusual events (refer to special reports).
 8. Stoppages, delays, shortages, and losses.
 9. Meter readings and similar recordings.
 10. Emergency procedures.
 11. Orders and requests of authorities having jurisdiction.
 12. Change Orders received and implemented.
 13. Construction Change Directives received.
 14. Services connected and disconnected.
 15. Equipment or system tests and startups.
 16. Partial Completions and occupancies.
 17. Substantial Completions authorized.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information on CSI Form 13.2A or similar form. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule at each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to ArchitectOwner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01320

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.
 - 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Allow 15 days for processing each resubmittal.
 - 4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

- D. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately **4 by 5 inches (100 by 125 mm)** on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Other necessary identification.
- E. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- F. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.
1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
 2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
 3. Transmittal Form: Use AIA Document G810 or similar form approved by Architect.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.

1. Number of Copies: Submit three copies of each submittal, unless otherwise indicated. Architect will return two copies. Mark up and retain one returned copy as a Project Record Document.

- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Wiring diagrams showing factory-installed wiring.

- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 1. Preparation: Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).

- D. Samples: Prepare physical units of materials or products, including the following:
 1. Comply with requirements in Division 1 Section "Quality Requirements" for mockups.
 2. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 3. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
 - a. Generic description of Sample.
 - b. Product name or name of manufacturer.
 - c. Sample source.
5. Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, provide the following:
 - a. Size limitations.
 - b. Compliance with recognized standards.
 - c. Availability.
 - d. Delivery time.
6. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 - a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three sets of paired units that show approximate limits of the variations.
 - b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
7. Number of Samples for Initial Selection: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
8. Number of Samples for Verification: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.
 - a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
9. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- E. Application for Payment: Comply with requirements in Division 1 Section "Payment Procedures."
- F. Schedule of Values: Comply with requirements in Division 1 Section "Payment Procedures."
- G. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.
 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."
- B. Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.
- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.
- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- J. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- K. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.

- L. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- M. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 1 Section "Closeout Procedures."
- N. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
 - 1. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken
- B. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 01330

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged.
- D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.4 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.5 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Reports: Prepare and submit certified written reports that include the following:
 1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Ambient conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

- F. Testing Agency Qualifications (arranged and paid for by the Owner): An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.
- G. Preconstruction Testing (arranged and paid for by the Owner): Testing agency shall perform preconstruction testing for compliance with specified requirements for performance and test methods.
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies to adequately demonstrate capability of product to comply with performance requirements.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Fabricate and install test assemblies using installers who will perform the same tasks for Project.
 - d. When testing is complete, remove assemblies; do not reuse materials on Project.
 - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- H. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 6. Demolish and remove mockups when directed, unless otherwise indicated.

1.7 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
 - 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
 - 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency as approved by the owner to perform these quality-control services.

- a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Special Tests and Inspections: Owner will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.
1. Testing agency will notify Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 5. Testing agency will retest and reinspect corrected work.
- D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.
- E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 3. Submit a certified written report, in duplicate, of each test, inspection and similar quality-control service through Contractor.
 4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
 5. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.

4. Facilities for storage and field-curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
 2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01400

SECTION 01410 - TESTING LABORATORY SERVICES

PART 1- GENERAL

1.1 SELECTION AND PAYMENT

- A. The Owner will engage and pay for the services of an independent testing laboratory to perform inspection and tests of materials and construction as defined in the General Conditions, except that in the event of a test failure the Contractor shall pay for re-testing. Types and extent of testing is specified in detail in applicable Sections of the Specifications.

1.2 COOPERATION OF CONTRACTOR

- A. The Contractor shall cooperate with the laboratory.
- B. Make available, without cost, samples of all material to be tested in accordance with applicable standard specifications.
- C. Furnish such nominal labor and sheltered working space as is necessary to obtain samples at the Project.
- D. Advise the laboratory of the identity of material sources and instruct suppliers of required tests or inspections by designated laboratory.
- E. Notify laboratory sufficiently in advance of operations to allow for completion of initial tests and assignment of inspection personnel (min 48 hour notice).
- F. Notify the laboratory sufficiently in advance of cancellation of required testing operations. The Contractor shall be responsible to the laboratory for charges due to failure to notify if requirements for testing are cancelled.

1.3 REJECTION OF MATERIALS

- A. The laboratory shall notify the Contractor of any materials which are not in full conformance with the Specifications. The Designer shall be informed of such notifications.

1.4 TEST METHODS

- A. Tests and inspections shall be conducted in accordance with the requirements of these Specifications, or where no specific procedure is specified, in accordance with the latest standards of ASTM or other recognized authorities applicable to the work being tested.

1.5 TEST REPORTS

- A. The laboratory shall promptly submit written reports of each test and inspection made to the Designer, Contractor, Owner and to such other parties the Designer or Owner may specify.

1.6 EXTENT OF LABORATORY TESTS AND INSPECTIONS

- A. The Designer will recommend to the Owner the type and number of tests to be performed on the Project. The Contractor will be advised of the number and type of tests to be performed by the Testing Laboratory, if different than specified in the various Sections of these Specifications.
- B. Testing Laboratory Services are specified in the applicable project specification.

- C. Additional laboratory services required for all concrete pours as described in DOTD standard specifications.
- D. The Contractor is responsible for testing laboratory costs necessary to design concrete and asphaltic concrete mixes to be used where specified in the plans.
- E. Concrete cylinders will be required as requested by the Designer and paid for by the Owner.

1.7 ADDITIONAL TESTS

- A. The Owner reserves the right to require additional tests to those specified and the right to require tests upon materials not originally specified to receive testing. Should such additional tests be judged necessary because of apparently defective materials or workmanship, costs of these additional tests shall be borne by the Contractor.

1.8 CONTRACTOR'S RESPONSIBILITY

- A. Employment of, or failure to employ, a Testing Laboratory by the Owner shall not relieve the Contractor of responsibility to comply with Contract requirements for materials and methods of construction in all parts of the work. Contractor is advised that Testing Laboratory services are for the Owner's purposes and that reports made available to the Contractor are for information only and are not to be construed as a warranty of acceptability of the work.

END OF SECTION

SECTION 01420 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": The term "approved," when used in conjunction with Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.
- D. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is Contractor or another entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.
- J. The term "experienced," when used with the term "installer," means having successfully completed projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction. Specific requirements are indicated in each specification section.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name,

such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

- K. "Project site" is the space available for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project. The extent of Project site is shown on the 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 the date of the Contract Documents, unless otherwise indicated.
- C. **Conflicting Requirements:** Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
 - 1. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Architect for a decision before proceeding.
- D. **Copies of Standards:** Each entity engaged in construction on Project must 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 the publication source and make them available on request.
- E. **Abbreviations and Names:** Abbreviations and acronyms are frequently used in the Specifications and other Contract Documents to represent the name of a trade association, standards-developing organization, authorities having jurisdiction, or other entity in the context of referencing a standard or publication. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of these entities. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01420

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.
 - 1. Hunt Correctional Center shall require two weeks (14 days) advance notice for any and all interruptions of mechanical and/or electrical service. The Contractor will be held fully responsible for any adverse effects as a result of the interruptions of scheduled activities.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Sewers and drainage.
 - 2. Water service and distribution.
 - 3. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
 - 4. Heating and cooling facilities.
 - 5. Electric power service.
 - 6. Lighting.
 - 7. Telephone service.
- C. Support facilities include, but are not limited to, the following:
 - 1. Temporary roads and paving.
 - 2. Dewatering facilities and drains.
 - 3. Project identification and temporary signs.
 - 4. Waste disposal facilities.
 - 5. Field offices.
 - 6. Storage and fabrication sheds.
 - 7. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Environmental protection.
 - 2. Stormwater control.
 - 3. Tree and plant protection.
 - 4. Site enclosure fence.
 - 5. Security enclosure and lockup.
 - 6. Temporary enclosures.
 - 7. Fire protection.

1.3 DEFINITIONS

- A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

- A. General: Cost or use charges for temporary facilities are not chargeable to Owner or Architect and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
 - 1. Owner's construction forces.
 - 2. Occupants of Project.
 - 3. Architect.
 - 4. Testing agencies.
 - 5. Personnel of authorities having jurisdiction.
- B. Sewer Service: Pay sewer service use charges for sewer usage, by all parties engaged in construction, at Project site.
- C. Water Service: Pay water service use charges, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site.
- D. Electric Power Service: Pay electric power service use charges, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site.

1.5 SUBMITTALS

- A. Temporary Utility Reports: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Within 15 days of date established for submittal of Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility.

1.6 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
 - 1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
 - 2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.7 PROJECT CONDITIONS

- A. Temporary Utilities: At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.

1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
 1. Keep temporary services and facilities clean and neat.
 2. Relocate temporary services and facilities as required by progress of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.
- B. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.76-mm-) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts.
- C. Water: Potable.

2.2 EQUIPMENT

- A. General: Provide equipment suitable for use intended.
- B. Field Offices: Prefabricated or Mobile units with lockable entrances, operable windows, and serviceable finishes; heated and air conditioned; on foundations adequate for normal loading.
- C. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- D. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- E. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water drinking-water units, including paper cup supply.
- F. Heating Equipment: Unless Owner authorizes use of permanent heating system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 1. Heating Units: Listed and labeled, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use for type of fuel being consumed.

- G. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
- H. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage appropriate **contractor** to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
 - 3. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.
- B. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
 - 1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
 - 2. Connect temporary sewers to permanent system as directed by sewer department officials.
 - 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
 - 4. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction until permanent water service is in use. Sterilize temporary water piping before use.
 - 1. Provide rubber hoses as necessary to serve Project site.

- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
 2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy.
 3. Drinking-Water Facilities: Provide bottled-water, drinking-water units.
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed.
1. Maintain a minimum temperature of 50 deg F (10 deg C) in permanently enclosed portions of building for normal construction activities, and 65 deg F (18.3 deg C) for finishing activities and areas where finished Work has been installed.
- F. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.
1. Install electric power service underground, unless overhead service must be used.
 2. Install power distribution wiring overhead and rise vertically where least exposed to damage.
 3. Connect temporary service to Owner's existing power source, as directed by local utility.
- G. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
 2. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the Work is being performed.
- I. Telephone Service: Provide temporary telephone service throughout construction period for common-use facilities used by all personnel engaged in construction activities. Install separate telephone line for each field office and first-aid station.
1. Provide additional telephone lines for the following:
 - a. In field office with more than two occupants, install a telephone for each additional occupant or pair of occupants.
 - b. Provide a dedicated telephone line for each facsimile machine and computer with modem in each field office.
 2. At each telephone, post a list of important telephone numbers.

- a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Owner's office.
3. Provide a portable cellular telephone for superintendent's use in making and receiving telephone calls when away from field office.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
2. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines. Comply with NFPA 241.
3. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period. Locate temporary roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 2 Section "Earthwork."
3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.

C. Dewatering Facilities and Drains: Comply with requirements in applicable Division 2 Sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, use same facilities. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining property nor endanger permanent Work or temporary facilities.
2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.
3. Remove snow and ice as required to minimize accumulations.

D. Project Identification and Temporary Signs: Prepare Project identification and other signs in sizes indicated. Install signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.

1. Engage an experienced sign painter to apply graphics for Project identification signs.
 - a. Sign shall be 4" x8" minimum and shall include providing a rendering on the sign along with names of State officials, Architect, Engineers, Contractor, etc. Final layout and location of sign shall be coordinated with Architect and approved by the Owner prior to sign fabrication.
2. Prepare temporary signs to provide directional information to construction personnel and visitors.

3. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in sizes and thicknesses indicated. Support on posts or framing of preservative-treated wood or steel.
 4. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer.
- E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.
- F. Common-Use Field Office: Provide an insulated, weathertight, air-conditioned field office for use as a common facility by all personnel engaged in construction activities; of sufficient size to accommodate required office personnel and meetings of **10** persons at Project site. Keep office clean and orderly.
1. Furnish and equip offices as follows:
 - a. Desk and four chairs, four-drawer file cabinet, a plan table, a plan rack, and bookcase.
 - b. Water cooler and private toilet complete with water closet, lavatory, and medicine cabinet with mirror.
 - c. Provide a room of not less than **240 sq. ft. (22.5 sq. m)** for Project meetings. Furnish room with conference table, 12 folding chairs, and **4-foot- (1.2-m-)** square tack board.
- G. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within building or elsewhere on-site.
1. Construct framing, sheathing, and siding using fire-retardant-treated lumber and plywood.
 2. Paint exposed lumber and plywood with exterior-grade acrylic-latex emulsion over exterior primer.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.
- B. Stormwater Control: Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains.
- C. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from construction damage. Protect tree root systems from damage, flooding, and erosion.
- D. Site Enclosure Fence: Before construction operations begin, install chain-link enclosure fence with lockable entrance gates. Locate where indicated, or enclose entire Project site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.

- E. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
- G. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
 - 1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
 - 2. Store combustible materials in containers in fire-safe locations.
 - 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
 - 4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
 - 5. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
 - 6. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 - 7. Provide hoses for fire protection of sufficient length to reach construction areas. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 - 2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

END OF SECTION 01500

SECTION 01600 - 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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following administrative and procedural requirements: selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

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. Comparable 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, appearance, 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.
- C. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
- D. 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.

1.4 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.

1.5 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.
 - 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.
 - 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.
 - 5. Store materials in a manner that will not endanger Project structure.
 - 6. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - 7. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 8. Protect stored products from damage.
- B. Storage: Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 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.
- 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 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS

- 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.
7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures: Procedures for product selection include the following:

1. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
2. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
3. Product Options: Where Specification paragraphs titled "Product Options" indicate that size, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide either the specific product or system indicated or a comparable product or system by another manufacturer. Comply with provisions in "Product Substitutions" Article.

2.2 COMPARABLE PRODUCTS

A. Where products or manufacturers are specified by name, submit the following, in addition to other required submittals, to obtain approval of an unnamed product:

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, visual effect, 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 01600

SECTION 01700 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.
 - 4. Progress cleaning.
 - 5. Starting and adjusting.
 - 6. Protection of installed construction.
 - 7. Correction of the Work.

1.3 SUBMITTALS

- A. Final Property Survey: Submit 2 copies showing the Work performed and record survey data.

1.4 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.

- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect and Owner not less than seven days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's written permission.

- C. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

- D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

- E. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a

detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
 2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 4. Maintain minimum headroom clearance of **8 feet (2.4 m)** in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 2. Allow for building movement, including thermal expansion and contraction.
- G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, contractor shall . Fit exposed connections together to form hairline joints. Where joints required by manufacturer's requirements are not shown on drawings, contractor shall coordinate final layout with Architect prior to commencement of work.
- H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.
1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.
- H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment to the satisfaction of the architect..
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01700

SECTION 01770 - 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 1 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. Project Record Documents.
 - 3. Operation and maintenance manuals.
 - 4. Warranties.
 - 5. Instruction of Owner's personnel.
 - 6. Final cleaning.

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. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. 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.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs and photographic negatives, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems.
 - 9. Submit test/adjust/balance records.
 - 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 11. Advise Owner of changeover in heat and other utilities.
 - 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 - 13. Complete final cleaning requirements, including touchup painting.
 - 14. 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 1 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.
 - 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.
- 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 **three** copies 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.
 - 1. Organize list of spaces in sequential order.
 - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

1.6 PROJECT RECORD DOCUMENTS

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.
- B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.

1. 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.
 - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
 2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
 4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
 5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
 6. Contractor shall submit electronic files of sprinkler, fire alarm and other submittals that were generated utilizing AutoCAD.
- C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy 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. Note related Change Orders, Record Drawings and Product Data, where applicable.
- D. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.
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 Drawings and Record Specifications, where applicable.
- E. Miscellaneous Record Submittals: 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.

1.7 OPERATION AND MAINTENANCE MANUALS

- A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
1. Operation Data:
 - a. Emergency instructions and procedures.
 - b. System, subsystem, and equipment descriptions, including operating standards.
 - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
 - d. Description of controls and sequence of operations.
 - e. Piping diagrams.
 2. Maintenance Data:
 - a. Manufacturer's information, including list of spare parts.
 - b. Name, address, and telephone number of Installer or supplier.
 - c. Maintenance procedures.
 - d. Maintenance and service schedules for preventive and routine maintenance.
 - e. Maintenance record forms.
 - f. Sources of spare parts and maintenance materials.
 - g. Copies of maintenance service agreements.
 - h. Copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.8 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.
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 (115-by-280-mm)** 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 DEMONSTRATION AND TRAINING

- A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Provide instructors experienced in operation and maintenance procedures.
 - 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 - 3. Schedule training with Owner with at least **seven** days' advance notice.
 - 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:
 - 1. System design and operational philosophy.
 - 2. Review of documentation.
 - 3. Operations.
 - 4. Adjustments.
 - 5. Troubleshooting.
 - 6. Maintenance.
 - 7. Repair.

3.2 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. 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.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete floors broom clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - i. 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.
 - j. Remove labels that are not permanent.
 - k. 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.
 - l. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Replace parts subject to unusual operating conditions.
 - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - q. 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.
 - r. Leave Project clean and ready for occupancy.
- C. 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 01770

SECTION 02100 - CLEARING AND PREPARING SITE

PART 1 – GENERAL

1.1 RELATED ITEMS SPECIFIED ELSEWHERE

- A. Field Engineering: 01050
- B. Temporary Facilities, Utilities and Operations: 01500
- C. Excavation, Filling and Grading: 02200
- D. Louisiana Standard Specification for Roads and Bridges, 2000 Edition, Section 201.02 and 201.03, Section 202.01 thru 202.05

1.2 PROTECTING

- A. Properly protect aboveground and underground property of the Owner, public service corporations, and other private and public owners.

1.3 CLEARING

- A. Stripping of surface material (undercutting) prior to placement of fill is specified in Section 02200.
- B. Where fill is not required, remove and dispose of vegetation, debris, obstructions and deleterious materials within working area as necessary for this work. Grub out stumps and large roots to at least 12" below work surface. Fill voids to maintain indicated grade.
- C. All clearing and stripping of trees, brush, weeds and other vegetation within working area shall be completed by the Contractor and shall be considered incidental to the cost of project and done at no direct pay.

1.4 REMOVAL

- A. As called for on the Drawings, remove and dispose of, or remove and replace (as directed by the Designer) existing culverts, fences, slabs and other surface and subsurface improvements.

1.5 REFERENCE POINTS

- A. Do not proceed with balance of site work until reference points have been established as specified in Section 01050.
- B. Protect and maintain reference points from dislocation or damage. Replace or repair, immediately, reference points that have been damaged, destroyed or dislocated.

1.6 UTILITIES

- A. Prior to excavating or disturbing land, verify the location of all utilities underground and aboveground as to horizontal and vertical location, size, levels and character of service. Probe site to locate underground utilities before beginning work. Notify all utility owners of proposed work.
- B. Maintain existing utilities indicated to remain, keep in service and protect against damage during construction operations.

- C. Refer to other requirements in Section 02200.

1.7 SETTING-OUT

- A. Field engineering shall be as specified in Section 01050.
- B. Accurately locate building(s), existing utility lines, pavement and curbs on site according to information given in Documents. Set grade stakes securely, to remain in place until construction has been completed.
- C. Notify Designer when laying-out is substantially complete.

1.8 CLEANING

- A. Remove debris and surplus materials from site promptly to prevent large accumulations. Construction debris and trash shall remain the Contractor's property and shall be disposed of by him, off the Owner's property.
- B. Burning or burying on site is not permitted.
- C. Any excess earthen materials shall remain the property of the Owner, and shall be hauled and deposited by the Contractor at a location on the Owner's property, but outside the Project area, as directed by the Designer.

END OF SECTION

SECTION 02200 - EXCAVATION, FILLING AND GRADING

PART 1 - GENERAL

1.1 RELATED ITEMS SPECIFIED ELSEWHERE

- A. Testing Laboratory Services: 01410
- B. Clearing and Preparing Site: 02100
- C. Trenching and Backfilling for Electrical Work: Division 16
- D. Louisiana Standard Specification for Roads and Bridge, 2000 Edition, Section 203.01 thru 203.14 (Excavation and Embankment) and Section 204.01 thru 204.08 (Temporary Erosion Control).
- E. Gautreau & Gonzalez, Inc., Geotechnical Engineering Recommendations, May 1999
(Note: The geotechnical engineering recommendations take precedence over the specifications in this section – Section 02200)

1.2 EXTENT OF WORK

- A. Perform the following within established Project limits as indicated or required:
 - 1. Prepare existing ground surface to receive fill if needed;
 - 2. Site filling, including fill under water tower foundation and paving if needed;
 - 3. Rough and finish grading;
 - 4. Excavation;
 - 5. Backfill.

1.3 UTILITIES

- A. Utilities on plans are shown for information only. Locate in-place underground utilities by careful probing and hand excavation. Protect them from damage during construction operations and relocate specific services as shown.

1.4 PROTECTION OF PERSONS AND PROPERTY

- A. Barricade open excavations and post with warning lights for safety of persons. Operate warning lights during hours from dusk to dawn each day. Contractor shall notify user agency of the need to keep excavated area open for an extended period. The User Agency has the right to reject such a request.
- B. Protect structures, utilities, sidewalks, pavements, and other facilities immediately adjacent to excavations, from damage and displacement.

1.5 SAMPLING AND TESTING

- A. Owner will provide soil testing and inspection services for quality control during earthwork operations as required.

1. Maximum density and optimum moisture content determinations for subgrade, backfill and fill materials: Modified Proctor Test, ASTM D 1557.
2. In-place density determinations: Any of the following methods:
 - a. Sand-Cone Method - ASTM D 1556
 - b. Nuclear Probe Method - ASTM D 2922
 - c. Rubber-Balloon (Volumeter) Method - ASTM D 2167
- B. In-place density determinations - At least one test of prepared subgrade and one test of each 8" lift, for each 2,500 sq. ft. of area or less.
- C. If, in opinion of Designer, based on reports of testing service and on-site inspection, fill or backfill which has been placed is below specified density, provide additional compaction and testing at no additional expense to the owner.

PART 2 - PRODUCTS

2.1 STRUCTURAL FILL MATERIAL

- A. Refer to paragraph 3.1 herein for locations where structural fill and backfill material is required.
- B. Structural fill and backfill material shall be sandy clay or clayey sand conforming to Louisiana Department of Transportation and Development Designation TR 423, Class A-2-4, A-2-6, A-4 or A-6, at the option of the Contractor, and shall have a maximum liquid limit (LL) of thirty-five (35) and a plastic index (PI) of fifteen (15) to twenty (20). All structural fill material shall be free of wood, roots, and other deleterious materials which would prevent achieving the required compaction.
- C. Structural fill material shall be "borrow material" obtained by the Contractor from a source other than the Owner's property, which meets the specified requirements. The Contractor shall be responsible for all costs and expenses of locating, procuring and transporting structural fill material to the work site.
- D. Structural fill materials shall be sampled at the borrow site and tested and classified by the Testing Laboratory before use for the project work. Notify the Designer and the Testing Laboratory, in writing, at least 15 days in advance of borrow operations so that samples may be obtained and analysis completed before borrow operations begin. The Contractor will not be permitted to begin borrow operations until soil tests have been completed and proposed materials have been approved.

2.2 ORDINARY FILL MATERIAL

- A. Fill and backfill material in non-structural areas shall be ordinary fill material and shall be surplus material generated by required on-site excavation including preparation of surfaces to receive structural fill as specified in paragraph 3.02 A below, to the extent it is available. Additional ordinary fill material required in excess of on-site excavated material shall be obtained by the Contractor from a source other than the Owner's property. The Contractor shall be responsible for all costs and expenses of locating, procuring and transporting

- ordinary fill material to the work site.
- B. Ordinary fill material shall be soil conforming to Louisiana Department of Transportation and Development Designation TR 423, Class A-2, A-4, A-5, A-6 or A-7, at the option of the Contractor, and shall be free from vegetation, debris and other deleterious materials.

2.3 OTHER MATERIALS

Topsoil:

1. All material used for topsoil shall be free from vegetation, wood, manure, stones larger than two (2) inches in any dimension, and other extraneous and toxic matter.
2. Within the fenced areas, topsoil shall be a rich, fertile, friable soil, loamy in texture and free from clay lumps. Topsoil for use in these areas shall be obtained by the Contractor from source other than the Owner's property.
3. Except at areas described in paragraph 3.01 A, topsoil may be material generated by required on-site excavation, or may be borrow material as specified in paragraph 2.02 herein.

PART 3 - EXECUTION

3.1 FILL AND BACKFILL

- A. Structural fill material only shall be used for fill and backfill as shown on plans or recommended in the Geotechnical Engineering Recommendations.
- B. In locations not defined in paragraph 3.1 A, fill and backfill material shall be ordinary fill material and may be surplus material generated by required on-site excavation to the extent it is available. Borrow material shall be used if excavated material is insufficient or unsatisfactory.
- C. Fill by placing and compacting acceptable soil materials, in 8" lifts, over ground surface as required to bring existing grade to elevations indicated.
- D. Backfill excavations by placing and compacting acceptable soils material in 8" lifts.
- E. Backfill excavations as promptly as work permits, but not until completion of the following:
 1. Waterproofing operations;
 2. Underground utility installation, inspection and testing;
 3. Removal of concrete formwork;
 4. Removal of trash and debris.
- F. Placement and Compaction:
 1. Place backfill and fill materials in layers not more than 8" in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to percentage maximum density specified in paragraph 3.03.
 2. Do not place backfill or fill material on surfaces that are muddy, frozen or that contain frost or ice. Do not place backfill or fill material on unsound surface.

- G. Place backfill and fill materials evenly adjacent to structures, to required elevations. Carry material uniformly around structure to approximately the same elevation in each lift, to prevent wedging action against structure.

3.2 EXCAVATION

- A. Excavate and remove all existing soil material encountered to obtain required elevations. Remove and dispose of vegetation, debris and other deleterious material from excavated material which will be used for ordinary fill.
- B. Correct unauthorized excavations and excavations beyond indicated subgrade elevations and dimensions as follows:
 - 1. Excess Undercut to Receive Fill: Fill with increased depth of acceptable fill material.
 - 2. Under Footings or Foundation Bases: Fill unauthorized excavation by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering required top elevation. 3,000 psi concrete fill may be used to bring elevations to proper position, only when acceptable to Designer.
 - 3. Elsewhere: Backfill and compact unauthorized excavations as specified for fill of same classification, unless otherwise directed by Designer.
- C. Water Control: Perform earthwork in a manner to prevent surface water and subsurface or groundwater from flowing into excavations and to prevent water from flooding Project site and surrounding areas.
 - 1. Do not allow water to accumulate in excavations. Remove water using dewatering methods which will prevent softening and/or soil changes. Provide and maintain pumps, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
 - 2. Convey water removed from excavations and rainwater to collecting or run-off areas. Provide and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use excavations as temporary drainage ditches.
- D. Material Storage: Stockpile satisfactory materials until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
- E. Excavation for Structures:
 - 1. Conform to elevations and dimensions shown with a tolerance for over-excavation not to exceed 0.10', and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, for other construction required, and for inspection.
 - 2. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete is placed. Trim bottoms to required lines and grades to leave solid base to receive concrete.
- F. Conditions of Excavation: Before placing vapor barrier membranes, steel and concreting operations, bottoms of excavations shall be made relatively dry, smooth and leveled and free from debris, and in a condition to allow Designer to inspect and authorize prior to concrete work to follow.

- G. Dry Bottom: Where soil conditions require, provide a dry bottom at all footings consisting of 6" layer of clam shells or 4" thick non-reinforced concrete slab composed of 1:3:5 mix. Dry bottom shall be subject to Designer's approval.
- H. Lining, Bracing and Protecting:
 - 1. Thoroughly line and brace walls and sides of all excavations as required to protect against caving or settlement and as required to maintain plumbness or line of excavation indicated.
 - 2. Contractor shall assume full responsibility for maintaining excavations free from cave-ins and shall employ sheeting, walers, bracing and whatever means necessary for protecting excavation.

3.3 COMPACTION - GENERAL

- A. Perform compaction of soil materials using suitable soil compaction equipment for materials to be compacted. Testing for compaction shall be in accordance with the Modified Proctor Test, ASTM D1557.
- B. Brace retaining walls to prevent deformation or caving from excessive loads caused by use of heavy equipment especially when rolling or tamping to obtain specified compaction.
- C. Control soil compaction during construction for compliance with percentage of maximum density specified for each classification. Provide not less than the following percentage so maximum density of the same soil material compacted at optimum moisture content, for actual density of each layer of soil material-in-place:
 - 1. Under Foundations: Compact each layer of full and backfill material to 95% of maximum density.
 - 2. Lawns and Unpaved Areas: Compaction is not required, except as Special Erosion Protection.
- D. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer, to prevent free water appearing on surface during, or subsequent to, compaction operations.
 - 1. Remove or replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
 - 2. Acceptable soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and permitted to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value as determined by moisture-density relation tests. When accepted by Testing Laboratory, this soil material may be used as backfill or fill.

3.4 GRADING

- A. Uniformly grade areas within limits of construction including adjacent transition areas. Smooth finished surface within specified tolerances. Compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
- B. Shape and rework existing ditches, and construct new ditches, to dimensions, lines and grades shown. Allow for thickness of topsoil and erosion protection, where required.

- C. Grading Outside Equipment: Grade areas adjacent to equipment lines to drain away from structure and to prevent ponding. Finish surfaces free from irregular surface changes, and as follows:
 - 1. Grassed Areas: Finish areas to receive topsoil to within not more than 0.10' above or below the required elevations, allowing for required thickness of topsoil. Fill to bring to required elevations.
 - 2. Fence Lines: Grade area 10 feet wide along fence lines to provide a uniform base for the fencing. Cut and fill as necessary to limit variation from a true line to 6 inches per 100 feet. Slopes (except at ditch crossings) shall be 4:1 or less.

3.5 TOPSOIL

- A. Furnish, place and fine grade a 4-inch layer to topsoil over all ground surface disturbed by construction operations, including all filled areas, which are not occupied by building, pavements, aggregate surfacing and similar improvements.

3.6 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion, and keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

3.7 DISPOSAL OF EXCESS AND MATERIALS

- A. Remove from the Project site and dispose of excavated existing material not used for ordinary fill, excess borrow material, trash and waste materials.
- B. Excess soil materials shall remain the Owner's property and shall be hauled and deposited by the Contractor at a location on the Owner's property but outside the Project area, as directed by the Designer. This material shall be deposited and graded as necessary to prevent ponding of rainwater and permit drainage.

END OF SECTION

SECTION 02201 - EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Preparation of subgrade for building.
 - 2. Drainage fill course for support of building slabs is included as part of this work.
 - 3. Backfilling of trenches within building lines is included as part of this work.
 - 4. Extent of Earthwork is indicated on drawings.
- B. Related Sections:
 - 1. Excavation for Mechanical/Electrical Work: Refer to Divisions 15 and 16 sections for excavation and backfill required in conjunction with underground mechanical and electrical utilities, and buried mechanical and electrical appurtenances are not work of this section.

1.2 DEFINITION

- A. "Excavation" consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

1.3 SUBMITTALS

- B. Test Reports-Excavating: Submit following reports directly to Architect/Engineer from the testing services, with copy to Contractor:
 - 1. Test reports on borrow material.
 - 2. Field density test reports.
 - 3. One optimum moisture-maximum density curve for each type of soil encountered.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Perform work in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Testing & Inspection Service: Owner will engage and pay for soil testing and inspection service for quality control testing during earthwork operations. Contractor shall pay for all retesting of failed tests.

1.5 PROJECT/SITE CONDITIONS

- A. The building pads have been prepared by the Owner to finish grade. Gravel fill, vapor retarder and building slab above the finished grade is a part of this Contract. The contractor should be prepared to repair the building pad after piling and plumbing have been installed.
- B. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn therefrom by Contractor. Data is made available for convenience of Contractor. Geotechnical Report may be reviewed at Architect's office.
- C. Additional test borings and other exploratory operations may be made by Contractor at no cost to Owner.
- D. Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
- E. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
- F. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Architect/Engineer and then only after acceptable temporary utility services have been provided.
 - 1. Provide minimum of 48-hour notice to Architect/Engineer, and receive written notice to proceed before interrupting any utility.
- G. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.
- H. Use of Explosives: The use of explosives is not permitted.
- I. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.
- J. Operate warning lights as recommended by authorities having jurisdiction.
- K. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
 - 1. Excavations within drip-line of large trees to be done by hand. Protect the root system from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with burlap. Paint root cuts of 1" diameter and larger with emulsified asphalt tree paint.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Soil material for fill shall be a low plasticity select clay material with a maximum Liquid Limit of 35 with a P.I. between 10 and 20.
- B. Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 1" in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter.

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Excavation includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.
- B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect/Engineer. Unauthorized excavation, as well as remedial work directed by Architect, shall be at Contractor's expense.
- C. Under footings, foundation bases, or retaining walls, fill excavations by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation.
- D. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Architect/Engineer.
- E. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by Architect/Engineer.
- F. Removal of unsuitable material and its replacement as directed will be paid on basis of contract conditions relative to changes in work.
- G. Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
- H. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- I. Dewatering: Prevent surface water and subsurface water from flowing into excavations and from flooding project site and surrounding area.
- J. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
- K. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavation to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.
- L. Material Storage: Satisfactory excavated materials maybe stockpiled where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.
- M. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
- N. Dispose all excess soil material and waste materials from site.
- O. Excavation for Structures: Conform to elevations and dimensions shown within a tolerance of plus 0.10', and extending a sufficient distance from footings and foundations to permit placing

and removal of concrete formwork, installation of services, other construction, and for inspection.

- P. When excavating for footings and foundations, take care not to disturb bottom of excavation. Trim bottoms to required lines and grades prior to placing concrete dry bottoms.
- Q. Excavation for Pavements: Cut surface under pavements to comply with cross-sections, elevations and grades as shown.
- R. Excavation for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Provide 6" to 9" clearance on both sides of pipe or conduit.
- S. Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups.
- T. For pipes or conduit 5" or less in nominal size and for flat-bottomed multiple-duct conduit units, do not excavate beyond indicated depths. Hand excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.
- U. For pipes or conduit 6" or larger in nominal size, tanks and other mechanical/electrical work indicated to receive subbase, excavate to subbase depth indicated, or, if not otherwise indicated, to 6" below bottom of work to be supported.
- V. Except as otherwise indicated, excavate for exterior water-bearing piping (water, steam, condensate, drainage) so top of piping is no less than 3'-6" below finish grade.
- W. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.
- X. Backfill trenches with concrete where trench excavations pass within 18" of column or wall footings and which are carried below bottom of such footings, or which pass under wall footings. Place concrete to level of bottom of adjacent footing.
- Y. Do not backfill trenches until tests and inspections have been made and backfilling authorized by Architect/Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.
- Z. For piping or conduit less than 2'-6" below surface of roadways, provide 4" thick concrete base slab support. After installation and testing of piping or conduit, provide minimum 4" thick encasement (sides and top) of concrete prior to backfilling or placement of roadway subbase.
- AA. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F. (1 degree C).

3.2 COMPACTION

- A. General: Compaction during construction shall be controlled by providing minimum percentage of density specified for each area classification indicated below.
- B. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density for soils which exhibit a well-defined moisture density

relationship (cohesive soils) determined in accordance with ASTM D1557; and for (cohesionless soils), determined in accordance with ASTM D4254.

1. Structures, Building Slabs, Steps, Pavements: Compact top 12" of subgrade and each layer of backfill or fill material at 92% maximum density for cohesive material.
 2. Lawn or Unpaved Areas: Compact top 6" of subgrade and each layer of backfill or fill material at 85% maximum density for cohesive soils.
 3. Walkways: Compact top 6" of subgrade and each layer of backfill or fill material at 88% maximum density for cohesive material or 70% relative density for cohesionless material.
- C. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
- D. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
1. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.
- E. Concrete shall be placed within 7 days of compaction testing.

3.3 BACKFILL AND FILL

- A. General: Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.
1. In excavations, use satisfactory excavated or borrow material.
 2. Under grassed areas, use satisfactory excavated or borrow material.
 3. Under walks and pavements, use subbase material.
 4. Under steps, use subbase material.
 5. Under building slabs, subbase material.
 6. Under piping and conduit, use subbase material where subbase is indicated under piping or conduit; shape to fit bottom 90 deg. of cylinder.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
 2. Inspection, testing, approval, and recording locations of underground utilities.
 3. Removal of concrete formwork.

4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.
 5. Removal of trash and debris.
 6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
- C. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface to a minimum of 6" depth prior to placement of fills. Plow, strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
- D. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.
- E. Placement and Compaction: Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers.
- F. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- G. Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

3.4 GRADING

- A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.
- B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.
- C. Finish surfaces free from irregular surface changes, and as follows:
1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within no more than 0.10' above or below required subgrade elevations.
 2. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10' above or below required subgrade elevation.
 3. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 2" above or below required subgrade elevation.

- D. Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 2" when tested with a 10' straightedge.
- E. Compaction: After grading, compact subgrade surfaces to the depth indicated at the percentage required for each area classification.

3.5 BUILDING SLAB DRAINAGE COURSE

- A. General: Drainage course consists of placement of clean gravel, over subgrade surface to support concrete building slabs.

3.6 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction: Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.
 - 1. Perform field density tests in accordance with ASTM standards.
- B. Verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to Architect/Engineer.
 - 1. Paved Areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 2000 square feet of paved area or building slab, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 2000 square feet of overlaying building slab or paved area, but in no case less than 3 tests.
- C. If in opinion of Architect/Engineer, based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense.

3.7 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.
- D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.8 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Removal to Designated Areas on Owner's Property: Transport acceptable excess excavated material to designated soil storage areas on Owner's property. Stockpile soil or spread as directed by Architect/Engineer.
- B. Transport waste material, including unacceptable excavated material, trash and debris away from Owner's property and legally dispose of as required.

END OF SECTION 02201

SECTION 02230 - SITE CLEARING

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 the following:
 - 1. Clearing and grubbing.
 - 2. Topsoil stripping.
 - 3. Removing above-grade site improvements.
 - 4. Disconnecting, capping or sealing, and abandoning site utilities in place.
 - 5. Disconnecting, capping or sealing, and removing site utilities.

1.3 DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than **2 inches (50 mm)** in diameter; and free of weeds, roots, and other deleterious materials.

1.4 MATERIALS OWNERSHIP

- A. Except for materials indicated to be stockpiled or to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from the site.

1.5 SUBMITTALS

- A. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.
- B. Record drawings according to Division 1 Section "Contract Closeout."
 - 1. Identify and accurately locate capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Improvements on Adjoining Property: Authority for performing indicated removal and alteration work on property adjoining Owner's property will be obtained by Owner before award of Contract.
- C. Notify utility locator service for area where Project is located before site clearing.

PART 2 - PRODUCTS (Not Applicable)

2.1 SOIL MATERIALS

- A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 2 Section "Earthwork."
 1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Locate and clearly flag trees and vegetation to remain or to be relocated.
- D. Protect existing site improvements to remain from damage during construction.
 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 1. Arrange to shut off indicated utilities with utility companies.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without Architect's written permission.
- C. Removal of underground utilities is included in Division 15 mechanical or Division 16 electrical Sections.

3.3 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
 - 3. Completely remove stumps, roots, obstructions, and debris extending to a depth of **18 inches (450 mm)** below exposed subgrade.
 - 4. Use only hand methods for grubbing within drip line of remaining trees.

3.4 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Limit height of topsoil stockpiles to **72 inches (1800 mm)**.
 - 2. Do not stockpile topsoil within drip line of remaining trees.
 - 3. Stockpile surplus topsoil and allow for respreading deeper topsoil.

3.5 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

3.6 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 02230

SECTION 02282 - TERMITE CONTROL

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 the following for termite control:
 - 1. Soil treatment.

1.3 DEFINITIONS

- A. EPA: Environmental Protection Agency.
- B. PCO: Pest control operator.

1.4 SUBMITTALS

- A. Product Data: Treatments and application instructions, including EPA-Registered Label.
- B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- C. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: A PCO who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment in jurisdiction where Project is located and who is experienced and has completed termite control treatment similar to that indicated for this Project and whose work has a record of successful in-service performance.
- B. Regulatory Requirements: Formulate and apply termiticides, and label with a Federal registration number, to comply with EPA regulations and authorities having jurisdiction.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with EPA-Registered Label requirements and requirements of authorities having jurisdiction.

1.7 COORDINATION

- A. Coordinate soil treatment application with excavating, filling, and grading and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs, before construction.

1.8 WARRANTY

- A. General Warranty: 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.
- B. Special Warranty: Written warranty, signed by applicator and Contractor certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
- C. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT

- A. Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in a soluble or emulsible, concentrated formulation that dilutes with water or foaming agent, and formulated to prevent termite infestation. Use only soil treatment solutions that are not harmful to plants. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to the product's EPA-Registered Label.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AgrEvo Environmental Health, Inc.; a Company of Hoechst and Schering, Berlin.
 - 2. American Cyanamid Co.; Agricultural Products Group; Specialty Products Department.
 - 3. Bayer Corp.; Garden & Professional Care.
 - 4. DowElanco.
 - 5. FMC Corp.; Pest Control Specialties.
 - 6. Zeneca Professional Products.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of the soil, interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparing substrate. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil and around foundations.
- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended by termiticide manufacturer.
- C. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

3.3 APPLICATION, GENERAL

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

3.4 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute the treatment evenly.
 - 1. Slabs-on-Grade: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
- B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
- C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.
- D. Post warning signs in areas of application.
- E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

END OF SECTION 02361

SECTION 02362 – TYPE “C” LIME TREATMENT

PART I - GENERAL

1.1 GENERAL

- A. This work consists of constructing one or more courses of a mixture of lime and soil, or soil-aggregate, and water in accordance with these specifications, in conformity with the lines, grades, thickness and sections shown on the plans.
- B. Lime treatment (designated as Type C) shall be used for conditioning of cement treatment or stabilization.

1.2 MATERIALS

- A. Materials shall comply with the following Sections and Subsections:

Emulsified Asphalt	1002
Water	1018.01
Lime	1018.03

- B. In order to meet air quality standards, the contractor may be required to use central plant mixing, lime slurry or granular lime in dust sensitive areas at no direct pay.

1.3 EQUIPMENT

- A. Equipment necessary to produce a finished product meeting specification requirements shall be furnished and maintained by the Contractor.
- B. An approved in-place mixer meeting the requirements of Subsection 303.03 shall be used for Type C treatments.

1.4 GENERAL CONSTRUCTION REQUIREMENTS

- A. Lime shall be protected from moisture prior to use. Water shall be added as needed during mixing and remixing operations, during the curing period, and to keep the cured material uniformly moist until covered.
- B. When granular quicklime is applied in dry form, precautions shall be taken to prevent injury to persons, livestock and plants.
- C. Quicklime spilled or deposited outside areas designated for treatment shall be immediately collected and buried or satisfactorily slaked.
- D. Lime shall not be applied on a frozen foundation or when the ambient air temperature is below 35 degrees F.
- E. Lime shall be incorporated in the following sequence:
 - 1. Spreading the lime
 - 2. Initial mixing
 - 3. Watering
 - 4. Sealing and mellowing for a minimum of 48 hours
 - 5. Mixing until pulverization requirements are met

6. Compacting
7. Finishing
8. Maintaining

F. The percent lime for Type C treatment will be as required by the plans or as directed.

1.5 SPREADING AND MIXING

- A. The percentage of lime to be incorporated shall be as specified. When not specified, the required percentage of lime will be determined by the laboratory in accordance with DOTD TR 416.
- B. A unit weight of 35 pounds per cubic foot (560 kg/cu m) will be used to compute the required application rate of hydrated lime or granular quicklime regardless of the actual unit weight of the lime used.
- C. Lime may be furnished in bags or bulk and distributed, in power form, granular or in a slurry, and in the required portion.
- D. Dry lime shall be prevented from blowing by adding water or by other suitable means.
- E. Lime shall be uniformly spread and mixed with the soil to the width and depth shown on the plans or as directed.
- F. The Department will determine lime spread rate in accordance with DOTD TR 436.
- G. Any procedure, which results in excessive loss or displacement of lime, shall be discontinued.
- H. Areas to which lime is applied shall be processed on the same day as application is made.
- I. Lime exposed to air for more than 6 hours and lime lost or damaged before incorporation due to rain, wind or other cause will be rejected, deducted from measured quantities, and shall be replaced by the contractor at no direct pay.
- J. Following the 48-hour mellowing period, the lime treated mixture shall be thoroughly manipulated with an in-place mixer to the satisfaction of the engineer.
- K. The mixture shall meet the pulverization requirements of Subsection 304.06 prior to subsequent stabilization or treatment with portland cement.

1.6 PULVERIZATION

- A. For Type C treatment, the pulverized mixture, when tested in accordance with DOTD TR 431, shall meet the gradation requirements below.

Gradation Requirements for Type C Lime Treatment

U.S. Sieve, Inches (mm)	Percent Passing by Weight (Mass)
$\frac{3}{4}$ (19.0)	95
No. 4 (4.75)	50

- B. Pulverization requirements for Type C treatments shall be met prior to final compaction and finishing.

1.7 COMPACTING AND FINISHING

- A. Type C lime conditioned materials shall be shaped and uniformly compacted to the required sections. The contractor shall make reasonable efforts to conform to the compaction requirements above.
- B. When conditions, such as yielding subgrade, make this impractical or detrimental, the contractor shall establish an optimum rolling pattern.

1.8 QUALITY CONTROL

- A. Construction methods shall prevent contamination, segregating, soft spots, wet spots, laminations and other deficiencies.
- B. The contractor shall be responsible for taking such tests as necessary to adequately control the work.
- C. The contractor shall control the lime spread, mixing and pulverization to construction a completed course that is uniform and conforms to the acceptance requirements.

END OF SECTION

SECTION 02459 - TIMBER PILES

PART 1 - GENERAL

1.1_ SUMMARY

1. This section includes the following:
 1. Timber piles Class B 50 foot long.

1.2 REFERENCES

1. Extent of driven piles is shown on drawings.

1.3 SUBMITTALS

1. Driving Records: Submit copies of driving record of each pile to Architect not later than 2 days after driving. Include project name and number, name of Contractor, pile location and number, computed pile capacity, type and size of hammer used, type of pile driving cap used, rate of operation of pile driving equipment, pile dimensions, elevation of point, elevation of butt before and after cut-off, ground elevation, continuous record of number of blows for each foot of penetration, pile deviation, pile uplift and reaction, and any unusual occurrences during pile driving. Owner shall pay for Testing Laboratory Services insure piles are of proper dimension as well as to monitor driving operations and compile driving records.

1.4 DELIVERY, STORAGE, AND HANDLING

1. Deliver materials to project site in such quantities and at such times to assure continuity of pile driving operations to project schedule.
2. Store piles in orderly groups above ground and blocked during storage to prevent distortion of members. Piles exhibiting variations beyond tolerance limits will be considered distorted and may not be used in the work.

1.5 PROJECT/SITE CONDITIONS

1. Site information: Data on indicated subsurface conditions are not intended as representations or warranties of such conditions. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn therefrom by Contractor. The data is made available for convenience of Contractor. Geotechnical Report may be reviewed at Architects=s Office.
 1. Additional test borings and other exploratory operations may be made by Contractor at no additional cost to Owner.
2. Protection: Protect structures, underground utilities and other construction from damage caused by pile driving operations.
3. Provide surveyed elevation bench marks on structures where directed by Architect before commencing work, when structures are adjacent to pile driving operations. Recording and report elevation of each bench mark after driving each pile and at least twice a day while pile

driving is in progress. Should bench mark readings indicate displacement, halt driving operations until corrective action has been provided and is acceptable to Architect.

4. Photograph, by Professional Photographer, any adjacent structures within 200 feet before and after pile driving operations to verify that no damage has occurred to these buildings during the driving operations. Provide photographs to Architect.

PART 2 - PRODUCTS

2.1 TIMBER PILES

1. Timber Piles: Round, clean-peeled, one piece from butt to tip, complying with ASTM D 25-91 Table 1 (b) with minimum tip Diameter of 7" and minimum Butt Diameter of 12", 3' from butt.
 1. Treat timber pile with a pressure preservation treatment in accordance with AWWA Standard C3 for foundation piles.
 2. Furnish treated piles to suit project conditions.
2. Field-Applied Wood Preservative: Treat field cuts and penetrations in accordance with AWWA Standard M4.

2.2 DRIVING EQUIPMENT

1. General: Provide well maintained pile driving equipment of type generally used in standard pile driving practice, operated at manufacturer=s specified rate, to development required rated energy per blow.
2. All piles shall be pre-bored, using a 6" bore diameter bit with a pipe stem constructed of drill stem pipe.
3. Hammer: Provide pile driving hammers of sufficient capacity, size and type able to deliver consistently effective dynamic energy, suitable to piles to be driven and to subgrade material into which they are to be driven, when operating at not less than 75% efficiency of rated driving energy. Use a Vulcan No. 06 hammer to develop 19,500 foot-pounds of energy.
4. Driving Caps: Equip hammer with cast steel or structural steel driving cap, with grooved base conforming to pile shape. Keep bearing surfaces of grooves true and smooth.
5. Leads: Use fixed or rigid type pile driver leads that will hold pile firmly in position and plum, and in axial alignment with hammer. Extend leads to within 2 ft. of elevation at which the pile enters ground.
6. Follower: The follower shall be constructed using a 12 inch pipe with a minium wall thickness of 0.75 inches.

PART 3 - EXECUTION

3.1 PRE-DRIVING WORK

1. Site Conditions: Do not drive piles until earthwork operation in area which piles are to occupy has been coordinated with General Contractor.

3.2 DRIVING PILES

- A. General: Continuously drive piles at locations indicated, to required point elevation or 30 blows per foot whichever is achieved first. Use follower as required.
1. The follower shall be placed on the pile when the pile butt is a minimum of two feet above grade. Any change in blow count after the follower has been added shall be reported immediately to the Architect and Engineer. All piles shall be installed continuously to required grade and/or blow count.
 2. Carefully maintain center of gravity for each group or cluster of piles to conform to locations shown on drawings.
 3. Carefully plumb leads and pile before driving each pile. Take care during driving to prevent and to correct any tendency of piles to twist or rotate.
 4. Pre-Excavation (Coring): Pre-drill all piles as shown on the drawings.
- B. Driving Tolerances: Drive piles within following maximum tolerance.
1. Location: 3" from location indicated for center of gravity of each single pile or pile group; 1" for piles under grade beams.
 2. Plumbness: Maintain 1" in 10'-0" from vertical, or maximum of 4", measured when pile is above ground, in leads.
 3. Batter Angle: Maximum 1" in 10'-0" from required angle; measured when pile is above ground, in leads.
- C. Heaved Piles: Provide recorded instrument observations made during pile driving to determine whether driven pile has lifted from its original seat during driving of adjacent piles. If uplift occurs, re-drive affected piles to point elevation at least as deep as original point elevation with a driving resistance at least as great as original driving resistance.
- D. Damaged or Misdriven Piles: Damaged piles, and piles driven outside required driving tolerance will not be accepted.
1. Withdraw piles rejected after driving, and replace with new piles.
 2. Where centerline deviation exceeds 3" and redesign indicates load on any pile exceeding 110% of design load, contractor shall drive additional piles.
 3. Piles rejected after driving may be abandoned and cut-off.
 4. Solidly fill spaces left by withdrawn piles, that will not be filled by new piles, using 500 psi slurry concrete. Place and compact throughout length of space.
- E. Cutting-Off: Cut-off tops of driven piles, square with pile axis and at elevations indicated. Dispose of excess materials off site. Owner reserves first rights of refusal to pile cut-offs.
1. Recoat cut-off tops of piles which have a protective coating. Use materials and methods to conform with existing coating.

3.3 WITHDRAWING AND RE-DRIVING PILES

- A. Pile Withdrawal: Withdraw selected driven piles when directed by Architect, to determine condition of piles after driving.
- B. Re-Driving: Re-drive piles withdrawn for test and inspection, unless damaged or found not meeting specification requirements:
 - 1. Withdrawing and re-driving of piles found to be satisfactory will be paid for in accordance with contract provisions for changes in work.
 - 2. Replace rejected piles with new piles as specified under ADamaged or Misdriven Piles@.

3.4 FIELD QUALITY CONTROL

- A. Test piles shall not be treated as job piles.
- B. Test piles required: Two piles, one 45 foot and one 50 foot long shall be tested.
- C. Pile design load: Design load per pile is 20 tons.

3.5 BID AND PAYMENT

- 1. Basis for Bids and Payment: Bids and payment will be based on number and lengths of piles indicated on the drawings. Contract price shall include labor, materials, tools, equipment, and incidentals, and for performing work for furnishing, driving, cutting-off and capping piles. Price also includes disposal of cut-offs.
 - 1. No payment will be made for rejected piles, including piles driven out of place, imperfect piles, or piles damaged in driving or handling.
 - 2. Provide a unit price for either an add or deduct of one pile.
 - 3. Contractor shall provide a credit dollar if 45 foot piles are used in lieu of 50 foot piles.

END OF SECTION 02459

SECTION 02515 - MANHOLES, WET WELLS, INLETS & CATCH BASINS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This work consists of the construction of manholes, inlets and catch basins as located and wet wells as located and detailed on the drawings. This section also includes the construction of wet wells.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete for these structures will be Class A conforming to Section 901 of the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition. Other materials shall conform to the following sections of the specifications:

Manhole Steps, Frames, Grates and Covers 1018.04

Asphaltic Varnish 1008.03

Reinforcing Steel 1009.01

Precast Reinforced Concrete Units 1016
(Louisiana Standard Specifications for Roads and Bridges, 2000 Edition)

- B. The Contractor shall have the option of furnishing structures of either cast-in-place concrete or precast concrete units; however, the design and installation procedures for precast concrete units will be subject to approval by the Engineer.
- C. Mortar shall consist of 1 part Portland cement, 2 parts approved sand and water as required for proper consistency. Mortar shall be used within 30 minutes after mixing.
- D. Manufacturing plants will be inspected periodically for compliance with specified manufacturing methods and material samples will be obtained for laboratory testing for acceptance of manufacturing lots as to quality.
- E. Sewer manholes and wet wells shall be given a 16-20 mil dry film thickness interior coating of Bitumastic 300M manufactured by Carboline, series 46H-413 Hi Build Tnemec Tar manufactured by Tnemec, or pre-approved equal

PART 3 – EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

- A. Concrete construction shall conform to Section 805 (Louisiana Specifications for Roads and Bridges, 2000 Edition). Joints shall be full mortar joints and shall not be more than ½ inch wide. When specified, the outside faces of structures shall be plastered with ½-inch thick cement-sand mortar coat. Unless otherwise provided, exposed surfaces of concrete and masonry shall be cured by approved methods for a period of not less than 48 hours.
- B. Bedding material, 6" thick and extending 12" outside the structure, will be required under all catch basins, inlets and manholes located in the pavement. For requirements, refer to Section 726 of Louisiana Standard Specifications for Roads and Bridges, 2000 Edition.

- C. Precast concrete units shall be cast with the specified number and size of pipe openings to incorporate the unit into the sewer system. However, if additional pipe for which holes have not been provided is required during construction, the Contractor shall make such holes, provided any damaged units are replaced or satisfactorily repaired to the satisfaction of the Engineer. Precast units shall be set within $\pm \frac{1}{2}$ -inch of established grade on bedding material as shown in the plans or approved by the Engineer. Joints of sectional precast units shall be sealed with flexible plastic gasket material conforming to Subsection 1006.06 (b) (Louisiana Standard Specifications for Roads and Bridges, 2000 Edition) so installed as to form a watertight seal.
- D. Metal frames shall be set in full mortar bed. Conduit sections shall be finished flush on the inside of the structure wall and project outside sufficiently for proper connection with the next pipe section. Masonry shall fit nearly and tightly around the conduit.
- E. Upon completion, structures shall be cleaned of accumulations of silt, debris or other foreign matter and all metal parts shall be coated with asphaltic varnish. The structures shall be kept clear of such accumulations until acceptance of the Work.
- F. After inspection of completed structures and when directed, excavated areas not occupied by the structures shall be refilled to the required elevations. The material and requirements for backfilling these structures shall conform to Subsection 701.08 (Louisiana Standard Specifications for Roads and Bridges, 2000 Edition).
- G. Exposed slopes shall be covered by approximately 12 inches of plastic soil material to protect the backfill from erosion.
- H. Excavated material not satisfactory for backfill and surplus material shall be disposed of by the Contractor as specified in Section 02200.
- I. All sewer manholes, storm drain manholes and storm drain catch basins with depth of 4'-0" or greater shall have manhole steps placed at 15-inch centers and 4-inch projections.

END OF SECTION

SECTION 02550 – CULVERTS AND STORM DRAINS

PART I - GENERAL

1.1 RELATED ITEMS SPECIFIED ELSEWHERE

- A. Special Provisions of the Louisiana Department of Transportation and Development Standard Specifications for Roads and Bridges, 2000 Edition, Section 701 shall be considered a part of this section.
- B. Field Engineering: 01050
- C. Submittals: 01300
- D. Excavation, Filling and Grading: 02200

PART 2 - PRODUCTS AND EXECUTION

2.1 BASIC MATERIALS (Submit descriptive data for all proposed materials).

- A. Pipe: All pipe shall be approved by the LA DOTD Qualified Products list unless otherwise specified on the plans.
- B. Fittings: Provide all special fittings required to complete installation.
- C. Side Drain Pipe or Side Drain Pipe Arch: When this item is included in the contract the contractor has the option of furnishing reinforced concrete pipe, corrugated metal pipe or plastic culvert pipe unless otherwise stated on plans.
- D. Cross Drain Pipe or Cross Drain Pipe Arch: When this item is included in the contract the contractor has the option of furnishing reinforced concrete pipe, corrugated metal pipe or plastic culvert pipe unless otherwise stated on plans.
- E. Storm Drain Pipe or Storm Drain Pipe Arch: When this item is included in the contract the contractor has the option of furnishing reinforced concrete pipe or plastic culvert pipe unless otherwise stated on plans.
- F. Yard Drain Pipe: When this item is included in the contract, the contractor has the option of furnishing concrete sewer pipe, plastic yard drain pipe or plastic culvert pipe in accordance with Section 1006 of the LA DOTD Standard Specifications for Roads and Bridges, 2000 Edition.

2.2 WORK INCLUDED

- A. Furnish and install all pipe of the type, size and depth designated by the design documents. Work includes furnishings, transporting, excavation, bracing, bedding, dewatering, laying, jointing, backfilling and surface clean-up.
- B. All bedding material shall conform to LA DOTD, Standard Specifications for Roads and Bridges, 2000 Edition, Section 726.
- C. All drain pipes under future pavement shall require a minimum of 6" thick bedding material.

2.3 CONSTRUCTION REQUIREMENTS

- A. Excavation. The bottom of the trench shall be excavated to a minimum width of 18 inches on each side of the pipe. Excavated material or surplus material that does not conform to

the requirements of Subsection 203.6(a) of the LA DOTD Standard Specifications for Roads and Bridges, 2000 Edition, shall be properly disposed of off of the owner's property at the contractor's expense.

- B. Forming Pipe Bed. When a suitable foundation cannot be obtained , unstable soil below established grade shall be removed and replaced with granular material or bedding material in accordance with Section 726 of the LA DOTD Standard Specifications for Roads and Bridges, 2000 Edition.
- C. Laying Pipe. The pipe shall be in contact with the foundation throughout its length.
- D. Joining Pipe.
 - 1. Joint usage
 - a. Type 1 (T1) joints shall be used for side drains under drives and similar installations.
 - b. Type 2 (T2) joints shall be used for cross drains under roadways, including turnouts.
 - c. Type 3 (T3) joints shall be used for closed storm drain systems, flumes and siphons.
 - 2. Concrete pipe: Joints shall comply with Subsection 1006.5 of the LA DOTD Standard Specifications for Roads and Bridges, 2000 Edition, and shall be sealed with gasket material installed in accordance with the manufacture's recommendations. Type 2 and 3 joints shall be wrapped for a minimum of 12 inches on each side of the joint for pipes 36 inches in diameter or less and 18 inches on each side of the joint for pipes greater than 36 inches in diameter.
 - 3. Metal Pipe: Band joints shall be sealed with gasket material. Joints shall be wrapped for a minimum of 12 inches on each side of the joint for pipes 36 inches in diameter or less and 18 inches on each side of the joint for pipes greater than 36 inches in diameter.
 - 4. Plastic Culvert Pipe: Joints shall be wrapped for a minimum of 12 inches on each side of the joint for pipes 36 inches in diameter or less and 18 inches on each side of the joint for pipes greater than 36 inches in diameter.
- E. Backfilling:
 - 1. Side Drain Pipes.
 - a. For Non-paved areas pipe backfill material, except for Plastic culvert pipe, shall be usable soil placed by approved methods and compacted to a density of the surrounding soil. Plastic culvert pipe shall be backfilled with granular material.
 - b. For Side Drain Pipes in Paved and pipes other than side drains the backfill material shall conform to Section 701.08(c) of the LA DOTD Standard Specifications for Roads and Bridges, 2000 Edition.
 - c. Backfill methods:
 - 1. Compaction by flooding shall not be permitted.

2. Backfills shall be placed at or near optimum moisture content determined in accordance with LA DOTD TR 418 in layers not exceeding 8 inches (12 inches for granular materials) compacted thickness. Backfill material is to be thoroughly compacted under the haunches. Each layer shall be compacted to 95% of maximum density prior to the placement of the next layer. Flowable fill shall be in accordance with Section 710 of the LA DOTD Standard Specifications for Roads and Bridges, 2000 Edition.

END OF SECTION

SECTION 02552 - GAS PIPELINE

PART 1 - GENERAL

1.1 SPECIFIED ELSEWHERE

- A. Submittals: 01300
- B. Testing Laboratory Services: 01410
- C. Excavation, Filling, & Grading: 02200

1.2 SUBMITTALS

- A. Submit data describing all materials and fittings intended for use in gas piping system.
- B. A record of location of all the following items shall be submitted prior to Substantial Completion, as specified in Section 01050:
 - 1. Gas valves;
 - 2. Intersecting gas pipe lines.

1.3 TESTING LABORATORY SERVICES

- A. Testing Lab specified in Section 01410 will observe and log gas pressure tests. The Contractor shall provide necessary equipment and shall perform the testing.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Gas lines shall conform to requirements of ASTM D 2513 Specification, "Thermoplastic Gas Pressure Pipe, Tubing and Fittings", latest edition, and to Department of Transportation Title 49, Part 192, "Transportation of Natural and Other Gas by Pipeline Minimum Safety Regulations." All plastic pipe and fittings shall be made from PE2406. Pipe wall thickness and fittings shall be compatible for an SDR 11 operating pressure system.
- B. Pipe for boring and jacking shall be Polyethylene Pipe (PE 3408) (SDR 11) conforming to ASTM D3350 having a classification of PE234333E.
- C. Furnish all bends, reducers, tees, crosses, wyes, caps, plugs required to complete the installation. All thermoplastic pipe and fittings shall be supplied from a single manufacturer to insure compatibility of components.
- D. Concrete: Shall be 3,000 psi minimum compressive strength at 28 days.
- E. Locator Wire: Locator wire shall be 14 gauge stranded copper with PVC jacket and shall be approved by the Designer.
- F. The Contractor shall place a strip of warning tape twelve inches (12") above all plastic pipe for the purpose of detection.
- G. All ball and plug valves shall be manufactured to conform to ASTM D 2513 and D 1598. All ball and plug valves shall operate so that the valve will open when turning the operating nut

in a counter-clockwise direction. All ball and plug valves buried underground with built-in position indicator-standard 2' square adaptor with deflector cone on top.

1. The Contractor shall furnish the Owner with one (1) valve wrench to fit the ball valve operating nut and one (1) valve wrench to fit the plug valve operating nut. All ball valves shall have pipe stub ends and all plug valves shall have transition fittings which can be butt heat-fused to the pipe or other fittings, unless otherwise specified on the Plans or the proposal form, and be wrench operated.
 2. The distribution system valve shall be Rockwell Model No. 82111 PE ball valve or Resun Model No. R-1431 semi-steel plug valve or pre-approved equal.
- H. All valve boxes shall be made of cast iron and shall be of the heavy roadway type with an inside diameter of not less than 5 inches. The valve boxes shall be adjustable for elevation and shall be of the three-piece screw type. The top of the valve box shall be installed flush with the ground surface or street surface and shall be supported by an 18" square concrete foundation as shown on the Plans. The valve box cover shall be cast iron with the word "GAS" embossed on the top side. All covers within the compound shall have locking lids.
- I. Casing Pipe: Steel casing pipe shall be constructed of steel plate, butt welded. Welds shall be wire brushed and the entire pipe cleaned and given two heavy coats of asphaltum. The pipe shall have minimum yield strength of 35,000 psi, conforming to the latest revisions of ANSI B36.10 or API 5L.
- J. Insulators to be used inside casing pipe shall be concentric support insulators by T.D. Williamson, Inc. or Designer approved equal. Seals shall be TDW "Z" Seals by T.D. Williamson, Inc. or Designer approved equal.
- K. Gas Line markers: A minimum of two gas line markers shall be placed as directed by the Project Designer.

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Perform all excavation of every description and of whatever substances encountered as indicated on the Drawing or as otherwise specified. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins.
- B. Trenches shall be of necessary width for the proper laying of the pipe, and the banks shall be as nearly vertical as practicable. The bottom of the trenches shall be graded to provide uniform bearing and support for each section of the pipe on undisturbed soil at every point along its entire length. Care shall be taken not to excavate below the depths indicated. Unauthorized overdepths shall be backfilled with earth satisfactory to the Designer, and thoroughly tamped. Trenches for lines shall be of a depth that will provide a minimum cover over the top of the pipe of 3 feet from the ground surface.

3.2 INSTALLING PIPING

- A. All pipe shall be handled with care. Manufacturer's recommendations shall be followed fully regarding storage, handling, laying and jointing pipe. Immediately before being placed in the trench, all pipe shall be examined for defects and shall be swabbed clean. All pipe

shall have a minimum of thirty-six inches (36") cover, unless otherwise approved by the Designer.

- B. When work is suspended for the night or for any other reason, open ends of the pipe shall be securely plugged to prevent the entrance of foreign materials. Dead ends of pipe and unused branches of crosses, tees, valves, etc., shall be closed with plugs suitable to the type of pipe in use. Proper and suitable tools for the safe and convenient handling of pipe shall be used and care shall be taken to prevent damage to pipe.
- C. Fittings shall be placed in the locations indicated on the Plans or at locations designated by the Designer. Before being placed in the trench, all fittings shall be carefully examined to see that they are in good working order.
- D. When connections are made between new work and existing mains, where such cases occur, the connections shall be made by using special fittings to suit the actual conditions. All bends, reducers, tees, crosses, wyes, caps, plugs, and such parts that are liable to draw away shall be firmly secured to avoid blowing out of joints. Where necessary, concrete thrust blocks of the correct size shall be poured behind each fitting to insure this securing. Thrust blocks, if required or recommended by Manufacturer's specifications, shall be placed at each wye or tee and at each change in direction.

3.3 BACKFILLING

- A. Trenches shall be carefully backfilled with the excavated materials approved for backfilling or other approved materials. Backfill shall be mounded up over the top of the trench to provide for future settlement and the ground on either side shall be graded to a reasonable uniformity and left in a neat condition. Perform backfilling in accordance with the requirements of Section 02200.

3.4 LOCATOR WIRE INSTALLATION

- A. Place locator wire directly over and on the center of all gas pipe for its entire length. The wire shall be connected to all fixtures and appurtenances. The method of placing and backfilling the wire shall, in general, meet the requirements of the Manufacturer of the wire and the pipe being traced and the Designer.

3.5 BORING AND JACKING

- A. Where gas pipes are permitted or required to be jacked under roadways or other locations without a sleeve pipe, the pipe shall be PE 3408 and installed by means of a boring machine or auger and hydraulic jack or by other means satisfactory to the Designer and in accordance with the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition, of the Department of Transportation and Development, Office of Highways. In the event subsurface operations result in injury or damage to the pavement, repairs to the pavement shall be made by the Contractor at no additional cost to the Owner. In the event the paving cracks on either side of the pipe line, or is otherwise disturbed or broken due to the Contractor's operations, he shall repair or replace same at his own expense without further compensation.

3.6 TEST FOR DISTRIBUTION LINES

- A. Prove the entire system of gas lines to be gastight by air test under a pressure not less than 100 psi. Testing shall conform to requirements of ASTM D2513 and D1598. The Contractor shall provide all necessary test equipment and shall perform the test. The Owner and Designer shall be contacted prior to testing.

- B. The test of gas lines may be made on the system as a whole or on sections that can be valved off. Smaller sections may be tested when backfilling of the trenches in such sections in advance of the completion of other sections is essential. The test shall continue for at least 24 hours between the times of the initial and final readings of pressure and temperature. The initial test readings of the instruments shall not be made for at least one hour after the pipe has been subjected to the test pressure and neither the initial nor final readings shall be made at times of rapid changes in atmospheric conditions. The temperatures shall be representative of the actual trench conditions. There shall be no indication or reduction of pressure during the test after corrections have been made for changes in atmospheric conditions in conformity with the relationship $T_1P_2 = T_2P_1$, in which T and P denote absolute temperature and pressure, respectively, and the subscripts denote initial and final readings. During the test, the entire system shall be completely isolated from all compressors and other sources of air pressure. The testing instruments shall meet the approval of the Designer and shall be subject to inspection at all times during the test.

3.7 BLOWING DOWN AND PURGING

- A. Immediately after tests have been performed, the entire system shall be blown with compressed air until all dirt and foreign matter have been removed. The system shall then be thoroughly purged of all moisture and air. Provide necessary taps, etc., at remote points of the system as required to purge the system. Following the purge, all taps shall be tightly sealed.

3.8 SYSTEM OPERATION

- A. Set and adjust all regulators, meters, valves, equipment, operating pressures, etc., required for proper and permanent operation of the system and test operate the system to the Owner's satisfaction prior to acceptance. Contractor shall be required to re-light all pilot lights affected by service tie-ins.

END OF SECTION

SECTION 02556 - WATER LINES

PART 1 - GENERAL

1.1 SPECIFIED ELSEWHERE

- | | | |
|----|-------------------------------|-------|
| A. | Submittals: | 01300 |
| B. | Testing Laboratory Services: | 01410 |
| C. | Excavation, Filing & Grading: | 02200 |

1.2 SUBMITTALS

- A. Submit descriptive data for all proposed materials. Include brochures and Shop Drawings for each type of fitting and for fire hydrants assemblies.
- B. A record of the location of all the following items shall be submitted prior to Substantial Completion, as specified in Section 01050.
 - 1. Water valves;
 - 2. All intersecting water pipe lines

1.3 QUALITY ASSURANCE

All materials shall be new and shall conform to the following standards:

- 1. American Society for Testing and Materials (ASTM)
- 2. American Water Works Association (AWWA)
- 3. American National Standards Institute (ANSI)

1.4 DELIVERY AND STORAGE

- A. Handle all materials with care.
- B. Store in accordance with Manufacturer's recommendations.
- C. In shipping, delivering and installing, pipe and accessories shall be handled in such a manner as to insure a sound, undamaged condition. Particular care shall be taken to avoid damage to pipe coating. Pipe shall be handled in conformance with the American Water Works Association Specifications 7A 6.

1.5 TESTING LABORATORY SERVICES

- A. The testing laboratory specified under Section 01410 will observe and log the results of all on-site hydrostatic pressure tests. The Contractor shall provide necessary test equipment and shall perform the testing.

PART 2 - PRODUCTS

2.1 BASIC MATERIALS

- A. Pipe: Either of the following:
 - 1. PVC: AWWA C 900, Class 200 (4" and larger), or Schedule 40 (under 4")
 - 2. Ductile Iron (Class 50) conforming to ANSI Specification A21.51 and AWWA C 151, with mechanical joints.
- B. Boring and Jacking (if necessary): Pipe shall be Polyethylene Pipe (PE 3408)(SDR 11) conforming to ASTM D3350 having a classification of 345434C.
- C. Fittings:
 - 1. Water fittings shall be Class 350, ANSI, AWWA-C153.
 - 2. Payment of fittings (when allowed) shall include all accessories but shall be based solely on the bare weight of the fittings.
- D. Concrete: Meeting requirements for concrete with 3,000 psi minimum compressive strength at 28 days.
- E. Locator Wire: 14 gauge stranded copper with PVC jacket and shall be approved by the Designer.

2.2 FIRE HYDRANTS

- A. Fire hydrants shall be cast iron bodies, fully bronze mounted, suitable for working pressure of 150 psi and shall meet all requirements of AWWA Specifications C502, latest revision. Each hydrant shall be given a 300 psi hydrostatic test in the shop. All hydrants shall be of the same make and Manufacturer.
- B. The waterways of hydrants shall be as free as possible of obstructions, sharp turns, corners or other cause for resistance. The base of the hydrant shall have mechanical joint connection.
- C. Hydrants located on mains 6 inches and larger shall have 6 inch leads, and 6 inch mechanical joint connection and shall be equipped with two (2) 2-1/2 inch branch nozzles with threads for hose connections and one brass nozzle and threads for pumper coupling. The bottom valve of the hydrant shall be not less than 5-1/4 inches in diameter.
- D. Nozzle caps shall be securely fastened to hydrants and shall be threaded to fit nozzles.
- E. Threads for hose and pumper connections shall be as approved by the Designer.
- F. The hydrant main valve shall be of the compression type, closing with pressure. The valve shall be faced with rubber, or other approved material. Hydrant shall be traffic model and shall be breakable on impact without loss of water.
- G. Drain valves shall be automatic and positive acting. When the main valve is closed, drain valves shall automatically open, insuring rapid and complete drainage of the hydrant riser. They shall close automatically when the main valve is opened.
- H. Hydrants shall have a safety "breakable" section located above ground line. The distance from the ground line of the hydrant to the top of the hydrant lead shall not be less than thirty (30") inches. Hydrants shall come with one shop coat of primer. After installation, skinned

or scratched surfaces of hydrants shall be wire brushed and touched up with one (1) coat of Dark Red Primer. All exposed surfaces shall be given one (1) final field coat of Bright Red Paint meeting AWWA Specifications.

2.3 VALVES AND VALVE BOXES

- A. Gate valves shall meet the requirements of AWWA C500-61 and shall be double-disc with non-rising stems and parallel seats. Valve ends shall be mechanical joint and shall include bolts, glands, gaskets, and complete mechanical joint accessories. Valves larger than 2 inches shall be brass fitted cast iron. Valves smaller than 2 inches shall be of bronze.
 - 1. Valves in the distribution system shall be of slip-on joint ends adaptable to PVC pipe or cast iron pipe into which the pipe can be slipped in tightly and be able to withstand 160 psi pressure without leakage.
 - 2. Flanged valves, where specified, shall conform to the American 125 pound standard for flanges and drilling.
 - 3. Valves shall be installed in a vertical position. Stem seals shall be O-ring, and wrench nuts or hand wheels, whichever is specified, shall turn left (counterclockwise) to open. Wrench nuts shall be 2 inch square. The Contractor shall provide the Owner with six (6) valve wrenches.
- B. Check valves shall be iron body, bronze mounted swing type. Valve body, bonnet and disc shall be ASTM A 126 cast iron. Bonnet shall be large enough to permit cleaning and maintenance of the inner works with removing valve from the line. Disc and valve body shall be provided with machine fused bronze seating rings. Valve disc shall be securely bolted to malleable iron hinges. Hinges shall be secured to bronze hinge pins, supported by bronze bearings mounted in the valve body. Hinge pins shall extend through the valve body and shall be suitable for attachment of the outside weight and lower assembly.
- C. All underground valves shall have valve boxes. All valve boxes shall be made of cast iron and shall be of the heavy roadway type with an inside diameter of not less than 5 inches. The valve boxes shall be adjustable for elevation and shall be of the three-piece screw type. The top of the valve box shall be installed flush with the ground surface and shall be supported by an 18" square concrete foundation as shown on the Plans. The valve box cover shall be cast iron with the word "WATER" embossed on the top side. All valves within the compound shall have locking lids.
- D. Flush valves shall be placed as shown on the plans or directed by the Designer, and shall consist of a complete installation of gate valve, valve boxes, concrete pad and outlet assembly consisting of two threaded galvanized 90° elbows and necessary galvanized piping.

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Perform all excavation of every description and of whatever substances encountered, as indicated on the drawings or as otherwise specified. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins.
- B. Trenches shall be of necessary width for the proper laying of the pipe, and the banks shall be as nearly vertical as practicable. The bottom of the trenches shall be graded to provide uniform bearing and support for each section of the pipe on undisturbed soil at every point.

along its entire length. Care shall be taken not to excavate below the depths indicated. Unauthorized overdepths shall be backfilled with earth satisfactory to the Designer and thoroughly tamped. Trenches for lines shall be of a depth that will provide a minimum cover over the top of the pipe of 2.5 feet from the ground surface. Minimum cover at ditches and drainage channel crossings shall be 2.0 feet over the top of the pipe.

3.2 PIPE LAYING

- A. Depth of lines shall conform as close as practicable to thirty (30") inches of cover, and trenches shall be graded to provide uniform support for the pipe. Pipe shall be clean inside before it is lowered into the trench and shall be maintained free of water, soil and all other foreign matter that might injure or obstruct the operation of valves, regulators or other equipment. All openings to the pipe shall be closed by suitable means at all times except as the actual progress of the work may require. Stub ends and fittings installed for future connection shall be closed with metal plugs or caps.
- B. Excavation for coupling or bells shall be made in the trench to allow the entire length of pipe barrel to be bedded, unless specifically recommended otherwise by the Manufacturer. Horizontal and vertical alignment of the pipe shall be as true as possible.
- C. Fittings shall be placed in the locations indicated and elsewhere as required. Any omission of these appurtenances shall be corrected by the Contractor without additional cost to the Owner. Before being placed in the trench, all fittings shall be carefully examined by the Contractor to ensure that they are in good working order.
- D. When connections are made between new work and existing mains where such cases occur, the connections shall be made by using special fittings to suit the actual conditions. All bends, reducers, tees, crosses, wyes, caps, plugs, and such parts that are liable to draw away shall be firmly secured to avoid blow out of joints. Concrete thrust blocks of the correct size shall be poured behind each fitting to insure the securing.
- E. Where necessary, pipe cutting shall be done in a neat and workmanlike manner without damage to the pipe.
- F. For the installation of PVC to metal fittings a thread lubricant shall be applied on all threads before screwing adapters into metal. Thread lubricants shall be used on all plastic threads. Do not use welding solvent on threads. These lubricants shall be in accordance with the Manufacturer's recommendations.
- G. Valves and valve boxes shall be located where shown on the plans.
- H. Install flush valves as shown on plans to include gate valve, valve boxes, concrete pad and outlet assembly consisting of two threaded galvanized 90° elbows, concrete anchor and necessary threaded galvanized piping.
- I. Install all water lines to provide a minimum clearance between the outside of the water line and the outside of any sewer line of 18 inches vertical at crossings and 10 feet horizontal at parallel lines.
- J. Locator wire shall be satisfactorily placed directly over and on the center of all pipe for its entire length. The tape shall be connected to all fixtures and appurtenances. The method of placing and backfilling over the tape shall, in general, meet the requirements of the Manufacturer of the tape and of the pipe.

3.3 SERVICE CONNECTIONS

- A. During construction, the Contractor is required to locate all service connections to existing

lines. After placement of new water lines, the Contractor is required to reconnect all service connections to new line. Additional service connections other than those shown on plans may be encountered.

- B. Service assemblies shall consist of curb valve tees and all related fittings and appurtenances. Service tie-ins shall conform to the specifications for water main of type used.
- C. Service line shall conform to the specifications for water mains of type used.

3.4 INSTALLING FIRE HYDRANTS

- A. Support fire hydrants at base on foundation at least eighteen (18") inches square of solid concrete pad (3000 psi) as shown on plans. Set concrete foundation on firm, solid ground properly graded.
- B. Provide adequate drainage for hydrants when closed by filling circular space around hydrant with at least 7 cubic feet of clean gravel. Place gravel carefully, so as not to displace hydrant or valve which has been connected.
- C. Before setting, clean hydrants completely free of dirt and other foreign matter. Set hydrants solidly with concrete thrust blocks behind barrel and behind tee connection to prevent movement of pipe in joints or of hydrant.
- D. Locate all hydrants where shown on the drawings and so that damage from vehicles and/or injury to pedestrians is minimized.
- E. All hydrants shall stand plumb and shall have their nozzles parallel with or set at right angles to street with pumper nozzles facing street. They shall conform to established grade, with nozzles at least eighteen (18") inches above ground. All hydrants shall be set to a depth and to the details as shown on the Plans and as specified.
- F. They shall be set at a depth so that the ground line beading shall be at the same elevation as the existing ground line.

3.5 HYDROSTATIC TESTING

- A. All pipelines shall be tested to demonstrate that they will successfully withstand 150 psi operating pressure without leakage in excess of the specified maximum in any test section of the pipeline. Before covering pipe, test each section for four (4) hours. If majority of pipe joints are covered, test for six (6) hours. Furnish all equipment, materials and labor required to perform the tests and to replace defective items.
- B. Whenever conditions will permit, the pipelines shall be tested before the pipe joints are backfilled. All uncovered joints shall be examined during the tests and all visible leaks shall be entirely stopped. Joints which leak shall be remade and retested until found to be satisfactory.
- C. Water used for testing shall be reasonably clean and free from oil, silt, mud, sticks, vegetable matter and other objectionable materials. Water required for testing shall be furnished by the Contractor. Furnish temporary pumping equipment and piping as required to deliver the water into the pipelines.
- D. Furnish the test pump, pressure gauge and approved means of accurately measuring all water introduced into the lines during each test. Provide all necessary temporary plugs,

bulkheads, pipe bracing, anchorages and other items required for the tests. Where required to insure the safety of the lines, place sufficient backfill over the pipelines during tests. Remove and replace all pipe, joints, fittings, valves, etc., damaged as a result of excessive test pressure, inadequate bracing, improper test procedure, lack of proper precautions or otherwise damaged as a result of test operations. UNDER NO CIRCUMSTANCES SHALL AIR BE USED TO DEVELOP THE TEST PRESSURE.

- E. Prior to testing, furnish and install corporation stops at high places on the pipeline for expelling air from the line, except at the high points where air valves may be indicated on the plans. Also, one corporation stop shall be furnished and install for each test pump location.
- F. When a section of pipe is ready for testing, it shall be given the specified leakage test and, if defects are discovered, it shall be retested after replacement of all defective items found therein. On the water distribution system, the test length shall not exceed 2,000 feet.
- G. For each leakage test, the air shall be completely expelled from the section of pipeline to be tested, and the test shall be made a hydrostatic pressure test. In all cases, the test period shall be of sufficient duration to permit proper examination of the pipe joints and other items in the test section of the pipe. All pipes, joints, fittings, valves, hydrants, and other items found to be cracked, leaking or otherwise defective shall be removed and replaced and the pipe lines shall be retested until the test requirements have been complied with.
- H. The allowable leakage permitted, for all types of pipe materials called for, at the above stated hydrostatic pressure and for a test duration of 4 hours minimum shall be equal to or less than ten (10) gallons per day per inch diameter, per mile of pipe.

ALLOWABLE LEAKAGE AT 150 PSI PRESSURE

Size (Inch)	Allowable Leakage Per 1,000 Ft. (ga./hr.)
1-1/2	0.118
2	0.158
3	0.237
4	0.316
6	0.473
8	0.631
10	0.789
12	0.947

The allowable leakage for a pipeline is calculated by multiplying the leakage per hour per 1,000 feet at the 150 psi test pressure and for the diameter of pipe tested as obtained from the above table by the duration of the test in hours and the total length of the line being tested divided by 1,000. If the line under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

3.6 BACKFILLING

- A. Trenches shall be carefully backfilled with the excavation materials approved for backfilling, or other approved materials. Backfill shall be mounded up over the top of the trench to provide for future settlement and the ground on either side shall be graded to a reasonable uniformity and left in a neat condition. Perform backfilling accordance with the requirements of Section 02200.

3.7 BORING AND JACKING

- A. Where water pipes are permitted or required to be jacked under roadways or other locations without a sleeve pipe, the pipe shall be PE 3408 and installed by means of a boring machine or auger and hydraulic jack, or by other means and in accordance with the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition, of the Department of Transportation and Development, Office of Highways. In the event subsurface operations result in injury or damage to the pavement, repairs to the pavement shall be made by the Contractor at no additional cost to the Owner. In the event the paving cracks on either side of the pipe line, or is otherwise disturbed or broken due to the Contractor's operations, he shall repair or replace same at his own expense without further compensation.

3.8 DISINFECTING WATER MAINS

- A. After satisfactory tests have been performed and before being placed in service, all pipelines shall be disinfected. Disinfecting the water mains shall be accomplished by utilizing a liquid chlorine gas-water mixture or a mixture of water and High Test Calcium hypochlorite (70% available chlorine), all in accordance with the provision of AWWA C651-99. UNDER NO CIRCUMSTANCES SHALL GRANULAR CALCIUM HYPOCHLORITE OR ANY CHLORINE-BEARING COMPOUND BE APPLIED INTO METALLIC OR NONMETALLIC PIPES IN A DRY FORM.
- B. This work shall be performed in segments of the pipeline in accordance with a schedule to be submitted by the Contractor and approved by the Designer before any work is commenced.
- C. As segments are disinfected and put into service after Louisiana State Board of Health approval, periodic samples shall be taken from completed sections as an added safety precaution until completion of the entire Project.

- D. Samples shall be taken from corporation stops installed in the lines as directed by the Designer and installed for the sole purpose of testing the line.
- E. After thorough flushing, sufficient available chlorine shall be added to the water in the line to show a minimum residual of 0.2 PPM. This chlorinated water shall be drawn off from each dead-end until an orthotolidin test shows a strong indication of chlorine. As the water is drawn off and new water added, this new water shall be chlorinated. After all points show an indication of chlorine, it shall be flushed out with potable water. Should subsequent bacteriological tests show any pipelines to be contaminated, the chlorination process shall be repeated in such pipelines until satisfactory results of tests are obtained. No water from any pipe shall be used for human consumption until bacteriological tests indicate that the water is entirely free of bacterial contamination.

3.9 SPARE MATERIALS

- A. The Contractor shall provide the Owner with six (6) valve wrenches and four (4) cartons of collision breakage repair parts for the hydrants.

END OF SECTION

SECTION 02611 - AGGREGATE SURFACE COURSE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This work shall consist of furnishing and constructing limestone aggregate surface course for roadways, drives, walkways and other facilities in accordance with the lines, grades and thickness' shown on the Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Limestone Gradation

U.S. Sieve	Percent Passing (By Weight)
1- ½ inches	100
¾ inch	50 to 100
No. 4	25 to 65
No. 40	10 to 32
No. 200	3 to 12

- B. The fraction of material passing the No. 40 sieve shall conform to the following requirements:

Plasticity Index (Max.)	6
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2.2 EQUIPMENT

- A. Equipment necessary to produce a finished product meeting Specifications requirements shall be furnished and maintained by the Contractor.

PART 3 – EXECUTION

3.1 SUBGRADE

- A. The subgrade shall be prepared as specified in Section 02200 and shall be approved before limestone is placed.

3.2 PLACING MATERIAL

- A. The material shall be deposited on the subgrade from vehicles used for hauling or from spreading equipment.
- B. Limestone surfacing shall not be placed or spread on concrete or asphalt pavement.
- C. No surface course shall be placed on a muddy or rutted subgrade.
- D. Limestone aggregate surface course work shall be performed in such a manner that

pavement surfaces and edges are not damaged.

3.3 MIXING

- A. When the surface course consists of a combination of different materials, the Contractor shall be required to thoroughly mix the material by disking, harrowing, blading or other approved method.

3.4 SHAPING AND COMPACTING

- A. The material shall be shaped by suitable means while being compacted. Any ruts, formed shall be filled by blading as often as necessary to prevent breaking through the surfacing material into the subgrade. Holes, waves and deficiencies in thickness which may develop and are not filled by blading shall be filled by adding more material.

END OF SECTION

SECTION 02612 - ASPHALTIC CONCRETE MIXTURES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. These specifications are applicable to asphaltic concrete wearing, binder and base course mixtures of the plant mix type.
- B. This work consists of furnishing and constructing one or more courses of asphaltic concrete mixture applied hot in conformance with these specifications and in conformity with the lines, grades, thicknesses and typical sections shown on the plans or established. The mixture shall consist of aggregates and asphalt with additives combined in proportions which meet the requirements of this Section including Table 1. The stability requirements of Table 1 of the mix used shall be equal to or greater than the mix originally specified.

1.2 MATERIALS

- A. The contractor shall keep accurate records, including proof of deliveries of materials for use in asphaltic concrete mixtures. Copies of these records shall be furnished to the engineer upon request. Materials shall conform to the following LA DOTD 2000 Standard Specifications Subsections:

Asphalt	1002.01
Silicone and Anti-Strip Additives	1002.02
Aggregates	1003.01 & 1003.06
Hydrated Lime	1018.03(a)
Mix Release Agent	1018.26

- B. Asphalt:

Asphalt cement Grade AC-30 shall be used, except when mixtures contain 20 percent to 30 percent reclaimed asphaltic pavement, Grade AC-10 shall be used. The contractor shall reduce the amount of asphalt cement in the plant's storage or working tanks to the 20 percent or less before adding another grade of asphalt cement or asphalt cement from another source.

- C. Additives:

1. Silicone: Silicone additives, when needed, shall be dispersed into the asphalt by methods and in concentrations given in QPL 22.
2. Anti-Strip (AS): An anti-strip additive shall be added at the minimum rate of 0.5 percent by weight of asphalt and thoroughly mixed with the asphalt cement at the plant. Additional anti-strip additive shall be added up to 1.2 percent by weight of asphalt in accordance with Subsection 1:03(b).
3. Hydrated Lime: Hydrated lime additive may be incorporated into all asphaltic concrete mixtures at the rate specified in the approved job mix formula. The minimum rate shall not be less than 1.5 percent by weight of the total mixture.

4. Hydrated lime additive shall be added to and thoroughly mixed with aggregates in conformance with following LA DOTD 2000 Standard Specifications Subsection 503.02(e). Hydrated lime may be added as a mineral filler in accordance with Heading c 3.
- D. Aggregates: Aggregates shall meet the requirements of Table 1 and LA DOTD 2000 Subsection 1003.
1. Recycled Portland Cement Concrete: Recycled Portland Cement Concrete will be allowed in base courses with a maximum of 70 percent recycled Portland cement concrete by weight combined with new aggregates. Recycled concrete shall be crushed and screened into a minimum of two stockpiles composed of different sized aggregates separate from other materials at the plant. Recycled concrete shall be dried as required for new aggregates.
 2. Reclaimed Asphaltic Pavement (RAP): Reclaimed asphaltic pavement shall be stockpiled separate from other materials at the plant and will be subject to approval prior to use. Such stockpiles shall be uniform and free of soil, debris, foreign matter and other contaminants. Reclaimed materials that cannot be broken down during mixing or that adversely affect paving operations shall be screened or crushed to pass a 2-inch sieve prior to use.
 3. Mineral Filler: Mineral filler conforming to the requirements of following LADOTD 2000 Standard Specifications Subsection 1003.06(a) (11) may be used in all mixtures.
 4. Screenings: Screenings conforming to the requirements of following LADOTD 2000 Standard Specifications Subsection 1003.06 (a) (6) may be used in all mixtures.
 5. Crushed Aggregates: Crushed aggregates are crusher generated materials manufactured by crushing materials which have a maximum of 10 percent passing the No. 4 sieve.
 - a. Type 3 Mixes: For Type 3 mixes, a minimum of 65 percent by weight of the new aggregates used in wearing courses shall be crushed aggregates; the remaining 35 percent may be natural sand and mineral filler.
 - b. Friction Ratings for coarse aggregates shall be determined in accordance with following LADOTD 2000 Standard Specifications Subsection 1003.06. The allowable usage of coarse aggregates shall be as follows.

Friction Rating	Allowable Usage For Type 3 WC
I	Acceptable
II	Acceptable
III	Acceptable
IV	Acceptable

¹Type 3 WC (with ADT/lane greater than 1000 VPD) may use this aggregate provided a minimum of 50 percent by weight of the coarse aggregates in the mixture have a Friction Rating of I or II. This aggregate may also be used in mixtures for shoulders, drives, curbs, detours, etc.

1.3 DESIGN AND QUALITY OF CONTROL OF MIXTURES.

- A. General: It is the intent of these specifications that the mixtures produced and placed meet the requirements for 100 percent payment. The contractor shall be responsible for design, production, transportation and lay down of mixtures. Work shall meet the requirements of this Section and be subject to acceptance by the Engineer.
1. The contractor shall exercise the quality control over materials and their assembly, design, processing, production, hauling, lay down and associated equipment. Quality control is defined as the constant monitoring of equipment, materials and processes to ensure that mixtures produced and laid are uniform, are within control limits, and meet specification requirements. When these specifications are not being met and satisfactory control adjustments are not being made, operations shall be discontinued until proper adjustments and uniform operations are established. Control shall be accomplished by a program independent of, but correlated with, an independent testing lab and shall ensure that the requirements of the job mix are being achieved and that necessary adjustments provide specification results.
 2. The contractor shall conduct such tests as necessary, in addition to the required tests, to design, control and place mixtures within specifications.
- B. Job Mix Formula: The contractor shall design the mixtures for optimum asphalt content and comply with requirements of DOTD TR 303, Method A; however, Method B may be used when approved. The job mix formula shall include the recommended formula and supporting design data. The recommended formula shall be submitted for approval to the Engineer. No mixture shall be produced until the proposed job mix formula has been approved.
1. The proposed job mix formula shall indicate a single anti-strip additive rate which is 0.1 percent greater than the percentage which will yield a minimum of 90 percent coating when tested in accordance with DOTD TR 317 or 0.1 percent greater than the percentage which will produce a minimum Tensile Strength Ratio (TSR) of 75 percent when tested in accordance with DOTD TR 322 whichever gives the greatest amount of anti-strip additive. The approved limit shall be 0.2 percent by weight of asphalt, with the lower limit being the quantity determined in accordance with DOTD TR 317 and the maximum limit no to exceed 1.2 percent by weight of asphalt.
 2. The job mix formula shall indicate a single rate of hydrated lime additive when used. The job mix formula rate of hydrated lime additive shall not be less than 1.5 percent by weight of total mixture.
 3. The job mix formula shall produce an asphaltic concrete mixture with a minimum TSR of 75 percent when tested in accordance with DOTD TR 322. The contractor's proposed job mix formula shall indicate a minimum TSR value of 75 percent attained in accordance with DOTD TR 322 on plant-produced mixture or laboratory-produced mixture. Production of this job mix formula will be allowed pending validation by the Engineer on plant produced mixture. When the Engineer's validation result is less than 75 percent TSR, no further production for that job mix formula or any proposed job mix formula substituted for that mix type will be accepted on any DOTD project having DOTD TR 322 requirements until a passing plant-produced TSR value is verified by the Engineer. A previously

validated and approved job mix formula may be produced in lieu of the disapproved job mix formula.

4. The job mix formula shall indicate the optimum mixing temperature which is the midpoint of the range shown on the Optimum Mixing and Compaction Temperatures Chart for the asphalt cement used. This chart shall be furnished by the LA DOTD Materials and Testing Section. The job mix formula limits for mix temperature will be $\pm 25^{\circ}\text{F}$ from the optimum mixing temperature.
 5. When aggregates with a water absorption value greater than 2.0 percent determined in accordance with AASHTO T 84 for fine aggregate or AASHTO T85 for coarse aggregate are used in the mixture, the contractor shall increase the initial optimum asphalt cement content to compensate for the asphalt cement absorbed by the aggregates. When aggregates with an asphalt absorption value greater than 0.5 percent, determined in accordance with DOTD TR 320, are used in the mixture, the contractor shall increase the initial optimum asphalt cement content to compensate for the asphalt cement absorbed by the aggregates.
 6. The job mix formula will allow the full range of gradation mix tolerances within the mix type specification limits.
 7. The plant shall be operated to produce, on a continuing basis, a mixture uniformly conforming to the approved job mix formula. When this is not the case, the contractor shall make satisfactory adjustments or cease operations.
- C. Reclaimed Asphaltic Pavement (RAP): The quantity of reclaimed asphaltic pavement to be used shall be designated in the job mix formula and meet the requirements of Table 1. The approved quantity shall be established after testing for absolute viscosity in accordance with LA DOTD 2000 Standard Specifications Subsection 503.02(a). When mixtures contain less than 20 percent reclaimed asphaltic pavement, Grade AC-30 asphalt cement shall be used. Grade AC-10 asphalt cement shall be used in mixtures containing from 20 to 30 percent RAP. The mixture produced shall conform to the requirements for the type mixture specified. The engineer may require the contractor to reduce the percentage of reclaimed asphaltic pavement to meet acceptance criteria.
- D. When RAP is used in the mixture, the new aggregate shall be dried and heated in a dryer to a sufficiently high temperature to produce a mixture with a minimum discharge temperature of 280°F .

1.4 WEATHER LIMITATIONS

- A. Asphaltic concrete mixtures shall not be applied on a wet surface or when the ambient temperature is below 50°F for wearing courses and 40°F for base and binder courses, except that material in transit, or maximum of 50 tons in a surge bin or silo used as a surge bin at the time plant operation is discontinued may be laid; however, mixture laid shall perform satisfactorily and meet specification requirements. Inclement weather will be sufficient reason to terminate or not begin production.

1.5 SURFACE PREPERATION

- A. The surface to be covered shall be approved prior to placing mixtures. The contractor shall maintain the surface until it is covered.

- B. Cleaning: The surface to be covered shall be swept clean of dust, dirt, caked clay, caked material and loose material by revolving brooms or other mechanical sweepers supplemented with hand equipment as directed.

- C. Applying Liquid Asphaltic Materials: Raw Aggregate Base Course and
 - 1. Raw Embankment: The contractor shall apply an approved asphaltic prime coat to unprimed surfaces, or protect in-place prime coat and spot patch as required with asphaltic prime coat, in accordance.

1.6 JOINT CONSTRUCTION

- A. Longitudinal Joints: Longitudinal joints shall be constructed by setting the screed to allow approximately 25 percent fluff and also overlapping the paver approximately 2 inches onto the adjacent pass. Prior to rolling, the overlapped mix shall be pushed back to the uncompacted side, without scattering loose material over the uncompacted mat, to form a vertical edge above the joint. The vertical edge shall then be compacted by rolling to form a smooth, sealed joint.

- B. Where adjacent paving strips are to be placed, the longitudinal edge joint of the existing strip shall be tacked.

- C. Transverse Joints: Transverse joints shall be butt joints formed by cutting back on the previously placed mixture to expose the full depth of the lift. An approved 10-foot static straightedge shall be used to identify the location at which the previously placed mixture is to be cut back to maintain no greater than a 1/8 inch deviation in grade. The cut face of the previously placed mat shall be lightly tacked before fresh material is placed. The screed shall rest on shims that are approximately 25 percent of plan thickness placed on the compacted mat or the screed shall be set a distance that is 25 percent of plan thickness above the mat surface. Transverse joints shall be formed by an adequate crew. Transverse joints shall be checked by the engineer for surface tolerance using a stringline extended from a point 10 feet before the joint to a point approximately 40 feet beyond the first joint. Any deviation in grade from the stringline in excess of 3/16 inch for roadway wearing courses and 1/4 inch for other courses shall be immediately corrected prior to the paving operation continuing beyond 100 feet of the transverse joint. Additionally, the transverse joint shall meet the surface tolerance requirements of Table 1. The Contractor shall make necessary corrections to the joint before continuing placement operations.

1.7 HAULING, PAVING AND FINISHING

- A. Mixtures shall be transported from the plant and delivered to the paver at a temperature no cooler than 25°F below the lower limit of the approved job mix formula. The temperature of the mix going through the paver shall not be cooler than 250°F.

- B. No loads shall be sent out so late in the day that completion of spreading and compaction of the mixture cannot be completed during daylight, unless artificial lighting has been approved.

- C. When segregation occurs, haul trucks shall be loaded with a minimum of three drops of mix, the last of which shall be in the middle.

- D. Coordination of Production: The contractor shall coordinate and manage plant production, transportation of mix and placement operations to achieve a high quality pavement and shall have sufficient hauling vehicles to ensure continuous plant and roadway operations. The engineer will order a halt to operations when sufficient hauling vehicles are not available.
- E. Pavement shall be protected from traffic until it has sufficiently hardened to the extent the surface is not damaged.
- F. Paving Operations: All mixtures shall flow through the paver hopper. Mixtures dropped in front of the paver shall be either lifted into the hopper or rejected and cast aside. Delivery of material to the paver shall be at the uniform rate and in an amount within the capacity of paving and compacting equipment. The paver speed and number of trucks shall be adjusted to have one truck waiting in addition to the one at the paver in order to maintain continuous paving operations. The height of material in front of the screed shall remain uniform.
- G. Transfer of mixture from haul truck to paver may be made by direct unloading into the paver hopper or by use of approved mechanical transfer devices to transfer mix from a haul truck or windrow. During mixture transfer, the paver shall not be jarred or moved out of alignment. During truck exchanges the level of mix in the paver hopper shall not drop so low as to expose the hopper feed slats.
- H. Pavers shall be designed and operated to place mixtures to required line, grade and surface tolerance without resorting to hand finishing.
- I. Longitudinal joints and edges shall be constructed along lines established. Stringlines or other forms of longitudinal control shall be placed by the contractor for the paver to follow. The paver shall be positioned and operated to closely follow the established line. Irregularities in alignment shall be corrected by trimming or filling directly behind the paver.
- J. After each load of material has been placed, the texture of the unrolled surface shall be checked to determine its uniformity. The adjustment of screed, tamping bars, feed screws, hopper feed, etc., shall be checked frequently and adjusted as required to assure uniform spreading of the mix to proper line and grade and adequate compaction. When segregation of materials or other deficiencies occur, paving operations shall be suspended until the cause is determined and corrected.
- K. Surface irregularities shall be corrected directly behind the paver. Excess material forming high spots shall be removed. Indented areas shall be filled and finished smooth. Hand placement in accordance with Heading c for surface repair will be permitted. Material shall not be cast over the surface.
- L. When paving and finishing operations are interrupted so that the mixture remaining in trucks, paver, paver hopper or on the pavement cools to such extent that it cannot be placed, finishes or compacted to the same degree of smoothness and with the same texture and density as the uncooled mixture, the cooled mixture shall be removed and replaced at no direct pay.
- M. The following shall apply for mechanical pavers:
 - 1. Minimum 30-foot Traveling Reference Plane: The minimum 30-foot traveling reference plane shall consist of a minimum of 8 sensing points with wheels or feet mounted on a frame and moving independently so that the grade reference

changes to follow the average reading from all wheels or feet. When the reference plane is designed for the grade sensor to rest on a solid one-piece rigid beam, a piano wire will not be required. When the beam is not monolithic and rigid, a piano wire shall be stretched from end-to-end, so that there is less than 0.1 inch variance when the grade sensor is in place.

2. After the initial paving strip of each lift is finished and compacted, adjacent paving strips shall be placed to the grade of the initial paving strip using a traveling reference plane to control grade and a slope control device to control cross slope.
 3. When directed the shoe device shall be used to control the grade of the initial or adjacent paving strips on any lift. On multilane pavements, the initial paving strip and the sequence of lane constructions will be subject to approval.
 4. When both outside edges of the paving strip being placed are flush with previously placed material, the slope control device shall not be used. A grade sensor is required for each side of the paver.
 5. Without Automatic Screed Control: When permitted, pavers without automatic screed control may be used for pavement patching, pavement widening, paved drives and turnouts.
- N. Hand Placement: When the use of mechanical finishing equipment is not practical, the mix may be placed and finished by hand to the satisfaction of the engineer. No casting will be allowed including casting the mixture from the truck to the grade. During paving operations material shall be thoroughly loosened and uniformly distributed. Material that has formed into lumps and does not break down readily will be rejected. The surface shall be checked before rolling and irregularities corrected.

1.8 COMPACTION

- A. General: After placement, mixtures shall be uniformly compacted, by rolling while still hot, to at least the density specified in Table 1. If continuous roller operation is discontinued, rollers shall be removed to cooler areas of the mat, where they will not leave surface indentations. The use of steel wheel rollers which result in excessive crushing of aggregate will not be permitted.
- B. The rolling pattern established by the contractor shall be conducted by experienced operators in consistent sequences and by uniform methods that will obtain specified density and smoothness. Individual roller passes shall uniformly overlap preceding passes to ensure complete coverage of the paving area. The speed and operation of rollers shall not displace, tear, or crack the mat. Non-vibrating steel wheel rollers shall be operated with drive wheels toward the paver. Any operations causing displacement, tearing or cracking of the mat shall be immediately corrected.
- C. Equipment which leaves tracks or indented areas which cannot be corrected in normal operations or fails to produce a satisfactory surface shall not be used. Operation of equipment resulting in accumulation of material and subsequent shedding of accumulated material into the mixture or onto the mat will not be permitted.
- D. To prevent adhesion of mixture, wheels of steel wheel rollers shall be kept properly moistened, but excess water will not be permitted.

- E. Pneumatic tire rollers shall be operated so that tires will retain adequate heat to prevent mix from adhering to tires. The pneumatic tire roller shall be operated at a contact pressure which will result in a uniform, tightly-knit surface. The pneumatic tire roller shall be kept approximately 6 inches from unsupported edges of the paving strip; however, when an adjacent paving strip is down, the roller shall overlap the adjacent paving strip approximately 6 inches.
- F. Vibratory rollers may be used provided they do not impair the stability of the pavement structure or underlying layers.
- G. The surface of mixtures after compaction shall be smooth and true to cross slope and grade within the tolerance specified. Mixtures that become loose, broken, contaminated or otherwise defective shall be removed and replaced with fresh hot mixture compacted to conform with the surrounding mixture. Ripples in the mat surface will not be accepted. Lots with rippled areas will be subject to rideability testing by the Project Engineer. These areas will be compared with the balance of the lot and adjacent acceptable riding surfaces to determine acceptability. Areas identified by such testing as unacceptable shall be corrected at no direct pay. Damage to the longitudinal joint shall be minimized to conform to Subsection 1:07(A).
- H. Breakdown Rolling: Breakdown or initial rolling shall be accomplished with a static or vibratory steel-wheel roller designed for initial compaction of hot asphaltic concrete mixtures conforming to LA DOTD 2000 Standard Specifications Subsection 503.06.
- I. Intermediate Rolling: Intermediate rolling shall be accomplished using an approved pneumatic tire roller conforming to LA DOTD 2000 Standard Specifications Subsection 503.06.
- J. Finish Rolling: Finish rolling shall be accomplished with an approved non-vibrating steel wheel roller conforming to LA DOTD 2000 Subsection 503.06 until roller marks have eliminated.
- K. After finish rolling, newly finished pavements shall have a uniform, tightly knit surface free of cracks, tears or other deficiencies. Deficiencies shall be corrected at no direct pay and the contractor shall adjust operations to correct the problem. This may require the contractor to adjust the mix or furnish additional or different equipment.
- L. Hand Compaction: Along forms, curbs, headers, walls and at other places inaccessible to rollers, mixture shall be uniformly compacted to the satisfaction of the engineer with approved hand tampers or mechanical tampers.

1.9 SURFACE TOLERANCE REQUIREMENTS

- A. Quality control testing will be the responsibility of the contractor. The contractor shall provide approved 25-foot California-Type Ames Profilograph collaborated and operated in accordance with DOTD TR 641 for longitudinal surface tolerance quality control testing. The profilograph used for longitudinal surface tolerance acceptance and to determine surface tolerance payment adjustments will consist of an approved 25-foot California-Type Ames Profilograph furnished, calibrated and operated by the Engineer in accordance with DOTD TR 641. An approved 10-foot metal static straightedge shall be furnished by the contractor for transverse and longitudinal surface tolerance acceptance testing.
- B. Longitudinal Surface Tolerance: The finished surface will be tested in the longitudinal direction for conformance to the surface tolerance requirements listed in this Section. For

parking area, testing of the wearing course in one random path will be required. The entire lot will be tested and shall meet the following requirements:

1. Quality Control Testing: The Contractor shall test the pavement no later than during the first work day following placement but in no case longer than 14 calendar days. Quality Control testing using a profilograph shall be required on parking area wearing courses.
2. When quality control testing establishes that the surface tolerance is deficient, the Contractor will immediately suspend paving operations. Paving operations will not be allowed to resume until appropriate corrections have been made and a test section successfully placed with acceptable surface tolerance. This test section shall consist of a maximum of 500 tons of asphaltic concrete which is to be placed in a continuous operation.
3. The Contractor shall control the paving operation and frequently test the surface to maintain the quality of the finished surface. The Contractor shall profile, correct and reprofile as many times as necessary to verify that specification requirements have been met before notifying the Engineer a lot is being submitted for acceptance.
4. The Contractor shall correct deficiencies, determined during quality control testing in accordance with Heading (1) at no direct pay. Once these corrections have been completed and the surface tolerance requirements listed herein and in Table 1 have been met, the Contractor shall provide the Engineer the reports required in DOTD TR 641 with notification that the lot is ready for acceptance testing.
 - a. Parking area wearing courses: The Average Profile Index shall not be more than 12.0 inches per mile per lot. Lots with an Average Profile Index more than 12.0 inches per mile and high points (bumps) in excess of 0.3 inch in 25 feet or less shall be corrected in accordance with Heading (b) and the lot retested. Surface requirements shall be met prior to placing the wearing course.
5. Acceptance Testing: After corrective work and quality control testing within a lot has been completed by the contractor in conformance with these specifications and Table 1, the Project Engineer will evaluate the profile trace from the contractor's quality control test for all courses. The entire lot will be tested by the Project Engineer no later than 14 calendar days after all corrective work is completed by the contractor with the same type of equipment. Test path for acceptance testing will be randomly selected independent of Quality Control test paths in accordance with the Materials Sampling manual.
 - a. Transverse Surface Tolerance: The transverse surface finish shall be controlled so that the values shown in Table 1 will not be exceeded. The surface for wearing courses will be tested at selected locations by the engineer in transverse direction for conformance to surface tolerance requirements of Table 1. Corrections shall be made as directed in accordance with Heading (b).
 - b. When requested by the Contractor, the acceptability of mixtures of work rejected by visual inspection will be evaluated by tests and measurements.

- C. Correction of Deficient Areas: Deficiencies to be corrected in the final wearing course shall be corrected by diamond grinding and applying a light tack coat, removing and replacing, or furnishing and placing a supplemental layer of wearing course mixture at least 1 ¼ inches compacted thickness for the full width of the parking area meeting the specification requirements at no direct pay. If the supplemental layer does not meet specification requirements, it shall be removed and replaced.

TABLE 1
 REQUIREMENTS FOR ASPHALTIC CONCRETE MIXTURES
 A. MIXTURE REQUIREMENTS

U.S. Sieve % Passing	Type 3 Wearing Course
1 ½"	---
1"	95 - 100
¾"	85 - 100
3/8"	70 - 100
No. 4	50 - 75
No. 10	28 - 55
No. 40	14 - 30
No. 80	8 - 20
No. 200 ⁹	3.0 – 8.0
Extracted Asphalt, %	---
Mix Temperature	---
% Crushed, Min.	85
Aggregates ¹	A, B, C
Marshall Stability, 1b	
No. of Blows	75
Design	1700
Minimum	1500
Individual	1300
Mar. Flow, 1/100 in.	6 - 15
% Voids	3.0 – 5.0
% VFA 70 - 80	
% VMA, Min. ²	14.5
% RAP, Max	0.00

B. PAVEMENT REQUIREMENTS

Density, % Pavement Wearing Course – 96.0%

1 – Slag

2 – For Design Guideline. For mixes with a theoretical gravity greater than 2.47, a tolerance of minus 1.0 percent will be applied to the minimum VMA.

END OF SECTION

SECTION 02730 - SANITARY SEWER

PART 1- GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|----------------------------------|-------|
| A. | Submittals: | 01300 |
| B. | Excavation, Filling & Grading: | 02200 |
| C. | Manholes, Inlets & Catch Basins: | 02515 |

1.2 WORK INCLUDED

- A. Furnish and install PVC gravity sewer, polyethylene or ductile iron pipe, of the type, size and depth designated for gravity flow sanitary sewers, service lines and riser pipes, conforming with the lines and grades shown on the plans. Work includes furnishing, transporting, excavation, bracing, bedding, dewatering, laying, jointing, testing, backfilling and surface clean-up.
- B. All pipe materials used between consecutive manholes in the sewer line including fittings, service connections, plugs, etc., shall be of the same kind unless otherwise provided by the plans.
- C. Manholes shall consist of the construction of pre-cast or cast-in-place concrete manholes with the required metal frames, coatings and covers on sanitary sewer gravity lines. No brick manholes will be allowed.
- D. Drop inlets shall consist of the construction of pipe drop inlets on sanitary sewer manholes including pipe, fittings and the encasements.
- E. Cleanouts shall consist of constructing cleanouts at the ends of sanitary sewer lines including the pipe, fittings, frame and cover, and encasement. Cleanouts within the compound must have locking lids.

1.3 SUBMITTALS

- A. Submit brochures, data sheets, cut sheets, etc., describing each product intended for use in the work.
- B. Submit samples of each proposed service fitting type for Designer's review.

1.4 REFERENCE STANDARDS

- A. Meet requirements and recommendations of applicable portions of Standards listed:
 - 1. American Society for Testing Materials. ASTM
 - 2. State of Louisiana, Department of Transportation and Development "Louisiana Standard Specifications for Roads and Bridges" 2000 Edition, referred to in this Section as "DOTD Standard Specifications".

1.5 TESTING LABORATORY SERVICES

- A. The Testing Laboratory specified under Section 01410 will observe and locate the results of

all on-site deflection and tightness testing. The Contractor shall provide necessary test equipment and perform the testing.

1.6 CLEARANCES

- A. Lay out lines prior to installation to maintain 10 feet minimum horizontal clearance between parallel sewer and water lines and 18 inches minimum vertical clearance between crossing sewer and water mains. Clearance measurements shall apply to outside of pipes.

PART 2- PRODUCTS

2.1 PIPE MATERIALS

- A. PVC Gravity Sewer Pipe: All PVC Gravity Sewer Pipe shall be unplasticized polyvinyl chloride (PVC) and conform to ASTM Designation D 3034 with a maximum SDR equal 35 and a minimum F/Y stiffness of 45 psi as tested in conformance with ASTM Designation D-2412. Contech A-2000 conforming to the requirements of ASTM Specifications F949 can also be used.
- B. High Density Polyethylene Pipe (PE3408): Shall be rated SDR 11, as specified by ASTM D3350 as having a cell classification of PE345434C.
- C. Fittings: All standard and special pipe fittings required shall be of the same materials, have the same type joints, and be made to the same standards as the sewer pipe with which they are used. All service fittings shall be "in line"; "saddle" type fittings are not acceptable.
- D. Ductile Iron Pipe (DI): Ductile iron sanitary sewer pipe shall be ductile iron (Class 50 or 51) conforming to ANSI Specification A21.51. The joints shall be mechanical (bolt, gasket and follower type) or slip-on type that employs a single elongated grooved rubber gasket to affect the joint seal.

2.2 BEDDING MATERIALS

- A. All bedding materials shall conform to Paragraph 1003.08, DOTD Standard Specifications.

2.3 MANHOLE MATERIALS

- A. Concrete for manhole structures and thrust blocks structures shall be 3,000 psi minimum.
- B. Reinforcing steel shall be Grade 60.
- C. Solid concrete masonry units shall be load-bearing units, ASTM C 145, Grade N, Type I, lightweight aggregate.
- D. Cement mortar shall conform with requirements of ASTM C270 Type M for work below grade and for load-bearing walls. Use mortar composed of one (1) part Portland Cement, two (2) parts approved mortar sand and water as required for proper consistency. Measure sand damp and loose. Mix materials mechanically for not less than five (5) minutes after all ingredients are in mixer. Mortar shall be used within 30 minutes after mixing. Clean mortar boxes at end of day's work.
- E. Manhole frames, cover sets, and gray iron castings shall conform with the applicable requirements of DOTD Standard Specifications.
- F. Manhole coating shall be 46H-413 Hi-Build Tnemec-Tar (one coat, coal tar-epoxy coating) or Kop-Coat Bitumastic 300 M or pre-approved equal.

PART 3- EXECUTION

3.1 TRENCHING AND FORMING PIPE BED

- A. All excavation shall be in such manner and to such widths as will give ample room for properly installing and inspecting the piping. All excavation necessary for laying pipe, construction of manholes, etc., shall be made to line and grade as indicated on the plans and as specified. Bottoms of trenches shall be excavated and formed to provide for pipe bedding.
- B. Bell holes shall be dug of sufficient size that the whole length of the pipe barrel be fully bedded.
- C. All excavations shall be open cuts with vertical sides, unless otherwise approved.
- D. The width of trench for sewer pipe installation at a point two (2') feet above the top of the pipe shall be the external diameter of the barrel of the pipe plus nine (9") inches on each side of the pipe.

3.2 EXCLUSION OR REMOVAL OF WATER

- A. Provide proper and satisfactory means and devices for the exclusion of water or removal of all water entering the excavation and remove all such water as fast as it may collect in such a manner as shall not interfere with the prosecution of the work.
- B. Do not divert water into any operating sewer line.
- C. Keep the completed sewer line free of water at all times and until final acceptance.

3.3 SHEETING AND BRACING

- A. Furnish and put in place such sheeting and bracing as may be required to support the sides of all trenches or other excavations. All sheeting and bracing shall conform to the DOTD Standard Specifications.
- B. Where the sheeting for the sewer pipe is driven no lower than the top of the pipe, such sheeting may be withdrawn. Do not withdraw sheeting until the trench is refilled to a point not less than two feet (2') above the crown of the pipe.

3.4 LAYING PIPE

- A. Pipe shall be laid in the trench on bedding or cradle as called for on the Plans. After the sewer is completed, the interior surface on the bottom thereof shall conform accurately to the required grade and alignment. As any stage of construction of a straight stretch between any two consecutive manholes, the starting end of the pipe shall be clearly visible on looking through the pipe in clear view. Any pipe which is not true to alignment or which shows settlement after laying, shall be taken up and relaid.
- B. Before being set in place, each section of pipe shall be thoroughly cleaned and freed of dirt. All bells shall be laid on the upstream end.
- C. Whenever pipe laying is stopped, either for the night or for any other cause, the end of the pipe securely closed to prevent the entrance of water, mud, or other matter, and shall be secured in such manner as to laying is in progress, keep the trench clear of water.
- D. Pipe alignment and grade shall be maintained by the use of laser beam construction methods. Self-leveling laser equipment shall be utilized for "Through the Pipe" alignment.

3.5 JOINTS

- A. The joints for all piping shall be made in accordance with manufacturer's directions and all joint materials shall be furnished with the pipe by the pipe manufacturer. All joint surfaces shall be thoroughly cleaned before making up the joint.

3.6 SEWER SERVICE LINES

- A. Sewer service lines shall be installed to the lines and grades required. Pipe, fittings, and joint materials shall conform to all applicable requirements herein specified for the various types of sewer pipe. Stoppers shall be left in all service lines which are left unconnected and shall be manufactured of the same material as the pipe.
- B. Accurate "As built" cleanout and plugged wye records shall be maintained by the Contractor. Three copies of the updated wye records shall be submitted with each request for payment.

3.7 BACKFILL

- A. No backfilling of trenches shall be done until the pipework to be covered has been inspected.
- B. Where any sheeting or bracing is withdrawn as backfilling progresses, all voids or spaces left thereby shall be carefully and thoroughly filled and compacted with the proper tools.
- C. The Designer reserves the right to forbid the use of any compacting tools or machines that he considers dangerous to the pipe or incapable of compacting the backfill properly.
- D. Material for backfill shall contain no rubble, trash, broken concrete, asphalt or other objectionable materials.
- E. Backfilling of trenches for pipe sewers shall start as soon as the Designer considers the joints to be satisfactory. The best of the excavated materials shall be placed in 6inch layers in the trench so as not to move the pipe or dislodge any of the jointing material and thoroughly but carefully compacted under and around the pipe up to the center line. The utmost care shall be taken not to disturb the pipes by stepping on or near them or by throwing earth upon them from the back above, or not to shift a pipe from its proper position

by careless or unskilled ramming around it or by unequal filling on the sides.

3.8 TESTING

- A. Deflection Testing: All sewer lines installed with pipe having an F/Y stiffness factor less than 150 psi when tested in accordance with ASTM D-2412 shall be required to be deflection tested, and all other sewer lines shall be subject to deflection tests at the Architect's request by the following procedure. In the presence of the Architect or his designated representative, the Contractor shall hand-pull an approved, rigid mandrel sized 4% smaller than the I.D. of the pipe through each line. In the event the mandrel cannot pass through freely, the failing line shall be repaired and retested until successfully passing the mandrel. If the test is performed over six months after the line has been installed, a mandrel sized 5% smaller than the pipe will be permitted.
- B. Tightness Testing: All gravity sanitary sewer lines, with all services and service pipe properly installed shall be subjected, in the presence of the Architect or his designated representative, to one or more of the three following methods of testing.

The type(s) of test required will be based on the job conditions and will be determined by the Designer.

- 1. Infiltration Testing: The measured infiltration in the test section shall not exceed 100 gallons per inch of diameter per mile of pipe per 24 hours.
- 2. Exfiltration Testing: With the test section properly subjected to a minimum positive differential head of 10 feet above the existing ground water, the total measured loss of water shall not exceed 100 gallons per inch of diameter per mile of pipe per 24 hours including manholes.
- 3. Low Pressure Air Testing: With the test section properly plugged between manholes, the amount of time required to produce a 1.0 PSIG pressure drop in temperature stabilized lines shall not be less than shown in the table below. The pressure drop shall be measured from 3.5 to 2.5 PSIG for lines without existing ground water. If ground water is present at the time of testing, the test pressures shall be adjusted to compensate for the external pressure. The 3.5 and 2.5 test pressures shall both be increased 1.0 psi for each two feet of existing ground water and the test will be conducted at that pressure range with the 1.0 PSIG drop and time requirements the same as shown in the table below.

Pipe Diameter (Inches)	Minimum Drop Time (Minutes)
8	8.0
10	10.0
12	12.0
15	15.0

3.9 INSTALLING PIPE FITTINGS

- A. Prior to installation of pipe fittings, the interior and end surfaces of pipe joints shall be cleaned of any foreign materials and inspected.
- B. Installation of the various types of fittings shall conform to the applicable requirements for sewer pipe installation as specified under 2.1C of this specification.
- C. The installation and jointing of pipe fittings shall be inspected prior to backfilling of trenches.

3.10 MANHOLES, DROP INLETS, AND CLEANOUTS

- A. Manholes constructed of pre-cast concrete risers and tops shall comply with the requirements of ASTM C 478.
- B. Pre-cast concrete manholes shall be constructed upon a monolithic concrete foundation or prepared bedding of the dimensions and set to the grades shown on the plans or as established by the Designer.
- C. Pre-cast concrete components shall be placed on the monolithic base structure before the base has taken initial set, or in a full bed of mortar and shall be carefully adjusted to true grade and alignment. The completed manholes shall be in strict accordance with the details shown in the plans. Joints shall be fully mortared to insure against any leakage.
- D. Reinforced concrete construction, including preparation of subgrade, forms, reinforcement, placing concrete, finishing and curing shall conform to the applicable requirements and in strict accordance with the details shown on the plans.
- E. Manhole frames and cover sets for manholes shall be as specified in DOTD Standard Specifications.
- F. Inverts and bottom curves shall be built accurately and so formed as to facilitate the smooth entrance and flow of sewage through the manhole. Benches shall be constructed of concrete. Benches shall be built to an elevation above the spring line of the sewer and shall be sloped to draft.
- G. The tops of all manholes shall be 3" above grade shown on plans and dressed off for drainage, unless otherwise specifically designated on the plans. The tops of all cleanouts shall match grade shown on plans. All manholes and cleanouts within the compound shall have locking lids.
- H. Drop inlets shall be installed where required and constructed in accordance with the plans and standard drawings.
- I. Cleanouts shall be installed where indicated on the plans or required and constructed in accordance with the plans and standard drawings.
- J. Backfill around manholes, structures, etc., shall conform to the applicable requirements of Section 02200 and shall be performed when the Designer considers the masonry to be sufficiently strong. The spaces shall be thoroughly filled and well tamped, and bracing and sheeting being removed as backfilling progresses.
- K. All visible leaks shall be repaired. A coating shall be applied to the inside of all manholes as specified 2.3 F of this specification.
- L. Bedding for manholes shall conform to DOTD Standard Specifications Paragraph 1003.08 and shall extend eighteen (18") inches all around with a minimum thickness of one (1) foot. The bedding material shall be 610 crushed stone with four (4) oz. geotextile fabric.

3.12 DETECTION TAPE INSTALLATION FOR NON-METALLIC PIPE

- A. A non-corrosive metallic tape shall be satisfactorily placed directly over and on the center of all pipe for its entire length. The tape shall be connected to all fixtures and appurtenances. The method of placing and backfilling over the tape shall, in general, meet the requirements of the manufacturer of the tape and of the pipe.

3.13 INSPECTION

- A. Final inspection of the work shall be made by the Designer after the Contract has been completed and tendered for acceptance. In order to be acceptable, the work must, at a minimum, comply with the following:
1. The pipe work shall be true to line and grade.
 2. There shall be no cracked or broken pipe or fittings.
 3. There shall be no defective joints.
 4. The interconnections and main shall be free from mud, trash, debris, etc.
 5. All trenches shall have been refilled after settlement so that the surface condition is equal to that before the work started, and all surplus soil shall have been removed, unless otherwise instructed by the Designer.
 6. All sewer lines shall be subject to inspection by "Lamping" and/or any other test procedure specified in this document. All materials, equipment and labor necessary for making the tests shall be provided by the Contractor at no extra cost to the Owner. All tests shall be performed in the presence of the Designer or his authorized representative.

END OF SECTION

SECTION 02731 - SANITARY SEWER FORCE MAIN

PART 1 – GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|----------------------------------|-------|
| A. | Submittals: | 01300 |
| B. | Testing Laboratory Services: | 01410 |
| C. | Excavating, Filling and Grading: | 02200 |

1.2 SCOPE OF WORK

- A. Force mains shall consist of furnishing and installing PVC, polyethylene pipe, ductile iron pipe or steel pipe of the type and size designated for sanitary sewer force mains in accordance with these Specifications or Special Provisions, and in conformity with the lines and grades shown on the Plans or established by the Designer. This item includes furnishing, transporting, excavation, bracing, dewatering, bedding, blocking, cradling, laying, jointing, testing, backfill and surface clean-up.

1.3 MATERIALS

- A. Where a certain material is specified on the Plans, only that material can be used. Where the term "Force Main" is shown on the Plans or in the proposal, it shall be interpreted to mean any of the specified pipe materials meeting the requirements of this Section, as the Contractor elects, of the dimension shown on the Plans. All pipe materials used in the force main including fittings, connections, plugs, etc., shall be of the same kind unless otherwise provided by the Plans. All pipe materials shall conform to the following requirements as applicable to the various types of pipe.
- B. Polyethylene Pipe
1. Polyethylene Force Main shall be rated SDR 11, as specified by ASTM D 3350 as having a cell classification of PE345434C. For the force main labeled 10" force main the Polyethylene Force Main shall be 12" in order to match inside diameters of other materials.
- C. Ductile Iron Force Main Pipe
1. Ductile iron pipe for sanitary sewer force mains shall have a minimum wall thickness conforming to Table 51.2 of ANSI 21.51 for laying condition "B". Unless specified in the Special Provisions or shown on the Plans, the rated working pressure shall be that shown in Table 51.1 of ANSI 21.51. This pipe shall be cement mortar lined and bituminous coated outside in accordance with Federal Specifications WW-P-421C. Fittings shall be of the same type, class, thickness and shall have the same coating treatment as the pipe.
- D. PVC Force Main Pipe
1. PVC Force Main shall be unplasticized polyvinyl chloride (PVC), C-909 (with 150 psi working pressure), except for jacked or bored crossing.
- E. Steel Force Main Pipe
1. Pipe shall be accordance with ASTM A53, Schedule 40, threaded and coupled or

plain end, or welding end. Pipe shall be galvanized unless otherwise specified.

2. Fittings shall be fabricated of the same kind of steel and same wall thickness as the pipe to which they are to be connected. Dimensions shall be as shown in AWWA C 208.
3. Flanges shall be slip-on type conforming to AWWA C 207 drilled as specified in ANSI B 16.5.
4. Steel pipe shall be prepared for one of the following types of joints as noted on the Plans or specified in the Special Provisions:
 - a. Bell-and-spigot ends prepared for O-ring rubber gaskets.
 - b. Lap joints for field welding.
 - c. Beveled ends for field butt-welding.
 - d. Plain ends fitted with butt straps for field welding.
 - e. Ends prepared for mechanical coupled field joints.
 - f. Plain ends fitted with flanges.
 - g. Threaded and coupled.
5. Unless otherwise shown on the Plans, the pipe joints shall comply with AWWA standards.
6. Joint tolerances shall not exceed those specified in AWWA C 201.
7. Unless otherwise noted on the Plans, steel pipe and fittings shall be lined with cement mortar and shall be coated on the exterior with coal-tar enamel and wrapped.
8. Cement mortar lining and coating shall be in accordance with AWWA C 250.
9. Coal tar lining and coating shall be in accordance with AWWA C 203. The coating on exterior surfaces shall be as follows: A uniform coat of coal-tar primer shall be applied, followed by a coat of hot coal-tar enamel into which shall be bonded, using a wrapping machine, a layer of 23-1/2 pound asbestos, or 40 pound rag felt, or a layer of fibrous glass and finished by wrapping with Kraft paper.
10. Asphalt mastic coating shall be in accordance with The Asphalt Institute, Construction Series No. 96, Specification M 2.
11. The exterior surfaces of the pipe and fittings shall be sand or grit blasted followed by a uniform coat of asphalt primer followed by a coat of hot asphalt not less than 3/22-inch in thickness and wrapped as specified for coal-tar coatings in subsection 127.53.
12. Where specified on the Plans and for pipe under 8 inches in diameter, steel pipe and fittings shall be galvanized in accordance with ASTM A53.

1.4 INSTALLING POLYETHYLENE PIPE

- A. All PE pipe shall be installed in strict accordance with the manufacturer's recommendation.
- B. The manufacturer of the type of pipe furnished shall furnish a qualified factory representative for a minimum of three full working days to train, observe and qualify the Contractor's personnel on the proper method of joining and installing every size of pipe and the associated fittings to be used on the job in accordance with applicable regulations. The

Contractor and the factory representative shall coordinate these days in order to assure that the representative is on the job at the start of the laying of the first lengths of pipe by the Contractor.

1.5 JOINTS

A. Jointing Polyethylene Pipe

1. The joints for polyethylene pipe shall be fused and shall be made in accordance with manufacturer's recommendations and directions. All joint surfaces shall be thoroughly clean and all joint materials shall be furnished with the pipe by the pipe manufacturer.

B. Jointing Ductile Iron to PE

1. All joints shall have a retaining gland, MJ x FE adapter, PE flange adapter, and backer ring installed as per manufacturer's recommendations and direction. All nuts and bolts to be furnished by manufacturer of joint hardware. Sufficient torque should be applied evenly to bolts to prevent leaks. After three (3) hours of initial installation and tightening of flanged connection, bolts should be re-tightened evenly. Under no circumstances will bolts be loosened to achieve uniform tightening.

C. Jointing Ductile Iron

1. The joints on ductile iron sanitary sewer force mains may be mechanical (bolt, gasket and follower type) or a slip-on type that employs a single, elongated grooved rubber gasket and retainer gland to affect the joint seal.

D. Jointing PVC Pipe

1. All joints shall consist of an integral bell with a factory installed "locked in" gasket. The spigot end of each joint shall be factory beveled. The joints shall be made and installed in accordance with the manufacturer's directions and all joint material shall be supplied with the pipe by the pipe's manufacturer. All joint surfaces shall be thoroughly cleaned before making up the joint.

E. Jointing Steel Pipe

1. Field joints in steel pipe, unless otherwise specified shall be made up with Dresser type couplings or equal mechanical couplings.
2. In long force mains where called for on the Plans, field joints in steel pipe shall be butt-welded. All field welding shall be conducted in accordance with AWWA Standard Specifications C2-6. Ends for field welding shall be beveled as required by the Welding Code for butt-welding. Pipe linings at field welded joints shall be repaired to be equal to the balance of the lining.
3. Where flanged connections are required, the flanges shall be of forged or rolled carbon steel complying with ASTM Standard Specification A 181, Grade 1.
4. Flanges shall have 125 psi drilling according to ANSI Specification B 16.1, or shall be drilled to match fittings or valves to which connected. Each flanged joint shall have a 1.16-inch smooth, full-face, cloth-inserted rubber gasket. The flanges shall

be butt-welded to the pipe. Flange bolts shall be of the stud type, full threaded, open hearth, Grade 1120 steel conforming to ASTM Standard Specifications A 107. Threads shall be the coarse series, Class 2 fit, ANSI B 1.1. The nuts shall be heavy series, semi-finished hexagonal form of material meeting ASTM Standard Specification A 194, Grade 1. Nuts shall meet dimensional requirements of ANSI Specification B 18.2. Bolts and nuts installed underground shall be given a field coat of heavy coal tar after hydrostatic test of the line.

1.6 LOCATOR WIRE FOR POLYETHYLENE PIPE AND PVC PIPE

- A. Contractor shall furnish and install locator wire that is 14 gauge stranded copper with PVC Jacket. The wire shall be satisfactorily placed directly over and on the center of all polyethylene pipes for its entire length. The wire shall be connected to all fixtures and appurtenances. The method of placing and backfilling over the wire shall, in general, meet the requirements of the manufacturer of the wire and applicable requirements of Section 02200.

1.7 THRUST BLOCKS

- A. Thrust blocks will be as required by the pipe manufacturer or as directed by the Designer, if needed. Cost of thrust blocks shall be at no direct pay.

1.8 PRESSURE TESTING OF FORCE MAINS

- A. Force mains shall be tested as follows:
 - 1. Contractor to assemble the maximum number of joints prior to placement in the trench. This section is to be filled with water and placed under slight pressure for at least 48 hours. Unless otherwise directed by the Designer, the pipeline shall then be brought up to a pressure of 100 psi, or 1-1/2 times the working pressure, whichever is greater and maintained under test for a period of not less than four (4) hours. Accurate means shall be provided for measuring the quantity of water required to maintain full pressure on the line for the test period. The volume of water required to maintain the test pressure shall not exceed 25 gallons per inch of diameter per mile of pipe per twenty-four (24) hours.
 - 2. In the event that the test results indicate leakage in excess of amount permissible, all detectable leaks shall be repaired by the Contractor. If necessary, additional tests shall be performed until a satisfactory test has been completed.

1.9 TESTING LABORATORY SERVICES

- A. The Testing Laboratory specified under Section 01410 will observe and log their results of all on-site pressure testing.

1.10 EXCAVATION

- A. The Contractor shall perform all excavation of every description and of whatever substances encountered in order to install the pipes and fittings as indicated on the drawings or as otherwise specified. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins.
- B. Trenches shall be of necessary width for the proper laying of the pipe, and the banks shall

be as nearly vertical as practicable. The bottom of the trenches shall be graded to provide uniform bearing and support for each section of the pipe on undisturbed soil at every point along its entire length. Care shall be taken not to excavate below the depths indicated. Unauthorized overdepths shall be backfilled with earth satisfactory to the Designer, and thoroughly tamped.

- C. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Designer immediately for directions as to procedure. Cooperate with utility owners in order to keep respective services and facilities in operation. Repair utilities damaged by Project work to satisfaction of utility owner.
- D. Unless otherwise required by the Owner, the User Agency or directed by the Designer, plug or cap all abandoned utility lines as designated on the Plans.

1.11 SHEETING AND BRACING

- A. Furnish and put in place such sheeting and bracing as may be required to support the sides of all trenches or other excavations. All sheeting and bracing shall conform to the DOTD Standard Specifications.
- B. Where the sheeting for the sewer pipe is driven no lower than the top of the pipe, such sheeting may be withdrawn. Do not withdraw sheeting until the trench is refilled to a point not less than two feet (2') above the crown of the pipe.

1.12 WATER IN TRENCHES

- A. The trenches shall be maintained free of water at all times while work is in progress, and water shall not be allowed to flow over or rise out of trench. The Contractor shall not open more trench than the available pumping facilities can de-water to the satisfaction of the Engineer. The Contractor shall assume all responsibility for disposing of all water so as not to injure or interfere with normal drainage of the locality.

1.13 BACKFILLING

- A. Trenches shall be carefully backfilled with the excavated materials approved for backfilling, or other approved materials. Backfill shall be mounded up over the top of the trench to provide for future settlement, and the ground on either side shall be graded to a reasonable uniformity and left in a neat condition to the satisfaction of the Designer.

1.14 HANDLING

- A. In shipping, delivering and installing, pipe and accessories shall be handled in such a manner as to insure a sound, undamaged condition.

1.15 PIPE LYING

- A. Depth of lines shall conform as close as practicable to those indicated above. The pipe shall be clean inside before it is lowered into the trench and shall be maintained free of water, soil and all other foreign matter.

1.16 PIPE CUTTING

- A. Where necessary, pipe cutting shall be done in a neat and workmanlike manner without damage to the pipe.

1.17 CONCRETE SIDEWALK AND DRIVEWAY REMOVAL AND REPLACEMENT

- A. Any concrete sidewalks or driveways which must be cut to allow line installation shall be saw cut on a neat straight line. Trench backfill shall be thoroughly compacted before replacement of concrete. Concrete used for replacement shall have a 28-day compressive strength of not less than 3,000 psi.

1.18 GUARANTEE

- A. The Contractor shall, by signing the Contract, warrant that he will remedy any defects in the work which may appear during a period of one year following acceptance of his Contract by the Owner.
- B. If any defects shall develop or be discovered during the performance of the contract or within the one year maintenance period following acceptance of the Contract, the Contractor shall properly repair or replace the defective workmanship and/or material at his own expense.

1.19 INSPECTION

- A. Final inspection of the work shall be made by the Designer after the Contract has been completed and tendered for acceptance. In order to be acceptable, at a minimum, all lines must have met the required pressure and leakage tests.

END OF SECTION

SECTION 02733 - TOP MOUNTED LIFT STATIONS - LIFT STATION #6

PART 1 - GENERAL

Note: Material contained in this technical specification shall overrule conflicting items in attached Manufacturer specification (Parts 2 & 3). All electrical components shall be UL listed.

1.1 SCOPE

- A. The Contractor shall furnish all equipment, materials and labor necessary to install one (1) factory-built, automatic pumping station. Lift Stations shall be manufactured by Smith & Loveless, Inc., Gorman-Rupp or pre-approved equal. (See Parts 2 & 3 for Technical Specifications at end of this section.)
- B. In order that various Manufacturers of lift stations may be preliminarily received and to assure that these minimum performance standards will be met, each Manufacturer requesting pre-approval will submit to the Designer, seven (7) working days prior to the bid opening, preliminary data including outline drawings, pump curves, design calculations, guarantee that station shall perform according to Plans and complete equipment descriptions for the proposed lift stations. Manufacturer shall follow all provisions of Part 1 and Part 2 or Part 3 exactly.
- C. Only those Manufacturers whose equipment is approved by the Designer by an addendum prior to the bid opening will be allowed.
- D. This in no way relieves the Supplier from submitting shop drawings for approval of complying fully with provisions of these specifications and drawings.

1.2 SUBMITTALS

- A. Submit shop drawings, specification data, brochures, etc., describing specified equipment. Include complete roughing-in data. B-10 bearing calculations based on continuous operation of the pump must be submitted with the shop drawings after contract has been awarded.
- B. At time of Substantial Completion, furnish seven (7) operation and maintenance manuals, including parts lists of components and complete service procedures and troubleshooting guide.

1.3 GUARANTEES

- A. The Manufacturer of the lift stations shall have experience in the design and manufacture of vacuum-priming type factory-built automatic pumping stations and shall guarantee the structure and all equipment to be free from defects in materials and workmanship.
- B. Warranties and guarantees by the Suppliers of various components in lieu of a single-source responsibility by the Contractor shall not be accepted. The Contractor shall be solely responsible for the guarantee of the stations and all components for a period of one year from date of acceptance by the Owner.

- C. In the event a component fails to perform as specified or is proven defective in service during the guarantee period, the Contractor shall provide a replacement part without cost to the Owner. He shall further provide, without cost, such labor as may be required to replace, repair or modify major components such as the pumps, pump motors and sewage piping manifold.

1.4 FACTORY TESTS

- A. All components of the lift stations shall be given an operational test of all equipment at the factory to check for excessive vibration, for leaks in all piping or seals, for correct operation of the vacuum priming and control systems and all auxiliary equipment. Pumps shall take suction from a deep well, simulating actual service conditions.

1.5 SPARE PARTS

- A. A complete replacement pump shaft seal assembly shall be furnished with each lift station. The spare seal shall be packed in a suitable container and shall include complete installation instructions. A spare volute gasket and seal shall be provided.

1.6 INSTALLATION AND OPERATING INSTRUCTIONS

- A. Installation of the pump chamber shall be done in accordance with the written instructions provided by the Manufacturer.
- B. Seven (7) operation and maintenance manuals shall be furnished which will include parts lists of components and complete service procedures and troubleshooting guide.
- C. Package lift stations shall be factory pre-wired to one point of electrical connection. Any 120V auxiliary power for controls, alarm light, solenoid valves, etc. as required shall be provided by the Manufacturer.
- D. Pump stations shall be supplied with a stanchion for pump removal.

1.7 OPERATING CONDITIONS

- A. See attached Manufacturer's specifications for operating conditions.
- B. All pump openings and passages shall be large enough to permit the passage of a sphere 3" in diameter and any trash or stringy material which will pass through a 4" house collection system.
- C. Packaged lift stations shall be factory pre-wired to one point of electrical connection for 460V, 3 phase, 60 Hz power. A 120V auxiliary power for receptacles, lighting, fans, etc. shall be provided by Manufacturer. Auxiliary power shall be provided from the incoming service or a properly sized auxiliary dry transformer. Dry transformer shall be provided with primary and secondary circuit protection as required by the NEC. Conduit entrance to lift stations shall be as shown on the drawing details.

1.8 WELDING

- A. All steel structural members shall be joined by electric arc welding with welds of adequate section for the joint involved.

1.9 PROTECTION AGAINST CORROSION

- A. After welding, all inside and outside surfaces of the structure shall be blasted with sand to

remove rust, mill scale, weld slag, etc. All weld splatter and surface roughness shall be removed by grinding. Immediately following the cleaning, a single heavy inert coating shall be factory applied to all inside and outside surfaces prior to shipment. This coating shall be "polyamide" epoxy resin especially formulated for abrasion and corrosion resistance. The dry coating shall contain a minimum of 85% epoxy resin with the balance being pigments and thixotropic agents.

1.10 ALARM LIGHT

- A. Alarm light shall be mounted as detailed in plans. The pump stations shall be supplied with one (1) 115-volt AC alarm light in a vapor-tight fixture with red globe, guard, conduit box, and mounting fixtures. Alarm light and mounting fixtures shall be designed to permit mounting in such a manner that rain water cannot stand or collect in the gasketed area of the fixture, between the base and globe. Do not penetrate top of control panel for alarm light installation.
- B. Alarm light shall be interconnected to the Control Panel to indicate a common alarm. Power for alarm light shall originate from Control Panel.

1.11 START UP

- A. Contractor shall supply the services of a factory-trained representative for a one day on-site visit to perform initial start up of the station and to instruct the Owner and User Agency in the operation and maintenance of the equipment.

1.12 WET WELL

- A. Wet well shall be constructed as detailed in the plans. All interior concrete surfaces shall be coated in accordance with specification 02515, 2:01,E.
- B. Bedding for wet well shall conform to DOTD standard specifications and shall extend one (1) foot all around with a minimum thickness of one (1) foot. The bedding material shall be 610 crushed stone with four (4) oz non woven geotextile fabric.

1.13 TIMERS

- A. Manufacturer shall provide control system design to include a time delay start for each motor rated 5 HP and above. Controls shall be designed to provide delay each time the control system experiences an electrical service outage and is re-energized. Upon energization of the electrical service, the time delay relay shall begin timing and shall not allow motor to start until time delay has expired. This will allow time for the on-site emergency generator to accept individual loads in steps. Time delay shall be provided through the use of a "time delay on energization relay" for each motor. The relay shall be mounted in each equipment control panel. Each time delay relay shall be digital type and shall utilize either "dip" switches or "thumbwheel" switches for programming the delay time. Use of variable resistance "rotary" style controls to program the delay time shall not be acceptable due to lack of repeatability. Time delay relay shall be plug-in style, base mounted for ease of replacement. Time delay relay shall provide delay from 1 second to 999 seconds as a minimum. Contractor shall coordinate the time delays for all motors, to insure a minimum of 10 seconds between each motor starting.

1.14 CONTROLS

- A. The control equipment shall be mounted in a NEMA Type 3R steel enclosure with a removable access over. The circuit breakers, starter reset buttons, and control switches shall be operable without removing the access cover, for deadfront operation.

- B. A grounding type convenience outlet shall be provided on the side of the cabinet for operation of 120 volt AC devices.
- C. Thermal magnetic air circuit breakers shall be provided for branch disconnect service and short circuit protection of all motor control and auxiliary circuits.
- D. Magnetic across-the-line starters with under-voltage release and overload coils for each phase shall be provided for each pump motor to give positive protection. Each single-phase auxiliary motor shall be equipped with an over-current protection device in addition to the branch circuit breaker, or shall be impedance protected. All switches shall be labeled and a coded wiring diagram shall be provided.

END OF SECTION

SECTION 02733 – PART 2 -SMITH & LOVELESS, INC. WET WELL MOUNTED SEWAGE LIFT STATION #1

PART 1 – GENERAL

1.1 GENERAL

- A. The Contractor shall furnish and install one (1) factory built, automatic pumping station as manufactured by Smith & Loveless or pre-approved equal.
- B. The principal items of equipment shall include two vertical, close-coupled, motor driven, vacuum primed, non-clog sewage pumps, valves, internal piping, central control panel with circuit breakers, motor starters and automatic pumping level controls, heater, ventilating blower, priming pumps and appurtenances and all internal wiring for each lift station.

1.2 PRE-SUBMITTALS

- A. The mechanical equipment specifications are written based on "Performance Standards." If prospective equipment manufacturers are of the opinion that their equipment meets the performance specifications and physical dimensions on the drawings and wish to have their equipment specified by the General Contractor in his bid, the Contractor must request approval in writing from the Designer. With the written approval request, the Contractor must submit detailed technical data to the Designer for evaluation. General sales brochures will NOT be sufficient. Data submitted must clearly show the size, model, type, mounting, electrical wiring diagrams, structural, etc., necessary to easily evaluate the equipment. Standard charts, graphs, tables, etc., may be used but must be highlighted to show the specific unit being proposed. In addition with the original submittal, the Contractor will provide a written certificate that the proposed equipment meets all provisions of the specifications and drawings without exception. Contractors requesting deviations from the specifications will NOT be given additional time to qualify their equipment. If the equipment proposed will require additional or special physical, structural or electrical provisions, the Contractor shall submit drawings which illustrate all special requirements.
- B. The Contractor shall be responsible for all costs associated with the Engineering evaluation of the proposed alternative system, as well as any costs associated with redesign, and any additional structural and electrical costs. All submittals shall be submitted in triplicate.
- C. The Designer reserves the right to request any additional data or drawings he believes necessary to properly evaluate the proposed equipment. No additional time, beyond that shown in the specifications, will be granted for this submittal.
- D. All requests for equipment approval shall be submitted to the Designer by 5:00 PM, seven (7) working days prior to bid date. No request for equipment approval will be accepted after that day. Equipment submittals that are incomplete will not be approved.
- E. Prior to the bid date, an Addendum will be issued listing any additional approved equipment.
- F. The Contractor will only be allowed to bid mechanical equipment that has been specifically listed in the specifications or approved by an Addendum; otherwise their bid will be rejected.

PART 2 - PRODUCTS

2.1 OPERATING CONDITIONS

Lift Station # – Model No. 6B3B

GPM	750
TDH, ft.	45
Hp (Min)	15

- A. The electrical conditions shall be 460 V, 3 phase, 60 Hz for each lift station.
- B. All openings and passages shall be large enough to permit the passage of a sphere 3" in diameter and any trash or stringy material which will pass through a 4" house-collection system.

2.2 WET WELL AND PIT PAD

- A. Backfill and fill around the station wet pit is to be solidly placed to prevent future settlement. All backfill and fill shall be placed in layers 12" thick or less and compacted to 90% of AASHTO density.
- B. The pump station pit slab shall be constructed as detailed on the plans. The edges shall be neatly chamfered and the slab shall be neatly broom finished. The Designer shall be notified 24 hours prior to the pouring of the pit slab work.

2.3 PUMP STATION

- A. The station shall be constructed in one complete, factory-built assembly. It shall be sized to rest on top of the wet well as defined in these specifications and as detailed in the plans. The floor plate shall be 3/8" thick mild steel plate. The pump station shall be enclosed by a hinged fiberglass cover. The cover shall have a suitable drip-lip around the edge and be provided with a clasp to allow the pump chamber to be locked with a padlock.
- B. The cover shall have a latch mechanism to keep it open under any normal load. A hinged aluminum manway cover, exterior to the fiberglass pump chamber and complete with padlock provision, shall be provided integral with the station base to provide access to the wet well.

2.4 WELDING

- A. All steel structural members shall be joined by electric arc welding with welds of adequate section for the joint involved.

2.5 PROTECTION AGAINST CORROSION

- A. After welding, all inside and outside surfaces of the structure shall be blasted with steel grit to remove rust, mill scale, weld slag, etc. All weld spatter and surface roughness shall be removed by grinding. Immediately following the cleaning, a single heavy inert coating shall be factory applied to all inside and outside surfaces prior to shipment. This coating shall be "Versapox" epoxy resin especially formulated by Smith & Loveless for abrasion and corrosion resistance, or approved equal. The dry coating shall contain a minimum of 85% epoxy resin with the balance being pigments and thixotropic agents.

2.6 PUMPS

- A. The pumps shall be vertical, non-clog sewage pumps of heavy cast iron construction especially designed for the use of mechanical seals and vacuum priming. In order to minimize seal wear caused by lineal movement of the shaft, the shaft bearing nearest the pump impeller shall be locked in place so that end play is limited to the clearance within

the bearing.

- B. The bearing nearest the impeller shall be designed for the combined thrust and radial load. The upper bearing shall be free to move lineally with the thermal expansion of the shaft and shall carry only radial loads.
- C. The shaft shall be solid stainless steel through the pump and bottom bearing to eliminate corrosion within the pump or the mechanical seal. Removable shaft sleeves will not be acceptable. The pump shaft from the top of the impeller to the lower bearing supporting the impeller shall have a minimum diameter of 2 1/8", 1 7/8" and 3" for Lift Stations #4, #5 and #6 respectively.
- D. The pump impellers shall be enclosed, made of close grained cast iron and balanced. It shall be keyed with a stainless key and secured to the motor shaft by a stainless steel cap screw equipped with a Nyloc or other suitable self-locking device. The impeller shall not be screwed or pinned to the motor pump shaft and shall be readily removable without the use of special tools. To prevent the buildup of stringy materials, grit and other foreign particles around the pump shaft, all impellers less than full diameter shall be trimmed inside the impeller shroud. The shroud shall remain full diameter so that close minimum clearance from shroud to volute is maintained. Both the end of the shaft and the bore of the impeller shall be tapered to permit easy removal of the impeller from the shaft.
- E. The pump shall be arranged so that the rotating element can easily be removed from the volute without disconnecting the electrical wiring or disassembling the motor, impeller, backhead or seal so that any foreign object may be removed from the pump or suction line. Volute clean-outs will not be acceptable.
- F. The motor shall be attached to the pump volute by a one-piece cast iron adapter and backhead. The pump shall be vacuum primed from above the impeller and behind a full shroud. The pump adapter shall be made so the water level can rise in the adapter and submerge the seal assembly. The water level shall rise in the adapter far enough to eliminate all air in the volute.
- G. The pump shaft shall be sealed against leakage by a single mechanical seal installed between the impeller and the pump backhead. The seal shall be of carbon and ceramic construction with the mating surfaces lapped to a flatness tolerance of one light band. The rotating ceramic seal shall be held in mating position with the stationary carbon by a stainless steel spring.
- H. The pump volute shall be furnished with mounting lugs and bolted to the station floor plate.

2.7 MOTORS

- A. The pump motors shall be vertical, solid shaft, specially built, NEMA P base, squirrel-cage induction type, suitable for electrical conditions relative to the site, as stated on the plans. They shall have Class F insulation suitable for temperatures up to 105°C. Insulation temperature shall, however, be maintained below 80°C. The motors will have normal starting torque and low-starting current, as specified by NEMA Design B characteristics. They shall be open drip-proof design with forced air circulation by integral fan. Openings for ventilation shall be uniformly spaced around the motor frame. Leads shall be terminated in a cast connection box and clearly identified.
- B. The motors shall have 1.15 service factor. The service factor shall be reserved for the Owner's protection. The motors shall not be overloaded beyond their name plate rating, at the design condition, nor at any head in the operating range.
- C. The motor pump shaft shall be centered, in relation to the motor base, within 0.005". The shaft run-out shall not exceed 0.003".

- D. The motor shaft shall equal or exceed the diameter specified under sewage pumps at all points; from immediately below the top bearing to the top of the impeller hub shall not exceed 6". A bearing cap shall be provided for the bottom motor bearing. Bearing housing shall be provided with fittings for lubrication, as well as purging old lubricant.
- E. The minimum B-10 bearing life for the lift station shall be submitted based on continuous operation of the pump. Bearing calculations shall be provided seven (7) working days prior to bid, with submittals to receive prior approval.
- F. The motor shall be fitted with heavy lifting eyes, each capable of supporting the entire weight of the pump and motor.

2.8 CONTROL

- A. The control equipment shall be mounted in a NEMA 3R steel enclosure with a removable access cover. Circuit breakers, overload reset buttons and control switches shall be operable without removing the access cover.
- B. Thermal magnetic air circuit breakers shall be provided for branch disconnect service and short-circuit protection of all motor control and auxiliary circuits.
- C. Magnetic across-the-line starters with lightning arrestors and overload heaters for each phase shall be provided for each pump motor, as well as phase failure and phase reversal protection. Each single phase auxiliary motor shall be equipped with an overcurrent protection device in addition to the branch circuit breaker or shall be impedance protected. All switches shall be labeled and a coded wiring diagram shall be provided.
- D. To control operation of the pumps with variations of sewage level in the wet well, four mercury displacement switches shall be provided.
- E. A separate and independent priming system shall be furnished for each sewage pump, providing complete standby operation. Each priming system shall include a separate vacuum pump. Vacuum pump shall have corrosion-resistant internal components. They shall each be capable of priming the sewage pump and suction piping in not more than 90 seconds under rated static suction lift conditions of 20' at mean sea level.
- F. Each priming system shall be complete with vacuum pump, vacuum control solenoid valve, prime level sensing probe and a float operated check valve installed in the system ahead of the vacuum pump to prevent liquid from entering the vacuum pump. The float operated check valve shall have a transparent body for visual inspection of the liquid level and will be automatically drained when the vacuum pump shuts off.
- G. The priming system shall automatically provide positive lubrication of the mechanical seal each time the sewage pump is primed. To prevent excessive stoppage due to grease accumulation, no passageway in the priming system through which sewage must pass shall be smaller than the equivalent of a 2½" opening.
- H. An automatic alternator with manual switch shall be provided to change the sequence of operation of the pumps every eight hours. The manual switch shall allow for either pump to be selected as base pump or for automatic alternation. Provisions shall also be made for the pumps to operate in parallel should the level in the wetwell continue to rise above the starting level for the low level pump.

2.9 VENTILATION

- A. A ventilating blower turned on and off automatically by a pre-set thermostat shall be provided to adequately cool the machinery chamber in hot weather.

2.10 HEATING

- A. A 500-watt electric heater with a pre-set thermostat shall be provided with the station. It shall be rigidly mounted to the pump station to prevent removal.

2.11 SEWAGE PIPING

- A. The pump suction shall be drilled and tapped for a 125-lb American Standard flange for ready connection to the suction riser. The discharge line from each pump shall be fitted with a clapper-type check valve and an eccentric full port plug valve. The check valve shall be spring-loaded with external lever arm and a resilient seal to ensure drip-tight seating. The common discharge pipe shall be provided with a Dresser type sleeve coupling to connect to either steel or cast iron piping. The discharge valves shall be above the base plate.

2.12 WIRING

- A. The pump station shall be completely wired at the factory, except for the power feeder lines. All wiring in the pump station shall be coded as indicated on the wiring diagram. Wiring diagrams matching the unit wiring shall be provided.

2.13 ELECTRICAL SERVICE REQUIREMENTS

- A. The Contractor shall be responsible for coordination with the electrical service adequate in size and voltage for the new pumping station. He shall provide a secondary lightning arrester on each phase of service. All wiring shall be in conduit as defined in Division 16 and comply with NEC and all local codes and ordinances.

2.14 FACTORY TESTS

- A. All components of the pump station shall be given an operational test of all equipment at the factory to check for excessive vibration, leaks in all piping or seals and correct operation of the control system and all auxiliary equipment. The pump suction and discharge lines shall be coupled to a reservoir and the pump shall recirculate water under simulated service conditions.

2.15 SUBMITTAL DRAWINGS

- A. Eight (8) copies of detailed, dimensioned shop drawings and data, including materials and accessories furnished, mechanical and electrical data, installation instructions and conforming to the requirements of the specifications, shall be submitted to the Designer and approved before fabrication, shipment or work specified under this item begins. Shop drawings shall include detailed dimensions of sizes, lengths, connections, etc. If standard catalog cut sheets are submitted, the equipment being submitted on must be properly marked.

2.16 START-UP

- A. The manufacturer shall provide the services of a factory trained field Designer for the purpose of installation inspection, equipment start-up, performance testing and training of plant personnel regarding proper operation and maintenance of the equipment for a period of one 8-hour day in one trip.

2.17 OPERATION AND MAINTENANCE MANUALS

- A. Seven (7) bound copies of Operation and Maintenance Manuals containing complete information on the assembly, operation, adjustment, maintenance and repair of the equipment, together with detailed parts lists and drawings shall be furnished at no additional cost to the Owner.

2.18 WARRANTY

- A. The Contractor shall warrant all materials and workmanship for a period of one year from the date of final acceptance by the Owner and shall promptly replace or repair any component that proves defective at no additional cost to the Owner.

2.19 SPARE PARTS

- A. A complete replacement pump shaft seal assembly shall be furnished with each lift station. The spare seal shall be packed in a suitable container and include complete installation instructions.

2.20 ACCESSORIES

A. Alarm System and Light

- 1. The pump station shall be equipped with a fourth mercury float control to detect high water level in the pit. The switch will activate a 115-volt light. The alarm light shall be 100-watt with red enclosing glass globe and metal globe guard and suitable for mounting as shown on the drawings.

B. Running Time Meter

- 1. The control panel shall be equipped with elapsed time meters to indicate total running time of each pump in hours and tenths of hours.

C. Pressure Gauge on Pump Discharge

- 1. Each pump shall be equipped with a discharge pressure gauge mounted with a brass stop valve and snubber.

D. Indicator Lamps

- 1. Indicator lamps for each motor shall be mounted on the control assembly to indicate run of each pump.

E. Stanchion

- 1. One stanchion with lifting arm shall be provided with each lift station.

2.21 SPECIAL CONSIDERATIONS

- A. Only pumps with a priming bowl with electrodes will be considered. Pump stations with special priming chamber, vacuum breaker, float switch, connecting lines and pump volute vent line for the vacuum priming system will not be approved.
- B. The minimum B-10 bearing life for the pump station shall be submitted based on continuous operation.

END OF SECTION

TOP MOUNTED LIFT STATION – PART 3 - GORMAN-RUPP DUPLEX PUMPS - WET WELL MOUNTED SEWAGE LIFT STATION #1

PART 1 – GENERAL

Factory-built 6' x 6' above ground fiberglass pump stations with duplex self-priming pumps and electronic pressure switch level control.

1.1 DESCRIPTION

A. Scope

1. The Contractor shall furnish and install one (1) factory-built above ground fiberglass reinforced automatic pump stations. The stations shall be complete with all equipment specified herein; factory installed in a fiberglass reinforced polyester resin enclosure. The principal items of equipment shall include two self-priming, horizontal, centrifugal v-belt motor driven sewage pumps, valves, internal piping, motor control center with heavy duty thermal-magnetic circuit breakers, magnetic motor starters, automatic liquid level control system, and internal wiring.

1.2 OPERATING CONDITIONS

A. Pumps

1. Each self-priming pump shall have the necessary characteristics and be selected to perform in accordance with, and subject to, the provisions of the paragraph hereafter titled pumps.

B. System Power Characteristics

1. Electrical power to be furnished to the pump station will be 460V, 3 phase, 60 hertz. Control voltage shall not exceed 132 volts.

1.3 STATION ENCLOSURE

A. Description

1. The station enclosure shall contain and enclose all pumps and equipment, and shall be constructed to enhance serviceability by incorporating the following design characteristics:
 - a. Access panels shall be provided. Panels shall be sized and placed to permit routine maintenance operations through the panel openings of the enclosure. For these purposes, routine maintenance shall include pump and motor inspection, drive belt adjustment, and pump cleanout. Panels shall be secured with tamper-proof hardware.
 - b. Not less than two access panels shall be provided with a hinge and latch. Such panels shall provide access to frequently performed adjustments and inspections of the electrical controls. Hinge shall be the continuous type. Latch shall engage the enclosure at not less than two places, and shall be protected by a keyed lock.
 - c. One access panel shall contain a screened vent to maximize airflow for enclosure ventilation.

- d. Station enclosure, less base must be completely removable or able to be disassembled following the removal of reusable hardware. After removal or disassembly, no portion of the enclosure shall project above the surface of the base to interfere with maintenance operations or endanger personnel.
- e. Removal or disassembly of the enclosure shall be accomplished by not more than two maintenance personnel without the use of lifting equipment.

B. Materials

1. The station enclosure shall be manufactured of molded reinforced orthophthalic polyester resins with a minimum of 30% fiberglass, and a maximum of 70% resin. Resin fillers or extenders shall not be used. Glass fibers shall have a minimum average length of 1-1/4 inches. Major design considerations shall be given to structural stability, corrosion resistance, and watertight properties. The polyester laminates shall provide a balance of mechanical, chemical, and electrical properties to insure long life. They must be impervious to microorganisms, mildew, mold, fungus, corrosive liquids, and gases, which can reasonably be expected to be present in the environment surrounding the wet well.
2. All interior surfaces of the housing shall be coated with a polyester resin-rich finish. It shall provide: maintenance free service; abrasion resistance; and protection from sewage, greases, oils, gasoline, and other common chemicals.
3. The outside of the enclosure shall be coated with a suitable pigmented resin compounded to insure long, maintenance-free life.

C. Enclosure Base

1. Station base shall be constructed of pre-cast, reinforced concrete, bonded inside a fiberglass form covering top and sides, and shall be designed to insure adequate strength to resist deformation of structure during shipping, lifting, or handling. Base shall incorporate drainage provisions, and shall be provided with an opening of sufficient size to permit piping and service connections to the wet well.
2. Station base shall incorporate anchor recesses for securing the pump station to the concrete pad supplied by the contractor in accordance with the station plans. Color used shall de-emphasize the presence of dirt, grease, etc.

D. Ventilating Blower

1. An exhaust blower shall be mounted in the roof of the enclosure. Blower capacity shall be sufficient to change station air once every two minutes. Blower motor shall be operated automatically and shall be turned on at approximately 70-degrees f and shall be turned off at 55-degrees f. Blower motor and control circuit shall be protected by a thermal-magnetic air circuit breaker to provide overcurrent and overload protection. Blower exhaust outlet shall be protected by a screen, and shall be designed to prevent the entrance of rain, snow, rocks, and foreign material.

E. Station Heater

1. Pump Station shall be provided with a 1300/1500 watt, 115 volt electric heater with cord and grounding plug. Ungrounded heaters shall not be acceptable.

1.4 PUMPS

A. Description

1. Pumps shall be horizontal, self-priming sewage pumps, specifically designed for pumping raw, unscreened, domestic sanitary sewage.

B. Size See project plans for details on pump piping sizes (suction/discharge).

C. Material

1. All areas of the pump casing and volute, which are exposed to sewage, shall be constructed of cast iron of no lesser grade than class 30.

D. Internal Passages

1. All openings, internal passages, and internal recirculation ports shall be large enough to permit the passage of a sphere 3 inches in diameter, and any trash or stringy material which may pass through the average house collection system. Screens or any internal devices that create a maintenance nuisance or interfere with priming and performance of the pump shall not be permitted.
2. Certified dimensional drawings indicating size and locations of the priming recirculation port or ports shall be submitted to the Designer for approval prior to shipment.

E. Pump Performance

1. Each pump must have the necessary characteristics and be properly selected to perform under these operating conditions:

Lift Station # 1- Model No. T6A-B

capacity, gpm	750
total dynamic head, feet	45
maximum static suction lift, feet	20
minimum horsepower	15

2. Consideration shall be given to the sanitary sewage service anticipated, in which occasionally debris will lodge between the pump suction check valve and seat, resulting not only in loss of the suction leg, but also in the siphoning of liquid from the pump casing to the approximate center line of the impeller. Such occurrence shall be considered normal with proper installation of air release line to atmosphere.
3. In consideration of such occurrence and of the unattended operation anticipated, each pump shall be so designed as to retain adequate liquid in the pump casing to insure unattended automatic repriming while operating at its rated speed in a completely open system without suction check valves and with a dry suction leg.

F. Certified Reprime Performance Test

1. Reprime lift is defined as the static height of pump suction centerline above liquid that the pump will prime; and delivery within five minutes on liquid remaining in the pump casing after a delivering pump is shut down with the suction check valve removed. Additional standards under which reprime tests shall be run are:
 - a. Piping shall incorporate a discharge check valve down stream from the pump. Check valve size shall be equal (or greater than) the pump

discharge diameter.

- b. A ten-foot length of one-inch pipe shall be installed between pump and discharge check valve. This line shall be open to atmosphere at all times to duplicate the air displacement rate of a typical pump station fitted with an air release valve.
 - c. No restrictions shall be present in pump or suction piping which could serve to restrict the rate of siphon drop of the suction leg. Suction pipe configuration for reprime test shall incorporate a minimum horizontal run of 4.5 feet and one 90° elbow.
 - d. Impeller shall be set at the clearances recommended by the manufacturer in the pump service manual.
 - e. Reprime lift repeatability shall be demonstrated by five sequential reprime cycles.
 - f. Liquid to be used for reprime test shall be water.
2. Upon request from the Designer, certified reprime test data, prepared by the pump manufacturer and certified by a registered professional Designer, shall be submitted to the Designer for approval.

G. Serviceability

1. The pump manufacturer shall demonstrate to the Designer's satisfaction that due consideration has been given to reducing maintenance costs by incorporating the following features.

H. Special Tools

1. No special tools shall be required for replacement of any components within the pump.

I. Cover Plate

1. The pump must be equipped with a removable cover plate, allowing access to pump interior to permit the clearance of stoppages and to provide simple access for service and repairs without removing suction or discharge piping.

J. Wear Plate and Rotating Assembly

1. The pump shall be fitted with a replaceable wear plate. Replacement of the wear plate, impeller, seal, and suction check valve shall be accomplished through the removable cover plate. The entire rotating assembly, which includes bearings, shaft, seal, and impeller, shall be removable as a unit without removing the pump volute or piping.

K. Suction Check Valve

1. Each pump shall incorporate a suction valve that can be removed or installed through the removable cover plate opening, without disturbing the suction piping. Sole function of check valve shall be to eliminate re-priming with each cycle.

Pumps requiring suction check valves to prime or reprime will not be acceptable.

L. Impeller Clearance Adjustment

1. Means shall be provided for external adjustment of the clearance between the impeller and wear plate. The entire rotating assembly shall move as one unit to enable the clearances to be adjusted. Clearance adjustment by means of moving the shaft, thereby affecting the seal, shall not be acceptable.

1.5 CONSTRUCTION

A. Impeller

1. The impeller shall be two-vaned, semi-open, non-clog, cast in ductile iron with integral pump out vanes on the back shroud. Impeller shall thread onto the pump shaft and be secured with a lockscrew.

B. Seal

1. The pump shaft shall be sealed against leakage by a mechanical seal. Both the stationary sealing member and mated rotating member shall be of tungsten titanium carbide alloy. Each of the mated surfaces shall be lapped to a flatness of one-half light band (5.8 Millionths of an inch), as measured by an optical flat under monochromatic light. The stationary seal seat shall be double floating so that faces will not lose alignment during periods of shock loads that will cause deflection, vibration, and axial movement of the pump shaft. The seal shall be lubricated with oil from a separate, oil-filled reservoir. The same oil shall not be used to lubricate both the shaft seal and the shaft bearings.
2. The seal shall be warranted for a minimum of four years from date of shipment. Should the seal fail within the first year, the manufacturer shall be obligated, upon notification, to furnish a new seal, without charge to owner, F.O.B. Factory.
3. The cost of replacement seals thereafter will be on a pro-rated basis as follows: failure within two years, 25% of new seal price; failure within three years, 50% of new seal price; failure within four years, 75% of new seal price.

C. Shaft Bearings

1. The pump shaft bearings shall be anti-friction ball or tapered roller bearings, of ample size and proper design to withstand all radial and thrust loads which can reasonably be expected during normal operation. Bearings shall be lubricated from a separate reservoir. Pump designs in which the same oil lubricates both the shaft bearings and the shaft seal shall not be acceptable.

D. Pump Suction Spool

1. Each pump shall be equipped with a one-piece, cast iron suction spool, flanged on each end. Each spool shall have one 1-1/4 inch npt and one 1/4 inch npt tapped hole with pipe plugs for mounting of gauges or other instrumentation.

1.6 VALVES AND PIPING

A. Check Valve

1. Each pump shall be equipped with a full flow type check valve, capable of passing a 3" spherical solid, with flanged ends and be fitted with an external lever and

spring. The valve seat shall be constructed of stainless steel and shall be replaceable. The valve body shall be cast iron and incorporate a 3" cleanout port. Valve clapper shall have a molded neoprene seating surface incorporating low pressure sealing rings. Valve hinge pin and internal hinge arm shall be stainless steel supported on each end in brass bushings, sealing bushing shall have double "O" rings. "O" rings shall be easily replaceable without requiring access to interior of valve body. Valve shall be rated at 175 psi water working pressure, 350 psi hydrostatic test pressure. Valves other than full flow type or valves mounted in such a manner that prevents the passage of a 3" spherical solid shall not be acceptable.

B. Plug Valve

1. The discharge header shall include a 3way plug valve to permit either or both pumps to be isolated from the common discharge header. Valves 4" and larger shall have ports designed to pass spherical solids equal to the pumps capability. The plug valve shall be non-lubricated, tapered type. Valve body shall be semi-steel with flanged end connections drilled to 125 pound standard. Valve shall be furnished with a drip-tight shutoff plug mounted in stainless steel bearings, and shall have a resilient facing bonded to the sealing surface. Valve shall be operated with a single lever actuator providing lift, turn, and reseal action. The lever shall be equipped with a locking device to hold the plug in the desired position.

C. Piping

1. Flanged header pipe shall be centrifugally cast, ductile iron, complying with ANSI/AWWA 21.51/C115 and class 53 thickness.
2. Flanges shall be cast iron class 125 and comply with ANSI B16.1.
3. Pipe and flanges shall be threaded and suitable thread sealant applied before assembling flange to pipe.
4. Bolt holes shall be in angular alignment within 1/2-degree between flanges. Flanges shall be faced and a gasket finish applied that shall have concentric grooves a minimum of 0.01 inch deep by approximately 0.03 inch wide, with a minimum of three grooves on any given surface spaced a maximum of 1/4 inch apart.

D. Spare Parts Kit

1. There shall be furnished with the pump station the following minimum spare parts:
 - a. Four spare mechanical seals (complete), and with it all gaskets, seals, sleeves, o-rings, and packings required to be replaced during replacement of the seal.
 - b. One set of impeller clearance adjustment shims.
 - c. One cover plate o-ring.
 - d. One rotating assembly o-ring.

1.7 SUPPORTS AND THRUST BLOCKS

A. Piping and Valves

1. All pipes connected to the pump station shall be supported according to good commercial practice to prevent piping loads from being transmitted to the pumps. Pump station discharge force main piping shall be anchored with thrust blocks where shown on the contract drawings.

1.8 DRIVE UNIT

A. Motors

1. The pump motors shall be horizontal, open drip-proof, induction type, with normal starting torque and low starting current characteristics, suitable for 460V, 3 phase, 60 hertz. The motors shall not be overloaded at the design condition or at any head in the operating range as specified.
2. Each motor shall be in current NEMA design, cast iron frame, copper windings, Class F insulation, with a 1.15 service factor.

B. Drive Transmission

1. Power shall be transmitted from motors to pumps by means of v-belt drive assemblies. The drive assemblies must be selected to establish proper pump speed to meet the specified operating conditions.
2. Each drive assembly shall have a minimum of two vbelts. In no case will a single belt drive be acceptable. Each v-belt drive assembly shall be selected on the basis that adequate power will be transmitted from driver to pump.
3. Drive systems with a safety factor of less than 1.5 to 1.0 shall not be considered sufficient for the service intended. Computation of safety factors shall be based on performance data published by the drive manufacturer.

C. Belt Guards

1. Pump drive transmissions shall be enclosed on all sides in a guard constructed of any one or combination of materials consisting of expanded, perforated, or solid sheet metal, except that maximum perforated or expanded openings shall not exceed 1/2 inch.
2. Guards shall be manufactured to permit complete removal from the pump unit without interference with any unit component, and shall be securely fastened to the unit base.
3. All metal shall be free of burrs and sharp edges. Structural joints shall be continuously welded. Panels may be riveted to frames with not more than five-inch spacing. Tack welds shall not exceed four-inch spacing.
4. The guard shall be primed with a minimum of 1.5 Mils of zinc-based synthetic primer. A finish acrylic enamel coating (minimum 1.5 Mils) shall be applied in accordance with section 3, color definitions of ANSI 253.1; 1967, Safety color code for marking physical hazards.

1.9 FINISH

A. Station Finish

1. The pumps, piping, and exposed steel framework shall be cleaned with industrial grade chemical cleaner. The prime coat shall be a zinc based synthetic primer.

The finish coat shall be an automotive grade white acrylic enamel.

1.10 ELECTRICAL CONTROL COMPONENTS

A. Panel Enclosure

1. The electrical control equipment shall be mounted within NEMA 3R, dead front type control enclosures fabricated of steel. Enclosure doors shall be gasketed with neoprene, shall be hinged, and shall be equipped with captive closing hardware. Control compartments shall include removable back panels on which control components shall be mounted. Back panels shall be secured to enclosures with collar studs.
2. All operating controls and instruments shall be securely mounted and shall be clearly labeled to indicate function.

B. Receptacle

1. A duplex ground fault indicating utility receptacle providing 115 volt, 60 hertz, single phase current shall be mounted on the side of the control enclosure. Receptacle circuit shall be protected by a 15 ampere thermal-magnetic circuit breaker.

1.11 MOTOR BRANCH COMPONENTS

A. Mounting

1. All motor branch components shall be of the highest industrial quality, securely fastened to a removable sub-plate with screws and lockwashers. The sub-plate shall be tapped to accept all mounting screws. Self-tapping screws shall not be used to mount any components.

B. Circuit Breakers and Operating Mechanisms

1. A properly sized heavy duty air circuit breaker shall be furnished for each pump motor, and shall have a minimum symmetrical rms interrupting rating of 25KAIC. All circuit breakers shall be sealed by the manufacturer after calibration to prevent tampering.
2. A padlocking operating mechanism shall be installed on each motor circuit breaker. Operator handles for the mechanisms shall be located on the exterior of the control compartment door, with interlocks which permit the door to be opened only when circuit breakers are in the "off" position.

C. Motor Starters

1. An open frame, across-the-line, NEMA rated magnetic motor starter shall be furnished for each pump motor. Starters of NEMA size 1 and above shall be designed for addition of at least two auxiliary contacts. Starters rated "0", "00", or half size shall not be acceptable. Power contacts shall be double-break and made of cadmium oxide silver. All motor starters shall be equipped to provide undervoltage release and overload protection on all three phases. Motor starter contacts shall be easily replaceable without removing the motor starter from its mounted position.
2. An overload reset pushbutton shall be mounted through the door of the control panel in such a manner as to permit resetting the overload relays without opening the control panel door.

D. Overload relays

1. Overload relays shall be block-type, utilizing melting alloy type spindles, and shall have visual trip indication with trip-free operation. Pressing of the overload reset lever shall not actuate the control contact until such time as the overload spindle has reset. Resetting of the overload reset lever will cause a snap-action control contact to reset, thus re-establishing a control circuit. Overload relays shall be manual reset only and not convertible to automatic reset. Trip setting shall be determined by heater element only and not by adjustable settings.

1.12 OTHER CONTROL COMPONENTS

A. Control Circuit

1. The control circuit shall be protected by a thermal-magnetic air circuit breaker which shall be connected in such a manner as to allow control power to be disconnected from all control circuits.

B. Pump Mode Selection

1. Pump mode selector switches shall be connected to permit manual start and manual stop of each pump individually, and to select automatic operation of each pump under control of the level control system. Manual operation shall override all shutdown systems, but not the motor overload relays. Selector switches shall be toggle switches meeting military standards (ms) for quality. Switch contacts shall be rated 15 amperes minimum at 120 volts non-inductive.

C. Alternator Relay

1. Pump alternator relay shall be of electromechanical industrial design. Relay contacts shall be rated 10 amperes minimum at 120 volts non-inductive.

D. Pump Run Indicators

1. Control panel shall be equipped with one pilot light for each pump motor. Light shall be wired in parallel with the related pump motor starter to indicate that the motor is or should be running.

E. Elapsed Time Indicators

1. Six digit elapsed time indicators (non-reset type) shall be connected to each motor starter to indicate that the motor is or should be running.

F. Sequence Selector

1. A switch shall be provided to permit the station operator to select automatic alternation of the pumps, to select pump number 1 to be the lead pump for each pumping cycle, or to select pump number 2 to be the lead pump for each pumping cycle.

G. High Pump Temperature Protection

1. The control panel shall be equipped with circuitry to override the level control system and shut down the pump motor(s) when required to protect the pump from damage caused by excessive temperature. A thermostat shall be mounted on

each pump to detect its temperature, and a signal relay shall be supplied for each thermostat. If the pump temperature should rise to a level which could cause pump damage, the thermostat shall cause a signal relay to drop out the motor starter. An indicator, visible on the front of the control panel shall indicate that the pump motor has been stopped because of a high temperature condition. The pump shall remain locked out until the pump has cooled and the circuit has been manually reset. Automatic reset of such a circuit shall not be acceptable.

H. Wiring

1. The pump station as furnished by the manufacturer shall be completely wired except for the power feeder lines to the branch circuit breakers and final connections to remote alarm devices.
2. All wiring, workmanship, and schematic wiring diagrams shall be compliance with applicable standards and specifications set forth by the national electric code (NEC).
3. All user serviceable wiring shall be type MTW or THW, 600 volts, and shall be color coded as follows:
 - a. Line and load circuits, ac or dc power black
 - b. Ac control circuit less than line voltage red
 - c. Dc control circuit blue
 - d. Interlock control circuit, from external source yellow
 - e. Equipment grounding conductor green
 - f. Current carrying ground white
 - g. Hot with circuit breaker open orange

I. Wire Identification and Sizing

1. Control circuit wiring inside the panel, with the exception of internal wiring of individual components, shall be 14 gauge minimum, type MTW or THW, 600 volts. Wiring in conduit shall be 14 gauge minimum. Motor branch wiring shall be 10 gauge minimum.
2. Motor branch conductors and other power conductors shall not be loaded above 60-degree C temperature rating. Wires shall be clearly numbered at each end in conformance with applicable standards. All wire connectors in the control panel shall be of the ring tongue type with nylon insulated shanks. All wires on the sub-plate shall be bundled and tied. All wires extending from components mounted on door shall be terminated on a terminal block mounted on the back panel. All wiring outside the panel shall be installed in conduit.

J. Wire Bundles

1. Control conductors connecting components mounted on the enclosure door shall be bundled and tied in accordance with good commercial practice. Bundles shall be made flexible at the hinged side of the enclosure. Adequate length and flex shall be allowed so that the door can swing to its full open position without undue mechanical stress or abrasion on the conductors or insulation. Bundles shall be clamped and held in place with mechanical fastening devices on each side of the hinge.

1.13 CONDUIT

- A. Conduit requirements are as follows:

1. All conduit and fittings shall be UL listed.
2. Liquid tight flexible metal conduit shall be constructed of a smooth, flexible galvanized steel core with smooth abrasion resistant, liquid tight, polyvinyl chloride cover.
3. Conduit shall be supported in accordance with articles 346, 347, and 350 of the National Electric Code.
4. Conduit shall be sized according to the National Electric Code

1.14 LEVEL CONTROL SYSTEM

A. Functional Description

1. The level control system shall start and stop the pump motors in response to changes in the wet well level, as set forth herein.

B. Type

1. The level control system shall be an air bubbler type. Air tubing into the wet well shall be placed in a 1" stainless steel pipe and supported off of the suction pipe.

C. Sequence of Operation

1. The level control system shall continuously monitor the wet well level, permitting the operator to read wet well level at any time. Upon operator selection of automatic operation, the electronic pressure switch shall start the motor for one pump when the liquid level in the wet well rises to the "lead pump start level". When the liquid is lowered to the "lead pump stop level", the electronic pressure switch shall stop this pump. These actions shall constitute one pumping cycle. Should the wet well level continue to rise, the electronic pressure switch shall start the second pump when the liquid reaches the "lag pump start level", so that both pumps are operating to pump down the well. Pumps shall stop at their respective "stop" levels. These levels shall be adjustable as described below.

D. Automatic Pump Alternation

1. The level control system shall utilize the alternator relay to select first one pump, then the second pump, to run as lead pump for a pumping cycle. Alternation shall occur at the end of a pumping cycle.

E. Serviceability

1. The electronic pressure switch shall be equipped with replaceable plug-in integrated circuits and output fuses. The main circuit board assembly shall be provided with keyed plug-in connections to "offboard" components permitting main board removal without de-soldering. All printed circuits shall have a conformal coating applied to both sides to protect against moisture or fungus.

F. Independent lag pump

1. Circuit design in which the application of power to the lag pump motor starter is contingent upon completion of the lead pump circuit shall not be acceptable.

G. High water alarm with alarm silence

1. In the event that the wet well liquid reaches a preset high water alarm level, the high water alarm output relay shall energize a signal relay. The signal relay shall complete a 115 volt ac circuit for an external alarm device. A mechanical indicator, visible on the front of the control panel, shall indicate that a high wet well level exists. The signal relay shall maintain the alarm signal until the wet well level has been lowered and the circuit has been manually reset.
2. An alarm silence switch and relay shall be provided to permit maintenance personnel to de-energize the external alarm device while corrective actions are underway. After silencing the alarm device, manual reset of the signal relay shall provide automatic reset of the alarm silence relay.
3. The pump station shall be supplied with one 115-volt ac alarm light in a vapor-tight fixture with red globe, guard, conduit box, and mounting fixtures. Alarm light and mounting fixtures shall be designed to permit mounting in such a manner that rain water cannot stand or collect in the gasketed area of the fixture, between the base and globe.

1.15 MANUFACTURER'S RESPONSIBILITIES

A. Operational Test

The pumps, motors, and controls shall be given an operational test in accordance with the standards of the hydraulic institute. Recordings of the test shall substantiate the correct performance of the equipment at the design head, capacity, suction lift, speed and horsepower as herein specified.

B. Support Literature

1. The manufacturer of the pump station shall be responsible for delivery to the Designer of 8 copies of the support literature required herein.

C. Installation Instructions

1. Installation of the pump station and related appurtenances shall be performed in accordance with written instructions by the manufacturer.

D. Operation and Maintenance Instructions

1. The pump station manufacturer shall be responsible for supplying written instructions, which shall be sufficiently comprehensive to enable the operator to operate and maintain the pump station and all equipment supplied by the station manufacturer. Said instructions shall assume that the operator is familiar with pumps, motors, piping, and valves, but that he has not previously operated and/or maintained the exact equipment supplied.
2. The instructions shall be prepared as a system manual applicable solely to the pump station and equipment supplied by the manufacturer to these specifications, and shall include those devices and equipment supplied by him. However, items of equipment for which the station manufacturer has made mounting or other provisions, but which he has not supplied, may be excluded from these instructions.

3. The instructions shall include, but not limited to, the following:
 - a. Descriptions of, and operating instructions for, each major component of the pump station as supplied.
 - b. Instructions for operation of the pump station in all intended modes of operation.
 - c. Instruction for all adjustments which must be performed at initial start-up of the pump station, adjustments which must be performed after the replacement of the level control system components, and adjustments which must be performed in the course of preventative maintenance as specified by the manufacturer.
 - d. Service instructions for major components not manufactured by the pump station manufacturer but which are supplied by him in accordance with these specifications. The incorporation of literature produced by the actual component manufacturer shall be acceptable.
 - e. Electrical schematic diagram of the pump station as supplied, prepared in accordance with NMTBA and JIC standards. Schematics shall show, to the extent of authorized repair, pump motor branch, control, and alarm system circuits, and interconnections among these circuits. Wire numbers shall be shown on the schematic. Schematic diagrams for individual components, the detail parts of which are not normally repairable by the station by the station operator, need not be included, and shall not be substituted for an overall schematic diagram. Partial schematics, block diagrams, and simplified schematics shall not be provided in lieu of overall schematic diagram.
 - f. Layout drawing of the pump station as supplied, prepared in accordance with good commercial practice, showing the locations of all pumps, motors, valves, and piping.
4. Operation and maintenance instructions which are limited to a collection of component manufacturer literature without overall pump station instructions shall not be acceptable.
5. Operation and maintenance instructions shall be specific to the equipment supplied in accordance with these specifications. Instruction manuals applicable to many different configurations and pump stations, and which require the operator to selectively read portions of the instructions shall not be acceptable.

1.16 MANUFACTURER'S ABILITIES

A. Delivery

1. Upon request from the Designer, the pump station manufacturer shall demonstrate proof of financial responsibility with respect to performance and delivery date.

B. Experience

1. Upon request from the Designer, the pump station manufacturer shall demonstrate proof or evidence of facilities, equipment, and skills required to produce the equipment specified herein.

1.17 WARRANTY

Contractor shall warrant all materials and workmanship for a period of one (1) year from the date of final acceptance by the Owner and shall promptly replace or repair any component that proves defective at no additional cost to the Owner.

END OF SECTION

SECTION 02831 - CHAIN LINK SECURITY FENCING (Rough Draft)

PART 1 - GENERAL

1.1 DESCRIPTION

A. RELATED DOCUMENTS

1. Drawings and general provisions of the contract, including general and supplemental conditions and Division 1 Specification Sections, apply to this section.

B. SUMMARY:

1. This section includes the following items to be furnished and installed to provide new security fencing, all of the work sequence and scheduling subject to the approval of the Warden of the Correctional Institution.
 - a. Galvanized steel chain link fabric for new fencing.
 - b. Galvanized steel post supports for new fencing.
 - c. Foundation excavations at new fencing.
 - d. Concrete and concrete reinforcing for fence supports and slabs between fencing rows.
 - e. Provide bottom rails, which have "U" bolts securing the fence fabric to the bottom rail.
 - f. Galvanized steel corner braces.
 - g. Barbed razor tape, stainless steel, 30-inch diameter, Concertina style, 6 inch strand spacing, shall be installed at the tops of the new fencing and new gates.
 - h. Barbed razor tape, stainless steel, 30 inch diameter, Concertina style, 6 inch strand spacing shall be installed in three (3) rows along the inside of the new fence and anchored to the fence fabric and between coils with stainless steel rings as well as stainless steel tension wire.
 - i. "U" bolts shall be installed through the galvanized chain link fabric and around the bottom fence rail, minimum of 3 galvanized "U" bolts equally spaced between fence posts.
 - j. "U" bolts shall be installed, two for each fence post, to anchor the chain link fence fabric to the steel post, "U" bolts spaced about three feet a part. These are in addition to the galvanized steel clamps used to maintain tension on the fence fabric.
 - k. Provide electrical service to the electrically operated gates plus grounding for the steel fencing system.
 - l. Provide exterior grade locks at each swinging gate, both existing and new. Most locks are manual but personnel gates near electrically operated vehicular gates shall have electrically operated locks. Approved manufacturers include Southern Steel, Folger Adams and Adtec.
 - m. New electrically operated vehicle gates as well as new pedestrian gates shall be provided.
2. The Contractor shall clear with the Warden all areas in which work will be performed and will get permission for delivery and storage of materials.

1.2 RELATED DOCUMENTS

- A. Shop drawings and submittals: Submit according to Division 1 and conditions of the contract..
- B. Excavation, Filling & Grading: Division 2
- C. Concrete: Division 3
- D. Electrical: Division 16

1.3 QUALITY ASSURANCE

- A. Comply with the following standards of the Chain Link Fence Manufacturer's Institute (CLFMI):
 - 1. Fabric: "Specifications for Metallic-Coated Steel Chain Link Fence Fabric".
 - 2. Fence Framework and Accessories: "Industrial Steel Specification for fence rails, posts, gates and accessories".
- B. Provide steel fence and gates as a complete unit produced by a single manufacturer, including necessary erection accessories, fittings and fastenings.
- C. The Contractor and Installer shall not have free access to the job site without clearing all workers, materials, and work sequence with the Warden and shall follow the Warden's instructions. Installer must examine the conditions under which the fence and gates are to be installed. Notify the Architect in writing of conditions which would interfere with proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.

1.4 SUBMITTALS

- A. Shop Drawings: Details of special fabrication and installation necessary for this Project, including special conditions, which require special configurations.
- B. Manufacturer's Literature:
 - 1. Recommended installation methods and procedures.
 - 2. Standard drawings for fence and gate installation.
- C. Certificates: Manufacturer's certification that materials meet specification requirements, for record purposes.

1.5 PRODUCT DELIVERY; STORAGE AND HANDLING

- A. Deliver materials with manufacturer's tags and labels intact.
- B. Handle and store so as to avoid damage.

PART 2 - PRODUCTS

2.1 BASIC FENCE MATERIALS

- A. Fabric: Comply with CLFMI specifications, as modified herein. Provide one-piece, galvanized steel fabric, full height of fence, fabricated with 9 gauge wire, 2-inch mesh, and twisted and barbed top and bottom edge. Fabric shall be hot dip galvanized after fabrication with minimum 2.0 oz. per sq. ft. zinc coating.
- B. Round posts, braces, top and bottom rails, and gate frames: Hot dipped galvanized steel pipe or tube. At the Contractor's option, material may be:
 - 1. ASTM A120 Schedule 40 pipe, with zinc coating not less than 1.8 oz. per sq. foot.
 - 2. Cold rolled welded tube, fabricated with structural quality steel having
 - 3. Minimum 50,000 psi yield strength, and with exterior triple coating and interior corrosion protection in accordance with CLFMI specification for Type II round post.
 - 4. Weights and sizes shall be as follows:

SIZE		SCHEDULE 40 PIPE		HIGH STRENGTH TUBE	
Nominal	Act. O.D.	Wall	W. (Lb./L.F.)	Wall	Wt. (Lb./L.F.)
1-3/8"	0.315"	0.133"	1.68	0.104"	1.345
1-5/8"	1.660"	0.140"	2.27	0.111"	1.836
2"	1.900"	0.145"	2.72	0.120"	2.281
2-1/2"	2.375"	0.154"	3.65	0.130"	3.117
3"	2.875"	0.203"	5.79	0.160"	4.640
3-1/2"	3.500"	0.215"	7.58	0.160"	5.706
4"	4.000"	0.226"	9.11	0.160"	6.560
6"	6.625"	0.280"	18.97		
8"	8.625"	0.322"	28.55		

- C. Tube Posts and Frames: Structural grade steel welded or seamless tubing complying with ASTM A500 (cold-formed) or A501 (hot formed), hot dipped galvanized after fabrication in accordance with ASTM A120 (1.80 oz. per sq. ft.. ave.) Minimum wall thickness for 2" size, 0.120", or 6" size, 0.250".
- D. Tension Wire: 7 gauge galvanized coiled spring wire.
- E. Accessories: All accessories shall be galvanized to comply with ASTM A153 and shall meet or exceed CLFMI specifications.
 - 1. Post Tops: Half-ball pressed steel caps
 - 2. Stretcher Bars: One piece lengths, full height of fabric, minimum size 3/16" X 3/4" (see paragraph 2.03) for requirements.
 - 3. Tension Bands: 1 inch wide, with 3/8" carriage bolts. Provide tension bands of proper size and configuration to attach stretcher bars to posts (see paragraph 2.03 for requirements).
 - 4. Tie Wire: 9 gauge steel for wire ties; 11 gauge steel for hog rings (See paragraph 3.06 for requirements).
 - 5. As indicated on drawings provide Corcentina style barbed tape continuous, 30 inch diameter harden stainless steel clips to limit the extension of the barbed razor tape.

2.2 MANUAL GATES

- A. Gate Posts: Unless otherwise indicated on the Drawings, provide swinging gates with posts as follows:
 - 1. Gate leaf 6' or less - 3" nominal dia.
 - 2. Gate leaf over 6' to 13' - 4" nominal dia.
 - 3. Gate leaf over 13' to 18' - 6" nominal dia.
 - 4. Gate leaf over 18' - 8" nominal dia.
- B. Frames: Comply with CLFMI specifications and the following:
 - 1. Unless other wise indicated on the Drawings, provide:
 - a. Gate leaf 8' or less in width - 2" nominal dia. Frame members.
 - b. Gate leaf over 8' in width - 2 1/2" nominal dia. Frame members.

2. Construction: Notch or cope and weld all corners and intersections. Clean welds and coat with galvanizing repair compound. Provide full perimeter frame additional horizontal, vertical and diagonal bracing as indicated on the drawings.
 3. Cross Bracing: Provide adjustable 3/8" diameter cross bracing truss rods on all gates.
- C. Fabric to the top and bottom edge of frames.
- D. Gate Hardware: All hardware shall be hot dip galvanized.
1. Hinges: Heavy duty welded steel or malleable iron, size to suit gate dimensions and gate post and frame size. Non-lift off type, offset to permit 180 degree gate swing.
 2. Locks: Security gate locks, designed for exterior applicant.
 3. Stops: Integral galvanized gate stops on fence interior at swinging gates.
- E. Above gates, extend the end member of gate frame above the top member and prepare to receive strands of wire. Provide necessary clips for securing wire to extension. Also provide barbed razor tape above gate tops.

2.3 FENCE FRAMEWORK

- A. Provide fences with bottom rail and continuous top tension wire, securely fastened to fence fabric. Add "U" bolts thru fabric and posts, and bottom rail per items 1.1. J and K listed above.
- B. Equip each terminal post (gate post, end post, pull post, and corner posts) with horizontal brace rails at top and at mid-height of fence and adjustable 3/8" diameter Truss rods in upper and lower panels formed by brace rails. Provide brace rails and truss rods at both sides of pull posts and corner posts.
- C. Provide tension wire top for each post.
- D. Provide one (1) stretcher bar for each gate and end post, and two (2) for each corner and pull post.
- E. Provide tension bands with bolts, spaced not over 15" o/c to secure stretcher bars to terminal posts and side frames of gates.

2.4 GALVANIZING REPAIR COMPOUND

- A. Zinc-rich paint complying with ASTM A780, 94% zinc dust by weight in dry film.

2.5 CONCRETE

- A. Concrete footings are required for fence and gate posts and for concrete slab adjacent to new fencing.
- B. Provide concrete consisting of Portland Cement complying with ASTM C 150, aggregates complying with ASTM C 33, and clean water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 2500 psi, using at least four (4) sacks of cement per cubic yard, 1" maximum strength aggregate, maximum 3" to 5" slump, and 2% to 4% entrained air.
- C. The Contractor shall be responsible for concrete quality, especially if he uses a small, portable concrete mixer.

2.6 DETENTION LOCKS AT MANUAL PEDESTRIAL GATES

- A. All manual pedestrian gates, both existing and new gates shall be fitted with new detention locks, manual key operated locks as well as electrically operated locks adjacent to electrically operated vehicle gates.
 1. All detention locks at gates shall be designed to operate in an exterior environment (exposed to all weather conditions).
 2. Manufacturers who produce detention locks which may be incorporated in the Work include, but are not limited to, the following:
 - a. Southern Steel.
 - b. Folger Adams.
 - c. Adtec.
 3. The above listed manufacturers shall be subject to compliance with the requirements of the Contract Documents, both Plans and Specifications.
 4. All gate detention locks at manually operated pedestrian gates shall be furnished by a single manufacturer and installed by a single Contractor experienced in the installation of detention type locks.
 5. All gate detention locks shall be keyed alike. Furnish two (2) keys per locking device, all keys capable of operating all gated locks. Turn keys over to Owner.
 - a. All electrically operated detention locks shall be capable of being key operated.

PART 3 - EXECUTION

3.1 GENERAL

- A. Installation shall be in accordance with ASTM F -567.
- B. Coordinate installation with related work of other Sections for proper sequence of all work.
- C. All installation sequences must be coordinated with the Warden and must be approved by the Warden before proceeding.

3.2 INSPECTION

- A. Verify that final grading in fence location is complete without irregularities which would interfere with fence installation. The Contractor shall provide a graded surface, along the fence line with vertical variation from a true line not exceeding 6 inches in 100 feet. Do not install fencing until grading is complete and within tolerances.

3.3 PREPARATION

- A. Measure and lay out complete fence line. Grade to a true line.
- B. Measure parallel to graded surface of ground.
- C. Locate and mark position of posts.
 1. Locate line posts at equal distance spacing, not exceeding 10 foot centers.
 2. Locate corner posts at positions where fence changes direction more than 10 degrees.
 3. Locate pull posts not more than 70 ft. apart.

- D. Determine actual location and depth of underground utilities crossing fence line by probing, hand digging, metal detector, or other means that will not damage the utility lines. Adjust post locations if necessary to avoid conflicts.

3.4 EXCAVATION

- A. Drill post holes approximately 3" deeper than post bottom with bottom of posts set not less than 48" below the surface. Excavate deeper as indicated on the Drawings for posts with heavy lateral loads.
- B. Spread soil from excavations uniformly adjacent to the fence line, or on adjacent areas of the site, as directed.

3.5 SETTING POSTS AND ACCESSORIES

- A. Remove all loose and foreign materials from sides and bottoms of holes and moisten soil prior to placing concrete.
- B. Center and align posts in holes and temporarily support in vertical position at proper height.
- C. Place concrete around posts in a continuous pour and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.
- D. Set anchor plates, keeps, stops, sleeves, and other accessories into concrete as required. Slope tops of concrete filled post holes a minimum of three (3) inches from the steel post to the concrete edge.
- E. Concrete Strength: Do not install rails, fabric, etc., until concrete has achieved 75% of design strength. Do not stretch and tension fabric and wires, and do not hang gates until the concrete has attained its full specified strength, and until seven (7) days have elapsed after the concrete pour and concrete samples have been tested by a laboratory and found to be acceptable.

3.6 FENCES, GATES, AND ACCESSORIES

- A. Top Tension Wire: Run continuously from terminal post to terminal post. Stretch taut.
- B. Bottom Rails: Accurately cut to length and secure to posts with bolted fittings.
- C. Brace Assemblies: Install braces so posts are plumb when diagonal rods tightened to proper tension. Secure braces to posts with bolted fitting.
- D. Fabric: Leave approximately 2" between finish-grade and bottom barbs. Pull fabric taut and tie to posts, rails and tension wires, and anchor to framework so that fabric remains in tension after pulling force is released. Secure fabric as follows:
 - 1. 9 gauge wire ties 12 inches o/c at line posts, rails, braces, and bottom frames of gates.
 - 2. 9 gauge hog rings 12 inches on centers at tension wire.
 - 3. Stretcher bars with bolted tension bands 15 inches on centers at terminal posts (gate posts, corner posts, pull posts, and end posts) and at side frames of gates. Thread stretcher bars through fabric, clamp to fabric 4 inches on centers.
 - 4. In addition to wire ties, secure fabric to line posts and bottom rail with 3/8 inch diameter U-bolts with plates.

- D. Welds shall be well formed and ground smooth. Touch up welds and damaged coatings in shop or during field erection by recoating with galvanizing repair compound, applied per manufacturer's recommendations.
- E. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage, as recommended by the fence manufacturer. Adjust hardware for smooth operation and lubricate where necessary.
- F. Wire Ties: Use U-shaped wire, conforming to diameter of pipe to which attached, clasp pipe and fabric firmly with ends twisted at least two (2) full turns.
- G. Fasteners: Install nuts for U-bolts, fittings, tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.
- H. Barbed Razor Tape: Stainless steel barbed razor tape shall be 30 inch diameter, concertina type with stainless steel tension wires and connector rings to anchor the barbed razor type to the chain link fence both fabric and frame. Barbed razor tape shall provide 6 inch or less spacing between adjacent strands.
 - 1. See Plans and Specifications for descriptions of the placing of the barbed razor tape. Contractor shall be required to visit the site for a pre-bid conference at which tie each Contractor can get clarifications on the project and can observe actual field conditions.
 - 2. In the Summary of the Work Specification Section 02830, 1.1, B, items "g" and "h" give a written description of where barbed razor tape shall go. Coordinate this description with indications on the Plans.
 - 3. The triple row of barbed razor tape at the bottom of the new fence should follow the ground contours, including fence depression.
- I. Besides the standard anchors and fittings necessary to properly tension the chain link fabric, the Contractor shall furnish and install 3/8" diameter galvanized steel "U" bolts to secure the chain link fabric to the galvanized steel pipe framing system.
 - 1. Provide a minimum of three (3) galvanized "U" bolts every 10 feet along the new fence's bottom rail, attached thru the chain link fabric and the bottom rail.
 - 2. Provide a minimum of two (2) galvanized "U" bolts at each fence post, spaced 3 feet apart and 3 feet above the bottom rail to the first "U" bolt."
- J. Where drainage swales, ditches, and other drainage pathways must be crossed by the security fence, provide 3 inch diameter galvanized steel pipe at 6 inches on center to close the gap between the surface of the ditch or swale and the bottom rail of the new security fence. Set the pipe at least 4 feet into the ground with a maximum clearance at the bottom rail of the security fence of 4 inches.
 - 1. Pave the ditch or swale with concrete following the drainage profile. Concrete shall extend 3 feet on either side of the fence and the width of the drainage depression. Reinforce the concrete with 6x6 – 6/6 welded wire mesh, concrete thickness a minimum of 4 inches with 12 inch by 12 inch slab thickening at all edges to minimize undercutting of the slab. Work concrete around steel pipe, described in "J" above.
- K. Ground all electrically operated devices on sliding vehicular access gates and on electrical locks on pedestrian gates as well as all other electrical devices whether or not they are shown on the plans. Also ground the entire fence and clean up back-in (see Section 3.09 Clean-Up pg 0230-7). Drawing sheet no. E1.1 provides electrical notes.
 - 1. Minimum size for rigid steel conduits shall be 3/4 inch and all conductors shall be copper.

2. Underground conduits shall be buried a minimum of 18 inches deep and encased in a minimum of 3 inches of red concrete all around.
3. Bare copper ground wires shall be no. 2 as a minimum connected to a 10' – 0" long vertical solid copper ground rods, complete with pressure connector.

END OF SECTION 02831

SECTION 02930 - SEEDING, FERTILIZING AND WATERING

PART 1 - GENERAL

1.1 RELATED ITEMS SPECIFIED ELSEWHERE

- A. Submittals: 01300
- B. Topsoil: 02200

1.2 SCOPE OF WORK

- A. Seed, fertilize, and water, all unpaved areas disturbed by the construction, including embankments and swales.
- B. Refer to Section 02200 for topsoil specifications. Contractor shall sample soils which are to be seeded and obtain analysis by a recognized agronomist to determine adjustment, if any, needed to provide proper soil acidity for grass mixture which will be planted. For information only, submit two (2) copies of agronomist's recommendations to the Designer.
- C. Adjustment of soil quality may require the addition of lime to achieve proper acidity and/or the addition of granular material to clay soils. Adjusted topsoil materials shall be sufficiently granular to permit percolation and shall be neutral or slightly acidic with Ph content in the range of 6 to 7.

1.3 DELIVERY AND STORAGE

- A. Each variety of seed shall be furnished and delivered in separate bags or other containers. Each bag or container shall bear an analysis tag conforming to the Rules and Regulations of the Louisiana Seed Commission.
- B. The date of analysis shown on each tag shall be within 5 months of the time of delivery to the Project.
- C. Analysis tags shall be removed from each bag or container only by the Engineer or his authorized representative.

PART 2 - PRODUCTS

2.1 SEED

- A. All seed shall conform to all requirements, rules and regulations of Chapter II, Title 3 of Louisiana Revised Statutes of 1950.
- B. All seed shall be from the previous season's crop.

- C. Depending upon planting time, the varieties of seed to be used on the Project shall be as shown in the following table.

Seeding Period and Grasses to be Used	Purity %	Germination %	Rate Lbs/1000 Sq. Ft
2 March - 14 September Hulled common Bermuda grass	95	87	0.4 pound
15 September - 30 November Mixture consisting of: Unhulled Common Bermuda	95	87	0.2 pound
Rye Grass	95	86	0.5 pound
1 December - 1 March Mixture consisting of: Unhulled Common Bermuda	95	87	0.2 pound
Hulled Common Bermuda	95	87	0.2 pound
Rye Grass	97	82	0.5 pound

2.2 SOIL SUPPLEMENTS

- A. Fertilizer shall be either 88-8, 12-12-12, or 13-13-13, at the option of the Contractor. All fertilizers shall be commercial type conforming to the commercial fertilizer laws in effect as issued by the Louisiana Department of Agriculture. The chemical composition shall be as specified and shall be designated a 3-number sequence representing minimum percentages by weight, respectively of nitrogen (N), available phosphoric acid (PO) and a soluble potash (KO). Fertilizer shall be supplied in granulated or pelletized form and shall be packaged in suitable containers to prevent contamination by moisture.
- B. Agricultural lime shall consist of ground limestone or seashells containing at least 90 percent calcium carbonate equivalent (CaCO) and not more than 10 percent magnesium carbonate (MgCO). The material shall be ground so that 100 percent must pass a No. 8 sieve and a minimum of 30 percent must pass a No. 100 sieve.
- C. Sand shall be pit run sand, screened if necessary to eliminate particles larger than 1/4 inch screen size.

PART 3 - EXECUTION

3.1 APPLICATION

- A. The seed bed shall be prepared by breaking, disking, harrowing, blading or other approved methods. The soil shall be thoroughly pulverized to a minimum depth of 3 inches and leveled as directed. All hardpan areas shall be roto-tilled if necessary to insure that the soil is in a condition to receive and sprout seed. Fertilizer and agricultural lime shall be incorporated at this time. Slopes shall be smoothed to grade and rolled prior to seeding.
- B. Apply agricultural lime and mix in sand, if recommended by agronomist (see paragraph 1.02 C) at recommended rate.
- C. Fertilizer shall be uniformly broadcast over the area to be fertilized by either hand or machine methods. Unless otherwise provided, the approximate rate of broadcast fertilizer per acre shall be as follows:

TYPE	POUNDS PER ACRE
------	-----------------

8-8-8	1,000
12-12-12	667
13-13-13	615

- D. The rate per acre may be increased or decreased as directed.
- E. When fertilizer is applied following surface dressing, it shall be thoroughly incorporated in the soil by light disking or harrowing. Fertilizer may be applied just before final disking or harrowing during the process of surface dressing, or if dressed by hand, it may be applied just before final raking and leveling.
- F. On the same day that the finish grading operations are performed (with no rain between operations) the grass seed shall be applied at the rate specified by means of an approved mechanical seed spreader which will provide a depth of 1/8" to 1/4".
- G. Seeding shall be done in two (2) directions perpendicular to each other, using half of the specified amount in each application.
- H. Immediately after seeding, roll seeded areas with a hand roller weighing not less than 150 pounds nor more than 200 pounds. Care shall be exercised to prevent foot prints or other disturbances to the finished surface.
- I. After the seed has been planted, the area shall be watered immediately with approved watering tanks unless, in the opinion of the Architect, there is sufficient moisture to eliminate watering. After the initial watering, other waterings shall follow as needed until the Project is accepted.

3.2 MAINTENANCE AND ACCEPTANCE

- A. Maintain seeded areas until acceptance of the Project. Include preparation and re-seeding of bare areas, watering, refilling of eroded and rutted areas, watering and mowing.
- B. For acceptance, a uniform cover of living grass free from gaps larger than 8 inches shall be established over the entire seeded area.

END OF SECTION

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the following:
 - 1. Concrete work.

1.2 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 (CRSI), "Manual of Standard Practice".
- B. Concrete Testing Service: Owner shall engage and pay a testing laboratory acceptable to Architect to perform material evaluation tests and to design concrete mixes.
- C. Materials and installed work may require testing and retesting, as directed by Architect, at anytime during progress of work. Allow free access to material stockpiles and facilities. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense.

1.3 SUBMITTALS

- A. Product Data: Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others as requested by Architect.
- B. Shop Drawings; Reinforcement: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures and support bars for slab reinforcement.
- C. Shop Drawings showing all pipes and/or conduits to be embedded in the concrete shall be submitted for approval. Contractor shall not assume pipes and/or conduits may be placed in structural elements without prior approval.
- D. Samples: Submit samples of materials as specified and as otherwise requested by Architect, including names, sources, and descriptions.
- E. 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 Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.
 - 1. Use plywood complying with U.S. Product Standard PS-1 "A-C High Density Overlaid Concrete Form", Class I.
- B. 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.
- C. 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.
- D. Forms for Textured Finish Concrete: Form textured finish concrete surfaces with units of face design, size, arrangement, and configuration as shown on drawings or as required to match Architect's control sample. Provide solid backing and form supports to ensure stability of textured form liners.
- E. The Contractor shall prepare a control sample using a light sand blasted finish representative of the proposed as built finish for all concrete encased steel members, i.e., columns and x-bracing.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.
- 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. Use wire bar type supports complying with CRSI specifications, unless otherwise acceptable.
 - 1. For slabs-on-grade, Contractor shall support the rebars and mesh with sand plates or horizontal runners where base material will not support chair legs to insure the mesh is located per the contract documents.
 - 2. 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: ASTM C 150, Type I or II, unless otherwise acceptable to Architect.
- B. Use one brand of cement throughout project, unless otherwise acceptable to Architect.
- C. Fly Ash nor Slag: Not permitted.
- D. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.
 - 1. Do not use fine or coarse aggregates containing spalling-causing deleterious substances.
 - 2. Local aggregates not complying with ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to Architect.
- E. Lightweight Aggregates: ASTM C330, and as herein specified. Provide aggregates from a single source.
- F. Water: Drinkable.
- G. Air-Entraining Admixture: ASTM C 260 - Do not use in slabs scheduled to receive dry shake floor hardener.
 - 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. "Sika Aer"; Sika Corp.
 - b. "MB-VR or MB-AE"; Master Builders.
 - c. "Darex AEA"; W. R. Grace.
 - e. "Edoco 2001 or 2002"; Edoco Technical Products.
- H. Water-Reducing Admixture: ASTM C 494, Type A, and containing not more than 0.1 percent chloride ions.
 - 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. "Eucon WR-75"; Euclid Chemical Co.
 - b. "Pozzolith 344"; Master Builders.
 - c. "Plastocrete 160"; Sika Chemical Corp.
 - d. "Chemtard"; Chem-Masters Corp.
- I. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G and containing not more than 0.1 percent chloride ions.
 - 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. "WRDA 19"; W. R. Grace.
 - b. "PSP"; Protex Industries Inc.
 - c. "Super P"; Anti-Hydro.
 - d. "Sikament"; Sika Chemical Corp.
 - e. "Mighty 150"; ICI Americas Corp.
 - f. "Eucon 37"; Euclid Chemical Co.
 - g. "PSI Super"; Gifford-Hill.
 - h. "Pozzolith 400"; Master Builders.

- J. Water-Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E, and containing not more than 0.1 percent chloride ions.
 - 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. "Accelquard 80"; Euclid Chemical Co.
 - b. "Pozzolith 500"; Master Builders.
- K. Water-Reducing, Retarding Admixture: ASTM C 494, Type D, and containing not more than 0.1 percent chloride ions.
 - 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. "Edoco 20006"; Edoco Technical Products.
 - b. "Pozzolith 300-R"; Master Builders.
 - c. "Eucon Retarder 75"; Euclid Chemical Co.
 - d. "Daratard"; W.R. Grace.
 - e. "Plastiment"; Sika Chemical Co.
- L. Calcium Chloride or admixtures containing more than 0.1% chloride ions are not permitted.

2.4 RELATED MATERIALS

- A. Swellstop Waterstops: Contractor shall install a swellable VOLCLAY waterproofing strips that swells upon contact with water to form a long lasting compression seal in non-moving concrete joints.
- B. 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 ASTM E 154, as follows:
 - 1. Polyethyelene sheet not less than 10 mils thick, with taped joints.
 - 2. Water resistant barrier paper consisting of heavy Kraft papers laminated together with glass fiber reinforcement and over-coated with black polyethylene on each side.
- C. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.
 - 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. Metallic
 - .1 "Vibrofoil"; A.C. Horn, Inc.
 - .2 "Metallic Spec. Grout"; The Burke Co.
 - .3 "Embeco 636"; Master Builders.
 - .4 "Ferrolith"; Sonneborn-Contech.
 - .5 "Firmix"; Euclid Chemical Co.
 - .6 "Kemox G"; Sika Chemical Co.
 - .7 "Ferrogrout"; L & M Const. Chemical Co.
 - b. Non-metallic

- .1 "Masterflow 713"; Master Builders.
- .2 "SonogROUT"; Sonneborn-Contech.
- .3 "Euco-NS"; Euclid Chemical Co.
- .4 "Crystex"; L & M Const. Chemical Co.
- .5 "Sure-Grip Grout"; Dayton Superior Corp.
- .6 "Horngrout"; A.C. Horn, Inc.

- D. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
1. Waterproof paper.
 2. Polyethylene film.
 3. Polyethylene-coated burlap.
- E. Sealer and Hardener: V.O.C. Compliant sealer of siliconate polymers which penetrate concrete increasing abrasion resistance and reduction in surface absorption of liquids.
1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. EUCO DIAMOND HARD®; The Euclid Chemical Co.
 - b. "Intraseal"; Conspec Marketing & Manufacturing Co., Inc.
- F. Bonding Compound: Polyvinyl acetate or acrylic base, rewettable type.
1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. "J-40 Bonding Agent"; Dayton Superior Corp.
 - b. "Weldcrete"; Larsen Products.
 - c. "Everbond"; L & M Construction Chemicals.
 - d. "EucoWeld"; Euclid Chemical Co.
 - e. "Hornweld"; A.C. Horn.
 - f. "Sonocrete"; Sonneborn-Contech.
 - g. "Acrylic Bondcrete"; The Burke Co.
- G. Epoxy Adhesive: ASTM C 881, two component material suitable for use on dry or damp surfaces. Provide material "Type", "Grade", and "Class" to suit project requirements.
1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. "Epoxite"; A.C. Horn, Inc.
 - b. "Edoco 2118 Epoxy Adhesive"; Edoco Technical Prod.
 - c. "Sikadur Hi-Mod"; Sika Chemical Corp.
 - d. "Euco Epoxy 463 or 615"; Euclid Chemical Co.
 - e. "Patch and Bond Epoxy"; The Burke Co.
 - f. "Sure-Poxy"; Kaufman Products Inc.
- H. Joint Sealant: ASTM C 920-86, Type S, Grade NS, Class 25, one part urethane sealant for sealing concrete control joints:
1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

- a. "Eucolastic I"; Euclid Chemical Co.

2.5 PROPORTIONING AND DESIGN OF MIXES

- I. Prepare design mixes for each type and strength of concrete by either (a) laboratory trial batch or (b) field experience methods (data submitted may not be more than 2 years old) as specified in ACI 301 for approval, No Exceptions. If trial batch method is used, use an independent testing facility acceptable to Architect 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 Architect.
- J. Submit written reports to Architect 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 approved by Architect.
- K. Design mixes to provide concrete with the properties as indicated on the structural drawings.
- L. Adjustment to Concrete Mixes: 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 Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

2.6 ADMIXTURES

- A. Use water-reducing admixture, ASTM C 494 Type A, F, or G, in concrete as required for placement and workability.
- B. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg. F (10 deg. C).
- C. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.

2.7 CONCRETE MIXES

- A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.
- B. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.
- C. When air temperature is between 85 deg. F (30 deg. C) and 90 deg. F (32 deg. C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg. F (32 deg. C), reduce mixing and delivery time to 60 minutes.

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 the hardened concrete. 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 back-up 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 all exposed corners and edges unless indicated otherwise, 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 1" inside concrete and will not leave holes larger than 1" diameter in concrete surface.
- I. 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.
- J. 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. Retightening 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.

- 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.
- E. 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 as indicated or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Architect.
- 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 main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated.
- D. Waterstops: Provide waterstops in all construction joints below grade. 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.
- E. Form contraction joints by inserting premolded plastic, hardboard or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
- F. Contraction joints may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
- G. 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. Clean re-used forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.
- B. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

- C. 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 in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.
- D. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.
- E. 2" dry bottom required for all of the following:
 - 1. Mat footings.
 - 2. Grade beams.
 - 3. Pile caps.
 - 4. Continuous spread footings.
 - 5. Elevator pits.

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 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as herein specified.
- 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.
- 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 309.
- 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 12" 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 in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- I. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- 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. Do not place concrete when the temperature is projected to be below 32 deg. F within 24 hours of the time the concrete placement starts.
- N. When air temperature has fallen to or is expected to fall below 40 deg. F (4 deg. C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg. F (10 deg. C), and not more than 80 deg. F (27 deg. C) at point of placement.
- O. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
- P. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
- Q. 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.
- R. Cool ingredients before mixing to maintain concrete temperature at time of placement below 95 deg. F (32 deg. C). 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 water. Use of liquid nitrogen to cool concrete is Contractor's option.
- S. 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.
- T. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.
- U. 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: 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: 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, veneer plaster, 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. Smooth Rubbed Finish: Provide smooth rubbed finish to scheduled concrete surfaces, which have received smooth form finish treatment, not later than one day after form removal.
 - 1. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.
- D. Grout Cleaned Finish: Provide grout cleaned finish to scheduled concrete surfaces which have received smooth form finish treatment.
 - 1. Combine one part portland cement to 1-1/2 parts fine sand by volume, and mix with water to consistency of thick paint. Proprietary additives may be used at Contractor's option. Blend standard portland cement and white portland cement, amounts determined by trial patches, so that final color of dry grout will match adjacent surfaces.
- E. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
- F. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.8 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 curing and sealing compound, by moist curing, by moisture-retaining cover curing, 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.
 - 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.

3.9 PROVIDE MOISTURE-COVER CURING AS FOLLOWS

- A. 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 of adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- B. Provide curing and sealing compound to interior slabs with resilient flooring, carpet over cushion, or left exposed; and to exterior slabs, walks and curbs, as follows:
- C. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
- D. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting, and other coatings and finish materials, unless otherwise acceptable to Architect.
- E. 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.
- F. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.
- G. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

3.10 REMOVAL OF FORMS

- A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F 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, joists, slabs, and other structural elements, may not be removed in less than 14 days and until concrete has attained 75% of the required compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members. Formwork for post-tensioned structures may be removed 24 hours after the structure was stressed and approved.
- 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.

3.11 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. Apply new form coating compound as specified for new formwork.

- B. 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 Architect.

3.12 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. Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.

3.13 CONCRETE SURFACE REPAIRS

- A. 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.
- B. Repair the finished of unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" in width or cracks which penetrate to reinforcement or completely through the sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
- C. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
- D. 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 Architect.
- E. Repair defective areas by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts. Expose reinforcing steel so as to have 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.
- F. 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.

- G. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, exposed reinforcing, 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.
- H. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.
- I. Repair concealed formed surfaces, where possible, that contain defects that affect the structural strength and/or durability of concrete. If defects cannot be repaired, remove and replace concrete.
- J. When acceptable to Architect repair and patch defective areas with cement mortar immediately after removal of forms.
- K. 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.
- L. 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.
- M. Perform structural repairs only after prior approval of Architect or Structural Engineer. Method procedures and materials shall be submitted, in writing for approval.
- N. Repair methods not specified above may be used, subject to acceptance of Architect.

3.14 SEALER AND HARDENER

- A. Where Δ Sealed Concrete Δ is indicated on the drawings, apply as per manufacture recommendations and as per listed below:
 - 1. Coverage Square Feet Per Gallon:

Hard Troweled Finish	300-400
Broom or Float Finish	200-300
Rough Slab Finish	150-250
Old Concrete	150-250
Vertical Surface-Lamb=s	
wool roller recommended	300-400

3.15 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. The owner will employ and pay a testing laboratory to perform tests and to submit test reports. Contractor shall pay for retesting of all failed tests.

- B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Architect.
- C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - 1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - 2. Concrete Temperature: Test hourly when air temperature is 40 deg. F (4 deg. C) and below, and when 90 deg. F (27 deg. C) and above; and each time a set of compression test specimens made.
 - 3. Compression Test Specimen: ASTM C 31; one set of 4 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.
 - 4. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; two specimen tested at 7 days, two specimen tested at 28 days.
 - 5. 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.
 - 6. When total quantity of a given class of concrete is less than 50 cu. yds., strength test may be waived by Architect if, in his judgement, adequate evidence of satisfactory strength is provided.
 - 7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 - 8. Strength level of concrete will be considered satisfactory if averages of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
- D. Test results will be reported in writing to Architect, Structural Engineer and Contractor within 24 hours 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.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- F. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. 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.

END OF SECTION 03300

SECTION 03301 – CONCRETE PAVEMENT

PART 1 – GENERAL

1.1 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required to construct portland cement concrete pavement, on a prepared subgrade or base course in accordance with these specifications and in conformity with the lines, grades, thicknesses and typical cross sections shown on the plans. All concrete pavement shall have a minimum compressive strength of 4,000 psi.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|----------------------------------|-------|
| A. | Submittals: | 01300 |
| B. | Testing Laboratory Services: | 01410 |
| C. | Material and Equipment: | 01600 |
| D. | Excavation, Filling and Grading: | 02200 |

1.3 CODES AND STANDARDS

- A. All concrete pavement shall comply with the Louisiana Standard Specifications for Roads and Bridges (2000 edition) section 601 and the applicable Sections and Subsections where applicable.

1.4 DESCRIPTION

- A. Concrete shall be composed of Portland cement, fine aggregate and coarse aggregate. Water and admixtures shall be ready-mixed concrete produced by a plant acceptable to the Engineer. All constituents, including admixtures, shall be batched at the central batch plant (unless otherwise noted).
- B. All testing and inspection services required shall be provided by the Owner. The cost of such work, except as specifically stated otherwise, shall be paid for by the Owner. Methods of testing shall comply in detail with the latest applicable ASTM Methods.
- C. Samples of constituents and of concrete as placed will be subjected to laboratory tests.
- D. Under special circumstances, the Engineer may allow minor deviations from the material requirements specified, provided that the resulting concrete quality is not adversely affected or that a suitable adjustment in cement content is made to compensate for such deviations.

1.5 SUBMITTALS

- A. The Contractor shall submit to the Engineer and the Owner's laboratory for approval a proposed mix design for each concrete strength and type required by these specifications. Information to be submitted for each type and strength shall include the following items:
1. Sources of concrete mix design components including coarse aggregate, fine aggregate, cement, water and admixtures (including pozzolans where included).

2. Concrete mix design:
 - a. Constituent quantities per cubic yard.
 - b. Water content: gallons/100 pounds cementitious materials.
 - c. Cement: type, manufacturer, and chemical analysis.
 - d. Mix design slump.
 - e. Average laboratory cylinder strength test results at twenty-eight (28) days for concrete mix design (include standard deviation). Provide results of seven (7) day and fourteen (14) day tests once available.
 3. Laboratory sieve analysis and mechanical properties for coarse and fine aggregate.
 4. Admixture types and chemical compositions (include certification of compliance with ASTM reference standards and confirmation of any supplementary requirements included in these Specifications).
- B. An additional mix design for each type and strength of concrete to be placed by pumping shall be submitted to the Engineer for approval.
- C. The Contractor shall submit copies of all concrete truck delivery tickets with contents of concrete mixtures.
- D. The Contractor shall submit to the Engineer results from all tests performed on the concrete placed during construction. (Includes but not limited to each specified day's compressive strength, slump, air content and temperature).
- E. Failure to include any item of information noted for a given concrete strength or type shall be cause for a required resubmittal to the Engineer.
- F. The Contractor shall submit to the Engineer for review and comment setting drawings showing the proposed locations of all penetrations and embedments.

1.6 FIELD TESTS

- A. Field tests shall be made by the Owner's laboratory/field technician in compliance with Chapter 16 of ACI 301. Field tests shall consist of compressive strength, slump, air content, and temperature tests.
- B. Strength Tests
1. A strength test shall consist of a set of at least four (4) field control cylinder specimens taken at random by the Owner's laboratory/field technician during the progress of the Work, in accordance with ASTM C31.
 2. The number of strength tests shall be determined by the designer.
 3. For 28-day concrete, one (1) test cylinder shall be broken at 7-days, one (1) at 14-days and two (2) test cylinders shall be broken at 28-days to determine the average compressive strength for each respective time period.
 4. When average 28-day compressive strength of control cylinders in any set falls below the required compressive strength or below proportional minimum seven-

day strengths (using previously provided relation between 7-day and 28-day strengths as established by tests) proportions, water content, or temperature conditions shall be changed to achieve the required strengths.

- C. Determine slump of concrete sample for each strength test and whenever consistency of concrete appears to vary in accordance with ASTM C143.
- D. Determine air content of concrete sample for each strength test in accordance with ASTM C231.
- E. Determine temperature of concrete sample for each strength test.
- F. The Contractor shall cooperate in the making of tests by allowing free access to the work for the selection of samples, providing an insulated closed curing box for specimens, affording protection to the specimens against injury or loss through his operations and furnishing material and labor required for the purpose of taking concrete cylinder samples. All shipping of specimens will be paid for by the Owner. Curing boxes shall be in conformance with ASTM criteria and acceptable to the Engineer.

PART 2 – PLACING CONCRETE PAVEMENT

2.1 MATERIALS

- A. Materials shall comply with the following Section or Subsection of the LA DOTD Standard Specifications for Roads and Bridges 2000 edition:

Portland Cement Concrete	901
Joint Materials	1005
Tie Bars	1009.03
Dowel Bars	1009.04
Curing Materials	1011.01
Water	1018.01
Geotextile Fabric	1019

2.2 PREPARATION AND MAINTENANCE OF SUBGRADE OR BASE

- A. The surface on which the concrete is to be placed shall be prepared and maintained in accordance with plan details and in such a manner that the pavement depth, grade and surface finish requirements will be met.
- B. The subgrade or base course shall be cleaned of loose material and maintained in a satisfactory condition. Deficient areas shall be corrected. The subgrade and base course shall be graded to proper cross section. High areas shall be trimmed to grade.

2.3 FORMS

- A. The foundation under forms shall be firm and true to grade so that the form will be firmly in contact for its whole length or firmly shimmed at the required grade. Form sections shall be free from movement in any direction. Face and top of forms shall be cleaned and oiled prior to placing concrete.

2.4 PLACING CONCRETE

- A. The subgrade or base shall be uniformly moist when concrete is placed. Concrete shall be deposited in such a manner as to require as little rehandling as possible. Placing shall be continuous between joints. Concrete shall be finished in accordance with LA Standard Specifications for Roads and Bridges Section 601.08. Joints shall be constructed in accordance with plan details.

END OF SECTION

SECTION 04200 - UNIT MASONRY ASSEMBLIES

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 unit masonry assemblies consisting of the following:
 - 1. Concrete masonry units.
 - 2. Decorative concrete masonry units.
 - 3. Face brick.
 - 4. Mortar and grout.
 - 5. Reinforcing steel.
 - 6. Masonry joint reinforcement.
 - 7. Ties and anchors.
 - 8. Embedded flashing.
 - 9. Cavity-wall insulation.

1.3 DEFINITIONS

- A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 SUBMITTALS

- A. Product Data: For each different masonry unit, accessory, and other manufactured product specified.
- B. Samples for Verification: For the following:
 - 1. Full-size units for each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
 - 2. Accessories embedded in the masonry.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

- C. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.
- D. Mockups: Before installing unit masonry, build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Locate mockups in the locations indicated or, if not indicated, as directed by Architect.
 - 2. Build mockups for the following types of masonry in sizes approximately 48 inches (1200 mm) long by 48 inches (1200 mm) high by full thickness, including face and backup wythes and accessories. Include a sealant-filled joint at least 16 inches (400 mm) long in each mockup.
 - a. Typical exterior wall including decorative concrete units and face brick..
 - b. Typical exterior wall with through-wall flashing installed for a 24-inch (600-mm) length in corner of mockup approximately 16 inches (400 mm) down from top of mockup, with a 12-inch (300-mm) length of flashing left exposed to view (omit masonry above half of flashing).
 - 3. Protect accepted mockups from the elements with weather-resistant membrane.
 - 4. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 5. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - 6. Approved mockups can be used in final construction.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. tend cover a minimum of 24 inches (600 mm) down both sides and hold cover securely in place.

- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is **40 deg F (4 deg C)** and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.
 - 1. When ambient temperature exceeds **100 deg F (38 deg C)**, or **90 deg F (32 deg C)** with a wind velocity greater than **8 mph (13 km/h)**, do not spread mortar beds more than **48 inches (1200 mm)** ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. General: Provide shapes indicated and as follows:
 - 1. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
- B. Concrete Masonry Units: ASTM C 90 and as follows:
 - 1. Weight Classification: Normal weight , unless otherwise indicated
 - 2. Light weight as shown on the drawings,
 - 3. Provide Type II, nonmoisture-controlled units.
 - 4. Size (Width): Manufactured to the following dimensions:
 - a. **4 inches (102 mm)** nominal; **3-5/8 inches (92 mm)** actual.
 - b. **6 inches (152 mm)** nominal; **5-5/8 inches (143 mm)** actual.
 - c. **8 inches (203 mm)** nominal; **7-5/8 inches (194 mm)** actual.
 - d. **12 inches (305 mm)** nominal; **11-5/8 inches (295 mm)** actual.
 - 5. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.
- C. Decorative Concrete Masonry Units: ASTM C 90 and as follows:
 - 1. Weight Classification: Normal weight, unless otherwise indicated.
 - 2. Provide Type II, nonmoisture-controlled units.
 - 3. Size: Manufactured to dimensions indicated for nondecorative units.

4. Finish: Block to match color 7M as manufactured by Acme Building Products.
 - a. Normal-weight aggregate, split-face finish.
 - b. Normal-weight aggregate, standard finish, scored vertically so units laid in running bond appear as square units laid in stacked bond.

5. Integral Water Repellent: Provide units made with liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive according to ASTM E 514, with test period extended to 24 hours, show no visible water or leaks on the back of the test specimen.
 - a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Block Plus W-10; Addiment Inc.
 - 2) Dry-Block; W. R. Grace & Co., Construction Products Division.
 - 3) Rheopel; Master Builders.

2.2 BRICK

- A. General: Provide shapes indicated and as follows for each form of brick required:
 1. Provide units without cores or frogs and with exposed surfaces finished for ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces.

- B. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
 1. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.

- C. Face Brick: ASTM C 216, Grade SW, Type FBS, and as follows:
 1. Initial Rate of Absorption: Less than 20 g/30 sq. in. (20 g/194 sq. cm) per minute when tested per ASTM C 67.
 2. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 3. Size: Manufactured to the following actual dimensions:
 - a. Modular: 3-1/2 to 3-5/8 inches (89 to 92 mm) wide by 2-1/4 inches (57 mm) high by 7-1/2 to 7-5/8 inches (190 to 194 mm) long.
 4. Application: Use where brick is exposed, unless otherwise indicated.
 5. Color and Texture: Match Architect's samples.
 6. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Acme Brick - Blend #33
 - b. Boral Brick - #4305

2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.
- D. Mortar Cement: ASTM C 1329.
- E. Aggregate for Mortar: ASTM C 144; except for joints less than **1/4 inch (6.5 mm)** thick, use aggregate graded with 100 percent passing the **No. 16 (1.18-mm)** sieve.
- F. Aggregate for Grout: ASTM C 404.
- G. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent by same manufacturer.
- H. Water: Potable.
- I. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Mortar Cement:
 - a. Magnolia Superbond Mortar Cement; Blue Circle Cement.
 - b. Lafarge Mortar Cement; Lafarge Corporation.
 - 2. Water-Repellent Admixture:
 - a. Mortar Tite; Addiment Inc.
 - b. Dry-Block Mortar Admixture; W. R. Grace & Co., Construction Products Division.
 - c. Rheopel; Master Builders.

2.4 REINFORCING STEEL

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A 617M, **Grade 60 (Grade 400)**.

2.5 MASONRY JOINT REINFORCEMENT

- A. General: ASTM A 951 and as follows:
 - 1. Hot-dip galvanized, carbon-steel wire for both interior and exterior walls.
 - 2. Wire Size for Side Rods: [W2.8 or **0.188-inch (4.8-mm)**] diameter.
 - 3. Wire Size for Cross Rods: [W2.8 or **0.188-inch (4.8-mm)**] diameter.
 - 4. Provide in lengths of not less than **10 feet (3 m)**, with prefabricated corner and tee units where indicated.
- B. For single-wythe masonry, provide either ladder or truss type with single pair of side rods and cross rods spaced not more than **16 inches (407 mm)** o.c.

C. For multiwythe masonry, provide types as follows:

1. Adjustable (2-piece) type with single pair of side rods and cross ties spaced not more than **16 inches (407 mm)** o.c. and with separate adjustable veneer ties engaging the cross ties. Cross ties are either U-shaped with eyes or rectangular. Space side rods for embedment within each face shell of backup wythe and size adjustable ties to extend at least halfway through outer wythe but with at least **5/8-inch (16-mm)** cover on outside face. Use where facing wythe is of different material than backup wythe.

2.6 TIES AND ANCHORS, GENERAL

- A. General: Provide ties and anchors, specified in subsequent articles, made from materials that comply with this Article, unless otherwise indicated.
- B. Hot-Dip Galvanized Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
- C. Steel Sheet, Galvanized after Fabrication: ASTM A 366/A 366M cold-rolled, carbon-steel sheet hot-dip galvanized after fabrication to comply with ASTM A 153.

2.7 BENT WIRE TIES

- A. General: Rectangular units with closed ends and not less than **4 inches (100 mm)** wide. Z-shaped ties with ends bent 90 degrees to provide hooks not less than **2 inches (50 mm)** long may be used for masonry constructed from solid units or hollow units laid with cells horizontal.
- B. Wire: Fabricate from **3/16-inch- (4.8-mm-)** diameter, hot-dip galvanized steel wire.

2.8 ADJUSTABLE ANCHORS FOR CONNECTING TO STEEL FRAME

- A. General: Provide two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 1. Anchor Section: Crimped **1/4-inch- (6.4-mm-)** diameter, hot-dip galvanized steel wire anchor section for welding to steel.
 2. Tie Section: Triangular-shaped wire tie, sized to extend within **1 inch (25 mm)** of masonry face, made from **0.1875-inch- (4.8-mm-)** diameter, hot-dip galvanized steel stainless-steel wire.

2.9 ANCHORS FOR CONNECTING TO CONCRETE

- A. General: Provide two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 1. Anchor Section: Dovetail anchor section formed from **0.0966-inch- (2.5-mm-)** thick, steel sheet, galvanized after fabrication.
 2. Tie Section: Triangular-shaped wire tie, sized to extend within **1 inch (25 mm)** of masonry face, made from **0.1875-inch- (4.8-mm-)** diameter, hot-dip galvanized steel wire.

2.10 ADJUSTABLE MASONRY-VENEER ANCHORS

- A. General: Provide two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
1. Structural Performance Characteristics: Capable of withstanding a 100-lbf (445-N) load in both tension and compression without deforming or developing play in excess of 0.05 inch (1.3 mm).
- B. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie section and a metal anchor section complying with the following requirements:
1. Anchor Section: Sheet metal plate with screw holes top and bottom and with raised rib-stiffened strap stamped into center to provide a slot between strap and plate for connection of wire tie.
 - a. Plate 1-1/4 inches (32 mm) wide by 6 inches (150 mm) long with strap 5/8 inch (16 mm) wide by 3-5/8 inches (92 mm) long; slot clearance formed between face of plate and back of strap shall not exceed diameter of wire tie by more than 1/32 inch (0.8 mm).
 2. Wire Tie Section: Rectangular shaped wire tie sized to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face.
 3. Fabricate sheet metal anchor sections and other sheet metal parts from 0.0677-inch- (1.7-mm-) thick, steel sheet, galvanized after fabrication.
 4. Fabricate wire tie sections from 0.1875-inch- (4.8-mm-) diameter, hot-dip galvanized steel wire.
- C. Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene washer, No. 10 (4.8-mm) diameter by length required to penetrate steel stud flange by not less than 3 exposed threads, and with the following corrosion protective coating:
1. Organic polymer coating with salt-spray resistance to red rust of more than 800 hours per ASTM B 117.
- D. Stainless-Steel Drill Screws for Steel Studs: Proprietary fastener consisting of carbon-steel drill point and 300 Series stainless-steel shank, complying with ASTM C 954 except manufactured with hex washer head and neoprene washer, No. 10 (4.8-mm) diameter by length required to penetrate steel stud flange by not less than three exposed threads.
- E. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
1. Screw-Attached, Masonry-Veneer Anchors:
 - a. 315-D with 316; Heckman Building Products, Inc.
 - b. 252 ; Heckman Building Products, Inc.
 - c. DW-10HS; Hohmann & Barnard, Inc.
 - d. Box tie with drip; Hohmann & Barnard, Inc.
 2. Stainless-Steel Drill Screws for Steel Studs:
 - a. By manufacturer of anchor.

2.11 EMBEDDED FLASHING MATERIALS

- A. Contractor's Option for Concealed Flashing: For flashing partly exposed to the exterior, use metal flashing specified above. For flashing not exposed to the exterior, use one of the following, unless otherwise indicated:
1. Copper-Laminated Flashing: Manufacturer's standard laminated flashing consisting of 5-oz./sq. ft. (1.5-kg/sq. m) sheet copper bonded with asphalt between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 2. Asphalt-Coated Copper Flashing: Manufacturer's standard product consisting of 5-oz./sq. ft. (1.5-kg/sq. m) sheet copper coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
- B. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by the flashing manufacturer for bonding flashing sheets to each other and to substrates.
- C. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
1. Copper-Laminated Flashing:
 - a. Copper Fabric; AFCO Products, Inc.
 - b. H & B C-Fab Flashing; Hohmann & Barnard, Inc.
 - c. Copper Fabric Flashing; Polytite Manufacturing Corp.
 - d. York Copper Fabric Flashing; York Manufacturing, Inc.
 2. Asphalt-Coated Copper Flashing:
 - a. Cop-A-Cote; AFCO Products, Inc.
 - b. H & B C-Coat Flashing; Hohmann & Barnard, Inc.
 - c. Coated Copper Flashing; Polytite Manufacturing Corp.
 - d. Copperseal; York Manufacturing, Inc.

2.12 CAVITY-WALL INSULATION

- A. Polyisocyanurate Board Insulation: Aluminum-foil-faced, glass-fiber-reinforced, rigid, cellular, polyisocyanurate thermal insulation complying with ASTM C 1289, Type I, Class 2.
- B. Adhesive: Type recommended by insulation board manufacturer for application indicated.
- C. Refer to 07214 – Foamed-in-place insulation for insulation in concrete masonry units.

2.13 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification.
1. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
 2. For reinforced masonry and where indicated, use Type [S].

3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type [N].
- C. Grout for Unit Masonry: Comply with [ASTM C 476].
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 5 of ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 2. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
1. Verify that foundations are within tolerances specified.
 2. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Before installation, examine rough-in and built-in construction to verify actual locations of piping connections.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this Section and in other Sections of the Specifications.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to the opening.
- D. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
1. Mix units from several pallets or cubes as they are placed.
- F. Wetting of Brick: Wet brick before laying if the initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at the time of laying.

3.3 CONSTRUCTION TOLERANCES

- A. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:
- B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than **1/4 inch in 20 feet (6 mm in 6 m)**, nor **1/2 inch (12 mm)** maximum.
- C. For vertical alignment of exposed head joints, do not vary from plumb by more than **1/4 inch in 10 feet (6 mm in 3 m)**, nor **1/2 inch (12 mm)** maximum.
- D. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than **1/4 inch in 20 feet (6 mm in 6 m)**, nor **1/2 inch (12 mm)** maximum.
- E. For exposed bed joints, do not vary from thickness indicated by more than plus or minus **1/8 inch (3 mm)**, with a maximum thickness limited to **1/2 inch (12 mm)**. Do not vary from bed-joint thickness of adjacent courses by more than **1/8 inch (3 mm)**.
- F. For exposed head joints, do not vary from thickness indicated by more than plus or minus **1/8 inch (3 mm)**. Do not vary from adjacent bed-joint and head-joint thicknesses by more than **1/8 inch (3 mm)**.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal **4-inch (100-mm)** horizontal face dimensions at corners or jambs.
 - 1. As indicated on Drawings.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than **2 inches (50 mm)**. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal **4-inch (100-mm)** horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
- F. Fill space between hollow-metal frames and masonry solidly with mortar, unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow concrete masonry units with grout **24 inches (600 mm)** under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

- I. Build non-load-bearing interior partitions full height of story to underside of roof structure above. At metal deck roof structure, utilize one of the following:
 1. Install compressible filler in joint between top of partition and underside of structure above.
 2. At fire-rated partitions, install firestopping in joint between top of partition and underside of structure above to comply with Division 7 Section "Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow masonry units as follows:
 1. With full mortar coverage on horizontal and vertical face shells.
 2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
 3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
- B. Lay solid brick-size masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
 1. At cavity walls, bevel beds away from cavity, to minimize mortar protrusions into cavity. As work progresses, trowel mortar fins protruding into cavity flat against the cavity face of the brick.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.6 CAVITIES

- A. Keep cavities clean of mortar droppings and other materials during construction. Strike joints facing cavities flush.
 1. Use wood strips temporarily placed in cavity to collect mortar droppings. As work progresses, remove strips, clean off mortar droppings, and replace in cavity.
- B. Coat cavity face of backup wythe to comply with Division 7 Section "Bituminous Dampproofing."
- C. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately **12 inches (300 mm)** o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
 1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.7 MASONRY JOINT REINFORCEMENT

- A. General: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of **5/8 inch (16 mm)** on exterior side of walls, **1/2 inch (13 mm)** elsewhere. Lap reinforcement a minimum of **6 inches (150 mm)**.
 - 1. Space reinforcement not more than **16 inches (406 mm)** o.c.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 ANCHORING MASONRY TO STRUCTURAL MEMBERS

- A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
 - 1. Provide an open space not less than **1 inch (25 mm)** in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar or other rigid materials.
 - 2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than **24 inches (610 mm)** o.c. vertically and **36 inches (915 mm)** o.c. horizontally.

3.9 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:
 - 1. Embed connector sections and continuous wire in masonry joints. Provide not less than **2 inches (50 mm)** of air space between back of masonry veneer and face of sheathing.
 - 2. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 - 3. Space anchors as indicated, but not more than **16 inches (406 mm)** o.c. vertically and **24 inches (610)** o.c. horizontally with not less than 1 anchor for each **2.67 sq. ft. (0.25 sq. m)** of wall area. Install additional anchors within **12 inches (305 mm)** of openings and at intervals, not exceeding **36 inches (914 mm)**, around perimeter.

3.10 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joints in unit masonry where indicated. Build-in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
- B. Form control joints in concrete masonry as follows:
 - 1. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete.
- C. Form expansion joints in brick made from clay or shale as follows:

1. Form open joint of width indicated, but not less than **3/8 inch (10 mm)** for installation of sealant and backer rod specified in Division 7 Section "Joint Sealants." Keep joint free and clear of mortar.
- D. Build in horizontal, pressure-relieving joints where indicated; construct joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 7 Section "Joint Sealants."
1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry veneer and attached to structure behind masonry veneer.

3.11 LINTELS

- A. Install steel lintels where indicated.
- B. Provide minimum bearing of **8 inches (200 mm)** at each jamb, unless otherwise indicated.

3.12 FLASHING, WEEP HOLES, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Unless otherwise indicated, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
- C. Install flashing as follows:
1. At masonry-veneer walls, extend flashing from exterior face of veneer, through veneer, up face of sheathing at least **8 inches (200 mm)**, and behind air-infiltration barrier or building paper.
 2. At lintels and shelf angles, extend flashing a minimum of **4 inches (100 mm)** into masonry at each end. At heads and sills, extend flashing **4 inches (100 mm)** at ends and turn flashing up not less than **2 inches (50 mm)** to form a pan.
 3. Cut flashing off flush with face of wall after masonry wall construction is completed.
- D. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:
1. Use open head joint to form weep holes.
 2. Space weep holes **24 inches (600 mm)** o.c.
 3. In cavities, place pea gravel to a height equal to height of first course, but not less than **2 inches (50 mm)**, immediately above top of flashing embedded in the wall, as masonry construction progresses, to splatter mortar droppings and to maintain drainage.
- E. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.13 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction.

1. Construct formwork to conform to shape, line, and dimensions shown. Make it sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements of ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
1. Comply with requirements of ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.14 FIELD QUALITY CONTROL

- A. Owner will engage a qualified independent testing agency to perform field quality-control testing indicated below.
1. Payment for these services will be made by Owner.
 2. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.
- B. Mortar properties will be tested per [ASTM C 780].
- C. Grout will be sampled and tested for compressive strength per [ASTM C 1019].

3.15 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces.

END OF SECTION 04200

SECTION 04270 - GLASS UNIT MASONRY ASSEMBLIES

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 exterior glass unit masonry assemblies, and glass-block grid systems.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include glass block, cementitious materials, waterproofing admixtures for mortar, and accessories.
- B. Samples for Initial Selection: Manufacturer's actual glass-block units for each form, pattern, and color indicated.

1.4 QUALITY ASSURANCE

- A. Source Limitations for Glass Block: Obtain each type and pattern of glass block through one source from a single manufacturer.
- B. Product Designations: Drawings indicate size, designs, colors, and other characteristics by referencing indicated manufacturer's trade designations. Other manufacturers' products of equal characteristics complying with requirements may be considered. Refer to Division 1 Section "Substitutions."
- C. Mockups: Before installing glass unit masonry, build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in the location indicated or, if not indicated, as directed by Architect.
 - 2. Build mockup of typical exterior panel, 48 by 48 inches (1200 by 1200 mm) in size.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store glass block in unopened cartons on elevated platforms, under cover, and in a dry location.
- B. Store accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.6 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation of glass unit masonry assemblies only when ambient and material temperatures are 40 deg F (4.4 deg C) and rising.
 - 1. Maintain temperature in installation areas at 40 deg F (4.4 deg C) or above for 48 hours after installing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Hollow Glass Block:
 - a. Oberland Glas AG, Bauglas Div.; Solaris Glasstein – Flemish Pattern.
 - b. Pittsburgh Corning Corporation – Decora Pattern.
 - c. Weck: J. Weck GmbH u. Co – Nubio Pattern .
 - 2. Glass-Block Grid Systems:
 - a. Innovative Building Products, Inc.
 - b. Pittsburgh Corning Corporation
 - c. Approved Equal.

2.2 GLASS BLOCK

- A. Hollow Glass Block: Non-load-bearing blocks made by fusing together two halves of pressed glass to produce partially evacuated hollow units complying with the following requirements for color, pattern, size, and other characteristics:
 - 1. Glass Colors: Clear.
 - 2. Patterns: Provide patterns indicated above.
 - 3. Unit Sizes: Manufacturer's standard sizes corresponding to nominal sizes indicated on Drawings.

2.3 GLASS-BLOCK GRID SYSTEMS

- A. General: Aluminum extrusions complying with ASTM B 221 (ASTM B 221M), alloy 6063-T6 or 6463-T6, forming a grid system and frame designed for application indicated.
 - 1. Finish: As selected by Architect from manufacturer's full range of finishes.
- B. Window and Wall System: Aluminum T-bar grid with tubular frame and thermal-expansion tape made from adhesive-backed, closed-cell, foam tape.
 - 1. Glass-Block Size: 7-3/4 inches (197 mm) square by 3-1/8 inches (79 mm) thick.
 - 2. Provide self-flashing aluminum exterior frame covers with vinyl thermal break.
 - 3. Provide aluminum trim and closures as indicated.
- C. Sealant: Neutral-curing silicone sealant complying with requirements in Division 7 Section "Joint Sealants" and recommended by glass-block grid system manufacturer.

2.4 GLASS UNIT MASONRY ACCESSORIES

- A. Plastic-Foam Expansion Strips: Polyethylene foam complying with requirements of glass-block manufacturer; **3/8 inch (9 mm)** thick by **3-1/2 inches (89 mm)** wide.
 - 1. Use plastic-foam expansion strips for non-fire-rated assemblies.
- B. Dovetail Wire Ties: Trapezoidal-shaped ties of size indicated, fabricated from **3/16-inch- (4.8-mm-)** diameter steel wire, complying with ASTM A 82; with zinc coating complying with **ASTM A 641 (ASTM A 641M)**, Class 3; attached to **0.108-inch- (2.8-mm-)** thick, galvanized strap shaped to engage dovetail slot.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine sills, jambs, and heads surrounding glass unit masonry assemblies for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Advise installers of other construction about specific requirements for placement of dovetail slots and other inserts required to anchor and support glass unit masonry assemblies. Furnish installers of other construction with Drawings or templates showing locations of these items.

3.3 GLASS-BLOCK GRID SYSTEM INSTALLATION

- A. General: Install glass-block grid systems according to manufacturer's written instructions.
- B. Window and Wall System Installation: Assemble grid system, apply continuous sealant bead to back of window Z-bar, place in position, adjust as needed to make grid level and plumb, and fasten to substrate.
 - 1. Adhere thermal-expansion tape to glass blocks and carefully insert into grid from exterior side. Install blocks firmly against T-bars without deforming thermal-expansion tape.
 - 2. Apply sealant to completely fill channel around each glass block, and tool flush with exterior surface. Remove excess sealant and smears.

3.4 CLEANING

- A. Remove excess sealants with commercial solvents of type recommended by sealant manufacturer. Exercise care not to damage sealant in joints.
- B. Perform final cleaning of glass unit masonry assemblies when surface is not exposed to direct sunlight. Start at top of panel using generous amounts of clean water. Remove water with clean, dry, soft cloths; change cloths frequently to eliminate dried mortar particles and aggregate.

END OF SECTION 04270

SECTION 05120 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the following:
1. 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.
 2. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.
 3. Refer to Division 3 for anchor bolt installation in concrete; Division 4 for masonry.
 4. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.
 - a. Promptly notify Architect, prior to bid, whenever design of members and connections for any portion of structure are not clearly indicated. Where member size is not shown, assume 2 lbs. per lineal foot of span.

1.2 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).
1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties. Structural steel members shall have heat marks corresponding with the mill certificates.
 2. High-strength tension control bolts (each type), including nuts and washers.
 3. Structural steel primer paint.
 4. Non-shrink grout.
- B. Shop Drawings: Submit shop drawings prepared under the supervision of a registered professional engineer, including anchor bolt plans and complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams. Shop drawings shall be checked by Contractor prior to submitting for approval. Unchecked shop drawings will be returned.
- C. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS A2.1 and A2.4 symbols, and show size, length, and type of each weld.
1. Provide setting drawings, templates, and directions for installation of anchor bolts and all other anchorages to be installed.

- 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.

1.3 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 the "Commentary" and Supplements thereto as issued.
 - 3. AISC "Specifications for Architecturally Exposed Structural Steel".
 - 4. 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.
 - 5. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel".
 - 6. "ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".
- B. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".
- C. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests within the last six (6) months.
 - 1. If recertification of welders is required, retesting will be Contractor's responsibility.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site in 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 delay work.
- 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 either members or supporting structures. Repair or replace damaged materials or structures as directed by the Architect.

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, rust and scale 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. Structural Steel Shapes, ASTM Grade 992.
- C. Plates and Bars ASTM A36.
- 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; or ASTM A 501.
 - 1. *Finish*: Black, except where indicated to be galvanized.
- G. Steel Castings: ASTM A 27, Grade 65-35, medium-strength carbon steel.
- H. Anchor Bolts: ASTM A 307, nonheaded type unless otherwise indicated.
- I. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts.
 - 1. Provide hexagonal heads and nuts for all connections.
- J. Electrodes for Welding: Comply with AWS Code - use E70XX unless noted otherwise.
- K. Structural Steel Primer Paint: Fabricators standard rust inhibiting primer. Do not paint steel scheduled to receive sprayed-on fireproofing.
 - 1. All exposed steel shall be galvanized.
- L. Metallic Shrinkage-Resistant Grout: Pre-mixed factory-packaged ferrous aggregate grouting compound.
 - 1. Available Projects: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. Embeco 153; Master Builders.
 - b. Ferrolith G; Sonneborn/Contech.
 - c. Kemox C; Sika Chemical.
 - d. Vibra-Foil; W. R. Grace.
- M. 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 CE-CRD-C621.
 - 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. Euco N.S.; Euclid Chemical Co.
 - b. Masterflow 713; Master Builders.
 - c. Five Star Grout; U.S. Grout Corp.

2.2 FABRICATION

- A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible or as called for on the drawings. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings.
- B. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
- C. 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.
- D. Connections: Shop weld or bolt connections, unless noted otherwise.
- E. Bolt field connections, except where welded connections or other connections are indicated.
- F. Provide high-strength tension controlled fasteners for principal bolted connections.
- G. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.
- H. Assemble and weld built-up sections by methods which will produce true alignment of axis without warp.
- I. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on shop drawings.
- J. Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.
- K. 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 FINISHES

- A. General: 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.
 - 1. Do not paint surfaces which are to be welded or high-strength bolted with friction-type connections.
 - 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.
 - 3. All exposed steel shall be galvanized.
- B. Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:
 - 1. SP-1 "Solvent Cleaning".
 - 2. SP-2 "Hand Tool Cleaning".
 - 3. SP-3 "Power Tool Cleaning".

4. SP-5 "White Metal 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 a uniform 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.
- D. Painting: Provide a one-coat shop applied paint system complying with Steel Structures Painting Council (SSPC) - Paint System Guide 7.00.

2.4 SOURCE QUALITY CONTROL

- A. Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

- 1. Promptly remove and replace materials or fabricated components which do not comply.

PART 3 - EXECUTION

3.1 ERECTION

- A. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds. Shore floor beams as indicated on structural drawings.
- B. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
- C. 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.
- D. Pack grout solidly between bearing surfaces and bases of plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
 - 1. For proprietary grout materials, comply with manufacturer's instructions.
 - 2. Setting Bases and Bearing Plates: 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. Base plates shall be grouted immediately after the structure is plumb.
- E. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
- F. Level and plumb individual members of structure within specified AISC tolerances.

- G. Establish required leveling and plumbing measurements at 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.
- H. Splice members only where indicated and accepted on shop drawings. Contractor shall provide inspection reports of welded splices.
- I. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.
- J. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
- K. Do not enlarge unfair 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.
- L. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members which are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.
- M. Touch-Up Painting: Immediately after erection erector shall clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.
- N. Apply by brush or spray to provide a minimum dry film thickness of 1.5 mils.

3.2 FIELD QUALITY CONTROL

- A. Engage an independent testing and inspection agency to inspect high-strength bolted and welded connections and to perform tests and prepare test reports. Testing shall be paid for by Contractor.
- 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, Architect 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 not acceptable.
 6. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T".
 7. Ultrasonic Inspection: ASTM E 164.
- H. Field Bolted Connections: Inspect in accordance with AISC specifications.
- I. 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.
 3. Perform tests of welds as follows as required:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 109; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable.
 - c. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T".
 - d. Ultrasonic Inspection: ASTM E 164.

END OF SECTION 05120

SECTION 05400 - COLD-FORMED METAL FRAMING

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 the following:
 - 1. Exterior load-bearing wall framing.

1.3 DEFINITIONS

- A. Minimum Uncoated Steel Thickness: Minimum uncoated thickness of cold-formed framing delivered to the Project site shall be not less than 95 percent of the thickness used in the cold-formed framing design. Lesser thicknesses shall be permitted at bends due to cold forming.
- B. Producer: Entity that produces steel sheet coil fabricated into cold-formed members.

1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
 - 1. Design Loads: As indicated.
 - a. Dead Loads: Weights of materials and construction.
 - b. Live Loads: Refer to structural drawings.
 - c. Wind Loads: Refer to structural 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 1/720 of the wall height.
 - 3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
 - 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 (13 mm).

1.5 SUBMITTALS

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

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Mill certificates signed by steel sheet producer indicating steel sheet complies with requirements, including uncoated steel thickness, yield strength, tensile strength, total elongation, chemical requirements, and galvanized-coating thickness.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
- D. Fire-Test-Response Characteristics: Where metal framing is part of a fire-resistance-rated assembly, provide framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by GA File Numbers in GA-600, "Fire Resistance Design Manual," or by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
- E. AISI Specifications: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members" for calculating structural characteristics of cold-formed metal framing[.]

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Clark Steel Framing Industries.
 - 2. Dietrich Industries, Inc.
 - 3. MarinoWare; Div. of Ware Industries, Inc.

2.2 MATERIALS

- A. Steel Sheet: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: As required by structural performance.
2. Coating: G90 (Z275).

2.3 LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, complying with ASTM C 955, and as follows:
 1. Minimum Uncoated-Steel Thickness: 0.0428 inch (1.09 mm).
 2. Flange Width: 1-5/8 inches (41 mm).
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, complying with ASTM C 955, and as follows:
 1. Minimum Uncoated-Steel Thickness: Matching steel studs.
 2. Flange Width: 1-1/4 inches (32 mm).

2.4 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33,000 psi (230 MPa).
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 1. Bracing, bridging, and solid blocking.
 2. End clips.
 3. Foundation clips.
 4. Stud kickers, knee braces, and girts.

2.5 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123.
- B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by mechanically deposition according to ASTM B 695, Class 50.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- E. Mechanical Fasteners: Corrosion-resistant-coated, self-drilling, self-threading steel drill screws.
 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035 ASTM A 780.

2.7 FABRICATION

- A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 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 screw penetrating joined members by not less than three exposed screw threads.
 - 4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of **1/8 inch in 10 feet (1:960)** and as follows:
 - 1. Spacing: Space individual framing members no more than plus or minus **1/8 inch (3 mm)** from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of **1/8 inch (3 mm)**.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed metal framing according to ASTM C 1007, unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Bolt or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding **1/16 inch (1.6 mm)**.
- D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.
 1. Cut framing members by sawing or shearing; do not torch cut.
 2. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 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 screw penetrating joined members by not less than three exposed screw threads.
- 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 comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
- H. Install insulation in built-up exterior framing 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 standard punched openings.
- J. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of **1/8 inch in 10 feet (1:960)** and as follows:
 1. Space individual framing members no more than plus or minus **1/8 inch (3 mm)** from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 LOAD-BEARING WALL INSTALLATION

- 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: 16 inches o.c..
- B. Squarely seat studs against webs of top and bottom tracks. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:
 1. Stud Spacing: **16 inches (406 mm)**.
- 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 wall-framing continuity is interrupted by floor framing. Where studs cannot be aligned, continuously reinforce track to transfer loads.
- E. Align floor and roof framing over studs. 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 as indicated.
- G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. 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 as indicated on Shop Drawings.
 - 2. Install runner 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 the dimension indicated on Shop Drawings apart. Fasten at each stud intersection.
 - 1. 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.
 - 2. 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.
- 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.

3.4 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05400

SECTION 05410 - PRE-FABRICATED LIGHT-GAUGE STEEL TRUSSES

PART 1 GENERAL

1.1_ SUMMARY

- A. Section includes pre-engineered, prefabricated and erection of light gauge cold formed steel framing elements. Work includes:
 - 1. Light Gauge cold formed steel roof trusses.
 - 2. Anchorage, bracing and bridging.
 - 3. Related work.

1.2 REFERENCES

- A. Reference Standards: ADTM A653/A653M-94 Sheet steel zinc-iron alloy-coated by the hot dip process American Welding Society (AWS).
 - 1. AWS D1.1 Structural Welding Code - Steel.
 - 2. AWS D1.3 Structural Welding Code - Sheet Steel.

1.3 SYSTEM DESCRIPTION

- A. AISI Specifications: Calculate structural characteristics of cold-formed steel truss members according to AISI's Specification for the Design of Cold-Formed Steel Structural Members, 1990.
- B. Structural Performance: Design, engineer, fabricate, and erect cold-formed steel trusses to withstand actual loads within limits and under conditions required.
 - 1. Deflections: Live load deflection limited to $L/420$.
 - 2. Total Load Deflection: limited to $L/360$.
 - 3. Design framing systems to provide for movement of framing members without damage or over-stressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change (range) of 120 deg. F.
 - 4. Design components for all live and dead and collateral loads and in addition for wind loads for 110mph in accordance with ASCE-7, IBC 2000.
- C. Fabrication and erection shall be under one contract.

1.4 SUBMITTALS

- 1. Submit manufacturer's product data and installation instructions for each type of cold-formed steel framing and accessory required. Submit shop drawings showing member, type, location, spacing, size and gage of member method of attachment to support members and all necessary erection

details, indicate supplemental bracing, strapping, splices, bridging, accessories, and details required for proper installed.

- B. Submit truss drawings, sealed and signed by a qualified registered Louisiana Registered Professional Engineer, verifying truss ability to meet local code and design requirements for Baton Rouge, Louisiana.
- C. Description of design criteria:
 - 1. Engineering analysis depicting member stresses and truss deflection.
 - 2. Truss member sizes and gauges and connections at truss joints.
 - 3. Truss support reactions.
 - 4. Top chord, bottom chord and web bracing requirements.

1.5 ENGINEERING DRAWINGS

- A. All truss designs shall bear the name and seal of a Licensed Professional Engineer registered as a Civil Engineer in the State of Louisiana.
- B. Truss designs shall include the following information: Pitch, span, dimension, and spacing of truss. Truss bearing sizes and locations. Design loading of truss. Screw type and required quantity at each joint. Size and gauge of steel required in all truss members. Permanent lateral bracing as required by design to reduce buckling length of individual truss members and for stability of overall truss roof system. Horizontal diagrams shall be designed at gabled ends to carry 300 pounds per ln. foot of wall. Handling and erection recommendations. A certified bracing plan shall be submitted for approval as part of the shop drawings.

1.6 QUALITY ASSURANCE

- A. Steel trusses shall be fabricated so as to have symmetry about the vertical axis of the truss.
- B. Cold formed steel truss system installation shall be performed by the steel truss system fabricator.
- C. Welding Standards: Comply with applicable provisions of AWS D1.1 Structural Welding Code-Steel and AWS D1.3 Structural welding Code-Sheet Steel.
- D. Qualify welding processes and welding operators in accordance with AWS Standard Qualification Procedure.

1.7 DELIVERY STORAGE AND HANDLING

- A. Deliver materials in manufacturer=s unopened containers or bundles, fully identified by name brand, type and grade. Exercise care to avoid damage during unloading, storing and erection.
- B. Store trusses on blocking, pallets, platforms or other supports off the ground and in an upright position sufficiently braced to avoid damage form excessive bending.
- C. Protect trusses and accessories form corrosion, deformation, damage and deterioration when stored at job site. Keep trusses free of dirt and other foreign matter.

1.8 PROJECT/SITE CONDITIONS

- A. During construction, adequately distribute all loads applied to trusses so as not to exceed the carrying capacity of any one truss or other component.
- B. The truss erector shall follow the guidelines as outlined in the Field Installation Guide For Cold-Formed Steel Roof Trusses as published by Light Gauge Steel Engineers Association.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. The following truss manufactures are approved:
 - 1. Apline Truss Steel, Grand Prairie, TX, 1-800-755-6005.
 - 2. Steel Source, Inc., Tyler, Texas, 1-903-581-8107.
 - 3. Steel Tech., Baton Rouge, Louisiana.
 - 4. All other suppliers require prior approval.

2.2 MATERIALS

- A. Reference Section: The design and fabrication of all steel trusses shall meet with the specifications set by the American Iron and Steel Institute (AISI) as well as any applicable codes set forth by the local governing building authority, and the Southern Building Code Congress International (SBCCI).
- B. Steel: All steel used for truss members shall be structural sections, meeting ASTM A446 Specifications. Steel is to have a minimum yield strength of 45 KSI, unless otherwise noted, and a minimum G60 galvanization.
- C. Screws: All screws used in the manufacture of steel trusses shall be exterior rated zinc coated Self-Drilling screws. Minimum shear capacity including a safety factor of 5 shall be as follows:
- D. When members of different gauges are joined, the smallest gauge should be used to determine the screw value at that point.
- E. All component gauges: Fabricate components of structural quality steel sheet per ASTM A653 with a minimum yield strength for top cord sections of 55 KSI with web material of 45 KSI steel in 18 gauge minimum thickness.
- F. Bracing, Bridging, and Blocking Members: Fabricate components of commercial quality steel sheet per ASTM A653 with a minimum yield strength of 33,000 psi.
- G. Steel truss components: Provide sizes, shapes, and gauges indicated and as required by design.
- H. Design Uncoated-Steel Thickness: 20 ga. (Minimum)
- I. Finish: Provide components with protective zinc coating complying with ASTM A653, minimum G60.

- J. Fastenings: manufacturer recommended self-drilling, self-tapping screws with exterior rated zinc plated finish. Fasteners shall be of sufficient size and number to ensure the strength of the connection.
- K. Welding: Comply with AWS D1.1 when applicable and AWS D1.3 for welding base metals less than 1/8" thick.
- L. Other fasteners as accepted by truss engineer.

2.3 FABRICATION

- A. Factory fabricate cold-formed steel trusses plumb, square, true to line, and with connections securely fastened, according to manufacturer=s recommendations and the requirements of this Section.
- B. Fabricate truss assemblies in jig templates.
- C. Cut truss members by sawing or shearing or plasma cutting. Truss members shall be properly placed in special jigs, holding the members uniformly in place, until the joints have been completely connected with the required number of screw fasteners.
- D. Fasten cold-formed steel truss members by welding or screw fastening, or other methods as standard with fabricator. Wire tying of framing members is not permitted.
- E. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- F. Locate mechanical fasteners and install according to cold-formed steel truss component manufacturer=s instructions with screw penetrating joined members by not less than 3 exposed screw threads.
- G. Care shall be taken during handling, delivery and erection. Brace, block, or reinforce truss as necessary to minimize member and connection stresses.
- H. Fabricate units to maximize variance tolerance from level, true and plumb of 1/8" in ten feet.
- I. Truss construction on job-site is strictly forbidden. They shall be manufactured by experienced workmen, using precision truss fabricating equipment, under the direct supervision of a qualified foreman. All trusses shall be fabricated under strict rules of inspection and quality control as the local codes may require.

PART 3 EXECUTION

3.1 HANDLING, ERECTION, AND BRACING

- A. Engineering framing anchors and/or truss hangers shall be provided by the contractor in accordance with design requirements.
- B. Field erection of the trusses, including items such as proper handling, safety precautions, temporary erection bracing to prevent toppling or dominoing of the trusses during erection, and any other safeguards or procedures consistent with good workmanship and good building erection practices, shall be the responsibility of the General Contractor and/or the Erection Contractor.

- C. During the entire construction period, all contractors shall provide means for adequate distribution of concentrated loads so that carrying capacity of any one truss and/or other components is not exceeded.
- D. Proper erection bracing shall be installed to hold the truss true and plumb and in safe condition until permanent truss bracing and bridging can be solidly fastened in place to form a structurally sound framing system. All erection and permanent bracing shall be installed and all components permanently fastened before the application of any loads.
- E. The permanent structural cross-bracing to ensure the overall rigidity of the roof system, shall be the responsibility of the Truss Supplier and Contractor. Provide a certified bracing plan for approval as part of the shop drawing submittal.

3.2 INSTALLATION

- A. Install metal framing systems in accordance with manufacturer=s printed or written instruction and recommendations.
- B. Installation of truss: Secure to structures, weld symmetrically on both sides of truss, or provide symmetrical connection hardware as required.
- C. Set trusses plumb where truss system abuts structural columns or walls, including masonry walls, anchor ends of stiffeners to supporting structure.
- D. Install supplementary framing, blocking, and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with manufacturer=s recommendations and industry standards in each case, considering weight or loading resulting from item supported.
- E. It is the responsibility of the General Contractor and Sub-Contractor to insure that fabricated trusses shall be handled, stored, and installed in such a manner that they are not subjected to damage. If it is necessary to store trusses prior to installation, the trusses must be stored in a vertical position with adequate bearing points and bracing to prevent tripping or racking. Proper handling, safety precautions, and other procedures consistent with good installation practices must be observed by all sub-contractors and their employees. Installation bracing shall hold trusses straight and plumb and in safe condition until decking and permanent truss bracing has been fastened forming a structurally sound framing system. All sub-contractors shall employ proper construction procedures to insure adequate distribution of temporary construction loads so that the carrying capacity of any single truss, or group of trusses, is not exceeded. All temporary and permanent bracing shall be installed and all trusses permanently fastened before application of any loads. Permanent structural bracing shall be installed prior to subjecting the structure to additional loads.
- F. Chord and web members SHALL NOT be removed, cut, punched, or altered without the prior approval of the truss design engineer. Damaged chords, webs, or complete trusses shall be repaired or replaced as directed and approved by a registered Professional Engineer. The repair or replacement detail(s) shall be approved by a registered Professional Engineer prior to installation or application of the repair or replacement.
- G. Weld 12 gauge minimum connectors to attach trusses to structure. Provide structural brackets on both sides of each bearing point. Prime all field welds with zinc chromate liquid galvanizing coating.

END OF SECTION 05410

SECTION 05500 - METAL FABRICATIONS

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 the following metal fabrications:
 - 1. Rough hardware.
 - 2. Cell fronts and doors.
 - 3. Loose bearing and leveling plates.
 - 4. Loose steel lintels.
 - 5. Shelf and relieving angles.
 - 6. Miscellaneous framing and supports for the following:
 - a. Applications where framing and supports are not specified in other sections.
 - 7. Miscellaneous steel trim, including the following:
 - 8. Floor plate and supports.
 - 9. Tread plate and supports.
 - 10. Cast thresholds.
 - 11. Extruded nosings and treads.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 5 Section "Structural Steel" for structural steel framing system components.
 - 2. Division 5 Section "Metal Stairs" for metal framed stairs with metal pan, metal plate, or grating treads.
 - 3. Division 5 Section "Pipe and Tube Railings" for metal pipe and tube handrails and railing systems.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for nonslip aggregates and nonslip aggregate surface finishes, prefabricated building columns, cast nosings, treads and thresholds, steel floor plate, paint products, and grout.
- C. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
- D. Samples representative of materials and finished products as may be requested by Architect.
- E. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.
- F. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include a list of completed projects with project name, addresses, names of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced in producing metal fabrications similar to those indicated for this Project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the Work.
- B. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel," AWS D1.2 "Structural Welding Code--Aluminum," and AWS D1.3 "Structural Welding Code--Sheet Steel."
 - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

PART 2 - PRODUCTS

2.1 FERROUS METALS

- A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Rolled Steel Floor Plates: ASTM A 786/A 786M.
- D. Steel Tubing: Product type (manufacturing method) and as follows:
 - 1. Cold-Formed Steel Tubing: ASTM A 500.
 - 2. Hot-Formed Steel Tubing: ASTM A 501.
- E. Steel Pipe: ASTM A 53, standard weight (schedule 40), unless otherwise indicated, or another weight required by structural loads.
 - 1. Black finish, unless otherwise indicated.
- F. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 (ASTM A 47M) malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.

- G. Welding Rods and Bare Electrodes: Select according to AWS specifications for the metal alloy to be welded.

2.2 PAINT

- A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements of FS TT-P-664, selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
- B. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.3 FASTENERS

- A. General: Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568, Property Class 4.6), with hex nuts, ASTM A 563 (ASTM A 563M), and, where indicated, flat washers.
- C. Machine Screws: ANSI B18.6.3.
- D. Lag Bolts: ANSI B18.2.1 (ANSI B18.2.3.8M).
- E. Wood Screws: Flat head, carbon steel, ANSI B18.6.1.
- F. Plain Washers: Round, carbon steel, ANSI B18.22.1 (ANSI B18.22M).
- G. Lock Washers: Helical, spring type, carbon steel, ANSI B18.21.1.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
 - 1. Material: Carbon steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material: Group 1 alloy 304 or 316 stainless-steel bolts and nuts complying with ASTM F 593 (ASTM F 738M) and ASTM F 594 (ASTM F 836M).
- I. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as required.

2.4 GROUT

- A. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.
- B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- C. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Nonshrink, Metallic Grouts:

- a. Supreme Plus; Cormix Construction Chemicals.
 - b. Hi Mod Grout; Euclid Chemical Co.
 - c. Embeco 885 and 636; Master Builders Technologies, Inc.
 - d. Ferrolith G Redi-Mix and G-NC; Sonneborn Building Products--ChemRex, Inc.
 - e. Met-ox; The Spray-Cure Company.
2. Nonsrink, Nonmetallic Grouts:
- a. B-6 Construction Grout; W. R. Bonsal Co.
 - b. Diamond-Crete Grout; Concrete Service Materials Co.
 - c. Supreme; Cormix Construction Chemicals.
 - d. Sure-grip High Performance Grout; Dayton Superior Corp.
 - e. Euco N-S Grout; Euclid Chemical Co.
 - f. Five Star Grout; Five Star Products.
 - g. Vibropruf #11; Lambert Corp.
 - h. Crystex; L & M Construction Chemicals, Inc.
 - i. Masterflow 928 and 713; Master Builders Technologies, Inc.
 - j. Sealtight 588 Grout; W. R. Meadows, Inc.
 - k. SonogROUT 14; Sonneborn Building Products--ChemRex, Inc.
 - l. Kemset; The Spray-Cure Company.

2.5 CONCRETE FILL

- A. Concrete Materials and Properties: Comply with requirements of Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless higher strengths are indicated.

2.6 FABRICATION, GENERAL

- A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.
1. Temperature Change (Range): 100 deg F (55.5 deg C).
- D. Shear and punch metals cleanly and accurately. Remove burrs.
- E. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- F. Remove sharp or rough areas on exposed traffic surfaces.
- G. Weld corners and seams continuously to comply with the following:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.
- H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- K. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- L. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.7 ROUGH HARDWARE

- A. Furnish bent, or otherwise custom-fabricated, bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.
- B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts that bear on wood structural connections, and furnish steel washers elsewhere.

2.8 LOOSE BEARING AND LEVELING PLATES

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

2.9 LOOSE STEEL LINTELS

- A. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Weld adjoining members together to form a single unit where indicated.
- C. Size loose lintels for equal bearing of 1 inch per foot (85 mm per meter) of clear span but not less than 8 inches (200 mm) bearing at each side of openings, unless otherwise indicated.
- D. Galvanize loose steel lintels located in exterior walls.

2.10 SHELF AND RELIEVING ANGLES

- A. Fabricate shelf and relieving angles from steel angles of sizes indicated and for attachment to concrete framing. Provide slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6

inches (150 mm) from ends and not more than 24 inches (600 mm) o.c., unless otherwise indicated.

- B. For cavity walls, provide vertical channel brackets to support shelf/relieving angles from back-up masonry and concrete. Align expansion joints in angles with indicated control and expansion joints in cavity wall exterior wythe.
- C. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.11 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports for applications indicated that are not a part of structural steel framework as required to complete the Work.
- B. Fabricate units to sizes, shapes, and profiles indicated and required to receive other adjacent construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
 - a. Except as otherwise indicated, space anchors 24 inches (600 mm) o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches (32 mm) wide by 1/4 inch (6 mm) thick by 8 inches (200 mm) long.
 - 2. Interior locations where indicated.

2.12 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from structural steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices wherever possible.
- B. Provide cutouts, fittings, and anchorages as required to coordinate assembly and installation with other work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches (150 mm) from each end, 6 inches (150 mm) from corners, and 24 inches (600 mm) o.c., unless otherwise indicated.
- C. Galvanize miscellaneous steel trim in the following locations:
 - 1. Exterior locations.
 - 2. Interior locations where indicated.

2.13 FLOOR PLATE

- A. Fabricate raised-pattern floor plates from rolled-steel floor plate of thickness and in pattern indicated below:
 - 1. Thickness: As indicated.
 - 2. Pattern: As selected from manufacturer's standard patterns.
- B. Include steel angle stiffeners, and fixed and removable sections as indicated.
 - 1. Provide 2 steel bar drop handles for lifting plates, 1 at each end of each removable section.

2.14 FINISHES, GENERAL

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designing finishes.
- B. Finish metal fabrications after assembly.

2.15 STEEL AND IRON FINISHES

- A. Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot-dip process complying with the following requirements:
 - 1. ASTM A 153 for galvanizing iron and steel hardware.
 - 2. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch (0.76 mm) thick or thicker.
- B. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1B): SSPC-SP 6 "Commercial Blast Cleaning."
 - 2. Interiors (SSPC Zone 1A): SSPC-SP 3 "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA 1 "Paint Application Specification No. 1" for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.
- B. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.2 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.

- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
- E. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.3 SETTING LOOSE PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
- B. Set loose leveling and bearing plates on wedges or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout.
 - 1. Use nonshrink, metallic grout in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 INSTALLING THRESHOLDS

- B. Install with anchorage system indicated to comply with manufacturer's recommendations.
- C. Seal thresholds exposed to exterior with elastomeric sealant complying with Division 7 Section "Joint Sealants" to provide a watertight installation.

3.5 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a 2.0-mil (0.05-mm) minimum dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal is specified in Division 9 Section "Painting."

END OF SECTION 05500

SECTION 05511 - METAL STAIRS

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 the following:
1. Preassembled steel stairs with concrete-filled treads.
 2. Railings attached to metal stairs.
 3. Handrails attached to walls adjacent to metal stairs.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Stairs: Provide metal stairs capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Uniform Load: **100 lbf/sq. ft. (4.79 kN/sq. m)**.
 2. Concentrated Load: **300 lbf (1.33 kN)** applied on an area of **4 sq. in. (2580 sq. mm)**.
 3. Uniform and concentrated loads need not be assumed to act concurrently.
 4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
 5. Limit deflection of treads, platforms, and framing members to L/360 or **1/4 inch (6.4 mm)**, whichever is less.
- B. Structural Performance of Railings: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Handrails:
 - a. Uniform load of **50 lbf/ ft. (0.73 kN/m)** applied in any direction.
 - b. Concentrated load of **200 lbf (0.89 kN)** applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 2. Top Rails of Guards:
 - a. Uniform load of **50 lbf/ ft. (0.73 kN/m)** applied in any direction.
 - b. Concentrated load of **200 lbf (0.89 kN)** applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 3. Infill of Guards:
 - a. Concentrated load of **50 lbf (0.22 kN)** applied horizontally on an area of **1 sq. ft. (0.093 sq. m)**.
 - b. Infill load and other loads need not be assumed to act concurrently.

1.4 SUBMITTALS

- A. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Provide templates for anchors and bolts specified for installation under other Sections.
 - 2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.
 - 1. Preassembled Stairs: Commercial class.
- C. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."
 - 2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.6 COORDINATION

- A. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Coordinate locations of hanger rods and struts with other work so that they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A 513, Type 5 (mandrel drawn).

- C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- D. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, either commercial steel, Type B, or structural steel, **Grade 30 (Grade 205)**, unless another grade is required by design loads.

2.3 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 25 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, **ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6)**; with hex nuts, **ASTM A 563 (ASTM A 563M)**; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36.
 - 1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts for stairs indicated to be shop primed with zinc-rich primer.
- D. Machine Screws: **ASME B18.6.3 (ASME B18.6.7M)**.
- E. Lag Bolts: **ASME B18.2.1 (ASME B18.2.3.8M)**.
- F. Plain Washers: Round, **ASME B18.22.1 (ASME B18.22M)**.
- G. Lock Washers: Helical, spring type, **ASME B18.21.1 (ASME B18.21.2M)**.
- H. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material for Anchors in Exterior Locations: Alloy Group **1 (A1)** stainless-steel bolts complying with **ASTM F 593 (ASTM F 738M)** and nuts complying with **ASTM F 594 (ASTM F 836M)**.

2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Shop Primers: Provide primers that comply with Division 9 painting Sections.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

- E. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless otherwise indicated.
- F. Welded Wire Fabric: ASTM A 185, 6 by 6 inches (152 by 152 mm)--W1.4 by W1.4, unless otherwise indicated.

2.5 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 - 1. Join components by welding, unless otherwise indicated.
 - 2. Use connections that maintain structural value of joined pieces.
 - 3. Fabricate treads and platforms of exterior stairs so finished walking surfaces slope to drain.
- B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- E. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- F. Weld connections to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Weld exposed corners and seams continuously, unless otherwise indicated.
 - 5. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.
- H. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.6 STEEL-FRAMED STAIRS

- A. Stair Framing:

1. Fabricate stringers of steel channels.
 - a. Provide closures for exposed ends of channel stringers.
 2. Construct platforms of steel channel headers and miscellaneous framing members as needed to comply with performance requirements indicated.
 3. Weld stringers to headers; weld framing members to stringers and headers.
 4. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.
- B. Metal-Pan Stairs: Form risers, subtread pans, and subplatforms to configurations shown from steel sheet of thickness needed to comply with performance requirements but not less than **0.0677 inch (1.7 mm)**.
1. Steel Sheet: Uncoated hot-rolled steel sheet, unless otherwise indicated.
 2. Directly weld metal pans to stringers; locate welds on top of subtreads where they will be concealed by concrete fill. Do not weld risers to stringers.
 3. Attach risers and subtreads to stringers with brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting, or bolting.
 4. Shape metal pans to include nosing integral with riser.

2.7 STEEL TUBE RAILINGS

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.
1. Configuration: **1-5/8-inch- (41-mm-) diameter** top and bottom rails, **1-1/2-inch- (38-mm-) square posts**, and **1/2-inch- (13-mm-) square pickets** spaced less than **4 inches (100 mm)** clear.
- B. Welded Connections: Fabricate railings with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
- C. Form changes in direction of railings as follows:
1. As detailed.
- D. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- E. Close exposed ends of railing members with prefabricated end fittings.
- F. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is **1/4 inch (6 mm)** or less.
- G. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.
1. Connect posts to stair framing by direct welding, unless otherwise indicated.

2. For nongalvanized railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.
- H. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.8 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal stairs after assembly.
- C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed products:
 1. Interior Stairs (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
- D. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Install metal stairs by welding stair framing to steel structure or to weld plates embedded into cmu, unless otherwise indicated.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- F. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- G. Place and finish concrete fill for treads and platforms to comply with Division 3 Section "Cast-in-Place Concrete."

3.2 INSTALLING METAL STAIRS WITH GROUTED BASEPLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of baseplates.
- B. Set steel stair baseplates on wedges, shims, or leveling nuts. After stairs have been positioned and aligned, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
1. Use nonmetallic, nonshrink grout, unless otherwise indicated.
 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 INSTALLING STEEL TUBE RAILINGS

- A. Adjust railing systems before anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loads. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:
1. Anchor posts to steel by welding directly to steel supporting members.
 2. Anchor handrail ends to concrete and masonry with steel round flanges welded to rail ends and anchored with postinstalled anchors and bolts.
- B. Attach handrails to wall with wall brackets. Provide bracket with **1-1/2-inch (38-mm)** clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets to building construction as follows:
1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
 2. Use type of bracket with predrilled hole for exposed bolt anchorage.
 3. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 4. For hollow masonry anchorage, use toggle bolts.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 painting Sections.

END OF SECTION 05511

SECTION 06100 - MISCELLANEOUS CARPENTRY

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 the following:
 - 1. Rooftop equipment bases and support curbs.
 - 2. Wood blocking and nailers.
 - 3. Wood furring.

1.3 DEFINITIONS

- A. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. SPIB - Southern Pine Inspection Bureau.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
 - 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 - 3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for **2-inch nominal (38-mm actual)** thickness or less, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA C2 (lumber), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and the following:
 - a. Chromated copper arsenate (CCA).
- B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

2.3 MISCELLANEOUS LUMBER

- A. General: Provide lumber for support or attachment of other construction, including the following:
 1. Rooftop equipment bases and support curbs.
 2. Blocking.
 3. Cants.
 4. Nailers.
 5. Furring.
- B. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with 19 percent maximum moisture content and the following species:
 1. Mixed southern pine; SPIB.
- C. For exposed boards, provide lumber with 19 percent maximum moisture content and the following species and grades:
 1. Mixed southern pine, B & B Finish grade; SPIB.

- D. For concealed boards, provide lumber with 19 percent maximum moisture content and the following species and grades:

- 1. Mixed southern pine, No. 2 grade; SPIB.

2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

- 1. Where carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

- B. Nails, Wire, Brads, and Staples: FS FF-N-105.

- C. Power-Driven Fasteners: CABO NER-272.

- D. Wood Screws: ASME B18.6.1.

- E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

- F. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

- C. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

- D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.

- E. Countersink fastener heads on exposed carpentry work and fill holes with wood filler.

- F. Use fasteners of appropriate type and length. Pre-drill members when necessary to avoid splitting wood.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
 - 1. Fire block furred spaces of walls, at each floor level and at ceiling, with wood blocking or noncombustible materials accurately fitted to close furred spaces.

END OF SECTION 06100

SECTION 06402 - INTERIOR ARCHITECTURAL WOODWORK

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 the following:
 - 1. Wood cabinets.
 - 2. Plastic-laminate cabinets.
 - 3. Plastic-laminate countertops.

1.3 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items, unless concealed within other construction before woodwork installation.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated, including cabinet hardware and accessories,.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 2. Show locations and sizes of cutouts and holes for plumbing fixtures, and other items installed in architectural woodwork.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed architectural woodwork 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.
- B. Fabricator Qualifications: A firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production and installation of interior architectural woodwork.
- D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork, construction, finishes, and other requirements.

1. Provide AWI Quality Certification Program certificate indicating that woodwork complies with requirements of grades specified.

1.6 DELIVERY, STORAGE, AND HANDLING

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

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork 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. Field Measurements: Where woodwork is 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 woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.

1.8 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Wood Species and Cut for Transparent Finish: White birch, plain sawn or sliced.
- C. Wood Species for Opaque Finish: Any closed-grain hardwood.
- D. Wood Products: Comply with the following:
 1. Medium-Density Fiberboard: ANSI A208.2, Grade MD
 2. Softwood Plywood: DOC PS 1, Medium Density Overlay.
 3. Hardwood Plywood and Face Veneers: HPVA HP-1.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.
 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high-pressure decorative laminates that may be incorporated into the Work include, but are not limited to, the following:

- a. Formica Corporation.
- b. Wilsonart International; Div. of Premark International, Inc.

2.2 CABINET HARDWARE AND ACCESSORIES

- A. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 170 degrees of opening, self-closing.
- C. Wire Pulls: Back mounted, 4 inches (100 mm) long, 5/16 inches (8 mm) in diameter.
- D. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
- E. Drawer Slides: Side-mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings, BHMA A156.9, B05091, and rated for the following loads:
 1. Box Drawer Slides: 75 lbf (330 N)
 2. File Drawer Slides: 150 lbf (670 N).
 3. Pencil Drawer Slides: 45 lbf (200 N).
 4. Keyboard Slide: 75 lbf (330 N).
- F. Grommets for Cable Passage through Countertops: 1-1/4-inch (32-mm) OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.
- G. 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.
- H. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.3 INSTALLATION 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 nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.4 FABRICATION, GENERAL

- A. Interior Woodwork Grade: Provide Custom grade interior woodwork complying with the referenced quality standard.
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
- C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members **3/4 Inch (19 mm)** Thick or Less: **1/16 inch (1.5 mm)**.
- D. Complete fabrication, including assembly, finishing, 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.
- E. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, 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.
1. Seal edges of openings in countertops with a coat of varnish.

2.5 WOOD CABINETS FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with AWI Section 400 requirements for wood cabinets.
- B. Grade: Premium.
- C. Wood Species and Cut for Exposed Surfaces: White birch, plain sawn or sliced.
1. Matching of Veneer Leaves: Random match.
- D. Semiexposed Surfaces: Provide surface materials indicated below:
1. Surfaces Other Than Drawer Bodies: Match species and cut indicated for exposed surfaces.
 2. Drawer Sides and Backs: Solid-hardwood lumber, same species indicated for exposed surfaces.
 3. Drawer Bottoms: Hardwood plywood.

2.6 WOOD CABINETS FOR OPAQUE FINISH

- A. Quality Standard: Comply with AWI Section 400 requirements for wood cabinets.
- B. Grade: Custom.
- C. Species for Exposed Lumber Surfaces: Any closed-grain hardwood.
- D. Panel Product for Exposed Surfaces: Medium-density fiberboard.
- E. Semiexposed Surfaces: Provide surface materials indicated below:
1. Surfaces Other Than Drawer Bodies: Match materials indicated for exposed surfaces.
 2. Drawer Sides and Backs: Solid-hardwood lumber.
 3. Drawer Bottoms: Hardwood plywood.

2.7 PLASTIC-LAMINATE CABINETS

- A. Quality Standard: Comply with AWI Section 400 requirements for laminate cabinets.
- B. Grade: Premium.

- C. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
 - 1. Horizontal Surfaces Other Than Tops: HGL.
 - 2. Postformed Surfaces: HGP.
 - 3. Vertical Surfaces: VGS.
 - 4. Edges: VGS.

- D. Materials for Semiexposed Surfaces: Provide surface materials indicated below:
 - 1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, Grade VGS.
 - 2. Drawer Sides and Backs: Solid-hardwood lumber.
 - 3. Drawer Bottoms: Hardwood plywood.

- E. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. Provide Architect's selections from laminate manufacturer's full range of colors and finishes in the following categories:
 - a. Patterns.

2.8 PLASTIC-LAMINATE COUNTERTOPS

- A. Quality Standard: Comply with AWI Section 400 requirements for high-pressure decorative laminate countertops.

- B. High-Pressure Decorative Laminate Grade: HGS.

- C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. Provide Architect's selections from manufacturer's full range of colors and finishes in the following categories:
 - a. Patterns.

- D. Edge Treatment: Same as laminate cladding on horizontal surfaces.

- E. Core Material: Exterior-grade plywood.

- F. Core Material at Sinks: exterior-grade plywood.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas before installation.

- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.
- B. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of **1/8 inch in 96 inches (3 mm in 2400 mm)**.
- C. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
- D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- E. 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. Maintain veneer sequence matching of cabinets with transparent finish.
- F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 1. Install countertops 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. Secure backsplashes to tops with concealed metal brackets at **16 inches (400 mm)** o.c. and to walls with adhesive.
 - 3. Calk space between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants."

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork, 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 woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06402

SECTION 07210 - BUILDING INSULATION

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 the following:
 - 1. Concealed building insulation.
 - 2. Exposed building insulation.
- B. Related Sections include the following:
 - 1. Division 4 Section "Unit Masonry Assemblies" for insulation installed in cavity walls.
 - 2. Division 7 Section "Foamed-in Place Insulation" for insulation installed in concrete masonry unit cores.
 - 3. Division 7 Section "SBS-Modified Bituminous Membrane Roofing" for insulation specified as part of roofing construction.
 - 4. Division 9 Section "Gypsum Board Assemblies" for insulation installed as part of metal-framed wall and partition assemblies.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Fire-Resistance Ratings: ASTM E 119.
 - 3. Combustion Characteristics: ASTM E 136.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Glass-Fiber Insulation:
 - a. CertainTeed Corporation.
 - b. Johns Manville Corporation.
 - c. Knauf Fiber Glass.
 - d. Owens Corning.

2.2 INSULATING MATERIALS

- A. General: Provide insulating materials that comply with requirements and with referenced standards.
1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.
- B. Unfaced, Flexible Glass-Fiber Board Insulation (lining interior walls of all mechanical rooms): ASTM C 612, Type IA; ASTM C 553, Types I, II, and III; or ASTM C 665, Type I; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively; and of the following properties:
1. Nominal density of not less than 1.5 lb/cu. ft. (24 kg/cu. m) nor more than 1.7 lb/cu. ft. (26 kg/cu. m), thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F (27.7 K x m/W at 24 deg C).
 2. Combustion Characteristics: Passes ASTM E 136.
- C. Unfaced Mineral-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from glass; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

2.3 INSULATION FASTENERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
1. Adhesively Attached, Spindle-Type Anchors:
 - a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
 - b. Eckel Industries of Canada Limited; Stic-Klip Type N Fasteners.
 - c. Gemco; Spindle Type.
 2. Insulation-Retaining Washers:
 - a. AGM Industries, Inc.; RC150.
 - b. AGM Industries, Inc.; SC150.
 - c. Gemco; Dome-Cap.

- d. Gemco; R-150.
 - e. Gemco; S-150.
3. Anchor Adhesives:
- a. AGM Industries, Inc.; TACTOO Adhesive.
 - b. Eckel Industries of Canada Limited; Stic-Klip Type S Adhesive.
 - c. Gemco; Tuff Bond Hanger Adhesive.
- B. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:
1. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
 2. Spindle: Copper-coated, low carbon steel, fully annealed, 0.105 inch (2.67 mm) in diameter, length to suit depth of insulation indicated.
- C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.
1. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
 - a. Mechanical rooms.
- D. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulations or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow.

- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- E. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:
 - 1. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 - 2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.
- C. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
 - 1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
 - 2. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
 - 3. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

3.5 PROTECTION

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

END OF SECTION 07210

SECTION 07311 - ASPHALT SHINGLES

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 the following:
 - 1. Asphalt shingles.
 - 2. Felt underlayment.
 - 3. Self-adhering sheet underlayment.

1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of asphalt shingle, ridge and hip cap shingles indicated.
 - 1. Include similar Samples of trim and accessories involving color selection.
- C. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain ridge and hip cap shingles felt underlayment and self-adhering sheet underlayment through one source from a single asphalt shingle manufacturer.
- B. Fire-Test-Response Characteristics: Provide asphalt shingle and related roofing materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Exterior Fire-Test Exposure: Class A; ASTM E 108 or UL 790, for application and roof slopes indicated.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store roofing materials in a dry, well-ventilated, weathertight location according to asphalt shingle manufacturer's written instructions. Store underlayment rolls on end on pallets or other raised surfaces. Do not double-stack rolls.

1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.

B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt shingle roofing to be performed according to manufacturer's written instructions and warranty requirements.

1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

1.8 WARRANTY

A. Installer's Project Warranty: Roofing Installer's warranty, on warranty form at end of this Section, signed by roofing Installer and general contractor, covering Work of this Section, in which roofing Installer agrees to repair or replace components of asphalt shingle roofing that fail in materials or workmanship within the following warranty period:

1. Warranty Period: Two years from date of Substantial Completion.

B. Manufacturer's Special Project Warranty: Roofing Manufacturer's warranty, signed by roofing Manufacturer, covering Work of this Section, in which roofing manufacturer agrees to repair or replace components of asphalt shingle roofing that fail in materials or workmanship within the following warranty period. This warranty specifically covers materials, labor, tear-off, disposal and workmanship for the entire warranty period.

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

- A. Laminated-Strip Asphalt Shingles: ASTM D 3462, laminated, multi-ply overlay construction, glass-fiber reinforced, mineral-granule surfaced, and self-sealing.

1. Products:
 - a. CertainTeed Corporation, Landmark 30;
 - b. GAF Materials Corporation; Timberline Select 30.
2. Strip Size: Manufacturer's standard.
3. Algae Resistance: Granules treated to resist algae discoloration.
4. Color and Blends: As selected by Architect from manufacturer's full range.

- B. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

2.3 UNDERLAYMENT MATERIALS

- A. Felts: ASTM D 226 or ASTM D 4869, Type II, asphalt-saturated organic felts, nonperforated.

- B. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970, minimum of **40-mil- (1.0- mm-)** thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release paper backing; cold applied. Provide primer for adjoining concrete or masonry surfaces to receive underlayment.

1. Products:
 - a. Grace, W. R. & Co.; Grace Ice and Water Shield.
 - b. Johns Manville International, Inc.; Roof Defender.
 - c. Note: Paragraph 1.5A requires that all products be from a single source. The installer may install a self-adhering sheet underlayment by one of the manufacturers listed above if a notarized letter is received from the manufacturer of the shingle indicating that this deviation will not void the warranty provisions listed in this specification section.
 - d. Or equal product by Certainteed or GAF.

2.4 ACCESSORIES

- A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.

- B. Roofing Nails: ASTM F 1667; stainless-steel, or hot-dip galvanized steel wire shingle nails, minimum **0.120-inch- (3-mm-)** diameter, **ring shank**, sharp-pointed, with a minimum **3/8-inch- (9.5-mm-)** diameter flat head and of sufficient length to penetrate **3/4 inch (19 mm)** into plywood decking. Nails shall not touch or penetrate the metal deck

1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

- C. Felt Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized steel wire with low profile capped heads or disc caps, **1-inch (25-mm)** minimum diameter.

2.5 METAL FLASHING AND TRIM

- A. Sheet Metal Flashing and Trim: Comply with requirements in Division 7 Section "Sheet Metal Flashing and Trim."
 - 1. Sheet Metal: Prepainted, metallic-coated steel.
- B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item.
 - 1. Apron Flashings: Fabricate with lower flange a minimum of **5 inches (125 mm)** over and **4 inches (100 mm)** beyond each side of downslope asphalt shingles and **6 inches (150 mm)** up the vertical surface.
 - 2. Step Flashings: Fabricate with a headlap of **2 inches (50 mm)** and a minimum extension of **5 inches (125 mm)** over the underlying asphalt shingle and up the vertical surface.
 - 3. Cricket Flashings: Fabricate with concealed flange extending a minimum of **24 inches (600 mm)** beneath upslope asphalt shingles and **6 inches (150 mm)** beyond each side of roof curb and **6 inches (150 mm)** above the roof plane.
 - 4. Open Valley Flashings: Fabricate in lengths not exceeding **10 feet (3 m)** with **1-inch- (25-mm-)** high inverted-V profile at center of valley and equal flange widths of **12 inches (300 mm)**.
 - 5. Drip Edges: Fabricate in lengths not exceeding **10 feet (3 m)** with **2-inch (50-mm)** roof deck flange and **2-inch** fascia flange with **3/8-inch (9.6-mm)** drip at lower edge.
- C. Vent Pipe Flashings: ASTM B 749, Type L51121, at least **1/16 inch (1.6 mm)** thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof and extending at least **4 inches (100 mm)** from pipe onto roof.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - 1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provision has been made for flashings and penetrations through asphalt shingles.
 - 3. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. Single-Layer Felt Underlayment: Install single layer of felt underlayment on roof deck perpendicular to roof slope in parallel courses. Lap sides a minimum of **2 inches (50 mm)** over

underlying course. Lap ends a minimum of **4 inches (100 mm)**. Stagger end laps between succeeding courses at least **72 inches (1830 mm)**. Fasten with felt underlayment roofing nails.

1. Install felt underlayment on roof deck not covered by self-adhering sheet underlayment. Lap sides of felt over self-adhering sheet underlayment not less than **3 inches (75 mm)** in direction to shed water. Lap ends of felt not less than **6 inches (150 mm)** over self-adhering sheet underlayment.
- B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install at locations indicated below lapped in direction to shed water. Lap sides not less than **3-1/2 inches (89 mm)**. Lap ends not less than **6 inches (150 mm)** staggered **24 inches (600 mm)** between courses. Roll laps with roller. Cover underlayment within seven days.
1. Eaves: Extend from edges of eaves **24 inches (600 mm)** beyond interior face of exterior wall.
 2. Rakes: Extend from edges of rake **24 inches (600 mm)** beyond interior face of exterior wall.
 3. Valleys: Extend from lowest to highest point **18 inches (450 mm)** on each side.
 4. Hips: Extend **18 inches (450 mm)** on each side.
 5. Ridges: Extend **36 inches (914 mm)** on each side.
 6. Sidewalls: Extend beyond sidewall **18 inches (450 mm)** and return vertically against sidewall not less than **4 inches (100 mm)**.
 7. Dormers, Chimneys, Skylights, and other Roof-Penetrating Elements: Extend beyond penetrating element **18 inches (450 mm)** and return vertically against penetrating element not less than **4 inches (100 mm)**.

Note: The contractor shall install a self-adhering sheet underlayment beneath all shingle roofs with a slope of 3:12 or less.

- C. Metal-Flashed Open Valley Underlayment: Install two layers of **36-inch- (914-mm-)** wide felt underlayment centered in valley. Stagger end laps between layers at least **72 inches (1830 mm)**. Lap ends of each layer at least **12 inches (300 mm)** in direction to shed water, and seal with asphalt roofing cement. Fasten each layer to roof deck with nails.
1. Lap roof deck felt underlayment over first layer of valley felt underlayment at least **6 inches (150 mm)**.

3.3 METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal to comply with requirements in Division 7 Section "Sheet Metal Flashing and Trim."
1. Install metal flashings according to recommendations in ARMA's "Residential Asphalt Roofing Manual" and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
- B. Apron Flashings: Extend lower flange over and beyond each side of downslope asphalt shingles and up the vertical surface.
- C. Step Flashings: Install with a headlap of **2 inches (50 mm)** and extend over the underlying asphalt shingle and up the vertical surface. Fasten to roof deck only.
- D. Cricket Flashings: Install against the roof-penetrating element extending concealed flange beneath upslope asphalt shingles and beyond each side.

- E. Open Valley Flashings: Install centrally in valleys, lapping ends at least **8 inches (200 mm)** in direction to shed water. Fasten upper end of each length to roof deck beneath overlap.
 - 1. Secure hemmed flange edges into metal cleats spaced **12 inches (300 mm)** apart and fastened to roof deck.
- F. Rake Drip Edges: Install rake drip edge flashings over underlayment and fasten to roof deck.
- G. Eave Drip Edges: Install eave drip edge flashings below underlayment and fasten to roof sheathing.
- H. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

3.4 ASPHALT SHINGLE INSTALLATION

- A. Install asphalt shingles according to manufacturer's written instructions, recommendations in ARMA's "Residential Asphalt Roofing Manual," and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
- B. Install starter strip along lowest roof edge, consisting of an asphalt shingle strip with self-sealing strip face up at roof edge.
 - 1. Extend asphalt shingles **1/2 inch (13 mm)** over fascia at eaves and rakes.
 - 2. Install starter strip along rake edge.
- C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- D. Install asphalt shingles by single-strip column or racking method, maintaining uniform exposure. Install full length first course followed by cut second course, repeating alternating pattern in succeeding courses.
- E. Fasten asphalt shingle strips with a minimum of four roofing nails located according to manufacturer's written instructions.
- F. Open Valleys: Cut and fit asphalt shingles at open valleys, trimming upper concealed corners of shingle strips. Maintain uniform width of exposed open valley highest to lowest point.
 - 1. Set valley edge of asphalt shingles in a **3-inch- (75-mm-)** wide bed of asphalt roofing cement.
 - 2. Do not nail asphalt shingles to metal open valley flashings.
- G. Ridge and Hip Cap Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.

3.5 ROOFING INSTALLER'S WARRANTY

- A. The contractor shall execute the Roofing Guarantee R-1 provided in this manual.

END OF SECTION 07311

SECTION 07620 - SHEET METAL FLASHING AND TRIM

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 sheet metal flashing and trim in the following categories:
 - 1. Exposed trim, gravel stops, and fasciae.
 - 2. Metal flashing.
 - 3. Reglets.
 - 4. Roof expansion-joint covers.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 7 Section "Joint Sealants" for elastomeric sealants.
 - 2. Division 7 Roofing Sections for flashing and roofing accessories installed integral with roofing membrane as part of roofing-system work.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing.
- B. Fabricate and install flashings at roof edges to comply with recommendations of FM Loss Prevention Data Sheet 1-49 for the following wind zone:
 - 1. Wind Zone 3: Wind pressures of 46 to 104 psf (2.20 to 4.98 kPa).

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data including manufacturer's material and finish data, installation instructions, and general recommendations for each specified flashing material and fabricated product.
- C. Shop Drawings of each item specified showing layout, profiles, methods of joining, and anchorage details.
- D. Samples of sheet metal flashing, trim, and accessory items, in the specified finish. Where finish involves normal color and texture variations, include Sample sets composed of 2 or more units showing the full range of variations expected.
 - 1. 8-inch- (200-mm-) square Samples of specified sheet materials to be exposed as finished surfaces.
 - 2. 12-inch- (300-mm-) long Samples of factory-fabricated products exposed as finished Work. Provide complete with specified factory finish.
- E. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and

addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.6 PROJECT CONDITIONS

- A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART 2 - PRODUCTS

2.1 METALS

- A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability of alloy and temper designated below.
- B. Pre-Finished Color Klad.

2.2 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. Elastomeric Sealant: Generic type recommend by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."
- B. Epoxy Seam Sealer: 2-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior and interior nonmoving joints, including riveted joints.
- C. Adhesives: Type recommended by flashing sheet metal manufacture for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal Accessories.
- D. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.

2.3 FABRICATION, GENERAL

- A. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and sale with epoxy seam sealer. River joints for additional strength.
- B. Expansion Provisions: Space movement joints at maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25mm) deep, filled with mastic sealant (concealed within joints).
- C. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
- D. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

- E. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.
- F. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.
 - 1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.4 SHEET METAL FABRICATIONS

- A. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.
- B. Exposed Trim, Gravel Stops, and Fasciae:
 - 1. Aluminum: 0.050 inch (1.2 mm) thick.
- C. Flashing:
 - 1. Aluminum: .040 Alum.
- D. Counterflashing: Fabricate from the following material:
 - 1. Aluminum: 0.0320 inch (0.8 mm) thick.
- E. Flashing Receivers: Fabricate from the following material:
 - 1. Aluminum: 0.0320 inch (0.8 mm) thick.
- F. Drip Edges: Fabricate from the following material:
 - 1. Aluminum: 0.0320 inch (0.8 mm) thick.
- G. Equipment Support Flashing: Fabricate from the following material:
 - 1. Stainless Steel: 0.0817 inch (0.5 mm) thick.
 - 2. Terne-Coated Stainless Steel: 0.018 inch (0.5 mm) thick.
 - 3. Aluminum-Zinc Alloy Coated Steel: 0.0276 inch (0.7 mm) thick.
- H. Roof-Penetration Flashing: Fabricate from the following material:
 - 1. Stainless Steel: 0.0187 inch (0.5 mm) thick.
 - 2. Terne-Coated Stainless Steel: 0.018 inch (0.5 mm) thick.
- I. Roof Expansion-Joint Cover: Fabricate from the following material:
 - 1. Aluminum: 0.040 inch (1.0 mm) thick.

2.5 ALUMINUM EXTRUSION FABRICATIONS:

- A. Aluminum Extrusion Units: Fabricate extruded-aluminum running units with formed or extruded aluminum joint covers for installation behind main members where possible. Fabricate mitered and welded corner units.

2.6 ALUMINUM FINISHES:

- A. General: Comply with Aluminum Association's (AA) "Designation System for Aluminum Finishes" for finish designations and application recommendations.
- B. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and Fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range of choices for color and gloss.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- B. Roof-Edge Flashings: Secure metal flashings at roof edges according to FM Loss Prevention Data Sheet 1-49 for specified wind zone.
- C. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection.
- D. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except where pretinned surface would show in finished Work.
 - 1. Do not solder the following metals:
 - a. Aluminum.
 - b. Prefinished steel.
 - 2. Pretinning is not required for the following metals:
 - a. Lead.
 - 3. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
- E. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.

1. Underlayment: Where installing stainless steel or aluminum directly on cementitious or wood substrates, install a slip sheet of red-rosin paper and a course of polyethylene underlayment.
 2. Bed flanges of Work in a thick coat of roofing cement where required for waterproof performance. Prime metal prior to installation.
- F. Counterflashings: Coordinate installation of counterflashings with installation of assemblies to be protected by counterflashing. Install counterflashings in reglets or receivers. Secure in a waterproof manner by means of snap-in installation and sealant. Lap counterflashing joints a minimum of 2 inches (50 mm) and bed with sealant.
- G. Equipment Support Flashing: Coordinate equipment support flashing installation with roofing and equipment installation. Weld or seal flashing to equipment support member.
- H. Roof-Penetration Flashing: Coordinate roof-penetration flashing installation with roofing and installation of items penetrating roof. Install flashing as follows:
- 1 Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.
 - 2 Seal and clamp flashing to pipes penetrating roof, other than lead flashing on vent piping.

3.3 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
- B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION 07620

SECTION 07841 - THROUGH-PENETRATION FIRESTOP SYSTEMS

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 through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:

1. Roofs.
2. Walls and partitions.
3. Smoke barriers.

- B. Related Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete" for construction of openings in concrete slabs and walls.
2. Division 15 Sections specifying duct and piping penetrations.
3. Division 16 Sections specifying cable and conduit penetrations.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.

1. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
2. Fire-resistance-rated roof assemblies.

- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

- C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:

1. Penetrations located outside wall cavities.
2. Penetrations located outside fire-resistive shaft enclosures.
3. Penetrations located in construction containing fire-protection-rated openings.
4. Penetrating items larger than **4-inch- (100-mm-)** diameter nominal pipe or **16 sq. in. (100 sq. cm)** in overall cross-sectional area.

- D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- E. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.4 SUBMITTALS

- A. Product Data: For each type of through-penetration firestop system product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.

1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is [UL,] [ITS,] <Insert name,> or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in "Fire Resistance Directory."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' 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 materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Firestop Systems Inc.
 - 2. Hilti Construction Chemicals, Inc.
 - 3. Specified Technologies Inc.
 - 4. 3M Fire Protection Products.
 - 5. Tremco.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.

2.3 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce 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.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

END OF SECTION 07841

SECTION 07900 - JOINT SEALANTS

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 sealants for the following applications, including those specified by reference to this Section:
- B. This Section includes sealants for the following applications:
 - 1. Exterior joints in the following vertical surfaces and nontraffic horizontal surfaces:
 - a. Control and expansion joints in unit masonry.
 - b. Joints in glass unit masonry assemblies.
 - c. Joints between different materials listed above.
 - d. Perimeter joints between materials listed above and frames of doors and windows.
 - e. Other joints as indicated.
 - 2. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings where indicated.
 - c. Tile control and expansion joints.
 - d. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
 - e. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
 - f. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - g. Other joints as indicated.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each type and color of joint sealant required. Install joint sealants in **1/2-inch- (13-mm-)** wide joints formed between two **6-inch- (150-mm-)** long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

1.5 QUALITY ASSURANCE

- A. **Installer Qualifications:** An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
- B. **Source Limitations:** Obtain each type of joint sealant through one source from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. **Environmental Limitations:** Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
 - 2. When joint substrates are wet.
- B. **Joint-Width Conditions:** Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- C. **Joint-Substrate Conditions:** Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. **Available Products:** Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified in the sealant schedules at the end of Part 3.

2.2 MATERIALS, GENERAL

- A. **Compatibility:** Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. **Colors of Exposed Joint Sealants:** As selected by Architect from manufacturer's full range for this characteristic.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant in the Elastomeric Joint-Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and uses.

2.4 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
 - 1. Type C: Closed-cell material with a surface skin.
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to **minus 26 deg F (minus 32 deg C)**. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. **Surface Cleaning of Joints:** Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:
1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:
 - a. Concrete.
 - b. Masonry.
 3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. **Joint Priming:** Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. **Masking Tape:** Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. **General:** Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. **Sealant Installation Standard:** Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. **Install sealant backings** of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. **Install bond-breaker tape** behind sealants where sealant backings are not used between sealants and back of joints.

- E. Install sealants by proven techniques to comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses provided for each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealants from surfaces adjacent to joint.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 - 4. Provide flush joint configuration, per Figure 5B in ASTM C 1193, where indicated.
 - 5. Provide recessed joint configuration, per Figure 5C in ASTM C 1193, of recess depth and at locations indicated.
 - a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.4 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants 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 joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

3.6 ELASTOMERIC JOINT-SEALANT SCHEDULE

- A. Medium-Modulus Neutral-Curing Silicone Sealant: Where joint sealants of this type are indicated, provide products complying with the following:
 - 1. Products: Provide one of the following:
 - a. 791; Dow Corning.
 - b. 795; Dow Corning.
 - c. HiFlex 393; NUCO Industries, Inc.
 - d. PSI-631; Polymeric Systems, Inc.
 - e. SM5731 Poly-Glaze; Schnee-Morehead, Inc.
 - f. SM5733 Poly-Glaze; Schnee-Morehead, Inc.
 - g. Spectrem 2; Tremco.
 - h. Tremsil 600; Tremco.

 - 2. Type and Grade: S (single component) and NS (nonsag).

3. Class: 25.
 4. Use Related to Exposure: NT (nontraffic).
 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: color anodic aluminum, aluminum coated with a high-performance coating, galvanized steel, brick, granite, limestone, marble, ceramic tile, and wood.
 6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.
- B. For temporary holding cells, residential cells, and dormitory areas at windows, door frames, and all other joints and expansion joints within residential areas:
1. Durowall Loc 20
 2. Pecora Dynaflex

END OF SECTION 07900

SECTION 08111 - STANDARD 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 this Section.

1.2 SUMMARY

- A. This Section includes the following products manufactured in accordance with SDI Recommended Standards:
 - 1. Doors: Flush, hollow or composite construction standard steel doors for interior and exterior locations.
 - 2. Frames: Pressed steel frames for doors, transoms, sidelights, mullions, interior glazed panels, and other interior and exterior openings of following type:
 - a. Welded unit type.
 - 3. Assemblies: Provide standard steel door and frame assemblies as required for the following:
 - a. Labeled and fire rated.
 - 4. Provide factory primed doors and frames to be field painted.
- B. Painting primed doors and frames is specified in Division 9 Section "Painting."
- C. Door hardware is specified in another Division 8 Section.
- D. Glass and Glazing are specified in another Division 8 Section.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.
- C. Shop drawings showing fabrication and installation of standard 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 door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
 - 1. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.
 - 2. Indicate coordinate of glazing frames and stops with glass and glazing requirements.
- D. Label Construction Certification: For door assemblies required to be fire-rated and exceeding limitations of labeled assemblies, submit manufacturer's certification that each door and frame assembly has been constructed to conform to design, materials and construction equivalent to

requirements for labeled construction.

1.4 QUALITY ASSURANCE

- A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications Standard Steel Doors and Frames" ANSI/SDI-100 and as herein specified.
- B. Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies whose fire resistance characteristics have been determined per ASTM E 152 and which are labeled and listed by UL, Factory Mutual, Warnock Hersey, or other testing and inspecting organization acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.
- B. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4-inches high wood blocking. 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-inches spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering standard steel doors and frames which may be incorporated in the work include; but are not limited to, the following:
 - 1. Standard Steel Doors and Frames:
 - a. Ceco Corp. – Regent Series
 - b. Republic Builders Products – DB Series
 - 2. Security Steel Doors and Frames:
 - a. Maximum Security Products
 - b. IMS/Johnson, Inc.
 - c. Metal Fabricator Corp.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.
- B. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, or drawing quality, ASTM A 642, hot dipped galvanized in accordance with ASTM A 525, with A60 or G60 coating designation, mill phosphatized.
- C. Supports and Anchors: Fabricate of not less than 18-gage sheet steel; galvanized where used with galvanized frames.

- D. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize in compliance with ASTM A 153, Class C or D as applicable.
- E. Shop Applied Paint: Apply after fabrication.
 - 1. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints complying with ANSI A224.1, "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames."

2.3 DOORS

- A. Provide metal doors of SDI grades and models specified below or as indicated on drawings:
 - 1. Interior Doors: ANSI/SDI-100, 18-gage cold-rolled sheet steel faces.
 - 2. Exterior Doors: ANSI/SDI-100, 16-gage cold-rolled sheet steel faces.
 - 3. Security Doors: Two-inch thick 12-guage cold rolled sheet steel faces.
- B. Door Louvers: Provide sightproof stationary louvers for interior doors where indicated, constructed of inverted V-shaped or Y-shaped blades formed of 24-gage cold-rolled steel set into minimum 20-gage steel frame.

2.4 FRAMES

- A. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 16-gage cold-rolled steel (14-gage cold rolled steel for exterior openings).
 - 1. Fabricate frames with mitered, welded corners.
- B. Door Silencers: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.
- C. Plaster Guards: Provide minimum 26-gage steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

2.5 FABRICATION

- 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. Comply with ANSI/SDI-100 requirements.
 - 1. Internal Construction: Manufacturer's standard honeycomb, polyurethane, polystyrene, unitized steel grid, vertical steel stiffeners, or rigid mineral fiber core with internal sound deadener on inside of face sheets where appropriate in accordance with SDI standards.
 - 2. Clearances: Not more than 1/8 inch at jambs and heads except between non-fire-rated pairs of doors not more than 1/4 inch. Not more than 3/4 inch at bottom.
- B. Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from only cold-rolled steel.

- C. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel.
- E. Fabricate exterior doors, panels, and frames from galvanized sheet steel in accordance with SDI-112. Close top and bottom edges of exterior doors as integral part of door construction or by addition of minimum 16-gage inverted steel channels.
- F. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.
- G. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware in accordance with final Door Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 Series Specifications for door and frame preparation for hardware.
 - 1. For concealed overhead door closers, provide space, cutouts, reinforcing and provisions for fastening in top rail of doors or head of frames, as applicable.
- H. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at project site.
- I. Locate hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware on Standard Steel Doors and Frames," published by Door and Hardware Institute.
- J. Shop Painting: Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.
 - 1. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
 - 2. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.
- K. Glazing Stops: Minimum 20 gage steel .
 - 1. Provide non-removable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.
 - 2. Provide screw applied removable glazing beads on inside of glass, louvers, and other panels in doors.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames," unless otherwise indicated.
 - 1. Except for frames located at existing concrete, masonry or 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.

2. In masonry construction, locate 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry Tee anchors.
 3. At existing concrete or masonry construction, provide 3 completed opening anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb, set frames and secure to adjacent construction with bolts and masonry anchorage devices.
 4. Install fire-rated frames in accordance with NFPA Standard No. 80.
 5. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In closed steel stud partitions, attach wall anchors to studs with screws.
- C. Door Installation: Fit hollow metal doors accurately in frames, within clearances specified in ANSI/SDI-100.
1. Install fire-rated doors with clearances as specified in NFPA Standard No. 80.

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

END OF SECTION 08111

SECTION 08211 - FLUSH WOOD DOORS

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 the following:
 - 1. Solid-core doors with wood-veneer faces.
- B. Related Sections include the following:
 - 1. Division 8 Section "Glazing" for glass view panels in flush wood doors.
 - 2. Division 13 Section "Radiation Protection" for lead-lined flush wood doors.

1.3 SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction and trim for openings.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
 - 1. Indicate dimensions and locations of mortises and holes for hardware.
 - 2. Indicate dimensions and locations of cutouts.
 - 3. Indicate requirements for veneer matching.
 - 4. Indicate fire ratings for fire doors.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.
- B. Quality Standard: Comply with AWI's "Architectural Woodwork Quality Standards Illustrated."
 - 1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.
- C. Fire-Rated Wood Doors: Doors 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 NFPA 252.
 - 1. Test Pressure: Test at atmospheric pressure.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.

- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup, or twist) more than **1/4 inch (6.4 mm)** in a **42-by-84-inch (1067-by-2134-mm)** section, or show telegraphing of core construction in face veneers exceeding **0.01 inch in a 3-inch (0.25 mm in a 75-mm)** span.
 - 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 2. Warranty shall be in effect during the following period of time from date of Substantial Completion:
 - a. Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Flush Wood Doors:
 - a. Eggers Industries; Architectural Door Division – 5 ply flush doors and FireGuard Plus Fire Rated Doors
 - b. Marshfield Door Systems – 5 Ply Doors (unrated) and Fire Rated Doors Series DFM-45, DFM-60, DFM-90.

2.2 DOOR CONSTRUCTION, GENERAL

- A. Doors for Transparent Finish:
 - 1. Grade: Economy (Grade B faces).
 - 2. Species and Cut: White birch, rotary cut.
 - 3. Match between Veneer Leaves: Pleasing match.
 - 4. Stiles: Same species as faces or a compatible species.
- B. Doors for Opaque Finish:
 - 1. Grade: Economy.
 - 2. Faces for Interior Doors: Any closed-grain hardwood of mill option.

2.3 SOLID-CORE DOORS

- A. Particleboard Cores: Comply with the following requirements:
 - 1. Particleboard: ANSI A208.1, Grade LD-1.
 - 2. Provide doors with glued-block cores instead of particleboard cores at locations where exit devices are indicated.

- B. Interior Veneer-Faced Doors:
 - 1. Core: Particleboard.
 - 2. Construction: 5 plies, bonded construction.

- C. Fire-Rated Doors:
 - 1. Construction: Construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as needed to provide fire rating indicated.
 - 2. Pairs: Furnish formed-steel edges and astragals with intumescent seals for pairs of fire-rated doors, unless otherwise indicated.
 - a. Finish steel edges and astragals to match door hardware (locksets or exit devices).

2.4 LOUVERS AND LIGHT FRAMES

- A. Metal Frames for Light Openings in Fire Doors: Manufacturer's standard frame formed of **0.0478-inch- (1.2-mm-)** thick, cold-rolled steel sheet; factory primed and approved for use in doors of fire rating indicated.

2.5 FABRICATION

- A. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
 - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Division 8 Section "Door Hardware."

- B. Manufacturer's Written Instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.

1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

C. Field-Finished Doors: Refer to the following for finishing requirements:

1. Division 9 Section Painting.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08211

SECTION 08305 - ACCESS DOORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following types of access doors:
 - 1. Wall access doors.
 - 2. Fire-rated wall access doors.
 - 3. Ceiling access doors.
 - 4. Fire-rated ceiling access doors.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 4 Sections for building in anchors and grouting frames set in masonry construction.
 - 2. Division 8 Section "Door Hardware" for mortise or rim cylinder locks.
 - 3. Division 9 Section "Gypsum Board Assemblies" for gypsum board walls and ceilings.
 - 4. Division 9 Section "Lath & Plaster" for plaster ceilings.

1.03 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of access door assembly specified, including details of construction relative to materials, individual components, profiles, finishes, and fire-protection ratings (if required).
 - 1. Include complete schedule, including types, general locations, sizes, wall and ceiling construction details, latching or locking provisions, and other data pertinent to installation.
- C. Shop drawings showing fabrication and installation of customized access doors and frames, including details of each frame type, elevations of door design types, anchorage, and accessory items.
- D. Samples, 3-inch (75-mm) by 5-inch (125-mm) minimum size, of each panel face material showing factory-finished color and texture.

1.04 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain access doors for entire Project from one source and by a single manufacturer.
- B. Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies tested for fire-test-response characteristics per test method as indicated below, and are labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Test Method for Vertical Installations: ASTM E 152.
 2. Test Method for Horizontal Installations: ASTM E 119.
- C. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units, which may vary slightly from sizes indicated.

1.05 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule specified under "Submittals" Article.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. J. L. Industries.
 2. Larsen's Manufacturing Co.

2.02 MATERIALS

- A. Steel Sheet: ASTM A 366/A 366M commercial-quality, cold-rolled steel sheet with baked-on, rust-inhibitive primer.

2.03 ACCESS DOORS

- A. Security type, Insulated, Fire-Rated Access Doors for use in fire rated ceilings and walls serving temporary holding cells, residential cells, dormitory areas and corridors servicing those areas: Self-latching units consisting of frame, trim, door, insulation, and hardware, including automatic closer, and interior latch release equal to:
- 1) J. L. Industries- NFGD Access door- Warnock -Hersey WHI-495-PSN-0163 (Clg-Wall)
 - 2) Larsen's Manufacturing Co. L-DPFB Access door- Warnock -Hersey U80045.(Clg-wall)
- B. Security type, Access Doors for use in non-rated ceilings and walls serving temporary holding cells, residential cells, dormitory areas and corridors servicing those areas: Self-latching units consisting of frame, trim, door, insulation, and hardware, including automatic closer, and interior latch release equal to:
- 1) Manufactured by J. L. Industries- SP door or Larsen's Manufacturing Co. L-DPH door
 - 2) Frames: 3/16-inch (4.76-mm) by 2-inch (50.8-mm) by 2-inch (50.8-mm) angle welded with joints ground smooth.
 - 3) Door: 0.1345-inch- (3.40-mm-) thick steel sheet.
 - 4) Hinges: Heavy-duty steel welded to door and frame.
 - 5) Locks: Heavy-duty, detention-type lock.

- C. Trimless, Flush Access Doors for Plaster: Units consisting of frame, casing bead, door, hardware, and complying with the following requirements:
1. Frame: 0.0598-inch- (1.52-mm-) thick steel sheet.
 2. Door: 0.0747-inch- (1.90-mm-) thick steel sheet.
 3. Plaster Casing Bead: 0.0299-inch (0.76-mm) zinc-coated-steel casing bead with flange formed out of expanded metal lath.
 4. Hinge: Concealed spring pin or continuous type.
 5. Locks: Mortise type.
 6. Manufactured by Larsen's – Model L-PSW or J.L. Industries – Model CP
- D. Recessed Doors for Acoustical Tile Ceilings: Units consisting of frame with no exposed trim, recessed door to receive tile, hardware, and complying with the following requirements:
1. Frame: 0.0897-inch- (2.30-mm-) thick steel sheet.
 2. Door: 0.0598-inch- (1.52-mm-) thick steel sheet, recessed 1 inch (25.4 mm).
 3. Hinge: Concealed, pivoting-rod type.
 4. Locks: Mortise type.
 5. Manufactured by Larsen's – Model L-CPA or J.L. Industries – Model CT

2.04 FABRICATION

- A. General: Manufacture each access door assembly as an integral unit ready for installation.
- B. Steel Access Doors and Frames: Continuous welded construction. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
1. Exposed Flange: Nominal 1 to 1-1/2 inches (25.4 to 38.1 mm) wide around perimeter of frame.
 2. For gypsum board assemblies or gypsum veneer plaster, furnish frames with edge trim for gypsum board or gypsum base.
 3. For full-bed plaster applications, furnish frames with galvanized expanded metal lath and exposed casing bead, welded to perimeter of frame.
 4. For installation in masonry construction, furnish frames with adjustable metal masonry anchors.
- C. Recessed Panel Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.
1. Furnish recessed panel doors for concealed installation in acoustic tile ceiling systems.
 2. Furnish recessed panel doors and frames with expanded metal lath for concealed installation in plaster.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Advise Installers of other work about specific requirements relating to access door installation,

including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices. Furnish inserts and anchoring devices for access doors that must be built into other construction. Coordinate delivery with other work to avoid delay.

3.02 INSTALLATION

- A. Comply with manufacturer's instructions for installing access doors.
- B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finished surfaces.
- C. Install concealed-frame access doors flush with adjacent finish surfaces.

3.03 ADJUST AND CLEAN

- A. Adjust hardware and panels after installation for proper operation.
- B. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08305

SECTION 08331 - OVERHEAD COILING DOORS

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 the following types of overhead coiling doors:
 - 1. Service doors.
 - 2. Counter doors.

1.3 DEFINITIONS

- A. Operation Cycle: One complete cycle of a door begins with the door in the closed position. The door is then moved to the open position and back to the closed position.

1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide overhead coiling doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:
 - 1. Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa), acting inward and outward.
- B. Operation-Cycle Requirements: Design overhead coiling door components and operator to operate for not less than 20,000 cycles and for 10 cycles per day.
 - 1. Include tamperproof cycle counter.

1.5 SUBMITTALS

- A. Product Data: For each type and size of overhead coiling door and accessory. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes. Provide roughing-in diagrams, operating instructions, and maintenance information. Include the following:
 - 1. Setting drawings, templates, and installation instructions for built-in or embedded anchor devices.
- B. Shop Drawings: For special components and installations not dimensioned or detailed in manufacturer's data sheets.

- C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied finishes.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who is an authorized representative of the overhead coiling door manufacturer for both installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain overhead coiling doors through one source from a single manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Cornell Iron Works Inc – 6F Service Doors & 1F Counter Doors.
 2. Raynor Garage Doors – LIF Service Doors & UCP Counter Shutters.

2.2 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Door Curtain: Fabricate overhead coiling door curtain of interlocking slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of material thickness recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
 1. Steel Door Curtain Slats: Structural-quality, cold-rolled galvanized steel sheets complying with **ASTM A 653, with G90 (ASTM A 653M, with Z275)** zinc coating.
 - a. Provide manufacturer's standard flat-profile slats.
 2. Insulation (@ exterior doors): Fill slat with manufacturer's standard rigid cellular polystyrene or polyurethane-foam-type thermal insulation complying with maximum flame-spread and smoke-developed indices of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within metal slat faces.
 3. Inside Curtain Slat Face: To match material of outside metal curtain slat and as follows:
 - a. Galvanized Steel Sheet Thickness: Not less than **22 gage** .
- B. Endlocks (at service doors): Malleable-iron castings galvanized after fabrication, secured to curtain slats with galvanized rivets, or high-strength nylon. Provide locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.
- C. Endlocks (at counter doors): Manufacturer's standard locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.
- D. Windlocks: Malleable-iron castings secured to curtain slats with galvanized rivets or high-strength nylon, as required to comply with wind load.

- E. Bottom Bar (at service doors): Consisting of 2 angles, each not less than **1-1/2 by 1-1/2 by 1/8 inch (38 by 38 by 3 mm)** thick, either galvanized or stainless-steel or aluminum extrusions to suit type of curtain slats.
- F. Bottom Bar (at counter doors): Manufacturer's standard continuous channel or tubular shape, either stainless-steel or aluminum extrusions to suit type of curtain slats.
- G. Curtain Jamb Guides (at service doors): Fabricate curtain jamb guides of steel angles, or channels and angles, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Build up units with not less than **3/16-inch- (5-mm-)** thick, galvanized steel sections complying with **ASTM A 36 (ASTM A 36M)**, and ASTM A 123. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain and a continuous bar for holding windlocks.
- H. Curtain Jamb Guides (at counter doors): Fabricate curtain jamb guides of angles, or channels and angles of material and finish to match curtain slats, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Provide continuous integral wear strips to prevent metal-to-metal contact and minimize noise of travel and removable stops on guides to prevent overtravel of curtain.

2.3 HOODS AND ACCESSORIES

- A. Hood: Form to entirely enclose coiled curtain and operating mechanism at opening head and act as weatherseal. Contour to suit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sag.
 - 1. Fabricate steel hoods, for steel doors, of not less than **0.028-inch (0.7-mm)** thick, hot-dip galvanized steel sheet with **G90 (Z275)** zinc coating, complying with **ASTM A 653 (ASTM A 653M)**.
 - 2. Shape: Square.
- B. Weatherseals: Provide replaceable, adjustable, continuous, compressible weather-stripping gaskets fitted to bottom and at top of exterior doors, unless otherwise indicated. At door head, use **1/8-inch- (3-mm-)** thick, replaceable, continuous sheet secured to inside of curtain coil hood.
 - 1. In addition, provide replaceable, adjustable, continuous, flexible, **1/8-inch- (3-mm-)** thick seals of flexible vinyl, rubber, or neoprene at door jambs for a weathertight installation.
- C. Push/Pull Handles: For push-up-operated or emergency-operated doors, provide galvanized steel lifting handles on each side of door.
 - 1. Provide pull-down straps or pole hooks for doors more than **84 inches (2130 mm)** high.
- D. Slide Bolt: Fabricate with side locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

2.4 COUNTERBALANCING MECHANISM

- A. General: Counterbalance doors by means of adjustable-tension steel helical torsion spring, mounted around a steel shaft and contained in a spring barrel connected to door curtain with

required barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

- B. Counterbalance Barrel: Fabricate spring barrel of hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than **0.03 in./ft. (2.5 mm/m)** of span under full load.
- C. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast-steel barrel plugs to secure ends of springs to barrel and shaft.
- D. Fabricate torsion rod for counterbalance shaft of cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Provide mounting brackets of manufacturer's standard design, either cast-iron or cold-rolled steel plate with bell-mouth guide groove for curtain.

2.5 FINISHES, GENERAL

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 STEEL AND GALVANIZED STEEL FINISHES

- A. Powder-Coat-Applied Finish: Apply manufacturer's standard powder-coat-applied finish consisting of primer and topcoat(s) according to coating manufacturer's written instructions for cleaning, pretreatment, application, thermosetting, and minimum dry film thickness.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range of colors and glosses.

2.7 MANUAL DOOR OPERATORS

- A. Provide manual operators, unless electric door operators are indicated. When not shown, provide chain-hoist operator unit on doors greater than 80 square feet.
- B. Push-up Operation: Design counterbalance mechanism so required lift or pull for door operation does not exceed **25 lbf (111 N)**.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install door and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to Shop Drawings, manufacturer's written instructions, and as specified.

3.2 ADJUSTING

- A. Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

END OF SECTION 08331

SECTION 08410 - ALUMINUM ENTRANCES AND STOREFRONTS

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 the following:
 - 1. Exterior storefront systems.
 - 2. Interior storefront systems.
- B. Related sections include the following:
 - 1. Division 7 Section "Joint Sealants" for joint sealants installed as part of aluminum entrance and storefront systems.
 - 2. Division 8 Section "Glazing."

1.3 SYSTEM DESCRIPTION

- A. General: Provide aluminum entrance and storefront systems capable of withstanding loads and thermal and structural movement requirements indicated without failure, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project. Failure includes the following:
 - 1. Air infiltration and water penetration exceeding specified limits.
 - 2. Framing members transferring stresses, including those caused by thermal and structural movement, to glazing units.
- B. Glazing: Physically and thermally isolate glazing from framing members.
- C. Wind Loads: Provide entrance and storefront systems, including anchorage, capable of withstanding wind-load design pressures calculated according to requirements of authorities having jurisdiction or the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever are more stringent.
 - 1. Deflection of framing members in a direction normal to wall plane is limited to 1/175 of clear span or **3/4 inch (19 mm)**, whichever is smaller, unless otherwise indicated.
 - 2. Static-Pressure Test Performance: Provide entrance and storefront systems that do not evidence material failures, structural distress, failure of operating components to function normally, or permanent deformation of main framing members exceeding 0.2 percent of clear span when tested according to ASTM E 330.
 - a. Test Pressure: 150 percent of inward and outward wind-load design pressures.
 - b. Duration: As required by design wind velocity; fastest **1 mile (1.609 km)** of wind for relevant exposure category.

- D. Hurricane-Resistance Test Performance: Provide entrance and storefront systems that pass large and small missile-impact tests, as required by systems' location above grade, and cyclic-pressure tests according to testing requirements of authorities having jurisdiction.
- E. Dead Loads: Provide entrance- and storefront-system members that do not deflect an amount which will reduce glazing bite below 75 percent of design dimension when carrying full dead load.
 - 1. Provide a minimum **1/8-inch (3.18-mm)** clearance between members and top of glazing or other fixed part immediately below.
 - 2. Provide a minimum **1/16-inch (1.59-mm)** clearance between members and operable windows and doors.
- F. Live Loads: Provide entrance and storefront systems, including anchorage, that accommodate the supporting structures' deflection from uniformly distributed and concentrated live loads indicated without failure of materials or permanent deformation.
- G. Air Infiltration: Provide entrance and storefront systems with permanent resistance to air leakage through fixed glazing and frame areas of not more than **0.06 cfm/sq. ft. (0.3 L/s/sq. m)** of fixed wall area when tested according to ASTM E 283 at a static-air-pressure difference of **1.57 lbf/sq. ft. (75.2 Pa)**.
- H. Water Penetration: Provide entrance and storefront systems that do not evidence water leakage through fixed glazing and frame areas when tested according to ASTM E 331 at minimum differential pressure of 20 percent of inward-acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures," but not less than **6.24 lbf/sq. ft. (299 Pa)**. Water leakage is defined as follows:
 - 1. Uncontrolled water infiltrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.
- I. Structural-Support Movement: Provide entrance and storefront systems that accommodate structural movements including, but not limited to, sway and deflection.
- J. Dimensional Tolerances: Provide entrance and storefront systems that accommodate dimensional tolerances of building frame and other adjacent construction.

1.4 SUBMITTALS

- A. Product Data: For each product specified. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Shop Drawings: For entrance and storefront systems. Show details of fabrication and installation, including plans, elevations, sections, details of components, provisions for expansion and contraction, and attachments to other work.
- C. Samples for Verification: Of each type of exposed finish required in manufacturer's standard sizes. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.

1.5 QUALITY ASSURANCE

- A. **Installer Qualifications:** Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing entrance and storefront systems similar to those required for this Project and who is acceptable to manufacturer.
 - 1. **Engineering Responsibility:** Prepare data for entrance and storefront systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. **Source Limitations:** Obtain each type of entrance and storefront system through one source from a single manufacturer.

1.6 PROJECT CONDITIONS

- A. **Field Measurements:** Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 WARRANTY

- A. **General Warranty:** The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. **Special Warranty:** Submit a written warranty executed by the manufacturer agreeing to repair or replace components of entrance and storefront systems that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures including, but not limited to, excessive deflection.
 - 2. Failure of system to meet performance requirements.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Failure of operating components to function normally.
 - 5. Water leakage through fixed glazing and frame areas.
- C. **Warranty Period:** 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Available Manufacturers:** Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following (for interior & exterior locations):
 - 1. Butler Manufacturing Company; Vistawall Architectural Products – Series 2000.
 - 2. Kawneer Company, Inc. – TriFab 450.
 - 3. Tubelite Architectural Systems – Series 4500.

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of standards indicated below.
 - 1. Sheet and Plate: **ASTM B 209** (ASTM B 209M).
 - 2. Extruded Bars, Rods, Shapes, and Tubes: **ASTM B 221** (ASTM B 221M).
 - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 - 4. Bars, Rods, and Wire: **ASTM B 211** (ASTM B 211M).
- B. Steel Reinforcement: Complying with **ASTM A 36** (ASTM A 36M) for structural shapes, plates, and bars; ASTM A 611 for cold-rolled sheet and strip; or **ASTM A 570** (ASTM A 570M) for hot-rolled sheet and strip.
- C. Glazing as specified in Division 8 Section "Glazing."
- D. Glazing Gaskets: Manufacturer's standard pressure-glazing system of black, resilient glazing gaskets, setting blocks, and shims or spacers, fabricated from an elastomer of type and in hardness recommended by system and gasket manufacturer to comply with system performance requirements. Provide gasket assemblies that have corners sealed with sealant recommended by gasket manufacturer.
- E. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.
- F. Sealants and joint fillers for joints at perimeter of entrance and storefront systems as specified in Division 7 Section "Joint Sealants."
- G. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos, formulated for **30-mil** (0.762-mm) thickness per coat.

2.3 COMPONENTS

- A. Brackets and Reinforcements: Provide manufacturer's standard brackets and reinforcements that are compatible with adjacent materials. Provide nonstaining, nonferrous shims for aligning system components.
- B. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Reinforce members as required to retain fastener threads.
 - 2. Do not use exposed fasteners, except for hardware application. For hardware application, use countersunk Phillips flat-head machine screws finished to match framing members or hardware being fastened, unless otherwise indicated.
- C. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.

2.4 FABRICATION

- A. General: Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

- B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.
- C. Prepare components to receive concealed fasteners and anchor and connection devices.
- D. Fabricate components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.
- E. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- F. Storefront: Fabricate framing in profiles indicated for flush glazing (without projecting stops). Provide subframes and reinforcing of types indicated or, if not indicated, as required for a complete system. Factory assemble components to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.5 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- D. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
 - 1. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.
 - a. Color and Gloss: As selected by Architect from manufacturer's full range of choices for color and gloss.

2.6 STEEL PRIMING

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying primer.
- B. Surface Preparation: Perform manufacturer's standard cleaning operations to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel.

- C. Priming: Apply manufacturer's standard corrosion-resistant primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of entrance and storefront systems. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing entrance and storefront systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
- B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.
- D. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction, unless otherwise indicated. Comply with requirements of Division 7 Section "Joint Sealants."
- E. Install framing components plumb and true in alignment with established lines and grades without warp or rack of framing members.
- F. Install glazing to comply with requirements of Division 8 Section "Glazing," unless otherwise indicated.
- G. Install perimeter sealant to comply with requirements of Division 7 Section "Joint Sealants," unless otherwise indicated.
- H. Erection Tolerances: Install entrance and storefront systems to comply with the following maximum tolerances:
 - 1. Variation from Plane: Limit variation from plane or location shown to **1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm)** over total length.
 - 2. Alignment: Where surfaces abut in line, limit offset from true alignment to **1/16 inch (1.5 mm)**. Where surfaces meet at corners, limit offset from true alignment to **1/32 inch (0.8 mm)**.
 - 3. Diagonal Measurements: Limit difference between diagonal measurements to **1/8 inch (3 mm)**.

3.3 ADJUSTING AND CLEANING

- A. Remove excess sealant and glazing compounds, and dirt from surfaces.

3.4 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure entrance and storefront systems are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08410

SECTION 08500 - SECURITY STEEL WINDOWS

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 the following:
 - 1. Security Steel Windows.

1.3 SUBMITTALS

- A. Product Data: For each type of security steel window, including accessories.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components. Include details of fabrication and installation including attachments to other work.

1.4 QUALITY ASSURANCE

- A. Security Steel Windows shown and detailed on the plans and specifications are the products of The William Bayley Company, Springfield, Ohio and have been used to establish the standard of construction and quality of workmanship required for this project. Other manufacturers desiring to bid this section of work must obtain approval of their products at least ten days prior to bid date and receive approval from the Architect by Addendum. Manufacturers intending to bid this section must show and submit a list of at least five projects of comparable size herein that have been satisfactorily installed for a minimum of three years. This requirement relates to the exact type of window products described in these specifications.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.6 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of security steel window systems that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures including, but not limited to, excessive deflection.
 - 2. Failure of system to meet performance requirements.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Failure of operating components to function normally.
 - 5. Water leakage through fixed glazing and frame areas.

C. Warranty Period: 5 years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Security Steel Windows shown and detailed on the plans and specifications shall be provided by The William Bayley Company, Springfield, Ohio or approved equal. See the Quality Assurance section of this specification.

2.2 MATERIALS

A. GENERAL

1. A maximum or moderate detention steel window for correctional institutions, having horizontal detention steel bars spaced 6" on centers. Awning type ventilators are linked together to operate in unison by means of a concealed operating mechanism, which may be located in the sill, jamb, or mullion. The operator is controlled with a cone knob and/or a removable crank. Vented and fixed areas shall be as shown on plan drawings. Fixed sight lines will not be required in fixed areas.
- B. Detention Members: Shall consist of 7/8" round steel pivotal bars spaced not more than 6" on centers, encased in the ventilator head or fixed rails; also, 1/4" x 2" steel bars at jambs, concealed within the subframe. Tool-resisting 7/8" round detention member is added at sill of unit for maximum detention (SNO-1) construction only.
1. For Series SNO-2: The 7/8" round bars shall be cold-rolled mild steel. The 1/4" x 2" bars shall be hot-rolled mild steel.
- B. Frames: Shall be one-piece sections, except where access covers are required. Frames shall be formed from low carbon steel, not less than No. 12 U.S. gauge. Frames shall be channel-shaped 5-5/16" deep, and shall carry through the vented and fixed portions continuously from bottom of sill to top of frame at each jamb. Frame members shall have dimensions and profiles as indicated on the drawings. Sill box, when required for sill operation, shall be 5-5/16" deep by 5-5/8" high on exterior, formed from No. 12 U.S. gauge steel. Frame members shall be coped and welded at corners the full depth of the frame for maximum strength and weather tightness, and exposed welds shall be dressed smooth.
- C. Ventilators: Jamb, sill and head rails shall be one-piece sections and shall provide external and internal metal-to-metal weathering contacts around the entire perimeter without the use of supplementary applied shapes. Jamb and sill rails shall be hot-rolled steel sections, not less than 1/8" thick and 1-5/8" deep. Head rail and/or fixed rails are cold-rolled formed from low carbon steel, not less than No. 12 U.S. gauge and 1-3/4" deep. Meeting rails shall have a combined minimum weight of 5.4 lbs. per foot and overall vertical dimension of not more than 1-15/16". Horizontal meeting rails in fixed units shall be web welded at jambs. Upper corners of ventilators consisting of jamb and head rails are coped and welded and then both jamb and head rails rigidly welded to the 7/8" round detention bar near each jamb. Head rail to have intermediate welds at maximum spacings of 21". Bottom corners consisting of jambs and sill rails shall be mitered and machine fusion welded, with all exposed welds dressed smooth.
- D. Ventilator Frame Contacts: Ventilator contacts at head of window shall be hot-rolled sections not less than 1/8" thick and 1-5/8" deep. Ventilator contacts at jamb of windows shall be cold-rolled formed sections not less than 11 gauge thick and 1-5/8" deep. Contacts to be securely welded to frame.
- E. Weatherstripping:
1. Shall be Bayseal, factory applied in an integral dovetail self-locking groove located in the same plane around the perimeter of each ventilated area. Weatherstrip shall be Q-Lon (TM) Weather

- Seal. Weatherstrip that relies on adhesives for application, or screw applied weatherstripping will not be acceptable. (Recommended only with BAYCO finish.)
2. Air infiltration - weatherstripped windows shall meet an air infiltration requirement not exceeding ½ cubic foot of air per minute per lineal foot of ventilator perimeter at an equivalent air pressure of 25 miles per hour wind.
- F. Linkage: Ventilator linkage arms shall be steel not less than 3/16" x 1-3/8" and vertical connecting bars shall be steel not less than 3/16" x 1-1/4" located at both jambs of each unit. The use of linkage at one jamb only shall not be acceptable. Linkage arms shall be welded to the pivotal bars at both ends. Vertical connecting bars shall connect all linkage arms at both jambs. Bronze flange bearings are provided for both bearing points of the pivotal bars and for the linkage arms. Bronze wave washers shall be furnished between the linkage arms and vertical 1/4" x 2" jamb bars.
- G. Plates, Covers, and Mullions: Removable access plates of not less than No. 12 U.S. gauge steel, having ½" caulking returns, shall be provided at exterior jambs. Sill access covers, where required, shall be of not less than No. 12 U.S. gauge steel. Exterior mullion plates shall not be less than No. 12 U.S. gauge steel. Interior mullion covers and closure plates shall be of not less than No. 12 U.S. gauge steel, if required.
- H. Screens: Screens are available if required, insect, detention, guard and safety types. For details and specifications refer to another section of this specification/detail binder.

2.3 ASSEMBLY

- A. Shall consist of ventilated and fixed units, or units with ventilators and fixed lights, as shown on the plans and indicated by the window schedule. Ventilators shall be linked together to operate in unison to an opening of 50°. Perimeter frame, ventilators, fixed members, operating mechanism and other components shall be shop assembled into complete units.

2.4 OPERATOR MECHANISM

- A. Sill Operation: Unit shall have a Bayley #406 Rotomatic power unit with overload safety device and protective cover, located at center of sill box, having 16 pitch, self-locking worm and gear power with 40:1 reduction. A 3/16" x 1-1/4" bell crank shall be located at each jamb. The use of one bell crank at one jamb only shall not be acceptable. The bell cranks shall be connected to the power unit with 3/4" round bar supported at the ends by bronze bearings located adjacent to the bell cranks. The bell cranks shall be connected to the actuating jamb mechanism by 3/16" x 1-1/4" adjustor arms with built-in micrometer adjustment for uniform operation and closing pressure at each jamb. Operator power unit shall have oil-impregnated, flange-type bronze bushings for both worm shaft and countershaft. The unit shall be lubricated during shop assembly, with the use of extra-pressure lubricant. The 3/4" round rods used in the operator power unit and the bell cranks shall be removable as a unit. The adjustor links and jamb connecting bars shall also be removable.
- B. Operation: Opening and closing of the ventilators shall be accomplished by continuous rotation of the Bayley #406 Rotomatic power unit, operated in either direction, with aluminum cone knob for inmate operation, and removable crank for attendant operation. Furnish 96 cranks.

2.5 GLAZING

- A. Windows shall be prepared for outside putty glazing. Screw applied aluminum glazing bead optional.

2.6 SCREWS

- A. Plated steel security self-tapping or machine screws. All exterior screws shall be spaced 12" on center and interior screws, 9" on center. Erector shall apply Loctite #271 before screw engagement.

2.7 FINISH

- A. After fabrication of windows, mullions, trim and screens shall receive BAYCO finish by The William Bayley Company. All material shall be either chemically or mechanically cleaned to remove mill scale, dirt, oil, and other foreign matter, followed by a zinc phosphate treatment. Then a coat of BAYCO light gray epoxy primer shall be applied and oven baked, resulting in a dry film thickness of not less than 1 mil, followed by a coat of BAYCO polyester oven baked, resulting in a dry film thickness of not less than 1 mil. Color of finish coat shall be as approved by the Architect.
- B. All finished material shall be properly packaged and protected for shipment. Care shall be exerted by the window erector to avoid damage to the finish. After erection of the windows, any abraded surface shall be cleaned and touched up by the window erector with air dry enamel, as approved by the window manufacturer, in a color to match factory applied finish.
- C. All concealed steel members shall be protected by electro-galvanizing, or shall be bonderized and prime painted.

2.8 ANCHORS

- A. All necessary manufacturer's standard steel anchors protected by electro-galvanizing or bonderized and primed shall be included for installation of windows into prepared openings. Anchors built into or a part of concrete, masonry, precast, structural steel, or other construction to which manufacturer's anchors are attached are to be furnished by the Miscellaneous Metal Subcontractor as part of the prepared openings. Built-in anchors to be located and set by the General Contractor in accordance with window manufacturer's approved shop drawings around the perimeter of each window at approximately 18" on center. Manufacturer's anchors shall be welded to built-in anchors by welds 3/16" x 1" minimum.

2.9 SEALANTS

- A. All exterior metal-to-metal joints between members of windows, frames, mullions, etc., shall be set in a mastic sealant of the type recommended by the window manufacturer. Remove all excess mastic.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of entrance and storefront systems. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Shall be the responsibility of the window manufacturer. Installation shall be made into prepared openings prepared by others, and shall be in accordance with manufacturer's instructions and approved manufacturer's shop drawings. Windows shall be set at proper location and elevation, plumb, level, and in alignment, and properly braced to prevent distortion and misalignment. Windows not properly set, anchored or out of plumb, or otherwise not satisfactorily installed shall be reset. All windows shall be completely adjusted after erection and before glazing to assure proper fit of ventilator to frame and to assure operating mechanism works freely and satisfactorily.

3.2 ADJUSTING AND CLEANING

- A. Remove excess sealant and glazing compounds, and dirt from surfaces.

3.3 PROTECTION

- A. Provide final protections and maintain conditions, in a manner acceptable to manufacturer and Installer. Protect windows during storage on the job and during and after installation, also, for final cleaning at the completion of the project

END OF SECTION 08500

SECTION 08710 – FINISH HARDWARE

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: "Finish Hardware" includes items known commercially as finish hardware which are required for swing, sliding and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.
- B. Extent of finish hardware required is indicated on drawings and in schedules.
- C. Types of finish hardware required include the following:

- Hinges
- Key control system
- Lock cylinders and keys
- Lock and latch sets
- Exit Devices
- Bolts
- Push/pull units
- Closers
- Overhead holders
- Door trim units
- Protection plates
- Weather-stripping
- Astragals
- Thresholds

1.3 RELATED SECTIONS

- A. Standard Steel Doors and Frames: Section 08110
- B. Flush Wood Doors: Section 08211

1.4 QUALITY ASSURANCE

- A. Manufacturer: Obtain each type of hardware (i.e. lock sets) from a single manufacturer.
- B. Supplier: A recognized architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than 2 years, and who is, or who employs an experienced architectural hardware consultant who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor. Supplier is responsible for proper coordination of all finish hardware with related sections to insure compatibility of products.
- C. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and local building code requirements. Provide only hardware that has been tested and listed by UL or FM for types and sizes of doors required and complies with requirements of door and doorframe labels.

- D. Where emergency exit devices are required on fire-rated doors (with supplementary marking on doors' UL or FM labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL or FM label on exit devices indicating "Fire Exit Hardware".

1.5 SUBMITTALS

- A. Product Data: Submit manufacturers' technical product data for each item of hardware in accordance with Division-1 section "Submittals". Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.
- B. Hardware Schedule: Submit final hardware schedule in manner indicated below. Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware.
1. Final Hardware Schedule Content: Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
 - a. Type, style, function, size and finish of each hardware item.
 - b. Name and manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of hardware set cross-referenced to indications on
 - e. Drawings both on floor plans and in door and frame schedule.
 - f. Explanation of all abbreviations, symbols, codes, etc., contained in schedule.
 - g. Mounting locations for hardware.
 - h. Door and frame sizes and materials.
 - i. Keying information.
- C. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames), which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinated review of hardware schedule.
- D. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- E. Samples if Requested: Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware, submit one sample of each type of exposed hardware unit, finished as required, and tagged with full description for coordination with schedule.
- F. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.

1.6 PRODUCT HANDLING

- A. Tag each item or package separately, with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- C. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.

- D. Provide secure lock-up for hardware delivered to the project, but not yet installed. Control handling and installation of hardware items which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

PART 2 PRODUCTS

2.1 SCHEDULED HARDWARE

- A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of finish hardware is indicated in the Finish Hardware Data Sheet and Hardware Schedule at the end of this section. Products are identified by using hardware designation numbers of the following.

- B. Manufacturer's Product Designations:

Hinges:	McKinney	(McK)
Locksets:	Sargent	(Sar)
Lock Cylinders	Medeco	(Med)
Exit Device	Sargent	(Sar)
Push/Pull Plates	Rockwood	(Roc)
Flush Bolts	Rockwood	(Roc)
Door Closers	Sargent	(Sar)
Kick Plates	Rockwood	(Roc)
Overhead Stops	Sargent	(Sar)
Floor/Wall Stops:	Rockwood	(Roc)
Silencers:	Rockwood	(Roc)
Thresholds:	Pemko	(Pem)
Weather-stripping:	Pemko	(Pem)

2.2 MATERIALS AND FABRICATION

- A. General:

1. Hand of door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
2. Finish: Hardware finish shall match US26D unless otherwise indicated. Closer bodies, covers and arms shall be powder coated finish to match AL.
4. Lockset Design: Lever handle design shall be similar to "SLL" as manufactured by SARGENT.
6. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
7. Furnish screws for installation, with each hardware item. Provide Torx security screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.
8. Provide concealed fasteners for hardware units which are exposed when door is closed, except to extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work, except where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each thru-bolt or use sex screw fasteners.
9. Tools and Maintenance Instructions for Maintenance: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

2.3 HINGES, BUTTS AND PIVOTS

- A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- B. Screws: Furnish Torx security machine screws for installation of units, except furnish Torx security wood screws for installation of units into wood. Finish screw heads to match surface of hinges or pivots.
- C. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - 1. Steel Hinges: Steel pins.
 - 2. Non-ferrous Hinges: Stainless steel pins.
 - 3. Exterior Doors: Prison Safety Feature (PSF)
 - 4. Out-swing Corridor Doors: Non-rising pins.
 - 5. Interior Doors: Non-rising pins.
 - 6. Tips: Hospital tip (HT).
 - 7. Number of hinges: Provide number of hinges indicated but not less than 3 hinges for door leaf for doors 90" or less in height and one additional hinge for each 30" of additional height.
 - 8. Hinge Size: Minimum Pin height for 1-3/8" thick doors shall be 4"; for 1-3/4" doors up to 36" wide height shall be 4-1/2"; doors 37" to 48" wide shall be 4-1/2" high, institutional heavy weight hinges. The width of the hinges shall be determined by trim condition.
- D. Acceptable Manufacturers:
 - 1. McKinney
 - 2. Stanley
 - 3. Hager

2.4 LOCK CYLINDERS AND KEYING

- A. All locksets shall be furnished with MEDECO cylinders to match owner's existing system.
- B. Supplier will meet with Owner to finalize keying requirements and obtain final instructions in writing.
- C. Review the keying system with the Owner and provide the type required (master, grandmaster or great-grandmaster), either new or integrated with Owner's existing system.
- D. Metals: Construct lock cylinder parts from brass/bronze, stainless steel or nickel silver.
- E. Comply with Owner's instructions for masterkeying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.
- F. Permanently inscribe each key with number or lock that identifies cylinder manufacturer key symbol, and notation "DO NOT DUPLICATE".
- G. Key Material: Provide keys of nickel silver only.
- H. Key Quantity: Furnish 3 change keys for each lock; 5 master keys for each master system; and 5 grandmaster keys for each grandmaster system. Furnish 10 Construction Keys.
- I. Furnish temporary cylinders for use during the construction period.
- J. Deliver keys to Owner's representative.

2.5 LOCKS, LATCHES AND BOLTS

- A. All locksets shall be 9200 High Security Mortise Locks as manufactured by SARGENT Manufacturing Corporation.
- B. Locks to be manufactured from 12 gauge zinc dichromate steel and have a fully adjustable, beveled armored front of 1/8" thick hardened high carbon steel. The lock case shall be closed on all sides and back.
- C. The deadbolt to be full 1" throw manufactured of investment cast stainless steel with a hardened steel insert. The latchbolt to be one-piece 3/4" throw manufactured of cast stainless steel with an anti-friction insert. The auxiliary deadlatch shall be stainless steel and non-handed.
- D. The lock case shall be field reversible without requiring part replacement.
- E. To insure proper alignment, all trim shall be thru-bolted. The trim to be fully interchangeable between rose and escutcheon designs.
- F. All locks shall comply with ASTM F1577-95b paragraph 6.2-Level 3 minimum for Impact, paragraph 6.6 for Mechanical Release Force and paragraph 6.8 Mechanical Release Operation Cycle for Detention Swinging Doors. Locks shall meet ANSI series 1000 grade 1 standards.
- G. Locks required for fire doors, shall be listed by Underwriters Laboratories for ratings of 3 hours (A label) and less for single doors up to 4' 0" x 10' 0" and pairs of doors 8' 0" x 8' 0".
- H. All locks shall have a one year limited warranty.
- I. Flush Bolt Heads: Minimum of 1/2" diameter rods of brass, bronze or stainless steel, with minimum 12" long rod for doors up to 7'-0" in height. Provide longer rods as necessary for doors exceeding 7'-0" in height.
- J. Exit Device Dogging: Except on fire-rated doors, wherever closers are provided on doors equipped with exit devices, equip the units with keyed dogging device to hold the push bar down and the latch bolt in the open position.

2.6 CLOSERS AND DOOR CONTROL DEVICES

- A. Size of Units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather and anticipated frequency of use.
- B. Closers: All door closers shall be of one manufacturer to provide for proper installation and servicing after installation. All closers shall be inspected after installation by a factory representative to ensure proper adjustment and operation. A report shall be filed with the architect after said visit has been made. Closer shall carry a manufacturer's TEN YEAR WARRANTY against manufacturing defects and workmanship.
- C. All door closers shall be ANSI/BHMA Grade 1 (A156.4) test requirements. ALL EXTERIOR DOOR CLOSERS TO HAVE A WRITTEN CERTIFICATION SHOWING SUCCESSFUL COMPLETION OF A MINIMUM OF 10,000,000 CYCLES.

- D. All closer cylinders shall be fully hydraulic rack and pinion action with high strength cast iron bodies and one piece forged steel pistons. Closing speed, latching speed and backcheck shall be controlled by key operated valves.
- E. All door closers shall comply with UL-10C and UBC 7-2 (1977) Positive Pressure Fire Test.
- F. All door closers shall have special security main arms with screwed in rollers.
- G. All door closers shall have a security track with adapter bar mounted on pull side for hinge side mount (SSPT) and security track for stop side mount (PSSPT). Track design ejects foreign objects from within track.
- H. All door closers shall have metal covers. Covers shall be secured with security screws.
- I. All door closers shall be mounted with tamper proof security screws.
- J. Delayed action feature shall be available and controlled by a separate valve. Delayed action shall be available in addition to, not in lieu of , backcheck.
- K. Subject to compliance with above requirements, provide products of the following:

SARGENT

281 SSPT/PSSTP

2.7 EXIT DEVICES

- A. General: All devices and mullions shall be of one manufacturer to provide for proper installation and servicing. Devices shall be furnished non-handed and capable of direct field conversion for all available trim functions. All devices shall carry a three-year warranty against manufacturing defects and workmanship.
- B. Shall be push through type touch pad design with straight or horizontal motion to eliminate pinch points. All exit devices shall be tested to ANSI/BHMA A156.3 test requirements by a BHMA certified testing laboratory.
 - 1. Outside Trim: Shall be heavy-duty type and fastened by means of concealed welded lugs and thru-bolts from the inside.
 - 2. All devices that are not fire labeled are to be equipped with cylinder dogging.
 - 3. All exit devices to have a nonferrous alloy heavy duty cast chassis. Latch bolts on rim and concealed vertical rod exit devices shall be stainless steel with a minimum of ¾" throw. Latch bolts on non-rated surface vertical rod exit devices shall be brass and stainless steel on fire rated.
 - 4. Furnish cylinder with all key removable mullions, lockable exit devices and cylinder dogging.
 - 5. Mounting rails shall be formed from a solid single piece of stainless steel, brass or bronze no less than 0.072" thick. Painted or anodized aluminum shall not be considered heavy duty and are not acceptable.
 - 6. All metal end caps shall be flush and formed from the same base metal as the push and mounting rails.

7. All exposed screws shall be Torx or spanner head security screws.
8. Furnish required filler plates and shim kits for flush mounting of exit devices on all doors.
9. Acceptable products as follows:

SARGENT

43-8800 x ETL

2.8 FLOOR AND WALL STOPS

- A. All floor stops to be field verified for locations.
- B. Acceptable Manufacturer
 1. Rockwood
 2. Trimco
 3. Ives

2.9 DOOR TRIM UNITS

- A. Fasteners: Provide Torx head security screws on exposed fasteners for door trim units (kick plates, edge trim, and similar units); either machine screws or self-tapping screws.
- B. Fabricate edge trim of stainless steel, not more than 1/2" nor less than 1/16" smaller in length than door dimension.
- C. Fabricate protection plates (armor, kick or mop) not more than 2" less than door width on stop side and not more than 1" less than door width on pull side, x the height indicated.
- C. Metal Plates: Stainless steel, .050" (U.S. 18 ga.).
- D. Acceptable Manufacturers
 1. Rockwood
 2. Trimco

2.10 WEATHERSTRIPPING

- A. General: Except as otherwise indicated, provide continuous weatherstripping at each edge of every exterior door leaf. Provide type, sizes and profiles shown or scheduled. Provide stainless steel security sheet metal screw fasteners, color to match the retainer of the gasketing material.
- B. Acceptable Manufacturers:
 1. Pemko
 2. National Guard

2.11 THRESHOLDS

- A. General: Except as otherwise indicated provide standard aluminum threshold unit of type, size and profile as shown or scheduled. Threshold are required at all exterior doors and different flooring surfaces occur at doorways. Provide stainless steel security machine screws and expansion shields on all thresholds.
- B. Acceptable Manufacturers:
1. Pemko
 2. National Guard

2.12 DOOR SILENCERS

- A. All hollow metal frames shall have gray resilient type silencers. Quantity (3) on single doors and quantity (4) on pair of doors.

2.13 KEY CABINET

- A. Telkee WC Series with key load record system, preindexed by Hardware Supplier or cylinder manufacturer representative who shall instruct Owner in usage and maintenance of key records. Accommodate all keys under this Contract, plus 100% future expansion.
- B. Acceptable Manufacturers:
1. Telkee
 2. Lund

2.14 HARDWARE SCHEDULE

HW-1

Each to Have:

3 ea.	Hinges	IHTB786	US26D	(Mck)
1 ea.	Lock	9204	US26D	(Sar)
	(Key one side & blank on other)			
1 ea.	Cylinder	MEDECO (10200)	US26D	(Med)
1 ea.	Door Closer	281-SSPT	EN	(Sar)
1 ea.	Kick Plate	8" x 2" LDW	US32D	(Roc)
1 ea.	Door Stop	466		(Roc)
3 ea.	Silencers	608	Gray	(Roc)

HW-2

Each to Have:

3 ea.	Hinges	IHTB786	US26D	(Mck)
1 ea.	Lock	9251	US26D	(Sar)
	(Key one side & thumb-turn on other)			
1 ea.	Cylinder	MEDECO (10200)	US26D	(Med)
1 ea.	Door Closer	281-SSPT	EN	(Sar)
1 ea.	Kick Plate	8" x 2" LDW	US32D	(Roc)
1 ea.	Door Stop	466		(Roc)

	3 ea.	Silencers	608		(Roc)
<u>HW-3</u>					
Each to Have:					
	3 ea.	Hinges	IHTB386	US32D	(Mck)
	1 ea.	Lock	9217	US32D	(Sar)
		(Key both sides)			
	1 ea.	Cylinder	MEDECO (10200)	US26D	(Med)
	1 ea.	Door Closer	281-PSSPT	EN	(Sar)
	1 ea.	Kick Plate	8" x 2" LDW	US32D	(Roc)
	1 ea.	Door Stop	466		(Roc)
	3 ea.	Silencers	608		(Roc)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect.
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division-9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.
- C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant.

3.2 ADJUST AND CLEAN

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly as intended for the application made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

- E. Continued Maintenance Service: Approximately six months after the acceptance of hardware in each area, the Installer, accompanied by the representative of the latch and lock manufacturer, shall return to the project and re-adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

END OF SECTION 08710

SECTION 08800 - 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 SUMMARY:

- A. Extent of glass and glazing work is indicated on Drawings and schedules.
- B. Types of work in this section include glass and glazing for:
 - 1. 1/4" wire glass.
 - 2. 1/4" tempered glass.
 - 3. Mirror glass as shown on the Drawings.
- C. Supply and install glazing materials needed for a complete job.

1.3 SYSTEM DESCRIPTION:

- A. Provide glass and glazing that has been produced, fabricated, and installed to withstand normal thermal movement, wind loading, and 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 SUBMITTALS:

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

1.5 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. Comply with Louisiana law as required for safety of entrances and storefront glass.

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 WARRANTY:

- A. General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

PART 2 - PRODUCTS

2.1 WIRED GLASS

- A. Wired Glass: ASTM C 1036, Type II (patterned and wired glass, flat), Class 1 (clear), Quality q8 (glazing); 6 mm (0.23 inch) thick; of form and mesh pattern indicated below:
 - 1. Polished Wired Glass: Form 1 (wired, polished both sides), and as follows:
 - a. Mesh m1 (diamond).
- B. Manufacturers: Subject to compliance with requirements, provide wired glass by one of the following companies:
 - 1. Polished Wired Glass:
 - a. Ashai Glass Co.
 - b. Central Glass Co., Ltd.
 - c. Nippon Sheet Glass Ltd.
 - d. Pilkington Sales (North America) Ltd.

2.2 TEMPERED SAFETY GLASS (Vision Glass)

- A. Kind FT (fully tempered) where required by law.
- B. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
 - 1. Manufacturers of Clear Mirrors or Clear and Tinted Float Glass:
 - a. AFG Industries, Inc.
 - b. Guardian Industries Corp.
 - c. LOF Glass, Inc.
 - d. Tempglass.

2.3 MIRRORING GLASS

- A. General: 1/4" th. Clear mirror with all sides seal (in back side of mirror).
- B. Installation:
 - a. Mirrored glass to be glued to wall with mirror mastic.
 - b. Stainless steel clips at quarter points at bottom side.
- C. Manufacturers: Products from the following, or any approved equal, could be incorporated in the work:
 - 1. Carolina Mirror.
 - 2. Sun Pane.
 - 3. Binswanger.

2.4 ELASTOMERIC GLAZING SEALANTS

- A. General: Glazing contractor to provide glazing sealants compatible with aluminum window

manufacturer and with storefront and curtain wall manufacturers' requirements.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A. Installer to follow manufacturer glazing and installation manuals.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine glass framing, with glazier present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
 - 2. Presence and functioning of weep system.
 - 3. Minimum required face or edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.3 GLAZING, GENERAL

- A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions as indicated on Drawings provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass from edge damage during handling and installation.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Install elastomeric setting blocks in sill rabbets, sized and located to comply with referenced glazing standard, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass sizes larger than 50 united inches.
- H. Provide edge blocking to comply with requirements of referenced glazing publications, unless otherwise required by glass manufacturer.

3.4 GASKET GLAZING (DRY)

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
- B. Secure compression gaskets in place with joints located at corners to compress gaskets producing a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant

recommended by gasket manufacturer.

- C. Install gaskets so they protrude past face of glazing stops.

3.5 LOCK-STRIP GASKET GLAZING

- A. Comply with ASTM C 716 and gasket manufacturer's printed recommendations. Provide supplementary wet seal and weep system unless otherwise indicated.

3.6 PROTECTION AND CLEANING

- A. Protect exterior glass from breakage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkali deposits, or stains, and remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.
- E. Wash glass on both faces in each area of Project not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION 08800

SECTION 09200 - LATH AND PLASTER

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. Metal lathing (interior & exterior).
 - 2. Portland cement plastering (exterior & interior).
- B. Metal framing: Steel channel suspension system. Re: 09250 - Section 2.2

1.3 SUBMITTALS

- A. Product data: Submit manufacturer's product data for cementitious materials, lath, metal support components, and accessories.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer.
- B. Store materials inside, under cover, and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, aging, corrosion, and damage from construction traffic and other causes.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portland Cement: ASTM C 150.
- B. Lime: U.S. Gypsum Mortaseal or approved equal.
- C. Sand: ASTM C-35. Finish coat, use white graded sandblast silica sand.
- D. Water: Potable.
- E. Metal Lath: 3.4-pound galvanized expanded lath with asphalt impregnated paper backing, Type 1, Grade D.
- F. Accessories: Exposed exterior accessories zinc. Include corner beads, casing beads, expansion joints, "J" molds, control joints, tie wires, screws, or any needed accessories.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all lathing required for complete job for ceiling. Include all accessories required for a complete job. Lath to be screwed to channel supports at existing channel, maximum spacing.

- B. Install lathing in accordance with applicable requirements of Metal Lath Association Specifications for Metal Lath and Furring.
- C. Refer to U.S. Gypsum instruction for exterior wall furring.
- D. Stucco Mix:
 - 1. Scratch Coat: Mix two parts Portland cement, one part masonry cement, 2-1/2 to 3 parts sand.
 - 2. Brown Coat: Two parts Portland cement, one part masonry cement, three to four parts sand.
 - 3. Finish Coat shall be Thoro Products White Thoroseal Plaster Mix. Mix in accordance with manufacturer's recommendations, using one part Acryl 60 to three parts clean water in the mixing.
- E. Stucco Application:
 - 1. First coat:
 - a. Minimum thickness 3/8-inch, applied with sufficient material and pressure to embed firmly in metal lath and allow for scratching (scoring) the surface.
 - b. As soon as the first coat has become firm, scratch the entire surface in horizontal direction only, so as to provide a mechanical bond with second coat.
 - 2. Second Coat: Minimum thickness 3/8-inch, applied with sufficient material and pressure to insure contact with the scratch coat and to bring the combined thickness of both coats to a minimum thickness of 3/4-inch.
 - 3. Finish Coat to be minimum 1/8-inch thick. Trowel and float finish of the white Thoroseal plaster mix or equal.
- F. Curing: Sufficient moisture shall be retained to permit hydration process of the cementitious materials to continue until curing is complete, as determined by job and climatic conditions.
- G. Clean up completely after work is complete. Leave the job site clear of all bags, trash, remains, etc. of the work.

END OF SECTION 09200

SECTION 09250 - GYPSUM BOARD ASSEMBLIES

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 the following:
 - 1. Nonload-bearing steel framing members for gypsum board assemblies.
 - 2. Gypsum board assemblies attached to steel framing.
 - 3. Exterior gypsum sheathing.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 5 "Cold Formed Metal Framing" for metal framing and furring, and gypsum sheathing applied over metal framing.
 - 2. Division 7 Section "Firestopping" for firestopping systems and fire-resistance-rated joint sealants.

1.3 DEFINITIONS

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 ASSEMBLY PERFORMANCE REQUIREMENTS

- A. Fire Resistance: Provide gypsum board assemblies with fire-resistance ratings indicated.

1.5 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of product specified.

1.6 QUALITY ASSURANCE

- A. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer, unless otherwise indicated.
- B. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
- C. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.
- D. Fire-Test-Response Characteristics: Where fire-resistance-rated gypsum board assemblies are indicated, provide gypsum board assemblies that comply with the following requirements:

1. Fire-Resistance Ratings: As indicated by GA File Numbers in GA-600 "Fire Resistance Design Manual" or design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

1.8 PROJECT CONDITIONS

- A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.
- B. Room Temperatures: For nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours before application and continuously after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources.
- C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 1. Steel Framing and Furring:
 - a. Clark Steel Framing, Inc.
 - b. Dietrich Industries, Inc.
 - c. Marino/Ware (formerly Marino Industries Corp.).
 - d. Unimast, Inc.
 2. Grid Suspension Assemblies:
 - a. Armstrong World Industries, Inc.
 - b. Chicago Metallic Corp.
 - c. USG Interiors, Inc.
 - d. Worthington Steel Company (formerly National Rolling Mills).
 3. Gypsum Board and Related Products and Gypsum Sheathing:
 - a. Domtar Gypsum.
 - b. Georgia-Pacific Corp.
 - c. National Gypsum Co.; Gold Bond Building Products Division.
 - d. United States Gypsum Co.

2.2 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS

- A. General: Provide components complying with ASTM C 754 for conditions indicated.
- B. Wire Ties: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper, 0.062 inch (1.6 mm) thick.
- C. Wire Hangers: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper, 0.162-inch (4.1-mm) diameter.
- D. Angle-Type Hangers: Angles with legs not less than 7/8 inch (22.2 mm) wide, formed from 0.0635-inch- (1.6-mm-) thick galvanized steel sheet complying with ASTM A 653, G 90 (ASTM A 653M, Z 180) coating designation, with bolted connections and 5/16-inch (8-mm) diameter bolts.
- E. Channels: Cold-rolled steel, 0.0598-inch (1.5-mm) minimum thickness of base (uncoated) metal and 7/16-inch- (11.1-mm-) wide flanges, and as follows:
 - 1. Carrying Channels: 1-1/2 inches (38.1 mm) deep, 475 lb/1000 feet (70 kg/100 m), unless otherwise indicated.
 - 2. Furring Channels: 3/4 inch (19.1 mm) deep, 300 lb/1000 feet (45 kg/100 m), unless otherwise indicated.
 - 3. Finish: ASTM A 653, G 60 (ASTM A 653M, Z 180) hot-dip galvanized coating for framing for exterior soffits and where indicated.
- F. Steel Studs for Furring Channels: ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch- (5-mm-) wide minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:
 - 1. Thickness: 0.0179 inch (0.45 mm), unless otherwise indicated.
 - 2. Depth: 1-5/8 inch (41.3 mm), or 2-1/2 inches (63.5 mm) (as indicated in drawings).
 - 3. Protective Coating: Manufacturer's standard corrosion-resistant coating.
- G. Steel Rigid Furring Channels: ASTM C 645, hat shaped, depth of 7/8 inch (22.2 mm), and minimum thickness of base (uncoated) metal as follows:
 - 1. Thickness: 0.0179 inch (0.45 mm), unless otherwise indicated.
 - 2. Protective Coating: Manufacturer's standard corrosion-resistant coating.
- H. Steel Resilient Furring Channels: Manufacturer's standard product designed to reduce sound transmission, fabricated from steel sheet complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M) to form 1/2-inch- (12.7-mm-) deep channel of the following configuration:
 - 1. Single-Leg Configuration: Asymmetric-shaped channel with face connected to a single flange by a single-slotted leg (web).
- I. Grid Suspension System for Interior Ceilings: ASTM C 645, manufacturer's standard direct-hung grid suspension system composed of main beams and cross-furring members that interlock to form a modular supporting network.

2.3 STEEL FRAMING FOR WALLS AND PARTITIONS

- A. General: Provide steel framing members complying with the following requirements:
 - 1. Protective Coating: ASTM A 653, G 40 (ASTM A 653M, Z 90) hot-dip galvanized coating.
- B. Steel Studs and Runners: ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch- (5-mm-) wide minimum lip (return), and complying with the following

requirements for minimum thickness of base (uncoated) metal and for depth:

1. Thickness: 0.0329 inch (20 Gage) for head runner, sill runner, jamb, and cripple studs at door and other openings.
 2. Thickness: 0.0329 inch (20 Gage) at interior walls
 3. Depth: 3-5/8 inches (92.1 mm) where indicated.
 4. Depth: 6 inches (152.4 mm) where indicated.
 5. Depth: 4 inches (101.6 mm) where indicated.
- C. Deflection Track: Manufacturer's top runner complying with the requirements of ASTM C 645 and with 2-inch- (50.8-mm-) deep flanges.
- D. Steel Rigid Furring Channels: ASTM C 645, hat shaped, depth and minimum thickness of base (uncoated) metal as follows:
1. Thickness: 0.0179 inch (25 Gage), unless otherwise indicated.
 2. Depth: 7/8 inch (22.2 mm).
- E. Steel Resilient Furring Channels: Manufacturer's standard product designed to reduce sound transmission, fabricated from steel sheet complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M) to form ½-inch- (12.7-mm-) deep channel of the following configuration:
1. Single-Leg Configuration: Asymmetric-shaped channel with face connected to a single flange by a single-slotted leg (web).
- F. Z-Furring Members: Manufacturer's standard Z-shaped furring members with slotted or nonslotted web, fabricated from steel sheet complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M); with a minimum base metal (uncoated) thickness of 0.0179 inch (0.45 mm), face flange of 1-1/4 inch (31.8 mm), wall-attachment flange of 7/8 inch (22.2 mm), and of depth required to fit insulation thickness indicated.
- G. Steel Channel Bridging: Cold-rolled steel, 0.0598-inch (1.5-mm) minimum thickness of base (uncoated) metal and 7/16-inch- (11.1-mm-) wide flanges, 1-1/2 inches (38.1 mm) deep, 475 lb/1000 feet (45 kg/100 m), unless otherwise indicated.
- H. Steel Flat Strap and Backing Plate: Steel sheet for blocking and bracing complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M), length and width as indicated, and with a minimum base metal (uncoated) thickness as follows:
1. Thickness: 0.0179 inch (25 Gage), unless otherwise indicated.
- I. Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum board manufacturers for applications indicated.
- 2.5 GYPSUM BOARD PRODUCTS
- A. General: Provide gypsum board of types indicated in maximum lengths available that will minimize end-to-end butt joints in each area indicated to receive gypsum board application.
1. Widths: Provide gypsum board in widths of 48 inches (1219 mm).
- B. Gypsum Wallboard: ASTM C 36 and as follows:
1. Type: **All gypsum wall board shall be impact resistant for vertical and horizontal surfaces**, unless otherwise indicated.

2. Type: Type X where required for fire-resistance-rated assemblies.
 3. Edges: Tapered.
 4. Thickness: 5/8 inch (15.9 mm) where indicated.
- C. Gypsum Board Base Layer(s) for Multi layer Applications: Gypsum wallboard, ASTM C 36, and as follows:
1. Type: Type X where indicated or required for fire-resistance-rated assemblies.
 2. Edges: Manufacturer's standard.
 3. Thickness: 5/8 inch (15.9 mm) where indicated.
- D. Water-Resistant Gypsum Backing Board: ASTM C 630 and as follows:
1. Type: Regular, unless otherwise indicated.
 2. Thickness: 5/8 inch (15.9 mm), unless otherwise indicated.
 3. Use at bathroom ceilings and walls unless otherwise indicated in Finish Schedule.

2.6 GYPSUM SHEATHING

1. Thickness: 5/8".
2. Edges: Square.
3. Core: Moisture resistant.
4. Paper Surface: Water repellent
5. Size: 4' x 8'.
6. Type: "X".

2.7 TRIM ACCESSORIES

- A. Accessories for Interior Installation: Cornerbead, edge trim, and control joints complying with ASTM C 1047 and requirements indicated below:
1. Material: Formed metal complying with the following requirement:
 - a. Galvanized steel.
 2. Shapes indicated below by reference to Dietrich Industries, Inc. (Standard Gage):
 - a. Cornerbead on outside corners, unless otherwise indicated.
 3. **Install expanded metal behind gypsum board assemblies as noted in the drawings.**

2.8 JOINT TREATMENT MATERIALS

- A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.
- B. Joint Tape for Gypsum Board: Paper reinforcing tape, unless otherwise indicated.
- C. Setting-Type Joint Compounds for Gypsum Board: Factory-packaged, job-mixed, chemical-hardening powder products formulated for uses indicated.
1. Where setting-type joint compounds are indicated as a taping compound only or for taping and filling only, use formulation that is compatible with other joint compounds applied over it.
- D. Drying-Type Joint Compounds for Gypsum Board: Factory-packaged vinyl-based products complying with the following requirements for formulation and intended use.

1. Ready-Mixed Formulation: Factory-mixed product.
2. Job-Mixed Formulation: Powder product for mixing with water at Project site.

2.9 ACOUSTICAL SEALANT

- A. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.
- B. Available Products: Subject to compliance with requirements, acoustical sealants that may be incorporated in the Work include, but are not limited to, the following:
 1. Acoustical Sealant for Concealed Joints:
 - a. BA-98; Pecora Corp.
 - b. Tremco Acoustical Sealant; Tremco, Inc.

2.10 MISCELLANEOUS MATERIALS

- A. General: Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.
- B. Laminating Adhesive: Special adhesive or joint compound recommended for laminating gypsum panels.
- C. Spot Grout: ASTM C 475, setting-type joint compound recommended for spot-grouting hollow metal door frames.
- D. Fastening Adhesive for Metal: Special adhesive recommended for laminating gypsum panels to steel framing.
- E. Steel drill screws complying with ASTM C 1002 for the following applications:
 1. Fastening gypsum board to steel members less than 0.033 inch (0.84 mm) thick.
 2. Fastening gypsum board to gypsum board.
- F. Steel drill screws complying with ASTM C 954 for fastening gypsum board to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
- G. Sound-Attenuation Blankets:
 1. Mineral-Fiber Type: Fibers manufactured from glass.
- I. Polyethylene Vapor Retarder: ASTM D 4397, thickness and maximum permeance rating as follows:
 1. 6 mils (0.15 mm), 0.13 perms (7.5 ng/Pa x s x sq. m).
- J. Vapor Retarder Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for

installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Ceiling Anchorages: Coordinate installation of ceiling suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.

3.3 INSTALLING STEEL FRAMING, GENERAL

- A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.
- B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with United States Gypsum Co.'s "Gypsum Construction Handbook."
- C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement. Comply with details shown on Drawings.
- D. Do not bridge building control and expansion joints with steel framing or furring members. Independently frame both sides of joints with framing or furring members as indicated.

3.4 INSTALLING STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS

- A. Suspend ceiling hangers from building structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
 - 3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
 - 4. Secure flat, angle, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for structure as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or otherwise fail.
 - 5. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 - 6. Do not attach hangers to steel deck tabs.
 - 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- B. Install suspended steel framing components in sizes and at spacings indicated, but not less than that required by the referenced steel framing installation standard.
 - 1. Wire Hangers: 48 inches (1219 mm) o.c.

2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
 3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.
- C. Installation Tolerances: Install steel framing components for suspended ceilings so that cross-furring or grid suspension members are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) as measured both lengthwise on each member and transversely between parallel members.
- D. Wire-tie or clip furring members to main runners and to other structural supports as indicated.
- E. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.5 INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS

- A. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.
- B. Installation Tolerances: Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
1. For STC-rated and fire-resistance-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid structural surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed, to support gypsum board closures needed to make partitions continuous from floor to underside of solid structure.
- D. Install steel studs and furring in sizes and at spacings indicated.
1. Single-Layer Construction: Space studs 16 inches (406 mm) o.c., unless otherwise indicated.
 2. Multi layer Construction: Space studs 24 inches (610 mm) o.c., unless otherwise indicated.
- E. Install steel studs so flanges point in the same direction and leading edge or end of each gypsum board panel can be attached to open (unsupported) edges of stud flanges first.
- F. For curved partitions, install steel framing as follows:
1. Cut top and bottom runners through leg and web at 2-inch (50-mm) intervals for arc length. In cutting lengths of runners, allow for uncut straight lengths of not less than 12 inches (300 mm) at ends of arcs.
 2. Bend runners to uniform curve of radius indicated and locate straight lengths so they are tangent to arcs.
 3. Support outside (cut) leg of runners by clinching a 1-inch- (25-mm-) high-by-0.0209-inch- (0.55-mm-) thick steel sheet strip to inside of cut legs using metal lock fasteners.
 4. Attach runners to structural elements at floor and ceiling with fasteners located 2 inches (50 mm) from ends and spaced 24 inches (610 mm) o.c.
 5. Attach runners to suspended ceilings with toggle bolts or hollow wall anchors located 2 inches (50 mm) from ends and spaced 16 inches (406 mm) o.c. in between where attached to suspended ceilings.
 - a. Screw runners directly to suspension grid of suspended acoustical tile ceilings where runners intersect grid.

6. Position studs vertically with open sides facing in same direction and engaging floor and ceiling runners. Begin and end each arc with a stud and space intermediate studs equally along arcs at stud spacing recommended by gypsum board manufacturer for radii indicated. Attach studs to runners with 3/8-inch- (9.5-mm-) long pan head framing screws. On straight lengths at ends of arcs, place studs 6 inches (150 mm) o.c. with last stud left free standing.
- G. Frame door openings to comply with GA-219, and with applicable published recommendations of gypsum board manufacturer, unless otherwise indicated. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 1. Install 2 studs at each jamb, unless otherwise indicated.
- H. Frame openings other than door openings to comply with details indicated or, if none indicated, as required for door openings. Install framing below sills of openings to match framing required above door heads.
- I. Install thermal insulation as follows:
 1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
- J. Install polyethylene vapor retarder where indicated to comply with the following requirements:
 2. Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with mechanical fasteners or adhesives. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose mineral-fiber insulation.
 3. Seal vertical joints in vapor retarders over framing by lapping not less than 2 wall studs. Fasten vapor retarders to framing at top, end, and bottom edges, at perimeter of wall openings, and at lap joints; space fasteners 16 inches (400 mm) o.c.
 4. Seal joints in vapor retarders caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor retarder tape.
 5. Repair any tears or punctures in vapor retarder immediately before concealing it with the installation of gypsum board or other construction.

3.6 APPLYING AND FINISHING GYPSUM BOARD, GENERAL

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840 and GA-216.
- B. Install sound-attenuation blankets, where indicated, prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
- C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- D. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- E. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Avoid joints other than control joints at corners of framed openings where possible.
- F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open

(unsupported) edges of stud flanges first.

- G. Attach gypsum panels to framing provided at openings and cutouts.
- H. Spot grout hollow metal door frames for solid-core wood doors, hollow metal doors, and doors over 32 inches (813 mm) wide. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.
- I. Form control and expansion joints at locations indicated and as detailed, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.
- J. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases that are braced internally.
 - 1. Except where concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- K. Isolate perimeter of nonload-bearing gypsum board partitions at structural abutments, except floors, as detailed. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- L. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.
 - 1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.
- M. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.

N. Install expanded metal behind gypsum board assemblies as noted in the drawings.

3.7 GYPSUM BOARD APPLICATION METHODS

- A. Single-Layer Application: Install gypsum wallboard panels as follows:
 - 6 On ceilings, apply gypsum panels prior to wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
 - 2 On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless parallel application is required for fire-resistance-rated assemblies. Use maximum-length panels to minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
 - b. At stairwells and other high walls, install panels horizontally.
 - 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
- B. Water-resistant Substrates: For substrates indicated to receive thin-set ceramic tile and similar rigid applied wall finishes, comply with the following:
 - 7 Install water-resistant gypsum backing board panels at showers, tubs, and all bathroom walls.

Install with 1/4-inch (6.4-mm) open space where panels abut other construction or penetrations.

- C. Multi layer Application on Ceilings: Apply gypsum board indicated for base layers prior to applying base layers on walls/partitions; apply gypsum wallboard face layers in same sequence. Offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints. Apply base layers at right angles to framing members, unless otherwise indicated.
- D. Multi layer Application on Partitions/Walls: Apply gypsum board indicated for base layers and gypsum wallboard face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints. Stagger joints on opposite sides of partitions.
- E. Single-Layer Fastening Methods: Apply gypsum panels to supports as follows:
 - 8 Fasten with screws.
- F. Multi layer Fastening Methods: Apply base layers of gypsum panels and face layer to base layers as follows:
 - 9 Fasten both base layers and face layers separately to supports with screws.
- G. Direct-Bonding to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's recommendations, and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- H. Exterior Soffits and Ceilings: Apply exterior gypsum soffit board panels perpendicular to supports, with end joints staggered over supports.
 - 10 Install with 1/4-inch (6.4-mm) open space where panels abut other construction or structural penetrations.
 - 2. Fasten with corrosion-resistant screws.

3.8 INSTALLING TRIM ACCESSORIES

- A. General: For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.
- B. Install cornerbead at external corners.
- C. Install edge trim where edge of gypsum panels would otherwise be exposed. Provide edge trim type with face flange formed to receive joint compound, except where other types are indicated.
 - 11. Install LC-bead where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
 - 2. Install aluminum trim and other accessories where indicated.
- D. Install control joints at locations indicated.
- E. Install control joints according to ASTM C 840 and manufacturer's recommendations and in specific locations approved by Architect for visual effect.

3.9 FINISHING GYPSUM BOARD ASSEMBLIES

- A. General: Treat gypsum board joints, interior angles, flanges of cornerbead, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.

- B. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.
- C. Apply joint tape over gypsum board joints and to flanges of trim accessories as recommended by trim accessory manufacturer.
- D. Levels of Gypsum Board Finish: Provide the following levels of gypsum board finish per GA-214.
 - 1. Level 1 for ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
 - 12 Level 2 at shower areas and mechanical, storage, electrical and miscellaneous utility rooms.
 - 3. Level 5 everywhere unless indicated otherwise.
- E. Use one of the following joint compound combinations as applicable to the finish levels specified:
 - 1. Embedding and First Coat: Setting-type joint compound. Fill (Second) Coat: Setting-type joint compound. Finish (Third) Coat: Sandable, setting-type joint compound.
 - 13 Embedding and First Coat: Setting-type joint compound. Fill (Second) Coat: Setting-type joint compound. Finish (Third) Coat: Ready-mixed, drying-type, all-purpose or topping compound.
 - 3. Embedding and First Coat: Ready-mixed, drying-type, all-purpose or taping compound. Fill (Second) Coat: Ready-mixed, drying-type, all-purpose or topping compound. Finish (Third) Coat: Ready-mixed, drying-type, all-purpose or topping compound.
 - 4. Embedding and First Coat: Job-mixed, drying-type, taping compound. Fill (Second) Coat: Job-mixed, drying-type, topping compound. Finish (Third) Coat: Job-mixed, drying-type, topping compound.
 - 5. Embedding and First Coat: Job-mixed, drying-type, all-purpose compound. Fill (Second) Coat: Job-mixed, drying-type, all-purpose compound. Finish (Third) Coat: Job-mixed, drying-type, all-purpose compound.
 - 6. Embedding and First Coat: Setting-type compound. Fill (Second) Coat: Setting-type compound. Finish (Third) Coat: Job-mixed, drying-type, all-purpose compound.
- F. Where Level 5 gypsum board finish is indicated, embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories; and apply a thin, uniform skim coat of joint compound over entire surface. For skim coat, use joint compound specified for third coat, or a product specially formulated for this purpose and acceptable to gypsum board manufacturer. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects, tool marks, and ridges and ready for decoration.
- G. Where Level 2 gypsum board finish is indicated, embed tape in joint compound and apply first coat of joint compound.
- H. Where Level 1 gypsum board finish is indicated, embed tape in joint compound.
- I. Finish exterior gypsum soffit board using setting-type joint compounds to prefill joints and embed tape, and for first, fill (second), and finish (third) coats, with the last coat being a sandable product. Smooth each coat before joint compound hardens to minimize need for sanding. Sand between coats and after finish coat.
 - 1. Painting exterior gypsum soffit board after finish coat has dried is specified in another Division 9 Section.
- J. Finish water-resistant gypsum backing board forming base for ceramic tile to comply with ASTM C 840 and gypsum board manufacturer's directions for treatment of joints behind tile.

3.10 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces

receiving texture finishes according to texture finish manufacturer's instructions. Apply primer only to surfaces that are clean, dry, and smooth.

- B. Texture Finish Application: Mix and apply finish to gypsum panels and other surfaces indicated to receive texture finish according to texture finish manufacturer's directions. Using powered spray equipment, produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray as recommended by texture finish manufacturer to prevent damage.

3.11 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Architect will conduct an above-ceiling observation prior to installation of gypsum board ceilings and report any deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
 - 1 Notify Architect one week in advance of the date and the time when the Project, or part of the Project, will be ready for an above-ceiling observation.
 - 2 Prior to notifying Architect, complete the following in areas to receive gypsum board ceilings:
 - a. Installation of 80 percent of lighting fixtures, powered for operation.
 - b. Installation, insulation, and leak and pressure testing of water piping systems.
 - c. Installation of air duct systems.
 - d. Installation of air devices.
 - e. Installation of mechanical system control air tubing.
 - f. Installation of ceiling support framing.

3.12 CLEANING AND PROTECTION

- A. Promptly remove any residual joint compound from adjacent surfaces.
- B. Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure gypsum board assemblies are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 09255

SECTION 09300 - TILE

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. Unglazed ceramic mosaic tile.
 - 2. Glazed ceramic wall tile.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified.
- C. Shop drawings indicating tile patterns and locations and widths of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
 - 1. Locate precisely each joint and crack in tile substrates by measuring, record measurements on shop drawings, and coordinate them with tile joint locations, in consultation with Architect.
- D. Samples for initial selection purposes in form of manufacturer's color charts consisting of actual tiles or sections of tile showing full range of colors, textures, and patterns available for each type and composition of tile indicated. Include samples of grout and accessories involving color selection.
- E. Samples for verification purposes of each item listed below, prepared on samples of size and construction indicated, products involve color and texture variation, in sets showing full range of variations expected.
 - 1. Each type and composition of tile and for each color and texture required, at least 12 inches square, mounted on plywood or hardboard backing and grouted.
 - 2. Full-size units of each type of trim and accessory for each color required.
 - 3. Stone thresholds in 6-inch lengths.
 - 4. Metal edge strips in 6-inch lengths.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- B. Single-Source Responsibility for Setting and Grouting Materials: Obtain ingredients of a uniform quality from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.
- C. Installer Qualifications: Engage an experienced Installer who has successfully completed tile installations similar in material, design, and extent to that indicated for Project.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.
- B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.
- C. Maintain temperatures at 50 deg F (10 deg C) or more in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

1.7 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials that match products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to two percent of amount installed, for each type, composition, color, pattern, and size.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Unglazed Ceramic Mosaic Tile:
 - a. American Olean Tile Co., Inc. – Unglazed Ceramic Mosaics
 - b. Dal-Tile Corp. - Keystones
 - 2. Glazed Ceramic Wall Tile:
 - a. American Olean Tile Co., Inc. – Matte or Bright
 - b. Dal-Tile Corp. – Matte or Semi-gloss
 - 3. Latex-Emulsion-Based Latex-Portland Cement Mortars:
 - a. American Olean Tile Co., Inc.
 - b. Laticrete International Inc.
 - 4. Ethylene-Vinyl-Acetate-Based Latex-Portland Cement Prepackaged Dry Grout Mixes:
 - a. American Olean Tile Co., Inc.
 - b. DAP Inc. Div.; USG Corp.
 - 5. Acrylic Emulsions for Latex-Portland Cement Grouts:
 - a. American Olean Tile Co., Inc.
 - b. Laticrete International Inc.

2.2 PRODUCTS, GENERAL

- A. ANSI Standard for Ceramic Tile: Comply with ANSI A137.1 "American National Standard Specifications for Ceramic Tile" for types, compositions, and grades of tile indicated.
 - 1. Furnish tile complying with "Standard Grade" requirements unless otherwise indicated.
- B. ANSI Standard for Tile Installation Materials: Comply with ANSI standard referenced with products and materials indicated for setting and grouting.
- C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements.
 - 1. Provide selections made by Architect from manufacturer's full range of standard colors, textures, and patterns for products of type indicated.
- D. Factory Blending: For tile exhibiting color variations within the ranges selected during sample submittals, blend tile in factory and package accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.
- E. Mounting: Where factory-mounted tile is required, provide back- or edge-mounted tile assemblies as standard with manufacturer unless another mounting method is indicated.
- F. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating them with a continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.3 TILE PRODUCTS

- A. Unglazed Ceramic Mosaic Tile: Provide factory-mounted flat tile complying with the following requirements:
 - 1. Composition: Porcelain.
 - 2. Nominal Facial Dimensions: 2 inches by 2 inches.
 - 3. Nominal Facial Dimensions: As indicated.
 - 4. Nominal Thickness: 1/4 inch.
 - 5. Face: Plain with cushion edges.
- B. Glazed Wall Tile:
 - 1. Nominal Facial Dimensions: 4 inches by 4 inches.
 - 2. Nominal Thickness: 5/16 inch.
 - 3. Face: Plain with cushion edges.
 - 4. Mounting: Factory Back Mounted.
- C. Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with following requirements.
 - 1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
 - 2. Shapes: As follows, selected from manufacturer's standard shapes:
 - a. Base for Portland Cement Mortar Installations: Coved.
 - b. Base for Thinset Mortar Installations: Straight.
 - c. External Corners for Portland Cement Mortar Installations: Bullnose shape with a radius of at least 3/4 inch unless otherwise indicated.
 - d. External Corners for Thinset Installations: Surface bullnose.
 - e. Internal Corners: Coved corners (round-in), except use coved base and cap angle pieces designed to member with stretcher shapes.
 - f. Tapered Transition Tile: Shape designed to effect transition between thickness of tile

floor and adjoining floor finishes of different thickness, tapered to provide a reduction in thickness from 1/2 inch to 1/4 inch across nominal 4 inch dimension.

- E. Accessories for Glazed Wall Tile: Provide vitreous china accessories of type and size indicated and in color and finish to match adjoining glazed wall tile.

1. One soap holder for each shower indicated.

2.4 STONE THRESHOLDS

- A. General: Provide stone that is uniform in color and finish, fabricated to sizes and profiles indicated or required to provide transition between tile surfaces and adjoining finished floor surfaces.

- B. Marble Thresholds: Provide marble thresholds complying with ASTM C 503 requirements for exterior use and for abrasion resistance where exposed to foot traffic, a minimum hardness of 10 per ASTM C 241.

1. Provide white, honed marble complying with MIA Group "A" requirements for soundness.

2.5 SETTING MATERIALS

- A. Portland Cement Mortar Installation Materials: Provide materials complying with ANSI A108.1 and as specified below.

- B. Latex-Portland Cement Mortar: ANSI A118.4, composition as follows:

1. Prepackaged dry mortar mix composed of portland cement, graded aggregate, and the following dry polymer additive in the form of a reemulsifiable powder to which only water is added at job site.

- a. Dry Polymer Additive: Manufacturer's standard.

2. Latex additive (water emulsion) of type described below serving as replacement for part or all of gauging water, combined at job site with prepackaged dry mortar mix supplied or specified by latex additive manufacturer.

- a. Latex Type: Manufacturer's standard.

- C. Organic Adhesive: ANSI A136.1, Type 1.

2.6 GROUTING MATERIALS

- A. Dry-Set Grout: ANSI A118.6, color as indicated.

- B. Latex-Portland Cement Grout: ANSI A118.6, color as indicated, composition as follows:

1. Prepackaged dry grout mix composed of portland cement, graded aggregate, and the following dry polymer additive in the form of a reemulsifiable powder to which only water is added at job site.

- a. Dry Polymer Additive: Ethylene vinyl acetate.

2. Latex additive (water emulsion) serving as replacement for part or all of gauging water, added at job site with dry grout mixture, with type of latex and dry grout mix as follows:

- a. Latex Type: Acrylic resin.

- b. Dry Grout Mixture: Dry-set grout specified or supplied by latex additive

manufacturer. Use latex additive without retarder with dry-set grout.

- 1.) Application: Use dry-set grout combined with latex additive for grouting joints in glazed wall tile.
- c. Dry Grout Mixture: Commercial portland cement specified or supplied by latex additive manufacturer.
- 1.) Application: Use commercial portland cement grout combined with latex additive for grouting joints in floor tile unless otherwise indicated.

2.7 ELASTOMERIC SEALANTS

- A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that comply with requirements of Division 7 Section "Joint Sealers," including ASTM C920 as referenced by Type, Grade, Class, and Uses.
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.
- C. Multipart Pourable Urethane Sealant for Use T: Type M, Grade P, Class 25, Uses T, M, A, and as applicable to joint substrates indicated, O.
- D. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
 1. Multipart Pourable Urethane Sealant:
 - a. "Chem-Calk 550"; Bostik Construction Products Div.
 - b. "Urexpan NR-200"; Pecora Corp.
 - c. "THC-900"; Tremco Corp.

2.8 MISCELLANEOUS MATERIALS

- A. Metal Edge Strips: Zinc alloy or stainless steel terrazzo strips, 1/8 inch wide at top edge with integral provision for anchorage to mortar bed or substrate unless otherwise indicated.
- B. Temporary Protective Coating: Provide product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout, is compatible with tile and mortar/grout products, and is easily removable after grouting is completed without damaging grout or tile.
 1. Petroleum paraffin wax, fully refined, tasteless, odorless, containing at least 0.5 percent oil with a melting point of 120 deg F (49 deg C) to 140 deg F (60 deg C) per ASTM D 87.
 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as a temporary protective coating for tile.

2.9 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with requirements of referenced standards and manufacturers including those for accurate proportioning of materials, water, or additive content; type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortars and grouts of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and areas where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm, dry, clean, and free from oil or waxy films and curing compounds.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Blending: For tile exhibiting color variations within the ranges selected during sample submittals, verify that tile has been blended in factory and packaged accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- B. Field-Applied Temporary Protective Coating: Where indicated under tile type or need to prevent adhesion or staining of exposed tile surfaces by grout, protect exposed surfaces of tile against adherence of mortar and grout by precoating them with a continuous film of temporary protective coating indicated below, taking care not to coat unexposed tile surfaces:
 - 1. Grout release.

3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standard: Comply with parts of ANSI 108 series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile" that apply to type of setting and grouting materials and methods indicated.
- B. TCA Installation Guidelines: TCA "Handbook for Ceramic Tile Installation"; comply with TCA installation methods indicated.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions except as otherwise shown. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile.
- E. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths unless otherwise shown.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw cut joints after installation of tiles.

1. Locate joints in tile surfaces directly above joints in concrete substrates.
2. Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealers".

H. Grout tile to comply with the requirements of the following installation standards:

1. For ceramic tile grouts (sand-portland cement, dry-set, commercial portland cement, and latex-portland cement grouts), comply with ANSI A108.10.

I. At showers, tubs and similar wet areas, install cementitious backer units and treat joints to comply with manufacturer's instructions for type of application indicated.

3.4 FLOOR INSTALLATION METHODS

A. Ceramic Mosaic Tile: Install tile to comply with requirements indicated below for setting bed methods, TCA installation methods related to types of subfloor construction, and grout types:

1. Portland Cement Mortar: ANSI A108.1

- a. Bond coat: Portland cement paste or dust coat on plastic bed or the following thin-set mortar on cured bed, ANSI A108.5, at Contractor's option:
 - 1.) Latex-portland cement mortar.
- b. Concrete Subfloors, Interior, Waterproofing Membrane: TCA F121.
- c. Grout: Latex-portland cement.

B. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile unless otherwise indicated.

1. Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent nontile floor finish.

C. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

3.5 WALL TILE INSTALLATION METHODS (BASE UNITS)

A. Install types of tile designated for wall application to comply with requirements indicated below for setting-bed methods, TCA installation methods related to subsurface wall conditions, and grout types:

1. Latex-Portland Cement Mortar: ANSI A108.5.

3.6 CLEANING AND PROTECTION

A. Cleaning: Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove latex-portland cement grout residue from tile as soon as possible.
2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but no sooner than 14 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to brick and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.
- C. Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer that ensures that tile is without damage or deterioration at time of Substantial Completion.
 - 1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
 - 2. Prohibit foot and wheel traffic from tiles floors for a least 7 days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 09300

SECTION 09510 – ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes: Ceiling panels, Suspension Systems..
- B. Related Sections:
 - 1. Section 09511 – Acoustical Panel Ceilings
 - 2. Mechanical: Division 15 - Air Supply and Return Devices
 - 3. Electrical: Division 16 – Light Fixtures

1.02 SUBMITTALS:

- A. Submit listed submittals in accordance with conditions of contract and Division 1 submittal procedures.
 - 1. Set of 6 inch square samples for each ceiling panel unit required, showing full range of exposed color and texture to be expected in completed work.
 - 2. Set of 12 inch long samples for each exposed suspension system track molding.
- B. Product data for each item specified.
- C. Shop Drawings: Submit Shop Drawings showing layout, profiles, and product components including anchorage, accessories, finish color and textures.
- D. Quality Assurance Submittals:
 - 1. Certificates: Product certificates signed by the manufacturer certifying materials comply with specified performance characteristics and physical requirements.
 - 2. Manufacturers Installation Instructions.
- D. Closeout Submittals:
 - 1. Operation and Maintenance data for installed products in accordance with Division 1 closeout submittals. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
 - 2. Warranty: Warranty documents specified herein.

1.03 QUALITY ASSURANCE:

- A. Comply with governing codes and regulations.
- B. Installer Qualifications:
 - 1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for the project.
 - 2. Installer must be radiology equipment assembler licensed with the State of Louisiana.

1.04 DELIVERY, STORAGE AND HANDLING:

- A. General: Comply with Division 1 Product Requirements Section.

- B. Ordering: Comply with manufacturers ordering instructions and lead-time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturers original, unopened, undamaged protective packaging, with manufacturer's labels indicating brand name, pattern size, and thickness, legible and intact.
- D. Storage and Protection: Store materials in original protective packaging to prevent soiling, physical damage or wetting. Store cartons open at each end to stabilize moisture content and temperature.

1.05 PROJECT CONDITIONS:

- A. Do not install interior acoustical ceilings until space is enclosed and weatherproof. Complete installation of damp materials before beginning work.
- B. Maintain humidity of 65 - 75 percent in areas where acoustical materials are to be installed 24 hours before, during, and after installation.
- C. Maintain a uniform temperature in the range of 55 – 70 degrees F. prior to and during installation of materials.

1.06 EXTRA MATERIALS:

- A. Deliver extra materials in full tiles equal to 2.0 percent of acoustical material supplied.
- B. All cartons shall be new, unopened, packaged with protective covering for storage, and identified with appropriate labels.

PART 2 – PRODUCTS

2.01 MANUFACTURERS:

- A. Tectum "Tonico" ceiling tile as produced by Tectum, Inc or "Acoustical Plank Tile" by Martin Fireproofing.

2.02 MATERIALS:

- A. Ceiling Tile:
 - 1. Thickness: 1 inch.
 - 2. Size: 24" X 48".
 - 3. Finish: Painted White.
- B. Suspension System
 - 1. Grid: ASTM C635 intermediate components die cut and interlocking.
 - 2. Accessories: Stabilizer bars, clips, splices, edge moldings required for suspended grid systems.
 - 3. Grid Materials: Commercial quality cold rolled steel with galvanized coating.
 - 4. Grid Finish: White, low gloss sheen.
 - 5. Support Channels and Hangers: Galvanized steel, size and type to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. **SITE VERIFICATION OF CONDITIONS:** Examine surfaces scheduled to receive suspended or directly attached acoustical units for unevenness, irregularities, and dampness that would affect quality and execution of work. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 CEILING TILE INSTALLATION:

- A. Do not begin installation until sufficient materials to complete a room are received.
- B. Install materials in accordance with manufacturer's printed instructions, governing regulations, fire resistance rating requirements, and industry standards applicable to work.
- C. 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 wherever possible.
- D. Symmetrically locate grid layout in each space. Coordinate work with other trades so that lighting fixtures, grilles, and other ceiling fixtures work with grid layout.
- E. Do not use universal splices or other splices, which would obstruct passage of recessed lighting fixtures through grid openings or limit fixture relocation upon flanges of ceiling grids.
- F. Support suspension system from structure above, not from ductwork, metal deck, equipment or piping.
- G. Space hangers not more than 6 inches from ends and not more than 4 feet on center.
- H. Install edge moldings at the perimeter of each acoustical ceiling area and at locations where edge of units would otherwise be exposed.
 - 1. Secure moldings to building construction by fastening with screw anchors into the substrate, through holes drilled in vertical leg. Space holes not more than 16 inches on center along each molding.
 - 2. Level moldings with ceiling suspension system, to a level tolerance of 1/8 inch in 12 feet.
 - 3. Miter corners of moldings accurately to prevent hairline joints, securely connected to prevent dislocation. Cope exposed flanges of intersecting suspension system members, so that flange faces will be flush.
 - 4. Furnish additional tees for supporting grilles, diffusers and light fixtures. Refer to the reflected ceiling, HVAC and electrical plans for locations.
 - 5. Provide reveal edge at walls, other abutting vertical surfaces.
 - 6. Field paint cut edges to surface color and sheen.
- J. Arrange acoustical units and orient directionally patterned units, if any, in manner shown on reflected plans.

3.03 CEILING BAFFLE INSTALLATION

- A. Install ceiling baffles in strict accordance with manufacturer's installation instructions.

3.04 CLEANING

- A. Clean exposed surfaces of acoustical ceilings, trim, edge moldings, and suspension members to comply with manufacturer's instructions for cleaning and touch-up of minor finish damage.
- B. Remove work that cannot be successfully cleaned and replace to permanently eliminate damage.

3.05 PROTECTION:

- A. Provide required protection for the acoustical ceilings, including temperature, humidity limitations and dust control so that the work will be without damage and deterioration at the time of acceptance by the Owner.

END OF SECTION 09510

SECTION 09511 - ACOUSTICAL PANEL CEILINGS

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 ceilings consisting of acoustical panels and exposed suspension systems.

1.3 SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Samples for Verification: Full-size units of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.
 - 1. 6-inch- (150-mm-) square samples of each acoustical panel type, pattern, and color.
 - 2. Set of 12-inch- (300-mm-) long samples of exposed suspension system members, including moldings, for each color and system type required.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Source Limitations for Ceiling Units: Obtain each acoustical ceiling panel from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
- C. Source Limitations for Suspension System: Obtain each suspension system from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
 - 1. Obtain both acoustical ceiling panels and suspension system from the same manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels and suspension system components 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 panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated for each designation in the Acoustical Panel Ceiling Schedule at the end of Part 3.

2.2 ACOUSTICAL PANELS, GENERAL

- A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
 - 1. Mounting Method for Measuring Noise Reduction Coefficient: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface per ASTM E 795.
- B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
 - 1. Where appearance characteristics of acoustical panels are indicated by referencing ASTM E 1264 pattern designations and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range of products that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.
- C. Antimicrobial Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial solution consisting of a synergistic blend of substituted ammonium salts of alkylated phosphoric acids admixed with free alkylated phosphoric acid that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria.
- D. Panel Characteristics: Comply with requirements indicated in the Acoustical Panel Ceiling Schedule at the end of Part 3, including those referencing ASTM E 1264 classifications.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.

- B. Metal Suspension System Characteristics: Comply with requirements indicated in the Acoustical Panel Ceiling Schedule at the end of Part 3.
- C. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
 - 1. High-Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- D. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
 - 1. Postinstalled Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.
- E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - 1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than ~~0.106-inch-~~ (2.69-mm-) diameter wire.
- F. Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.
 - 1. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
 - 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
 - 3. For narrow-face suspension systems, provide suspension system and manufacturer's standard edge moldings that match width and configuration of exposed runners.
- G. Hold-Down Clips for Non-Fire-Resistance-Rated Ceilings: For interior ceilings consisting of acoustical panels weighing less than ~~1 lb/sq. ft.~~ (4.88 kg/sq. m), provide hold-down clips spaced ~~24 inches~~ (610 mm) o.c. on all cross tees.
- H. Impact Clips: Provide manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels for interior ceilings..

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical panel ceilings.

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

3.2 PREPARATION

- A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.
- B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
 1. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.
- B. Suspend ceiling hangers from building's structural members and as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, powder-actuated fasteners, or drilled-in anchors that extend through forms into concrete.
 6. Do not attach hangers to steel deck tabs.
 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 8. Space hangers not more than **48 inches (1200 mm)** o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than **8 inches (200 mm)** from ends of each member.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 1. Screw attach moldings to substrate at intervals not more than **16 inches (400 mm)** o.c. and not more than **3 inches (75 mm)** from ends, leveling with ceiling suspension system to a tolerance of **1/8 inch in 12 feet (3 mm in 3.6 m)**. Miter corners accurately and connect securely.
 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

- E. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
 - 1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 - b. Install panels with pattern running in one direction parallel to long axis of space.
 - 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
 - 3. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated or required.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

3.5 ACOUSTICAL PANEL CEILING SCHEDULE

- A. Water-Felted, Mineral-Base Acoustical Panels for Acoustical Panel Ceiling: Where this designation is indicated, provide acoustical panels, treated with antimicrobial solution, and complying with the following:
 - 1. Products: Provide one of the following:
 - a. Omni Auratone Acoustical Panels as manufactured by USG Interiors, Inc.
 - b. Cortega as manufactured by Armstrong
 - 2. Classification: Panels fitting ASTM E 1264 for Type III, mineral base with painted finish; Form 2, water felted.
 - 3. Pattern: Panels fitting ASTM E 1264 pattern designation fissured.
 - 4. Color: White.
 - 5. Light Reflectance Coefficient: Not less than LR 0.80.
 - 6. Noise Reduction Coefficient: NRC 0.50 – 0.60.
 - 7. Edge Detail: Reveal sized to fit flange of exposed suspension system members.
 - 8. Thickness: **5/8 inch (16 mm)**.
 - 9. Size: **24 by 24 inches (610 by 610 mm)**.
- B. Gypsum Board Panels with vinyl film overlay in kitchen/food service areas and laundry building: Provide Type XX, Form A units per ASTM E1264 with washable vinyl-film overlay and gypsum core, complying with pattern and other requirements indicated.
 - 1. Products: Provide one of the following:
 - a. Vinyltone as manufactured by Celotex Corporation
 - b. ClimaPlus Gypsum Lay-in Panels by USG Interiors, Inc.
 - 2. Color: White.
 - 3. Light Reflectance Coefficient: Not less than LR 0.80.
 - 4. Noise Reduction Coefficient: N/A
 - 5. Ceiling Attenuation Class: Not less than CAC 40.

6. Edge Detail: Square.
 7. Thickness: ½"
 8. Size: 24 by 24 inches (610 by 610 mm).
- C. Suspension System for Acoustical Panel Ceiling: Where this designation is indicated, provide acoustical panel ceiling suspension system complying with the following:
1. Products: Provide one of the following:
 - a. Armstrong Prelude.
 - b. Chicago Metallic, Inc., 211-01.
 - c. USG – Donn DX
 2. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, G01 (Z001) coating designation, with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges; other characteristics as follows:
 - a. Structural Classification: Intermediate-duty system.
 - b. Face Design: Flush face.
 - c. Cap Material: Steel sheet.
 - d. Cap Finish: Painted white.

END OF SECTION 09511

SECTION 09660 - RESILIENT TILE FLOORING

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 the following:
 - 1. Vinyl composition floor tile.
- B. Resilient wall base, reducer strips, and other accessories installed with resilient floor tiles are specified in Division 9 Section "Resilient Wall Base and Accessories."

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified.
 - 1. Certification by tile manufacturer that products supplied for tile installation comply with local regulations controlling use of volatile organic compounds (VOC's).
- C. Samples for initial selection purposes in the form of manufacturer's color charts consisting of actual tiles or sections of tiles showing full range of colors and patterns available for each type of resilient floor tile indicated.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for Floor Tile: Obtain each type, color, and pattern of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver tiles and installation accessories to Project site in original manufacturer's unopened cartons and containers each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store flooring materials in dry spaces protected from the weather with ambient temperatures maintained between 50 deg F (10 deg C) and 90 deg F (32 deg C).
- C. Store tiles on flat surfaces. Move tiles and installation accessories into spaces where they will be installed at least 48 hours in advance of installation.

1.6 PROJECT CONDITIONS

- A. Maintain a minimum temperature of 70 deg F (21 deg C) in spaces to receive tiles for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 deg F (13 deg C).

- B. Do not install tiles until they are at the same temperature as the space where they are to be installed.
- C. Close spaces to traffic during tile installation.

1.7 SEQUENCING AND SCHEDULING

- A. Install tiles and accessories after other finishing operations, including painting, have been completed.
- B. Do not install tiles over concrete slabs until the slabs have cured and are sufficiently dry to bond with adhesive as determined by tile manufacturer's recommended bond and moisture test.

1.8 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents.
 - 1. Furnish not less than one box for each 50 boxes or fraction thereof, of each class, wearing surface, color, pattern and size of resilient floor tile installed.

1.9 WARRANTY

- A. Manufacturer's standard 5 (five) year limited warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, resilient floor tiles that may be incorporated in the Work include, but are not limited to, the following products:
 - 1. Armstrong World Industries, Inc – Imperial Texture.
 - 2. Mannington Commercial - Essentials.

2.2 RESILIENT TILE

- A. Vinyl Composition Floor Tile: Products complying with ASTM F 1066, Composition 1 (nonasbestos formulated), and with the following requirements:
 - 1. Class 2: Through pattern tile.
 - 2. Gage: 1/8" thick.
 - 3. Static Load Limit: not less than 75 psi.
 - 4. Color: as selected by Architect
 - 5. Size: 12"x12"

2.3 INSTALLATION ACCESSORIES

- A. Concrete Slab Primer: Nonstaining type as recommended by flooring manufacturer.
- B. Adhesives (Cements): Water-resistant type recommended by tile manufacturer to suit resilient floor tile products and substrate conditions indicated.
- C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect

exposed edge of tiles, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. General: Examine areas where installation of tiles will occur, with Installer present, to verify that substrates and conditions are satisfactory for tile installation and comply with tile manufacturer's requirements and those specified in this Section.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by tile manufacturer.
 - 2. Finishes of subfloors comply with tolerances and other requirements specified in Division 3 Section "Cast-In-Place Concrete" for slabs receiving resilient flooring.
 - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with manufacturer's installation specifications to prepare substrates indicated to receive tile.
- B. Use trowelable leveling and patching compounds per tile manufacturer's directions to fill cracks, holes, and depressions in substrates.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- D. Broom or vacuum clean substrates to be covered by tiles immediately before tile installation. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
- E. Apply concrete slab primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.

3.3 INSTALLATION

- A. General: Comply with tile manufacturer's installation directions and other requirements indicated that are applicable to each type of tile installation included in Project.
- B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths at perimeter that equal less than one-half of a tile. Install tiles square with room axis.
- C. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles with grain running in one direction.

- D. Where demountable partitions and other items are indicated for installing on top of finished tile floor, install tile before these items are installed.
- E. Scribe, cut, and fit tiles to butt tightly to vertical surfaces, permanent fixtures, built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.
- F. Extend tiles into toe spaces, door reveals, closets, and similar openings.
- G. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent marking device.
- H. Use full spread of adhesive applied to substrate in compliance with tile manufacturer's directions including those for trowel notching, adhesive mixing, and adhesive open and working times.
- I. Hand roll tiles where required by tile manufacturer.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing tile installation:
 - 1. Remove visible adhesive and other surface blemishes using cleaner recommended by tile manufacturers.
 - 2. Sweep or vacuum floor thoroughly.
 - 3. Do not wash floor until after time period recommended by resilient floor tile manufacturer.
 - 4. Damp-mop tile to remove black marks and soil.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by tile manufacturer.
 - 1. Cover tiles with undyed, untreated building paper until inspection for Substantial Completion.
 - 2. Do not move heavy and sharp objects directly over tiles. Place plywood or hardboard panels over tiles and under objects while they are being moved. Slide or roll objects over panels without moving panels.
- C. Clean tiles not more than 4 days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean tiles using method recommended by manufacturer.

END OF SECTION 09660

SECTION 09678 - RESILIENT WALL 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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Resilient wall base.
 - 2. Resilient flooring accessories.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 9 Section "Resilient Tile Flooring."

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and division 1 Specification Sections.
- B. Product data for each type of product specified.
- C. Samples for initial selection purposes of manufacturer's standard sample sets in form of pieces cut from each type of product specified showing full range of colors and patterns available.
- D. Product certificates, in lieu of laboratory test reports when permitted by Architect, signed by manufacturer certifying that each product complies with requirements.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for products: Obtain each type and color of product specified from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- B. Fire Performance characteristics: Provide products with the following fire performance characteristics as determined by testing products per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Cove Base: Class B rating in ASTM E-84, NFPA 255, UL No. 273, ANSI 2.5, UBC No. 42.1 "Tunnel Test" with a smoke density of 150-200.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in original manufacturer's unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store products in dry spaces protected from the weather with ambient temperatures maintained between 50 degrees F (10 degrees C) and 90 degrees F (32 degrees C).

- C. Move products into spaces where they will be installed at least 48 hours in advance of installation.

1.6 PROJECT CONDITIONS

- A. Maintain a minimum temperature of 70 degrees F (21 degrees C) in spaces to receive products specified in this Section for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 degrees F (13 degrees C).
- B. Do not install products until they are at the same temperature as that of the space where they are to be installed.
- C. Close spaces to traffic during installation of products specified in this Section.

1.7 SEQUENCING AND SCHEDULING

- A. Sequence installing products specified in this Section with other construction to minimize possibility of damage and soiling during remainder of construction period.

1.8 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage, and identified with labels clearly describing contents.
 - 1. Furnish not less than 10 linear feet for each 500 linear feet or fraction thereof of each different type and color of resilient wall base installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Burke Flooring Products - BurkeBase.
 - 2. Johnsonite – Rubber Wall Base.
 - 3. Flexco – Base 2000.

2.2 RESILIENT WALL BASE

- A. Rubber Wall Base: Products complying with the following requirements.:
 - 1. Color: As selected by Architect from manufacturer standard commercial colors.
 - 2. Height: 4"
 - 3. Type: Cove base.
 - 4. Thickness: 1/8".
 - 5. Inside and outside corner segmets: NOT ALLOWED
 - 6. Warranty: 2 years limited warranty.
 - 7. Continuous roll type.

2.3 INSTALLATION ACCESSORIES

- A. Concrete Slab Primer: Nonstaining type as recommended by flooring manufacturer.

- B. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by flooring manufacturer for applications indicated.
- C. Adhesives: Water-resistant type recommended by manufacturer to suit resilient flooring product and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where installation of products specified in this Section will occur, with Installer present, to verify that substrates and conditions are satisfactory for installation and comply with manufacturer's requirements and those specified in this Section.

3.2 PREPARATION

- A. General: Comply with manufacturer's installation specifications for preparing substrates indicated to receive products indicated.
- B. Use trowelable leveling and patching compounds per manufacturers directions to fill cracks, holes, and depressions in substrates.
- C. Use stair tread nose filler per tread manufacturer's directions to fill nosing substrates not conforming to tread contours.
- D. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- E. Broom or vacuum clean substrates to be covered immediately before installing products specified in this Section. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
- F. Apply concrete slab primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.

3.3 INSTALLATION

- A. General: Install products specified in this Section using methods indicated according to manufacturer's installation directions.
- B. Apply resilient wall base to walls, columns, pilasters, casework, and other permanent fixtures in rooms and areas where base is required. Install wall base in lengths as long as practicable. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
 - 1. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
 - 2. Install inside and exterior corners before installing straight pieces.
 - 3. Form inside corners on job from straight pieces of maximum lengths possible by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce snug fit to substrate.
 - 4. Form outside corners on job from straight pieces of maximum lengths possible by shaving back of base at point where bending will occur. Remove a strip

perpendicular to length of base and only deep enough to produce a snug fit without bends whitening or removal of more than half the thickness of wall base.

- C. Place resilient accessories so they are butted to adjacent materials of type indicated and bond to substrates with adhesive. Install reducer strips at edges of flooring that otherwise would be exposed.
- D. Apply resilient accessories to stairs as indicated and according to manufacturer's installation instructions.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing installation:
 - 1. Remove visible adhesive and other surface blemishes using cleaner recommended by manufacturers of resilient product involved.
 - 2. Sweep or vacuum floor thoroughly.
 - 3. Do not wash floor until after time period recommended by manufacturer.
 - 4. Damp-mop resilient accessories to remove black marks and soil.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by manufacturer of resilient product involved.
 - 1. Cover resilient accessories on floors and stairs with undyed, untreated building paper until inspection for Substantial Completion.

END OF SECTION 09678

SECTION 09680 - CARPET

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 the following:
 - 1. Tufted Carpet
- B. Related Sections include the following:
 - 1. Division 9 Section "Resilient Wall Base and Accessories" for resilient wall base and accessories installed with carpet.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance. Include installation recommendations for each type of substrate required.
- B. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
 - 1. Carpet: 12-inch- (300-mm-) square Sample.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.
- B. Product Options: Products and manufacturers named in Part 2 establish requirements for product quality in terms of appearance, construction, and performance. Other manufacturers' products comparable in quality to named products and complying with requirements may be considered.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with CRI 104, Section 5, "Storage and Handling."

1.6 PROJECT CONDITIONS

- A. General: Comply with CRI 104, Section 6.1, "Site Conditions; Temperature and Humidity."

- B. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- C. Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

PART 2 - PRODUCTS

2.1 CARPET

- A. Product[s]: Subject to compliance with requirements, provide [one of] the following:
 - 1. Mannington Commercial
 - a. Color: As selected by Architect from manufacturer's full range.
 - b. Pattern: Carthage II
 - 2. J & J Commercial
 - a. Color: As selected by Architect from manufacturer's full range.
 - b. Pattern: Harmonize II

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided by or recommended by the following:
 - 1. By Carpet manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and that is recommended by the following:
 - 1. By Carpet manufacturer.
- C. Seaming Cement: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.
- D. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Verify that substrates and conditions are satisfactory for carpet installation and comply with requirements specified.

- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by the following:
 - a. Carpet manufacturer.
 - 2. Subfloor finishes comply with requirements specified in Division 3 Section "Cast-in-Place Concrete" for slabs receiving carpet.
 - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and carpet manufacturer's written installation instructions for preparing substrates indicated to receive carpet installation.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by the following:
 - 1. Carpet manufacturer.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. Direct-Glue-Down Installation: Comply with CRI 104, Section 8, "Direct Glue-Down Installation."
- B. Comply with carpet manufacturer's written recommendations for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
 - 1. Bevel adjoining border edges at seams with hand shears.
 - 2. Level adjoining border edges.
- C. Do not bridge building expansion joints with carpet.
- D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
 - 2. Remove yarns that protrude from carpet surface.
 - 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 15, "Protection of Indoor Installations."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer.

END OF SECTION 09680

SECTION 09700 – SEAMLESS FLOORING SPECIFICATION

PART 1 – GENERAL

1.1 DESCRIPTION

- A. **WORK INCLUDED:** All labor, materials, appliances, tools, equipment, facilities, transportation, and services necessary for and incidental to performing all operations of the work in this Section, complete as shown on the Drawings and as specified herein. Work includes, but is not limited to, the following:
1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
 2. Submittals.
 3. Resinous flooring and cove base at showers.
- B. **RELATED DOCUMENTS:** Drawings and General Provision of Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to Work of this Section as if printed herein.
- C. **RELATED WORK SPECIFIED IN OTHER SECTIONS:** The following items are covered by the indicated other Sections of this Project Manual. Coordinate as required with all other trades to ensure proper and adequate provision for the Installation of items described in this Section.
- | | | |
|----|-------------------------|---------------|
| 1. | Cast-In-Place Concrete: | Section 03300 |
| 2. | Finish Carpentry : | Section 06200 |
| 3. | Sealants and Caulking: | Section 07920 |

1.2 QUALITY ASSURANCE

- A. **ACCEPTABLE MANUFACTURER:** As specified herein under “Products.”
- B. **INSTALLER’S QUALIFICATIONS:** Installation shall be qualified personnel.
- C. Furnish and install the resinous flooring using materials and methods to ensure that the completed work will remain bonded to the substrate in this building and will have the chemical resistance and physical properties as published by the Manufacturer for the specified products.
- D. **REFERENCES AND STANDARDS (Latest Edition):**
- American Society of Testing and Materials (ASTM)
American Concrete Institute (ACI)

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01300.
- B. **PRODUCT DATA:** Submit:
1. Complete list of all materials, with descriptive data and installation instructions.
 2. Selection of color and finish will be made by the Architect from samples of Manufacturer’s palette.
 3. Manufacturer’s recommended care and maintenance instructions.

1.4 DELIVERY, STORAGE AND HANDLING

- A. COMPLY WITH PERTINENT PROVISIONS OF SECTION 01600: Material shall be stored in a dry, protected area in such a manner as to prevent damage. Damaged or deteriorated materials shall be removed from the premises.
- B. Ensure timely delivery so products will be available at project site when required for installation so as not to delay job progress.

1.5 PROJECT CONDITIONS

- A. New concrete substrates should be properly cured to develop specified compressive strength, and other properties. A safe period of cure is usually determined to be 21 to 28 days under normal temperature and humidity conditions. Shorter cure time may be acceptable in the event that high early strength and/or other accelerated cure concrete are being used.
- B. The concrete shall have a light steel trowel finish.
- C. Floor flatness tolerance as determined by ASTM E 1155, "Standard Method for Determining Floor Flatness and Levelness Using the F-Number System," should have a minimum F_F of 30, 3/16 inch as determined by the 10-foot straightedge method (ACI 118 gives information on both systems). Values outside these tolerances may necessitate the use of fill material in addition to the amount of material specified herein.
- D. Expansion joints shall be of non-asphalt type.
- E. Concrete shall be finished to grade of desired finish color.
- F. Utilities, including electric, water and temporary or finished lighting shall be supplied by the General Contractor.
- G. Job area shall be free of other trades during, and for a period of time specified in Part 3.3.F, after floor installation.
- H. Protection of finished floor from damage by subsequent trades shall be the responsibility of the General Contractor.

1.6 WARRANTY

- A. Warranty for this work is extended beyond the normal one year period to five years.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- 1. MRXL Series as manufactured by: Tufco International, Inc.
P. O. Box 456
Gentry, Arkansas 72734
501/736-2201
- 2. Trafficote #105 as manufactured by: General Poly Polymers, Southeast Division
4535 Canterbury Lane
Birmingham, AL 35215
205/815-0508

2.2 PERFORMANCE CRITERIA

- A. RESIN: The resin primer, binder and glaze shall be thermosetting resins formulated for the specific flooring application taken from the following list of resins:

Tufco Resin 2080	Tufco Resin 1099
Tufco Resin 1098	Tufco Resin 7010
Tufco Resin 1093	Tufco Resin 7040
Tufco Resin 1095	Tufco Resin 7090

Refer to specific floor to be installed, and Product Bulletins of specified resins for performance criteria.

- B. AGGREGATE: The aggregate fillers shall be clean, kiln dried silica sand and aluminum oxide as follows:

Tufco No. 8 Silica Sand	U. S. Standard Sieve passing 8 to 16
Tufco No. 24 Silica Sand	U. S. Standard Sieve passing 20 to 40
Tufco Colored Aggregate	U. S. Standard Sieve passing 20 to 40
Tufco Aluminum Oxide	U. S. Standard Sieve passing; varies with varying surface requirements

- C. FINISHED FLOOR PHYSICAL PROPERTIES

Compressive Strength, ASTM C-579	14,000 PSI Minimum
IZOD Impact, Ft-Lb/in	1.8 Minimum

2.3 JOINT SEALANT MATERIALS

- A. Joint sealant shall be the type produced by the resinous flooring manufacturer for type of service and joint condition indicated.

2.4 OTHER MATERIALS

- A. All other materials not specifically described, but required for a complete installation, shall be only those recommended by the Manufacturer of the seamless flooring system.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Prior to all work of the Section, carefully inspect previously installed work of other trades and verify that all such work is complete to the point where this installation may commence. Particular attention should be given to items in Part 1.4 of this Specification.
- B. The concrete shall be allowed to cure for an acceptable period prior to application of resinous flooring. Refer to Part 1.5.A of this Specification.
- C. Verify that the final installation shall be complete in accordance with the original design and the Manufacturer's recommended method of installation. In the event of discrepancy, immediately notify the Architect.

3.2 SURFACE PREPARATION

- A. Concrete floor preparation shall be by mechanical means and shall include the use of scabbler, scarifer, shot-blast or other acceptable devices for removal of bond-inhibiting materials such as curing compounds or laitance.
- B. After all operations in 3.2.A, thoroughly clean surface to remove dust and loose material.

3.3 APPLICATION

- A. **GENREAL:** Apply each component of resinous system in compliance with Manufacturer's directions to produce a uniform monolithic wearing surface of thickness indicated, uninterrupted except at divider strips, sawn joints or other types of joints, if any, indicated or required.
- B. **KEYING:** Keying shall be done to assure soundness at all floor terminations.
 - 1. Keying shall be performed at all flooring terminations to a nominal width of 1-1/2 inches and a nominal depth of one inch.
 - 2. Keying shall be performed at walls, pads and other vertical surfaces to a nominal width of one inch and a nominal depth of one inch.

- C. **DETAILING:** Detailing shall be done at all moving cracks and joints to prevent cracking to the flooring.

Working cracks, expansion joints and control joints shall be detailed in one of the following ways:

- 1. Keying and installation of non-reinforced flexible joint compound.
 - 2. Keying and installation of metal reinforcing mesh and the specified flooring resins and aggregates.
- D. The flooring shall be applied in laminated layers at the following material coverage rates to yield a nominal 1/4 to 7/16 inch finished floor, excluding any additional fill and leveling material:

MRXL6 SERIES

1. LAYER DESCRIPTION

MRXL6 – Nominal Thickness 9/32 to 7/16 inch

- a) **LAYER 1, PRIMER COAT:** A resin layer shall be spread and worked into the concrete surface, cracks, keys and detailed areas for a complete seal. Aggregate may be sprinkled lightly over the cured resin prior to application of Layer 2.
- b) **LAYERS 2 & 3, SAND COATS:** Resin layers shall be applied over the entire area, aggregate shall be distributed evenly over the uncured resin to a dry appearance.
- c) **LAYERS 4 & 5, COLORED AGGREGATE COATS:** Resin layers shall be applied over the entire area, aggregate shall be distributed evenly over the uncured resin to a dry appearance.
- d) **LAYER 6, GLAZE COAT:** A resin layer optionally sprinkled with aggregate to achieve the desired texture. Resin layer shall be applied over the area in sufficient volume to anchor the aggregate and seal the floor. High non-skid (XNS) texture is required.

END OF SECTION 09700

SECTION 09800 - ACOUSTICAL CEILINGS (CEMENTITIOUS WOOD FIBER CEILINGS)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Cementitious wood fiber plank acoustical ceiling system.
- B. Related Sections:
 - 1. Division 9 Sections: Acoustical Suspension.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM C635 Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - 2. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 3. ASTM E1264 Standard Classification for Acoustical Ceiling Products.
- B. Ceilings and Interior Systems Construction Association (CISCA):
 - 1. CISCA Code of Practices.

1.3 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. Provide acoustical ceiling assembly designed and tested to provide surface burning characteristics (ASTM E84) as follows:
 - a. Flame spread: 25 or less.
 - b. Smoke Developed: 25 or less.

1.4 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Product Data: Submit manufacturer's product data and installation instructions.
- C. Samples: Submit selection and verification samples: 6" x 6" (152 x 152 mm) sample for each wood fiber ceiling unit required, showing full range of exposed texture to be expected in completed work.

D. Quality Assurance/Control Submittals: Submit the following:

1. Certificates: Submit manufacturer's certificate that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity.

B. Regulatory Requirements and Approvals:

1. Southern Building Code Congress International (SBCCI):
 - a. SBCCI Report 9406A.
2. Building Officials and Code Administrators International, Inc. (BOCA):
 - a. BOCA Research Report No. 86-39.

C. Preinstallation Meetings: arrange a meeting at the site.

1.6 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 1 Product Requirement Section.

B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

1. Provide labels indicating brand name, style, size and thickness.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

1. Prevent soiling, physical damage or wetting.
2. Store cartons open at each end to stabilize moisture content and temperature.

1.7 PROJECT/SITE CONDITIONS

A. Environmental Requirements:

1. Do not install ceiling panels until building is closed in and ventilation system is operational.
2. Locate materials onsite at least 24 hours before beginning installation to allow materials to reach temperature and moisture content equilibrium.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Tectum Inc., Newark, Ohio 43058, 888-977-9691.
- B. Martin Fireproofing Georgia Inc., Elberton, Georgia 30635, 800-766-3369.

2.2 ACOUSTICAL CEILING SYSTEM

- A. Lay-in Grid Panels - Lay-in Tile: (@ interlocks Room 101, 105, 108 and 110):
 - a. Material: wood fibers bonded with inorganic hydraulic cement.
 - b. Thickness: 1 1/2" (38 mm) thick.
 - c. Color: Factory painted white.
 - d. Panel Retention Clip - Panel retention clip to hold panels in place and automatically repositions panels after being struck. Retention clip shall be non-visible from below the ceiling and compatible with the ceiling grid system.
- 2. Lay-IN Grid Panels Layin Tile (@ central core rooms 100, 102, 107, 109):
 - a. Material: Aspen wood fibers bonded with inorganic hydraulic cement.
 - b. Thickness: 1 1/2" (38 mm).
 - c. Size: 24" x 24" (610 x 610 mm).
 - d. Color: Factory painted white.
- 3. Security Ceilings System:
 - a. Panel Material: wood fibers bonded with inorganic hydraulic cement, factory installed 25-gauge steel backing.
 - b. Grid Material (ASTM C635): 6063 T-5 aluminum alloy, heavy duty.
 - c. Suspension Rods: 1/4" (6.4 mm) steel.
 - d. NRC Rating: 0.40.
 - e. Flame spread: less than 25.
 - f. Panel Thickness: 1" (25.4 mm).
 - g. Panel Width: 24" (610 mm).
 - h. Panel Length: 96" (2438 mm).

2.3 ACCESSORIES

- A. Provide accessories as follows:
 - 1. Panel retention clip - holds panels in place and automatically repositions panels after being struck. Retention clip shall be non-visible from below the ceiling and compatible with the ceiling grid system.
 - 2. Material: Steel. Painted Head Drywall Screws:
 - a. Material: Steel.
 - b. Length: **2 1/4" (57 mm)** min. .
 - c. Color: **White**.
 - 3. Trim Molding: Material: Plastic.
 - 4. Touch-Up Paint: Color: White.

5. Ceiling Grid System – All exposed suspension system shall be a minimum of intermediate duty grid, 1 ½" height.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- A. Comply with the instructions and recommendations of the ceiling system manufacturer.
- B. Install materials in accordance with governing regulations, fire resistance rating requirements, and industry standards applicable to work.
 1. Comply with CISCA Code of Practices.

3.2 EXAMINATION

- A. Site Verification of Conditions:
 1. Examine surfaces scheduled to receive suspended or directly attached acoustical units for unevenness, irregularities and dampness that would affect quality and execution of work.
 2. Do not proceed with installation of ceiling system until unacceptable conditions are corrected.

3.3 INSTALLATION

- A. General: Do not begin installation until materials sufficient to complete an entire room are received and prepared for installation.
- B. 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.
- C. Symmetrically locate grid layout in each space. Coordinate work with other trades so that lighting fixtures, grilles and other ceiling fixtures work with grid layout.
- D. Do not use universal splices or other splices, which would obstruct passage of recessed lighting fixtures through grid openings or limit fixture relocation upon flanges of ceiling grids.
- E. Support suspension system from structure above, not from ductwork, metal deck, equipment or piping.
- F. Space hangers not more than 6" (152 mm) from ends and not more than 4' (1219 mm) on centers on runners.

- G. Install wall moldings at the perimeter of each acoustical ceiling area and at locations where edge of units would otherwise be exposed.
 - 1. Secure moldings to supporting construction by fastening with screw anchors into the substrate, through holes drilled in vertical leg. Space holes not more than 3" (76 mm) from each end and not more than 16" (406 mm) on center along each molding.
 - 2. Level moldings with ceiling suspension system, to a level tolerance of 1/8" (3.2 mm) in 12' (3658 mm).
 - 3. Miter corners of moldings accurately to provide hairline joints, securely connected to prevent dislocation. Cope exposed flanges of intersecting suspension system members, so that flange faces will be flush.
 - 4. Furnish additional tees for supporting grilles, diffusers and light fixtures. Refer to reflected ceiling, HVAC and electrical plans for locations.
 - 5. Provide reveal edge at walls, other abutting vertical surfaces.
- H. Field paint cut edges to match surface color and sheen.
- I. Arrange acoustical units and orient directionally patterned units, if any, in manner shown on reflected ceiling plans.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical ceilings, trim, edge moldings and suspension members to comply with manufacturer's instructions for cleaning.
- B. Touch up any minor finish damage.
- C. Remove and replace work, which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

3.5 PROTECTION

- A. Protect installed work from damage due to subsequent construction activity, including temperature and humidity limitations and dust control, so that the work will be without damage and deterioration at the time of acceptance by the Owner.

END OF SECTION 09800

SECTION 09900 - PAINTING

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 surface preparation and field painting of exposed exterior and interior items and surfaces.
 - 1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
 - 1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
 - 1. Prefinished items include the following factory-finished components:
 - a. Architectural woodwork.
 - b. Acoustical wall panels.
 - c. Metal toilet enclosures.
 - d. Metal lockers.
 - e. Unit kitchens.
 - f. Elevator entrance doors and frames.
 - g. Elevator equipment.
 - h. Finished mechanical and electrical equipment.
 - i. Light fixtures.
 - 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
 - a. Foundation spaces.
 - b. Furred areas.
 - c. Ceiling plenums.
 - d. Utility tunnels.
 - e. Pipe spaces.
 - f. Duct shafts.
 - 3. Finished metal surfaces include the following:

- a. Anodized aluminum.
 - b. Stainless steel.
 - c. Chromium plate.
 - d. Copper and copper alloys.
 - e. Bronze and brass.
4. Operating parts include moving parts of operating equipment and the following:
- a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

1.3 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
1. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
 2. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.

1.4 SUBMITTALS

- A. Product Data: For each paint system indicated. Include block fillers and primers.
1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
 2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
- B. Samples for Initial Selection: For each type of finish-coat material indicated.
1. After color selection, Architect will furnish color chips for surfaces to be coated.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.
- C. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.
1. Architect will select one room or surface to represent surfaces and conditions for application of each type of coating and substrate.

- a. Wall Surfaces: Provide samples on at least 100 sq. ft. (9 sq. m).
 - b. Small Areas and Items: Architect will designate items or areas required.
2. Apply benchmark samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.
 - a. After finishes are accepted, Architect will use the room or surface to evaluate coating systems of a similar nature.
 3. Final approval of colors will be from benchmark samples.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
 1. Product name or title of material.
 2. Product description (generic classification or binder type).
 3. Manufacturer's stock number and date of manufacture.
 4. Contents by volume, for pigment and vehicle constituents.
 5. Thinning instructions.
 6. Application instructions.
 7. Color name and number.
 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain storage containers in a clean condition, free of foreign materials and residue.
 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.7 PROJECT CONDITIONS

- A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F (10 and 32 deg C).
- B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F (7 and 35 deg C).
- C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.
- B. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
 - 1. Benjamin Moore & Co. (Benjamin Moore).
 - 2. Sherwin-Williams Co. (Sherwin-Williams).

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
 - 1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- C. Colors: As selected by Architect from manufacturer's full range.

2.3 CONCRETE UNIT MASONRY BLOCK FILLERS

- A. Concrete Unit Masonry Block Filler: Factory-formulated high-performance latex block fillers.
 - 1. Benjamin Moore; Moorcraft Super Craft Latex Block Filler No. 285: Applied at a dry film thickness of not less than **8.1 mils (0.206 mm)**.
 - 2. Sherwin-Williams; PrepRite Interior/Exterior Block Filler B25W25: Applied at a dry film thickness of not less than **8.0 mils (0.203 mm)**.

2.4 EXTERIOR PRIMERS

- A. Exterior Concrete and Masonry Primer: Factory-formulated alkali-resistant acrylic-latex primer for exterior application.
 - 1. Benjamin Moore; Moore's Acrylic Masonry Sealer No. 066: Applied at a dry film thickness of not less than **0.7 mils (0.018 mm)**.
 - 2. Sherwin-Williams; Loxon Exterior Masonry Acrylic Primer A24W300: Applied at a dry film thickness of not less than **3.0 mils (0.076 mm)**.
- B. Exterior Ferrous-Metal Primer: Factory-formulated rust-inhibitive metal primer for exterior application.
 - 1. Benjamin Moore; Moore's IMC Alkyd Metal Primer No. M06: Applied at a dry film thickness of not less than **2.0 mils (0.051 mm)**.
 - 2. Sherwin-Williams; Kem Kromik Universal Metal Primer B50NZ6/B50WZ1: Applied at a dry film thickness of not less than **3.0 mils (0.076 mm)**.

2.5 INTERIOR PRIMERS

- A. Interior Concrete and Masonry Primer: Factory-formulated alkali-resistant acrylic-latex interior primer for interior application.
1. Benjamin Moore; Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer No. 253: Applied at a dry film thickness of not less than **1.2 mils (0.030 mm)**.
 2. Sherwin-Williams; PrepRite Masonry Primer B28W300: Applied at a dry film thickness of not less than **3.0 mils (0.076 mm)**.
- B. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.
1. Benjamin Moore; Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer No. 253: Applied at a dry film thickness of not less than **1.2 mils (0.030 mm)**.
 2. Sherwin-Williams; PrepRite 200 Latex Wall Primer B28W200 Series: Applied at a dry film thickness of not less than **1.6 mils (0.041 mm)**.
- C. Interior Plaster Primer: Factory-formulated latex-based primer for interior application.
1. Benjamin Moore; Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer No. 253: Applied at a dry film thickness of not less than **1.2 mils (0.030 mm)**.
 2. Sherwin-Williams; PrepRite 200 Latex Wall Primer B28W200 Series: Applied at a dry film thickness of not less than **1.6 mils (0.041 mm)**.
- D. Interior Wood Primer for Acrylic-Enamel and Semigloss Alkyd-Enamel Finishes: Factory-formulated alkyd- or acrylic-latex-based interior wood primer.
1. Benjamin Moore; Moorcraft Super Spec Alkyd Enamel Underbody and Primer Sealer No. 245: Applied at a dry film thickness of not less than **1.5 mils (0.038 mm)**.
 2. Sherwin-Williams; PrepRite Classic Interior Primer B28W101 Series: Applied at a dry film thickness of not less than **1.6 mils (0.041 mm)**.
- E. Interior Ferrous-Metal Primer: Factory-formulated quick-drying rust-inhibitive alkyd-based metal primer.
1. Benjamin Moore; Moore's IMC Alkyd Metal Primer No. M06: Applied at a dry film thickness of not less than **2.0 mils (0.051 mm)**.
 2. Sherwin-Williams; Kem Kromik Universal Metal Primer B50NZ6/B50WZ1: Applied at a dry film thickness of not less than **3.0 mils (0.076 mm)**.

2.6 EXTERIOR FINISH COATS

- A. Exterior Low-Luster Acrylic Paint: Factory-formulated low-sheen (eggshell) acrylic-latex paint for exterior application.
1. Benjamin Moore; Moorcraft Super Spec Low Lustre Latex House Paint No. 185: Applied at a dry film thickness of not less than **1.0 mil (0.025 mm)**.
 2. Sherwin-Williams; A-100 Exterior Latex Satin House & Trim Paint A82 Series: Applied at a dry film thickness of not less than **1.5 mils (0.038 mm)**.
- B. Exterior Semigloss Acrylic Enamel: Factory-formulated semigloss waterborne acrylic-latex enamel for exterior application.
1. Benjamin Moore; Moorcraft Super Spec Latex House & Trim Paint No. 170: Applied at a dry film thickness of not less than **1.1 mils (0.028 mm)**.

2. Sherwin-Williams; A-100 Latex Gloss A8 Series: Applied at a dry film thickness of not less than **1.3 mils (0.033 mm)**.

2.7 INTERIOR FINISH COATS

- A. Interior Semigloss Acrylic Enamel: Factory-formulated semigloss acrylic-latex enamel for interior application.
 1. Benjamin Moore; Moorcraft Super Spec Latex Semi-Gloss Enamel No. 276: Applied at a dry film thickness of not less than **1.2 mils (0.031 mm)**.
 2. Sherwin-Williams; ProMar 200 Interior Latex Semi-Gloss Enamel B31W200 Series: Applied at a dry film thickness of not less than **1.3 mils (0.033 mm)**.

2.8 INTERIOR WOOD STAINS AND VARNISHES

- A. Open-Grain Wood Filler: Factory-formulated paste wood filler applied at spreading rate recommended by manufacturer.
 1. Benjamin Moore; Benwood Paste Wood Filler No. 238.
 2. Sherwin-Williams; Sher-Wood Fast-Dry Filler.
- B. Interior Wood Stain: Factory-formulated alkyd-based penetrating wood stain for interior application applied at spreading rate recommended by manufacturer.
 1. Benjamin Moore; Benwood Penetrating Stain No. 234.
 2. Sherwin-Williams; Wood Classics Interior Oil Stain A-48 Series.
- C. Clear Sanding Sealer: Factory-formulated fast-drying alkyd-based clear wood sealer applied at spreading rate recommended by manufacturer.
 1. Benjamin Moore; Moore's Interior Wood Finishes Quick-Dry Sanding Sealer No. 413.
 2. Sherwin-Williams; Wood Classics Fast Dry Sanding Sealer B26V43.
- D. Interior Waterborne Clear Satin Varnish: Factory-formulated clear satin acrylic-based polyurethane varnish applied at spreading rate recommended by manufacturer.
 1. Benjamin Moore; Stays Clear Acrylic Polyurethane No. 423, Satin.
 2. Sherwin-Williams; Wood Classics Waterborne Polyurethane Satin, A68 Series.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application.
 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
 2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 - 1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.
 - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
 - 1. Provide barrier coats over incompatible primers or remove and reprime.
 - 2. Cementitious Materials: Prepare concrete, concrete unit masonry, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
 - a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
 - b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
 - 3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
 - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.
 - c. If transparent finish is required, backprime with spar varnish.
 - d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on back side.
 - e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.

4. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
 - a. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3.
 - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
- D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
 1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
 1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 3. Provide finish coats that are compatible with primers used.
 4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
 9. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
 10. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Omit primer over metal surfaces that have been shop primed and touchup painted.
 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
- F. Mechanical items to be painted include, but are not limited to, the following:
1. Uninsulated metal piping.
 2. Uninsulated plastic piping.
 3. Pipe hangers and supports.
 4. Tanks that do not have factory-applied final finishes.
 5. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 6. Duct, equipment, and pipe insulation having "all-service jacket" or other paintable jacket material.
 7. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
- G. Electrical items to be painted include, but are not limited to, the following:
1. Switchgear.
 2. Panelboards.
 3. Electrical equipment that is indicated to have a factory-primed finish for field painting.
- H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- I. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

- J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque 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.
- K. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.
- L. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 FIELD QUALITY CONTROL

- A. Owner reserves the right to invoke the following test procedure at any time and as often as Owner deems necessary during the period when paint is being applied:
 - 1. Owner will engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Contractor.
 - 2. Testing agency will perform appropriate tests for the following characteristics as required by Owner:
 - 3. Owner may direct Contractor to stop painting if test results show material being used does not comply with specified requirements. Contractor shall remove noncomplying paint from Project site, pay for testing, and repaint surfaces previously coated with the noncomplying paint. If necessary, Contractor may be required to remove noncomplying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
 - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
 - 1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 EXTERIOR PAINT SCHEDULE

- A. Concrete, Stucco, and Masonry (Other Than Concrete Unit Masonry): Provide the following finish systems over exterior concrete, stucco, and brick masonry substrates:
 - 1. Low-Luster Acrylic Finish: Two finish coats over a primer.
 - a. Primer: Exterior concrete and masonry primer.
 - b. Finish Coats: Exterior low-luster acrylic paint.
- B. Concrete Unit Masonry: Provide the following finish systems over exterior concrete unit masonry:
 - 1. Low-Luster Acrylic Finish: Two finish coats over a block filler.
 - a. Block Filler: Concrete unit masonry block filler.
 - b. Finish Coats: Exterior low-luster acrylic paint.
- C. Ferrous Metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.
 - 1. Semigloss Acrylic-Enamel Finish: Two finish coats over a rust-inhibitive primer.
 - a. Primer: Exterior ferrous-metal primer.
 - b. Finish Coats: Exterior semigloss acrylic enamel.

3.8 INTERIOR PAINT SCHEDULE

- A. Concrete and Masonry (Other Than Concrete Unit Masonry): Provide the following paint systems over interior concrete and brick masonry substrates:
 - 1. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior concrete and masonry primer.
 - b. Finish Coats: Interior semigloss acrylic enamel.
- B. Concrete Unit Masonry: Provide the following finish systems over interior concrete masonry:
 - 1. Semigloss Acrylic-Enamel Finish: Two finish coats over a block filler.
 - a. Block Filler: Concrete unit masonry block filler.
 - b. Finish Coats: Interior semigloss acrylic enamel.
- C. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:
 - 1. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior semigloss acrylic enamel.
- D. Plaster: Provide the following finish systems over new interior plaster surfaces:
 - 1. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior plaster primer.
 - b. Finish Coats: Interior semigloss acrylic enamel.

- E. Wood and Hardboard: Provide the following paint finish systems over new interior wood surfaces:
 - 1. Semigloss Acrylic-Enamel Finish: Two finish coats over a wood undercoater.
 - a. Primer: Interior wood primer for acrylic-enamel and semigloss alkyd-enamel finishes.
 - b. Finish Coats: Interior semigloss acrylic enamel.
- F. Ferrous Metal: Provide the following finish systems over ferrous metal:
 - 1. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coats: Interior semigloss acrylic enamel.

3.9 INTERIOR STAIN AND NATURAL-FINISH WOODWORK SCHEDULE

- A. Stained Woodwork: Provide the following stained finishes over new interior woodwork:
 - 1. Waterborne Stain Satin-Varnish Finish: Two finish coats of waterborne clear satin varnish over a sealer coat and waterborne interior wood stain. Wipe wood filler before applying stain.
 - a. Filler Coat: Open-grain wood filler.
 - b. Stain Coat: Interior wood stain.
 - c. Sealer Coat: Clear sanding sealer.
 - d. Finish Coats: Interior waterborne clear satin varnish.

END OF SECTION 09900

SECTION 10160 - TOILET COMPARTMENTS

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 toilet compartments and screens as follows:
 - 1. Type: Stainless steel.
 - 2. Compartment Style: Overhead braced and floor anchored.
 - 3. Screen Style: Floor anchored.
- B. Related Sections include the following:
 - 1. Division 10 "Toilet and Bath Accessories" for toilet paper holders, grab bars, purse shelves, and similar accessories.

1.3 SUBMITTALS

- A. Product Data: For each type and style of toilet compartment and screen specified. Include details of construction relative to materials, fabrication, and installation. Include details of anchors, hardware, and fastenings.
- B. Shop Drawings: For fabrication and installation of toilet compartment and screen assemblies. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for Verification: Of each compartment or screen color and finish required, prepared on **6-inch- (150-mm-)** square Samples of same thickness and material indicated for Work.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions in areas of installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Accurate Partitions Corporation – Stainless Steel Partitions Floor Anchored Overhead Braced
2. Metpar Corp. – Stainless Steel – FP500 Corinthian Overhead Braced

2.2 MATERIALS

- A. General: Provide materials that have been selected for surface flatness and smoothness. Exposed surfaces that exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are unacceptable.
- B. Stainless-Steel Sheet: ASTM A 666, Type 302 or 304, that is leveled to stretcher-leveled flatness, finished on exposed faces as indicated in the "Stainless-Steel Sheet Finishes" Article, and of the following minimum thicknesses:
 1. Pilasters (Overhead Braced): 0.0375 inch (0.95 mm).
 2. Panels and Screens: 0.0312 inch (0.8 mm).
 3. Doors: 0.0312 inch (0.8 mm).
 4. Tapping Reinforcement: 0.0781 inch (2.0 mm).
- C. Core Material for Metal-Faced Units: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch (25 mm) minimum for doors, panels, and screens and 1-1/4 inches (32 mm) minimum for pilasters.
- D. Pilaster Shoes and Sleeves (Caps): ASTM A 666, Type 302 or 304 stainless steel, not less than 0.0312 inch (0.8 mm) thick and 3 inches (75 mm) high, finished to match hardware.
- E. Full-Height (Continuous) Brackets: Manufacturer's standard design for attaching panels and screens to walls and pilasters of the following material:
 1. Material: Stainless steel.
- F. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories of the following material:
 1. Material: Stainless steel.
- G. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile in manufacturer's standard finish.
- H. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match hardware, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

2.3 FABRICATION

- A. General: Provide standard doors, panels, screens, and pilasters fabricated for compartment system. Provide units with cutouts and drilled holes to receive compartment-mounted hardware, accessories, and grab bars, as indicated.
- B. Metal-Faced Toilet Compartments and Screens: Pressure laminate seamless face sheets to core material and provide continuous, interlocking molding strip or lapped and formed edges. Seal corners by welding or clips. Grind exposed welds smooth.

- C. Overhead-Braced-and-Floor-Anchored Compartments: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions. Make provisions for setting and securing continuous head rail at top of each pilaster. Provide shoes at pilasters to conceal supports and leveling mechanism.
- D. Floor-Anchored Screens: Provide pilasters and panels of same construction and finish as toilet compartments. Provide manufacturer's standard corrosion-resistant anchoring assemblies complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- E. Doors: Unless otherwise indicated, provide 24-inch- (610-mm-) wide in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide out-swinging doors with a minimum 32-inch- (813-mm-) wide clear opening for compartments indicated to be handicapped accessible.
 - 1. Hinges: Manufacturer's standard self-closing type that can be adjusted to hold door open at any angle up to 90 degrees.
 - 2. Latch and Keeper: Manufacturer's standard surface-mounted latch unit with combination rubber-faced door strike and keeper designed for emergency access. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be handicapped accessible.
 - 3. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
 - 4. Door Bumper: Manufacturer's standard rubber-tipped bumpers at out-swinging doors or entrance screen doors.
 - 5. Door Pull: Manufacturer's standard unit that complies with accessibility requirements of authorities having jurisdiction at out-swinging doors. Provide units on both sides of doors at compartments indicated to be handicapped accessible.

2.4 STAINLESS-STEEL SHEET FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
 - 1. Remove or blend tool and die marks and stretch lines into finish.
 - 2. Grind and polish surfaces to produce uniform, directional textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
- B. Finish: Manufacturer's standard No. 3 or No. 4 directional polish.
- C. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
- D. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, plumb, and level. Provide clearances of not more than 1/2 inch (13 mm) between pilasters and

panels and not more than 1 inch (25 mm) between panels and walls. Secure units in position with manufacturer's recommended anchoring devices.

- B. Overhead-Braced-and-Floor-Anchored Compartments: Secure pilasters to floor and level, plumb, and tighten. Secure continuous head rail to each pilaster with not less than 2 fasteners. Hang doors and adjust so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Screens: Attach with anchoring devices according to manufacturer's written instructions and to suit supporting structure. Set units level and plumb and to resist lateral impact.

3.2 ADJUSTING AND CLEANING

- A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and swing doors in entrance screens to return to fully closed position.
- B. Provide final protection and maintain conditions that ensure toilet compartments and screens are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 10160

SECTION 10441 - INTERIOR SIGNS –INCAST PLAQUES

PART 1 GENERAL

1.1 SUMMARY

- A. Related Documents: Provisions established within the General and Supplementary Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.
- B. Section Includes:
 - 1. Interior unframed signs.
- C. Related Sections:
 - 1. Section 10420 - Cast Plaques.
 - 2. Section 10423 - Dimensional Letters - LC Series.
 - 3. Section 10427- Dimensional Letters - LTV Series.
 - 4. Section 10431 - Exterior Fiberglass Signs - 2 Sided Non Illuminated Pylon - Series 820.
 - 5. Section 10435 - Exterior Aluminum Signs - Post and Panel - 2500 Series.
- D. Allowances: Work of this section is affected by allowances. Refer to Division 1 for allowance amounts and requirements.

1.2 QUALITY ASSURANCE

- A. Supplier: Obtain all products in this section from a single supplier.
- B. Regulatory Requirements: Products shall meet requirements of the Americans With Disabilities Act Accessibility Guidelines (ADAAG) and local amendments and modifications.
- C. Installer: Installation shall be performed by installer specialized and experienced in work similar to that required for this project.

1.3 SUBMITTALS

- A. Submit in accordance with requirements of Division 1.
- B. Product Data: Submit product data for specified products. Include material details for each sign specified.
- C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including dimensions, anchorage, and accessories.
- D. Samples: Submit supplier's standard color chart for selection purposes and selected colors for verification purposes.
- E. Installation: Submit supplier's installation instructions.
- F. Closeout Submittals:
 - 1. Submit operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods.
 - 2. Submit warranty documents specified herein.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of Division 1.
 - 1. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
 - 2. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
 - 3. Store products protected from weather, temperature, and other harmful conditions as recommended by supplier.
 - 4. Handle products in accordance with manufacturer's instructions.

1.5 WARRANTY

- A. Project Warranty: Comply with requirements of Division 1.
- B. Manufacturer's Warranty: Submit manufacturer's standard warranty document executed by authorized company official.
 - 1. Warranty Period: One year from product ship date.

PART 2 PRODUCTS

2.1 SIGNAGE SYSTEMS

- A. Acceptable Manufacturers:
 - 1. ASI Sign Systems, 3860 W. Northwest Highway, Suite 350, Dallas, TX 75220; (214) 352 9140 telephone; (214) 352 9741 facsimile; (800) ASI-SPEC [274-7446]
 - 2. or Prior Approved Equal.
- B. Acceptable Product: ASI InCast™ Plaque Signs with requirements indicated for materials, thickness, finish colors, designs, shapes, sizes and details.

2.2 SIGN MATERIALS

- A. Sign Face: High impact polyester acrylate resins, pressure molded into a single polymerized component, using Unibond™ co-molding process. [Stone appearance signs have sign body of aluminum tri-hydrate filled polyester acrylate resins.]
- B. Tactile Graphics and Text: Provide tactile copy [and grade 2 Braille] raised 1/32 inch minimum from plaque surface using manufacturer's co-molding process.
 - 1. Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements indicated for size, style, spacing, content, position, and colors.
- C. Colors: High contrast semi-matte integral colors for graphics. All integral resins are U.V. stabilized resins utilizing automotive grade pigments.

2.3 FABRICATION OPTIONS

- A. Depth: 0.125 inch thickness.
- B. Panel appearance:
 - 1. Specify from manufacturer's standard, high contrast, semi-matte color chart.
- C. Surface Texture:
 - 1. Matte Non-Glare.

- D. Letter style[s], and size[s] and layout position: Specify from manufacturer's standard letter styles and color charts.
- E. Text schedule: Verify correct capitalization.
- F. Sign Size: Reference Drawings.
- G. Sign Shape: Rectangular, Radiused Corners.

2.4 INSTALLATION METHOD

- A. SA, silicone adhesive.

2.5 FABRICATION – GENERAL

- A. General: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
- B. Preassemble signs in the shop to the greatest extent possible to minimize field assembly. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in a location not exposed to view after final assembly.
- C. Conceal fasteners if possible; otherwise, locate fasteners to appear inconspicuous.
- D. Form panels to required size and shape. Comply with requirements indicated for design, dimensions, finish, color, and details of construction.
- E. Coordinate dimensions and attachment methods to produce message panels with closely fitting joints. Align edges and surfaces with one another in the relationship indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions: Verify installation conditions previously established under other sections are acceptable for product installation in accordance with manufacturer's instructions.
- B. Scheduling of installation by Owner or its representative implies that substrate and conditions are prepared and ready for product installation. Proceeding with installation implies installer's acceptance of substrate and conditions.

3.2 INSTALLATION

- A. Install product in accordance with supplier's instructions.
- B. Install product in locations indicated using mounting methods recommended by sign manufacturer and free from distortion, warp, or defect adversely affecting appearance.
- C. Install product level, plumb, and at heights indicated.
- D. Install product at heights to conform to Americans with Disabilities Act Accessibility Guidelines (ADAAG) and applicable local amendments and regulations.
- E. Install signs within the following tolerances and in accordance with manufacturer's recommendations:
 - 1. Interior Signs: Within 1/4 inch vertically and horizontally of intended location.

3.3 CLEANING, PROTECTION, AND REPAIR

- A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 5 feet.
- B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project in accordance with provisions in Division 1.

3.4 SIGN SCHEDULE

- A. Schedule: Refer to signage schedule and Drawings for sizes, locations, and layout of signage types, sign text copy, and graphics.

END OF SECTION 10441

SECTION 10522 - 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.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. 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.
- C. 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:
 - 1. J.L. Industries – Cosmic 5E.
 - 2. Larsen's Manufacturing Co – MP5.

2.2 FIRE EXTINGUISHERS

- A. General: Provide fire extinguishers for each extinguisher cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard, which comply with requirements of governing authorities.
- B. Multipurpose Dry Chemical Type: UL-rated 1-A:10-B:C, 5-lb. nominal capacity, in enameled steel

container.

- C. Provide hook hanger for fire extinguishers. Mount hook per code with expansion fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for thickness and framing for cabinets to verify cabinet depth and mounting prior to cabinet installation.
- B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Following manufacturer's printed instructions for installation.
 - 1. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.
 - 2. Fasten mounting brackets and cabinets to structure, square and plumb.

END OF SECTION 10522

SECTION 10530 - EXTRUDED ALUMINUM WALKWAY COVERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 DESCRIPTION OF WORK:

- A. The extent of aluminum walkway cover is shown on the drawings and as specified herein.
- B. Definition: Extruded Aluminum Walkway Cover shall consist entirely of extruded aluminum sections (roll-formed not acceptable). System shall consist of heli-arc welded, one-piece rigid structural bents (column and beam assemblies), decking, fascia, accessory items and hardware to provide a complete system.
- C. Water shall drain from deck into designated beams and out at grade level of columns through weepholes.

1.03 SUBMITTALS

- A. Shop Drawings: Submit detailed drawings, layout of walkway cover system, bent locations (identify drain columns and wet bents), all mechanical joint locations with complete details, connections, jointing and accessories. Include details of concrete footings and bent anchorage.
- B. Product Data: Submit manufacturer's product data, specifications, component performance data and installation instructions.
- C. Calculations: Provide signed and sealed structural calculations for the proposed walkway cover, by a professional engineer registered in the state of Louisiana, who professes his discipline to be structural engineering.

1.04 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following except as otherwise indicated:
 - Standard Building Code, latest addition with amendments, if any.
 - AWS (American Welding Society) standards for structural aluminum welding.
- B. Manufacturer: Obtain aluminum covered walkway system from only one (1) manufacturer, although several may be indicated as offering products complying with requirements.
- C. Installer Qualification: Firm with not less than three (3) years experience in installation of aluminum walkway covers of type, quantity and installation methods similar to work of this section.
- D. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to insure proper fitting of work. However, allow for adjustments within specified tolerations wherever taking of field measurements before fabrication might delay work.

- E. Shop Assembly: Preassemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- F. Coordination: Coordinate work of this section with work of other sections which interface with covered walkway system (sidewalks, curbs, building fascias, etc.).

1.05 PERFORMANCE REQUIREMENTS:

- A. System Performance: Provide aluminum covered walkway system that has been designed, produced, fabricated and installed to withstand normal temperature changes as well as live loading, dead loading and wind loading in compliance with Standard Building Code requirements for geographic area in which work is located and as follows:

Live Load: 30 p.s.f. minimum

Structural design for wind forces: Comply with ANSI A58.1-1982

Design Wind Velocity: 110 m.p.h.

Importance Factor: 1.1.

Stability Criteria: Standard Building Code, Section 1205.3.

- B. Sizes shown on drawings are to be considered minimum.
- C. Structure shall be capable of sustaining severe icing, hail, hurricane force winds and supporting a concentrated load such as being walked upon.

PART 2 - PRODUCT

2.01 MANUFACTURERS

- A. Subject to compliance with these requirements, provide products by one of the following manufacturers:
 - 1) E.L. Burns Company
 - 2) DITT-Deck Extruded Aluminum Walkway Cover System by Dittmer Architectural Aluminum is specified as the standard of quality.
 - 3) Peachtree
 - 4) Nu-Vent

2.02 MATERIALS

- A. All aluminum extrusions shall be alloy 6063 heat treated to a T-6 temper.
- B. Standard finish for all components shall be anodized bronze.
- C. Fasteners:
 - 1. Deck Screws (rivets not permitted): Type 18-8 non-magnetic stainless steel sealed with a neoprene "O" ring beneath 5/8" outside dimension, conical washer.
 - 2. Fascia Rivets: Size 3/16" by 1/2" grip range aluminum rivets with aluminum mandrel.
 - 3. Bolts: All bolts, nuts and washers to be 18-8 non-magnetic stainless steel.
 - 4. Tek Screws: not permitted
- D. Warranty:

1. Manufacturer shall warrant the entire system against defects in labor and materials for a period of one (2) years commencing on the date of substantial completion as established in Division One of these specifications.
2. Intention of this warranty is the manufacturer will come onto the jobsite and do all necessary to effect corrections of any deficiencies.
3. Evidence of defects in labor and material may include but is not limited to, one or more of the following:
 - a. Moisture leaks
 - b. Metal failure including excessive deflection
 - c. Fastener failure
 - d. Finish failure

2.03 FABRICATION

- A. Comply with indicated profiles, dimensioned requirements and structural requirements.
- B. Use sections true to details with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture, free from defects impairing strength and durability.
- C. All welding do be done by heli-arc process.
- D. Bents shall consist of shop welded one piece units. When size of bents do not permit shipment as a welded unit, concealed mechanical joints may be used.
- E. Mechanical joints shall consist of stainless steel bolts with a minimum of two (2) bolts per fastening. Bolts and nuts shall be installed in a concealed manner utilizing 1/2" thick by 1 1/2" aluminum bolt bars welded to structural members. All such mechanical joints must be detailed on shop drawings showing all locations.
- F. Roof Deck: Extruded Aluminum shapes, interlocking self-flashing sections. Shop fabricate to lengths and panels widths required for field assembly. Depth of sections to comply with structural requirements. Provide shop induced camber in deck units with spans greater than 16'- 0" to offset dead load deflections. Welded dams are to be used at non-draining ends of deck.
- G. Expansion joints, design structure for thermal expansion and contraction. Provide expansion joints as required.
- H. Exposed rivets used to fasten bottom of fascia to deck to have finish to match fascia.
- I. Apply a shop applied dip-coat of clear acrylic enamel to each column end terminating in concrete to insulate from electrolytic reaction. Column ends shall be pierced to "key" grout to bent for maximum uplift protection.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING:

- A. Deliver, store and handle covered walkway system components as recommended by manufacturer. Handle and store in a manner to avoid deforming members and to avoid excessive stresses.

3.02 EXAMINATION

- A. Examine adjacent work for conditions that would prevent quality installation of system.

- B. Do not proceed until defects are corrected.

3.03 CONCRETE FOOTINGS

- A. Concrete footings are not work of this section. Refer to "concrete work", Section 03300.
- B. Sleeves (styrofoam blockouts) shall be furnished by walkway cover manufacturer and placed by general contractor. Coordinate block outs at drains through the brick casing around the columns. Refer to drawings.

3.04 FIELD DIMENSIONS

- A. General contractor shall field confirm bent locations, dimensions and elevations shown on shop drawings prior to fabrication.

3.05 INSTALLATION

- A. Erection: Set roof support frames (bents) into pockets provided in top of footings; set to required elevations, align, plumb and level; and grout in place with 2,000 p.s.i. portland cement grout. Assure that grout fills all voids and "keys" to columns. Fill downspout units with grout to bottom of discharge level. Install aluminum deflectors after grouting. Follow manufacturer's instructions. Match to finish and elevation of adjacent sidewalks.
- B. Install roof deck sections, accessories and related flashing in accordance with manufacturer's instructions. Provide roof slope for rain drainage without ponding water. Align and anchor roof deck units to structural support frames.
- C. Assemble all components in a neat, workmanlike manner.

3.06 FLASHING

- A. Flashings: Flashings required between covered walkway system and adjoining structures are not work of this section. Refer to "Flashing and Sheet Metals" in Division 7.

3.07 CLEANING AND PROTECTION

- A. Damaged Units: Replace roof deck panels and other components of the work which have been damaged or have deteriorated beyond successful minor repair.
- B. Cleaning: Remove protective coverings at time in project construction sequence, which will afford greatest protection of work. Clean finished surfaces as recommended by manufacturer. Maintain in a clean condition during construction.
- C. Protection: Advise Contractor of protection and surveillance procedures, as required to ensure that work of this section will be without damage or deterioration at time of substantial completion.

END OF SECTION 10530

SECTION 10800 - TOILET AND BATH ACCESSORIES

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 toilet and bath accessory items as scheduled and shown on the drawings.

1.3 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specifications Sections.
- B. Product data for each toilet accessory item specified, including construction details relative to materials, dimensions, gages, profiles, mounting method, specified options, and finishes.
- C. Maintenance instructions including replaceable parts and service recommendations.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise acceptable to Architect.

1.5 PROJECT CONDITIONS

- A. Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference with and ensure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

1.6 WARRANTY

- A. Warranty Period: 15 years from date of Substantial Completion.
- B. 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 requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering toilet accessories that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Bobrick Washroom Equipment, Inc.
 - 2. Bradley Corporation.

2.2 MATERIALS, GENERAL

- A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 0.034-inch (22-gage) minimum

thickness.

- B. Sheet Steel: Cold-rolled, commercial quality ASTM A 366, 0.04-inch (20-gage) minimum. Surface preparation and metal pretreatment as required for applied finish.
- C. Galvanized Steel Sheet: ASTM A 527, G60.
- D. Mirror Glass: Nominal 6.0-mm (0.23-inch) thick, conforming to ASTM C 1036, Type I, Class 1, Quality q2, and with silvering, electro-plated copper coating, and protective organic coating.
- E. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit, or of galvanized steel where concealed.

2.3 PAPER TOWEL DISPENSERS

(Refer to manufacturer mounting specifications for ADA approved design)

- A. Surface mounted (Bobrick or equal):
 - 1. B-262 or 250-15
 - 2. B-369 (@ single occupant non secure restrooms) or 291-0000
 - 3. B-3944 (@ large staff non secure restrooms) or 234-000000

2.4 TOILET TISSUE DISPENSERS

- A. Surface mounted (Bobrick or equal):
 - 1. B-954 Security or SA 14-000000
 - 2. B-388 Non-Secure or 5412-000000

2.5 GRAB BARS

- A. Surface mounted (Bobrick or equal):
 - 1. B-68137 (for HC. Toilets) or 8220-0000

2.6 SOAP DISPENSERS

- A. Surface mounted (Bobrick or equal):
 - 1. B-2112 (At all wall hung lavatories always) Non-Secure or 6542-000000
 - 2. B-973 Security or SA 22-000000
 - 3. B-8226 in countertops. Or 6326-68-0000

2.7 MIRROR UNITS

- A. Surface mounted (Bobrick or equal):
 - 1. B-9436 Security or SA 03-000002
 - 2. B-293 Non-Secure or MIR 740
- 2.8 SANITARY NAPKIN DISPOSAL
- 1. B-354 (between partitions) or 4721-150000
 - 2. B-254 (surface mounted) or 4222-15

2.9 FABRICATION

- A. General: No names or labels are permitted on exposed faces of toilet and bath accessory units. On either interior surface not exposed to view or on back surface, provide identification of each accessory item either by a printed, waterproof label or a stamped nameplate indicating manufacturer's name and product model number.
- B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.
- C. Framed Mirror Units, General: Fabricate frames for glass mirror units to accommodate wood, felt, plastic, or other glass edge protection material. Provide mirror backing and support system that will permit rigid, tamperproof glass installation and prevent moisture accumulation, as follows:
 - 1. Provide galvanized-steel backing sheet, not less than 0.034 inch (22 gage) and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.
- D. Mirror Unit Hangers: Provide system for mounting mirror units that will permit rigid, tamperproof, and theftproof installation, as follows:
 - 1. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
- E. Keys: Provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply, etc. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install toilet accessory units according to manufacturers' instructions, using fasteners appropriate to substrate as recommended by unit manufacturer. Install units plumb and level, firmly anchored in locations and at heights indicated.
- B. Secure mirrors to walls in concealed, tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, according to manufacturer's instructions for type of substrate involved.
- C. Install grab bars to withstand a downward load of at least 250 lbf, complying with ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.
- B. Clean and polish all exposed surfaces strictly according to manufacturer's recommendations after removing temporary labels and protective coatings.

END OF SECTION 10800

SECTION 11190 – DETENTION EQUIPMENT

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section must be provided by the DEC contractor.
- B. This Section consists of furnishing all plant, labor equipment, appliances, services and materials to perform all work in connection with the installation of detention equipment complete, in strict accordance with the specifications and the applicable drawings. The types of work included in this section are as follows:
1. Detention hollow metal doors, frames and all detention hardware.
 2. Detention hollow metal borrowed light frames and Security Glass.
 3. Detention hollow metal Control Room Frames.
 4. Detention Access Doors and hardware.
 5. Detention Grating, Detention Grating Sliding Doors, 3/16" Plate Headers Detention Sliding Cell and Corridor Door Operators (**See Section 11200**).
 6. Exterior Windows.
- C. The following items of work specified in other sections of these project specifications shall be the responsibility of the Detention Equipment Contractor:
1. Electronic Detention Locking System Controls and Indicators.
 2. Electronic Detention Intercommunications.
 3. Electronic CCTV System.
 4. Electronic Controls for Lighting, TV, and Telephone (on/off).
 5. Electronic Detention Plumbing Fixture (turn low voltage on/off to solenoid valve).
 6. Electronic Wiring and termination for all above controls.
 7. UPS Back-up for all of the Security Electronics.
 8. Complete Conduit System for all Security Electronics.
 9. Detention Furnishings.
- D. Related items of work to be performed by others include the following:
1. Unloading, handling and setting of items, which are to be embedded in masonry or concrete.
 2. Field cleaning, touch-up and finish painting.
 3. Forming recess in slab for grating cell line and grouting after grating is installed.
 4. Installation of all mechanical connections and plumbing connections.
 5. All concrete, masonry work and caulking.
- E. Related Documents:
1. Detention Contractors Work:
 - a. The work consists of the provision and installation of all detention items delineated within the detention drawings and specifications.
 - b. The scope of the work includes all work required for the complete installation of security intercoms, paging, Plumbing Controls, Touch screen controls, below counter lockable equipment rack for Touch Screen Computer and Amps, CCTV System, UPS Back-up Power for all Electronics, complete conduit system for all Security Electronics, detention hollow metal doors, detention frames and detention hardware, detention hollow metal window frames,

detention furnishings (including owner furnished items), detention grating, detention grating doors, insulated 3/16" Plate headers (to roof deck) above sliding devices, detention hollow metal doors, Sliding Cell and Corridor Operators, **Bunks, Stainless Steel Desk, Stainless Steel Stools (Owner Furnished items)**, Embed Plates for furniture, Stainless Steel Exterior Windows, and Security Glass & Glazing.

2. The following sections shall be provided by one DEC contractor:
 - a. Section 11190 – Detention Equipment
 - b. Section 11191 – Detention Furnishings (Installation of owner furnished items)
 - c. Section 11192 – Electronic Controls
 - d. Section 11193 – Detention Windows
 - e. Section 11194 – Security Glazing
 - f. Section 11199 – Operable Detention Windows
 3. The detention contractor shall be responsible for the coordination, supply and layout of all steel imbeds as required for a complete installation of windows and furnishings.
 4. Detention contractor shall set, brace, level and plumb all Security Door Frames.
 5. The detention contractor shall be responsible for all electronic wiring and conduit related to detention locking system controls and indicators, detention intercommunications, CCTV, electronic lighting controls, electronic plumbing controls.
 6. If the Detention Contractor needs additional AC Power other than as shown on drawings, the cost of additional power shall be responsibility of the Detention Contractor.
- F. The following items are furnished by the Detention Equipment Contractor. These items are installed and protected by the General Contractor:
- a. Wall Embed Plates for 10 ga. Wall Bunks
 - b. Wall Embed Plates for Stainless Steel Cell Desk
 - c. Wall Embed Plates for Detention Mirrors in Cells
 - d. Fixed Security Hollow Metal Window Frames

NOTE: Detention Contractor shall install all Trim Plates on Control Rooms Windows after windows are set by the General Contractor.

- e. Galvanized Manual Fence Gate Locks, Pockets & Strikes (Installed by Fencing Sub-Contractor).

G. The following items are by the General Contractor:

- a. Provide block-out in the slab for the Grating Cell Front installation.
- b. Grouting the trough after the Grating Cell Font is installed.
- c. All Security Caulking.
- d. All Finish Painting.
- e. Grouting of all Detention Hollow Metal Door Frames and Windows.

H. The following items are furnished and installed by the Detention Equipment Contractor:

- a. Security Hollow Metal Door Frames. Frames shall be properly braced prior to masonry being installed. Any frame out of tolerance shall be removed and reinstalled at the Detention Contractor's expense.

- b. Security Doors.
- c. Security Hardware.
- d. Security Glass & Glazing.
- e. Paper Pass in Control Room Window Frame.
- f. Stainless Steel Bullet Proof Speak Thru @ Control Room.
- g. Wall Mounted 10 Ga. Bunks. (Owner Furnished, DEC installed)**
- h. Wall Mounted 10 Ga. Stainless Steel Cell Desk. (Owner furnished, DEC installed)**
- i. Security Key Cabinet with #10 Security Lock and Raised Pull Handle (Mounting location to be determined by the Architect).
- j. Stainless Steel Floor Mounted Stools in Cells. (Owner furnished, DEC Installed)**
- k. Stainless Steel Wall Mounted Swing Stools in H/C Cells. (Owner furnished, DEC Installed)**
- l. 3/16" Formed Channels to cap Cell End Walls (See DetailM11/Sheet A6.1). Channel is continuous from floor to roof deck. Detention Contractor shall set channels in straight line and properly brace. Braces shall be removed after wall is completed.
- m. Steel Grating Partitions for Corridor Units.
- n. Steel Grating Cell Fronts with 3/16" Plate Insulated Headers up to the Roof Deck. Detention Contractor shall provide factory cutouts for other trades at no cost. It is the responsibility of each trade to provide layout prior to manufacturing. Any cutting after headers are manufactured will be the responsibility of the respective trades.
- o. Sliding Corridor Doors Devices with Vertical Release Columns.
- p. Sliding Cell Door Devices with Release Cabinets.
- q. CCTV Monitor Shelves in Control Rooms.
- r. Special 3/16" Steel Security Relay Cabinets. Provide A full height 3/16" Steel Plate hinged door with F/A #82 Security Lock.
- s. TV monitor shelves in the cell area.
- t. Detention Mirrors
- u. Transaction/Pass Drawer
- v. Exterior Operable Cell Windows

1.2 QUALITY ASSURANCE

A. Qualifications of Detention Equipment Contractor:

The following Detention Equipment Contractors are prior approved:

- 1. R&S Corporation
- 2. Securtec

Any other Detention Equipment Contractor who intends on submitting a bid on this section of the specifications shall specialize in and be experienced in the manufacturing, delivery, installation and maintenance of detention equipment. Each Detention Equipment Contractor including those listed herein must submit the following information as herein listed.

- 3. Evidence that the Detention Equipment Contractor as named on bid documents has documented experience and has documented experience in successfully completing projects of equal scope and magnitude with the same specified herein.
- 4. A list of all jobs in the past (7) years in which the Detention Equipment Contractor has been involved in litigation with a local, state and/or federal governmental agency and the status thereof.
- 5. Contractors Qualification Statement (AIA Document 305A).
- 6. Financial Statement for Previous Year.

7. Grounds for disqualification shall exist if it is proven that the information submitted is inaccurate or, in the opinion of the Owner, Architect, Engineer, does not satisfy the qualification requirements.
 8. Approval of a Security Contractor does not relieve the Detention Equipment Contractor of furnishing information listed above or from furnishing materials from the manufacturers herein specified.
- B. Qualification of the Detention Equipment Contractor, Manufacturer: Throughout the specification and drawings, type of material may be specified by the manufacturer's name and catalog number in order to establish standards of quality and performance. The bidder shall include all items as specified. Substitutions must be submitted seven (7) working days prior to receipt of bids. Approved products, items will be published and issued by addenda (only). Substitutions will not be considered after deadline. Should the substituted items not be accepted, the bidder must provide, furnish and install the specified approved product, item. The following submittal requirements must be strictly adhered to when submitting a substitute product to the Architect for approval.
1. Submittal Requirements: In addition to a written request for equality, a sample of each lock, device, control, etc. performance data, catalog information, and a written list showing names, locations, and Architects, engineers of seven (7) institutions of which similar materials have been installed for a period of seven (7) years shall also be submitted.
 2. Operating and Maintenance Manuals: Detention equipment contractor shall furnish three (3) copies of a parts manual for all security locks, hardware, control systems equipment and provide instructions for the operation and care of the equipment.
- C. Detention Hollow Metal: Provide products and items from manufacturers who have not less than seven (7) years successful experience with, and shall now be actively engaged in, the design and manufacturing of detention hollow-metal doors, frames of the type required for this project. The same manufacturer shall produce all detention hollow-metal doors and frames.
1. Submittal Requirements: In addition to a written request for equality, a full-size corner sample of each type door and frame showing door construction, face stiffening, insulation, and top hinge reinforcement; details of each type of door and frame, performance data; catalog information and a written list showing the names, locations, and architects of a minimum of seven (7) institutions for which similar materials have been installed for a period of seven (7) years shall be submitted.

1.3 CODES

- A. All work shall be in compliance with the latest editions (and revisions thereto) of the following codes and requirements:
1. State and Local codes and ordinances.
 2. National Electrical Code.
 3. Local electrical code at location of installation.
 4. Occupational Safety and Health Administration, U.S. Department of Labor.
- B. Test Reports: As required herein.

1.4 GUARANTEE

- A. Prior to final acceptance, Detention Equipment Contractor shall provide a written warranty-covering door operating and locking mechanisms. Warranty shall guarantee the satisfactory operation of all doors operating and locking mechanisms for a period of two (2) years (except on

paint finish) after final acceptance. During this period, Detention Equipment Contractor shall, without cost to Owner, make any necessary adjustments to the mechanism or replace any worn or broken parts due either to faulty material or defective construction within twenty-four (24) hours of notification.

- B. The Detention Equipment Contractor is to warranty his material and workmanship on this project for a period of two (2) years (except on paint finish) after date of acceptance by Owner. Detention Equipment Contractor agrees to repair replace any defective security materials and to correct any defective security work when given written notice during the warranty period. In no event shall the Detention Equipment Contractor be liable for consequential, incidental special damages. Vandalism, misuse or excessive abuse is also excluded from this warranty.

1.5 DELVIERY AND HANDLING OF DETENTION EQUIPMENT

- A. Embedded items of Detention Equipment that are to be set in concrete or masonry by the General Contractor shall be furnished and delivered by the Detention Equipment Contractor, F.O.B. his truck or common carrier, to the building site and there unloaded by the General Contractor so as not to delay the truck's departure from the building site. General contractor shall be responsible for security of the embedded items of detention equipment at the job site.
- B. The General Contractor shall provide the required openings of sufficient size through the outside walls to permit the placing of the detention equipment in the areas of the building where it is to be installed, as designated by Detention Equipment Contractor.
- C. The Detention Equipment Contractor shall deliver and be responsible for placing in the building, all Detention Equipment that he is to install as part of his contract.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. All materials required for the work specified herein shall be new and produced especially for the detention use or shall conform to accepted standards of the detention equipment industry.
- B. Electrical components, including motors, switches and relays, shall be the best of their kind and quality manufactured by nationally recognized manufacturers.

2.2 DETENTION LOCKS AND HARDWARE

- A. Paracentric Detention Locks: Shall be heavy duty, lever tumbler type as manufactured by Folger Adams Company, or Approved Equal. Lock cases shall be ductile or malleable iron or steel, with covers of cold-rolled steel. Cases and covers shall be Zinc Plated or galvanized. Cylinders shall be silicon bronzes. Locks shall have minimum of five lever tumblers of spring temper brass; each actuated by a flat, phosphor bronze spring.
- B. Institutional Mogul Locks: Shall be heavy-duty, pin tumbler type as manufactured by Folger Adams Company 120 series, R R Brink model 5020M, Southern Steel model 10126 or approved equal. Cylinder shall be brass, not less than 2 (two) inches in diameter, with not less than five pin tumblers and engaging balls of stainless steel.
- C. Electro/Mechanical Detention locks: Doors to be provided with Electro/Mechanical Detention Locks shall be as indicated on the Detention Door/Hardware schedule. Interior mechanism of the detention lock shall provide for the following:
 - 1. Remote electric push-button unlocking with indications.
 - 2. Manual unlocking by key at the door.

3. Automatic mechanical deadlocking of door upon closing.
 4. Electro/Mechanical Lock shall be mounted in special pocket in doorframe as shown on drawings/templates.
 5. Swinging doors to be equipped with an Electro/Mechanical Detention Lock shall be provided with heavy-duty institutional concealed door closer with built-in door position switch indicator included as indicated on security hardware schedule.
 6. Electrical Contractor shall install and connect all wiring from sources of supply to electronic controls and from controls to Electro/Mechanical locks operated there from, including conduits, cutoff switches and all other electrical equipment incident to power supply (115v AC, 60 cycle, single phase).
- D. Door closure/door indication: Shall be LCN 2210, Norton 7970DPS or equal to match LCN 2210, to be provided where indicated by the Detention Door Hardware Schedule, and shall function as follows:
1. When door is unlocked and/or ajar, the switch contained therein, activating a lamp or audible indicator, as specified elsewhere shall complete a circuit. This switch shall be enclosed in the door closure. The closure will be concealed type installed in the detention doorframe. The Electrical Contractor shall furnish, install and connect all wiring and conduits from sources of supply to door, as well as all other electrical equipment incident to power supply (115v AC, 60 cycle, single phase). When used on the same door with an Electro/Mechanical Lock, wiring between door closure/position switch shall be provided by the Detention Equipment Contractor.
- E. Keys: Paracentric and Mogul Detention Keys shall be silicon bronze/copper alloy having a tensile strength of 60,000 p.s.i., a yield strength of 20,000 p.s.i., and a Rockwell hardness of B-73/75. Furnish three (3) keys for each key change. All keys are to be stamped with designated identifying number of letter.
- F. Key Schedule: Furnish complete key schedule for all locks to be provided under this section. The Owner's representative shall provide Detention Equipment Contractor with the required information for preparation of the key schedule.
- G. Detention Door Hinges: Detention Type Hollow Metal Swinging Doors shall be hung on three (3) #4-1/2 x 4-1/2 butt hinges. Plate Detention Swing Doors or Tube Detention Swing Doors shall be hung on three (3) 5" x5" butt weld on hinges. All Pipe Chase Access Doors, Food Passes, Observation Shutters etc. shall be hung on two (2) 3" x3" weld on hinges of ample size for weight carried and of a type designed especially for Detention Use. Hinges shall be ASTM Grade 1 and manufactured by a U. S. manufacturer.
- H. Detention Door Pulls: Shall be raised pulls, recessed pulls, and knob pulls in accordance with Detention Door/Hardware Schedule.
- I. Door Stops: Detention Doors/Hardware Schedule indicates doors to be with stops for limiting swings of doors in the open position. Detention Hollow Metal doors under this section shall be provided, where indicated, with heavy-duty dome type floor-mounted bumpers.

2.3 DETENTION DOOR HARDWARE SETS

- A. Acceptable Manufacturers are:
1. Folger Adams
 2. Southern Steel Co.
 3. R.R. Brink

Type-Sh#1 (Exterior Security)

- 1- Folger Adam 126MC Electro-Mechanical Deadlock or SSCO 10120AMD-2 deadlock (1/2 Cycle Lock)
- 1- LCN 2210 Concealed Closure/Door Position Switch or Norton 7970DPS Concealed Closure/Door Switch
- 2- Folger Adam Raised Door Pull or SSCO 212C door pull
- 4- Folger Adam 4½ FM Stainless Steel Hinges
- 1- Set of Weather stripping & ADA Threshold

Type-SH#2 (Interior Security, Sally Ports)

- 1- Folger Adam 126MC Electro/Mechanical Deadlock or SSCO 10120AM-2 deadlock (1/2 Cycle Lock)
- 1- LCN 2210 Concealed Closure/Door Position Switch or Norton 797DPS Concealed Closure/Door Switch
- 2- Folger Adam Raised Door Pull or SSCO 212C door pull
- 4- Folger Adam 4½ FM Stainless Steel Hinges or SSCO 204FMSS hinge

Type-SH#3 (Janitor Closets)

- 1- Folger Adam 122MC Electro/Mechanical Deadlock or SSCO 10120AM-2 deadlock (1/2 Cycle Lock) SPECIAL KNOB RELEASE INSIDE ROOM
- 1- LCN 2210 Concealed Closure/Door Position Switch or Norton 797DPS Concealed Closure/Door Switch
- 1- Folger Adam Raised Door Pull or SSCO 212C door pull
- 4- Folger Adam 4½ FM Stainless Steel Hinges or SSCO 204FMSS hinge

Type-SH#4 (Shower Rooms)

- 1- Folger Adam 122MC Electro/Mechanical Deadlock or SSCO 10210AMD-1 deadlock (1/2 Cycle Lock) Electric Lock shall be 24VDC, Provide 24VDC Power Supply
- 1- LCN 2210 Concealed Closure/Door Position Switch or Norton 797DPS Concealed Closure/Door Switch
- 1- Folger Adam Raised Door Pull or SSCO 212C door pull
- 1- Folger Adam Flush Pull
- 3- Folger Adam #5IIS Hinges or SSCO 205 HS hinges
Electric Lock shall be 24VDC
Provide 24VDC Power Supply

Type-SH#5 (Isolation Rooms, Holding Cells)

- 1- Folger Adam 122MC Electro/Mechanical Deadlock or SSCO 10210AMD-1 deadlock (1/2 Cycle Lock)
- 1- LCN 2210 Concealed Closure/Door Position Switch or Norton 797DPS Concealed Closure/Door Switch
- 1- Folger Adam Raised Door Pull or SSCO 212C door pull
- 1- Folger Adam Flush Pull
- 4- Folger Adam 4½ FM Stainless Steel Hinges or SSCO 204FMSS hinge
- 2- Folger Adam #3FP Hinge with Stops
- 1- Folger Adam #17 Food Pass Lock with Mogul Cylinder

Type-SH#6 (Control Rooms) (Delete Food pass lock and hinges at door 164A)

- 1- Folger Adam 126MC Electro/Mechanical or SSCO 10120AM-2 deadlock (1/2 Cycle Lock)

- 1- #17 FP lock with Mogul Cylinder
- 1- LCN 2210 Concealed Closure/Door Position Switch or Norton 797DPS Concealed Closure/Door Switch
- 2- Folger Adam Raised Door Pull or SSCO 212C door pull
- 4- Folger Adam 4½ FM Stainless Steel Hinges or SSCO 204FMSS hinge
- 1- Folger Adams #3 FP Hinges or SSCO 203FP hinge

Type-SH#7 (Electric Cell Sliders)

Electric Slide Door Sliding device with mechanical release at end of run. (see specifications for device)

Type SH#8 (Chase)

- 1- Folger Adam #82 Series manual lock or SSCO 1080A-1 lock (with HM mounting plate)
- 4- Folger Adam 4½ FM Stainless Steel Hinges or SSCO 204FMSS hinge
- 1- Folger Adam Raised Door Pull or SSCO 212C door pull
- 2- Set of Weather Stripping at Exterior Conditions
- 1- Threshold at Exterior Conditions

Type SH#9 (Chain Link Swing Gate Lock)

- 1- Folger Adam 86 Deadbolt or SSCO 1080A-2
- 1- Galvanized Gate Mount & Strike Keeper

Type SH#10 (Office Security Doors)

- 1- Folger Adams 125 Mechanical Deadlock with knobs or SSCO 10500 lock
- 1- LCN 2210 Concealed Closure/Door Position Switch or Norton 7970DPS Concealed Closure/Door Switch
- 4- Folger Adam 4½ FM Stainless Steel Hinges or SSCO 204FMSS hinge

Type-SH#11 (Corridor Sliders)

- 1- Electric Corridor Sliding Device with vertical release column
- 1- Folger Adams #16 Lock
- 1- Escutcheons

Type-SH#12 (Mechanical Exterior Double Doors)

- 1- Folger Adam #82 Series Manual Lock
- 1- Folger Adam HM Mount Plate
- 6- Folger Adam 4 ½" FM SS Hinge
- 1- Set of Folger Adam #105 Head/Foot Bolt
- 1- 6'-0" Threshold
- 1- Set Weatherstripping
- 1- Raised pull

Type-SH#13 (Chain Link Electric Swing Gate Lock)

- 1- Folger Adams Series 806ES Deadlatch with both sides keyed
Case & cover- 7 gauge steel
Stainless Steel springs & ¾" dia. Deadbolt
Finish & all working parts galvanized
- 1- "L" Switch option (Switch Location / Control Rm. 214)

Type SH#14 (Grating at Water/ Ice Location)

- 1- Folger Adam #82 Series manual lock or SSCO 1080A-1 lock
- 3- Folger Adam # 5IIS hinges or SSCO 205 HS hinges
- 1- Folger Adam Raised Door Pull
G Mount

Type SH#15 – Fire Rated Opening (Doors w/ Monitor)

- 1- Folger Adam #66K Series manual lock or SSCO 1080A-1 lock (with HM mounting plate)
- 4- Folger Adam 4½ FM Stainless Steel Hinges or SSCO 204FMSS hinge
- 3- Set of Weather Stripping at Exterior Conditions
- 1- Threshold at Exterior Conditions
- 1- Concealed closure DPS w/ strike indication switch

Type-SH#16 (Mechanical Exterior Double Doors w/ Monitor)

- 1 Folger Adam #82 Series Manual Lock
- 1 Door Strike with Indication Switch
- 1 Folger Adam HM Mount
- 1 Raised Pull
- 7 Folger Adam 4 ½” FM SS Hinges
- 1 Folger Adam Electric Transfer Hinge
- 1 Set of Folger Adam Head & Foot Bolts
- 1 Head Bolt Strike Indication Switch
- 2 LCN 2210 Concealed Door Closer/DPS
- 1 6'-0" Threshold
- 1 Set of Weatherstripping

Type-SH#17 (Fire Rated Opening)

- 1 Folger Adam #66 Series Manual Lock
- 1 Folger Adam Strike with Indication Switch
- 1 Folger Adam HM Mount Plate
- 4 Folger Adam 4 ½” FM SS Hinge
- 2 Raised Pulls
- 1 LCN 2210 Concealed Closer/DPS

General Note:

- All locks are galvanized.
- All hinges are stainless steel.
- Food pass hinges are USP.
- All pulls are US 32D.
- All the weather stripping & thresholds are aluminum.
- All doors except Mechanical Rooms & Chases have (4) Hinges per door

2.4 DETENTION HOLLOW METAL

A. Description

Items covered under this section of the specifications are:

1. Detention type doors of all types and all related items necessary to complete the work-related items necessary to complete the work indicated on the drawings and as described in the specifications.
2. Detention type frames of all types including sidelights, visitation area framing and all related items necessary to complete the work indicated on the drawing, and as described in the specifications.

B. Quality Assurance

1. Experience Criteria: Documented experience in manufacturing detention hollow metal products.
2. Product Supplier: one company shall manufacture both doors and frames. Supply samples of each type of door and frame.
3. Shop Assembly: Pre-assemble products in shop to greatest extent possible to minimize field splicing and assembly. Disassemble products only as necessary for shipping and handling limitations. Clearly mark products for reassemble.
4. Fire Rated Assemblies:
 - a. Wherever a detention hollow metal assembly is located in a fire-rated wall/partition, the detention hollow metal assembly must meet or exceed the fire rating of the wall/partition. Identify each fire door and frame with UL labels indicating applicable fire rating.
 - b. Install assemblies to comply with NFPA standard #80.
5. Performance Testing:
 - a. Submit an independent testing laboratory report certifying the following minimum performance of the manufacturer's typical prison door.
 - b. Static Load Test: Under centrally applied load of 14,000 lbs. At quarter points, the maximum permitted deflection shall be 0.45" with a rebound of 0.010" after release of load.
 - c. Rack Test: Under a concentrated load of 7,000 lbs., maximum deflection shall not exceed 3.5" without failure
6. Delivery, Storage and Protection:
 - a. Delivery of detention hollow metal doors crated to provide protection during transit. Frames shall ship with two (2) spreader bards.
 - b. Inspect hollow metal work upon delivery for damage.
 - c. Store doors and frames under cover. Place units on at least 4" high wood sills or on floors in a manner that will prevent rust or damage. Avoid the use of non-vented plastic or canvas, which could create a humidity chamber. Provide a ¼" space between stacked doors to promote air circulation.

C. Applicable Reference Standards:

1. Comply with the following standards:

- a. ASTM A569-Hot rolled low carbon steel sheets.
- b. ASTM A366-Cold rolled low carbon steel sheets.
- c. ASTM A525-Zinc coated by hot dipped process steel sheets.
- d. ASTM A526-Zinc coated by hot dipped process steel sheets.

D. Submittal:

1. Shop Drawings:

- a. Submit composite type drawings showing detailed construction including door and frame elevations, sections, anchors, visitation areas detail an related type of construction. (All drawings must be computer generated).
- b. Submit on-site instructions.

E. Acceptable Manufacturers:

1. The following manufacturers are pre-approved to furnish detention hollow metal for this project:

Chief Industries
R & S Corporation
Habersham
Trussbilt
Pioneer
Slate Security

2. Other manufacturers requesting approval must meet the requirements specified in Section 1.2, C, 1 and furnish the additional information listed below:

- a. Contractor qualification statement AIA-305A.
- b. List of projects completed in the last seven (7) years (include Owner and Architect's address and phone number).
- c. List of projects under construction (include Owner and Architect's address and phone number).

F. Fabrication:

1. Detention Doors:

- a. General: Provide detention-type hollow metal doors and related frames where designated on drawings.
- b. Door Construction:
 1. Type: Detention hollow metal doors, nominal 2" thick jambs and 4" head sections as designated on drawings; flush design, with smooth seamless steel faces and side edges of 12 gauge steel unless otherwise noted. Use galvanized steel at exterior doors.
 2. Vertical steel channel or steel hat sections full height of door with flanges occurring against each door face at not more than 3" on centers, each welded to face sheets at maximum 4" o/c., or inner reinforcements may be a continuous true truss design form with flat apexes occurring against each door face at not more than 3" o/c. and each apex spot welded to face sheet at maximum 4" o/c.

3. Channel perimeter reinforcement: Minimum 10 gauge welded to face sheets at maximum 4" o/c. around full perimeter of door.
 4. Insulation: 6 lb. Density mineral wool filling voids within door panel
- c. Hardware Preparation:
1. Prepare and reinforce doors for operation and hardware specified in detention door hardware schedule.
 2. Where hardware requires fastener attachment, provide additional concealed reinforcing, drill and tap to receive tamper-resistant security fasteners. Through bolting will not be accepted in place of additional reinforcing.
 3. For mortise hinges, provide back-up reinforcement of 3/16" x 1-1/2" x 9" steel plate at each hinge, welded to perimeter channel of door.
 4. For surface hinges when applicable, provide additional back-up reinforcement of minimum 3/8" x 9" steel plat at each hinge, welded into door between vertical reinforcement.
 5. Provide special reinforced lock pockets where detention locks are required consisting 3/16" steel plate on sides and perimeter edges of pocket, and provide for removable lock cover plate on secure side of door to be flush with door face.
- d. Door Edges:
1. Bevel vertical edges of swinging doors as required to prevent binding, but no greater than 1/8" in 2".
 2. Top and bottom edges of door of flush construction, top watertight when exposed to weather elements. Side edges flush and seamless produced by continuously welding joint of face sheets and grinding smooth. Furnish astragal for door pairs in exterior walls.
- e. Vision Panels:
1. Prepare and reinforce doors for vision panels where required. Provide frame and stops to accommodate glazing.
 2. Weld frame and stop to door on "detention" side. Attach frame and stop on "non-secure" side with tamper-resistant security fasteners at 4" o.c. maximum.
- f. Accessory Items:
1. Provide for installation of accessory items for doors.
 2. Prepare and reinforce doors for these accessory items to maintain rigidity and security of basic door construction.
 3. Provide flush side edges at opening, welded and ground smooth.
- g. Detention Door Frames:
1. Detention hollow metal frames: Formed with integral stops, fabricated to size and profile shown using minimum 12 gauge steel unless otherwise noted.
 - a. Corners of frames shall be fully mitered, continuously welded and ground smooth.
 - b. Fabricated from galvanized sheet steel at exterior locations.
 2. Anchors: Provide door frames built-in to concrete or masonry with a floor anchor at each jamb and minimum 4 wall anchors each jamb of type detailed and suitable for wall construction involved.

- a. For conditions, which require welded anchorage, provide for such welded anchorage.
- b. Furnish frames to job-site with temporary bottom spreader.

3. Hardware Preparation:

- a. Prepare and reinforce frame for operation and hardware specified in detention door hardware schedule.
- b. Where hardware requires fastener attachment, drill and tap to receive tamper-resistant security fasteners.
- c. For mortise hinges, provide minimum 3/16" x 1-1/2" x 9" steel plate reinforcement welded to frame at each hinge.
- d. For surface hinges, provide minimum 3/8" x 1-1/2" x 9" steel plate reinforcement welded to frame at hinge.
- e. Provide reinforced lock pockets for jamb mounted Electro/mechanical locks consisting of minimum 3/16" steel plate back-up reinforcement welded to frame, and provide for removable lock cover plate on secure side of frame, flush with face of frame unless otherwise detailed.
- f. Provide slots in frames to receive latch and lock bolts as applicable and provide for strike plate or bolt keeper plate as required.
- g. Provide steel mortar guard at lock bolt keeper slot and behind other cutouts for mortise hardware as applicable.
- h. Provide factory installed metal junction boxes and metal conduit between lock pocket and door position indicator on doorframes receiving jamb-mounted electric lock and concealed door closure. Junction box, minimum 1/2" conduit and related connectors shall be UL approved.

4. Sidelight Frames:

- a. Provide fixed stops and loose steel stops as detailed. Use loose stops on "non-secure side of opening and attach at countersunk tamper-resistant security fasteners.
- b. Verify thickness of glazing material and clearances required for installation, prior to fabrication of frames and stops.

5. Edge Clearances: Provide the following edge clearances:

- a. Between doors and frames at head and jamb: 1/8"
- c. Between meeting stiles: 1/8"
- d. Sill without threshold: 1/2"
- e. Sill with threshold: 1/8" between threshold and door

2.5 STEEL GRATING

Rib and flat bars in steel grating shall be of the sizes, shapes and quality specified herein. Vertical round bars shall pass through and positively interlock with horizontal flat bars at each intersection without reducing the circumference of the rounds at these intersections. Pipe sleeves, wedging, caulking or any interlock that is not positive or that depends on friction for security will not be acceptable. Grating connections with plate work shall be framed at connections with bars of the same quality and size as the horizontal bars. Tool-resisting horizontal bars shall be connected to side frame bars with steel knees of the same thickness as horizontal bars. Mild steel horizontal bars may be connected to mild steel frame bars by electric welding.

- A. Grating shall be constructed of 7/8" double ribbed steel vertical round bars, complying with ASTM A36, spaced not more than 5" on centers, and 3/8" x 2-1/2" steel horizontal flat bars, complying with ASTM A36, spaced not more than 12" apart.
- B. All material shall be sand or bead blasted prior to receiving (1) coat of universal primer.

Mild Steel Plate work

Shall be 3/16" thick, unless otherwise specified or noted on the drawings. Steel plates butting together in a straight line, forming walls, may be connected and stiffened, where practical, with double 2"x2"x 3/16" angles on one side and 3/16" x 4" battens opposite side. Bottom edges may be framed and stiffened with 2" x 2" x 3/16" angle on one side and 3/16" x 2" Trim bar on opposite side, except where plate walls set against masonry or concrete walls, or as detailed on the drawings. Vertical corners may be connected with 2" x 2" x 3/16" angle on inside and 2-1/2" x 2-1/2" x 3/16" angle outside; ceiling plates may be connected with double 2" x 2-1/2" x 3/16" angle on 3" tee sections. Where space above plate ceiling is insufficient for field riveting or welding, angles shall be placed on underside and bar omitted; plate angles; joints between framing members of grating and connections and method of construction may be used subject to the architects approval. Additional or heavier stiffening and supporting members necessary shall be provided; and, when erected in building, all plate work shall be free from twists, bends, or open joints.

Header Panels shall have 2" insulation in voids.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS:

- A. Examine and inspect all surfaces, anchors and grounds that are to receive materials, fixtures, assemblies and equipment specified herein. Report all unsatisfactory conditions in writing to the Architect and Construction Manager.
- B. Check location, "roughing in", and field dimensions prior to beginning work.
- C. Do not begin installation until all satisfactory conditions have been corrected

3.2 RESPONSIBILITIES:

- A. The Electrical Contractor shall be responsible for the following:
 - 1. Electrical power to factory installed terminal blocks and power outlets including cut-off switches and all other electrical equipment incidental to supply power. Power shall be provided for the control console, locks, amplifiers and Paging Amps.
- B. The DEC shall be responsible for the installation and final adjustments of the following items:
 - 1. Security doors and locking systems
 - 2. Finish hardware for security doors
 - 3. Security glass
 - 4. Electronic controls, intercom, Paging and associated control wiring and conduits.

3.3 INSTALLATION OF THE SECURITY ELECTRONICS SYSTEM:

- A. The quality of workmanship and fabrication performed on all equipment and also that of components which are custom fabricated shall be comparable to that of professional equipment as produced by specialized manufacturers of electronic apparatus. Only skilled craftsmen shall be employed for all aspects of the fabrication of custom assemblies. System manufacturer(s)

shall supply photographs and other documentation as requested to establish quality of his workmanship to satisfaction of Architect and Engineer.

1. All switches, connectors, jacks, receptacles, outlets, cables and cable terminations shall be clearly, logically and permanently identified.
 2. All equipment, materials, construction and installation methods, tests and definitions shall be in strict conformity with design criteria established by applicable organizations among the following: Institute of Electrical and Electronics Engineers; American National Standard Institute; International Standards Organization; National Electrical Manufacturers Association; Underwriters Laboratories, Inc.; Industries Association.
 3. All electronic equipment or other supplies furnished for this system must be solid state type new and in current production by manufacturer and each component shall bear manufacturers model number and serial number on chassis or nameplate securely attached to component.
 4. Transformers shall be an integral part of equipment insofar as possible. Plug in units are acceptable. All circuits of +30 Dbm or less shall be balanced both within and external to rack cabinets.
- B. All equipment cabinet wiring shall be laced and fastened in place using tie raps or equal. Cabled runs shall be straight and either parallel or perpendicular to cabinet sides. Use of plastic wire ways to contain signal wiring is encouraged in lieu of cabling and lacing, but cabling and fastening requirements shall still apply to wiring after emerging from raceway. Microphone and line level wiring shall be on right side (viewed from rear) and output, power and control wiring on left. Plugmold shall be installed on left side of each cabinet for AC power. All signal wiring shall be shielded. Microphone circuits, line level circuits and loudspeaker circuits shall be well spaced from each other and from power circuits. All wire-to-wire junctions in rack cabinet shall be made using connector suitable for application such as barrier terminal strip or Christmas Tree block. Twisted pigtail type wire nut splices are NOT acceptable except on ceiling mounted devices.
1. All connections performed to screw type terminals shall be by suitable crimp lugs soldered with resin core solder. All cable ends shall be protected with shrink tubing.
 2. Christmas Tree block or Barrier trip terminal blocks shall be used for all other connections except where plug-in connections are required.
 3. Conduit sizing shall be DEC's responsibility. Size of conduit shall be based upon manufacturer's system requirements and shall comply with full rules of NEC. Minimum conduit size shall be 3/4".
 4. Separate conduit must be employed for low level runs (-50dbm); line level runs (110 to 20 Dbm); and high level (+30 Dbm or greater).
 5. All devices located in secure areas shall be secured with approved tamper proof screws. Screws shall be allen head type with center reject pin.
 6. All microphone and line level signal runs shall be balanced. Characteristics shall be that microphones maintain nominal impedance of 150 ohms. Line level circuits may be terminated with resistive load of 600 ohms.
 7. Microphone lines and line level lines shall be free from splices.
 8. Continuity of shield shall be maintained at all connecting points, subject to N.E.C. rules for grounding.
- C. Frame and external surfaces of all rack cabinets, chassis and rack panels shall be grounded by copper wire having protection and gauge complying with local code or NEC requirements for grounding of switch or breaker panels. Separate ground wires from each rack shall be brought together at common grounding point not part of any rack and ground line carried to cold water pipe or other ground as specified by local code or NEC.
1. Supports and fastening for all fixed equipment components shall provide safety factor of 3 or greater.
 2. All equipment shall be designed to operate from 120 volts, 60Hz, single phase electrical power. Line voltage variations of 10% from nominal value shall not affect operation.

3. System shall be free of interference and covered modulation from radio frequency signals including AM, FM and TV broadcasts, communications systems, radar, diathermy, etc. Adequate suppression of interference shall be considered to have been achieved when spurious or interfering signals or recovered modulations therefrom are at minimum of 60 Db below level of desired signal at output of system.
- D. Control and other panels shall be mounted with sufficient clearance for observation and testing. Junction boxes must be clearly marked for easier identification. Wiring shall be in conduit; EMT thin wall or other approved methods. Flexible connectors shall be used for devices mounted in suspended, lay-in ceiling panels. Conduit, mounting boxes, junction boxes and panels, shall be securely hung and fastened with appropriate fittings to ensure positive grounding throughout entire system.
- E. Wiring other than that directly associated with security component's functions shall not be permitted in security system conduits. Wiring splices are to be avoided to extent possible, and if needed must be made only in junction boxes and shall use crimp connections only. Transposing or changing color-coding or wires shall not be permitted. Conductors in conduit containing more than one wire shall be labeled on each end with markers. Conductors in cabinets shall be carefully formed and harnessed so each drops off directly opposite to its terminal. Cabinet terminals shall be numbered and coded. Controls, function switches, etc., shall be labeled on respective equipment panels.
1. Cables shall be grouped and neatly bundled as to type and routed from source to termination in a uniform manner throughout all equipment housing. Care shall be taken not to break the insulation or deform the cable by harness supports.
 2. High and low or medium level audio cable shall not be grouped together.
 3. Cable support bars shall be installed to support audio or control cables in areas of dense harness breakouts such as behind panels, distribution amplifiers and other multiple input /output devices.
 4. Control cables and power distribution wiring shall not be installed adjacent to signal cables. Power distribution cabling shall be on the opposite side from signal wiring equipment enclosures and shall be uniformly located throughout an installation.
- F. The Electronic contractors shall employ the latest installation practices and materials. Coaxial connectors shall be crimp-on: Audio and control wires shall be terminated in crimp-on lugs at terminal strips or with other approved devices. Connectors shall be properly utilized. For example, use of "F" type connectors in base band video cabling is prohibited.
1. Audio and control cable ends shall be neatly formed and shrinkable tubing applied where necessary to secure the insulation against fraying or raveling.
 2. All wire and cable utilized in systems interconnection shall be of the flame retardant type (pass FR-1 flame test).
 3. All low and line level audio cables shall be foil shielded twisted pair, 20 gauge minimum.
 4. All cabling or system interconnection which passes through or into acoustically isolated areas, such as the lineup room, shall be suitably sealed after cable has been installed.

CONDUIT AND WIRING:

All conduit and wiring associated with the Detention Equipment Contractor work to be provided and installed by DEC.

The **ELECTRICAL SUB-CONTRACTOR** shall provide 110V power at the following locations. This power shall be tied to the Emergency Power Panels for the building: (2) 120 Volt receptacles (20 Amp circuits) under each Touch Screen to power the Intercom Amp and Paging Amp. Provide (3) 120 Volt (20 Amp. Circuit) to the Relay Cabinets Locations. Provide (3) 120 Volt (20 Amp. Circuits) to VIDEO RACK IN Room 208, Provide (1) 20 Amp circuit to each CCTV Monitor Rack (2 Locations) The DEC is responsible

to provide any additional electrical materials required including but not limited to panels, conduit and wiring not indicated in construction documents at no additional cost to the owner. DEC can utilize spare circuits in electrical panels as available.

END OF SECTION 11190

SECTION 11191 DETENTION FURNISHINGS

PART 1 GENERAL

a. RELATED DOCUMENTS

- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- C. This section must be provided by DEC Contractor.

1.2 SUMMARY

A. This Section includes the following:

1. Detention Mirrors
2. Detention Floor Mounted Stools
3. Detention Door Food Passes
4. Stainless steel Transaction/ Package Drawer
5. Key Cabinet
6. Speaking Device
7. TV Shelf
8. Monitor Shelf in Control Room
9. Wall Mounted Bunk
10. Cell Desk
11. Wall Mounted Bench

1.3 MATERIALS

- A. All materials required for the work specified herein shall be new and produced especially for the detention use or shall conform to accepted standards of the detention equipment industry.

1.4 PERFORMANCE REQUIREMENTS

A. Detention Mirrors

1. Detention-type mirror shall be as indicated on the drawings. Faceplate shall be 20-gauge stainless steel frame. Mirror shall be attached to a 3/16" steel anchor plate embedded in the masonry wall. Provide and install one mirror per cell, two mirrors in handicapped cells, and two mirrors in toilet 256.

B. Detention Floor Mounted Stools

1. Stool seat is 14-gauge drawn mild steel, 12 inches in diameter, with an approximate 1-inch flange. A 3/16-inch thick reinforcing plate is securely welded to the underside. Provide and install one stool per cell except handicapped cell and one swivel stool per handicapped cells.
2. An 8-inch by ¼ inch mounting plate is welded to the 2-inch schedule 40 pipe support. Stool height is 20 inches.

C. Detention Door Food Passes

1. Food Passes in doors shall be constructed of 3/16" steel plate. Clear openings as per drawings. Hinges shall be 3", with 90-degree stops. Provide built in stop to position door as shelf when opened. Provide manual snap lock or approved equal on door assembly. Provide and install one per cell and as otherwise indicated in plans and specifications.

D. Stainless Steel Transaction Tray/Package Drawer

1. Shall be type 1210S Creative Industries, Armortex RMDT or equal. Stainless steel drop-in model. Tray is recessed into counter top opening for flush appearance. Width 12" x 10" depth. As indicated in plans and specifications.

E. Key Cabinet

1. Provide and install 150 Capacity surface mounted key cabinet in Central Control Room 164. Location as directed by the Architect. Cabinet to be made of 10ga steel (size 16"W x 24"H x 6"D). Key Hook strips will be made from 14 ga. Steel and will accept both mogul and paracentric keys. Door of cabinet will be mounted on a heavy duty continuous hinge and will be locked by means of a #10 series lock with escutcheon. All steel components shall be provided with (1) shop coat of universal metal. Field finish paint, color by Architect.

F. Speaking Device

1. Stainless Steel 6" round bullet resistant located by Architect.

G. TV Shelf

1. TV Shelf top shall be constructed of 10 gauge HRPO Steel
2. TV Shelf top shall be 36" wide X 24" deep
3. Edges of the top shall be turned down 2"
4. End brackets shall be constructed of 7 gauge material
5. After fabrication, each TV Shelf shall receive (1) coat of primer
6. Finish painting shall be by Division 9 Contractor
7. Provide embeds as required

H. Monitor Shelf in Control Room

1. The Monitor Shelf top shall be constructed of 10 gauge HRPO Steel
2. The front portion of the shelf shall be framed w/4x4x1/4" steel tube, provide 2x2x1/4" steel tube intermediate bracing as shown on detail
3. After fabrication, each Monitor Shelf shall receive (1) coat of primer
4. Finish painting shall be by Division 9 Contractor
5. Provide embeds as required

I. Wall Mounted Bunk

1. Bunk pans shall be constructed of 10 gauge HRPO steel, 27" Wide x 80" long with (6) 1" diameter holes equally spaced for ventilation
2. End brackets shall be constructed of 7 gauge material
3. Edges of bunk shall be turned up 2" and shall have a 1" hem
4. Each bunk shall have (2) plastic storage bins
5. After fabrication, each bunk shall receive (1) coat of primer
6. Finish painting shall be by Division 9 Contractor
7. Provide embeds as required

J. Cell Desk

1. The cell desk top shall be constructed of 10 gauge HRPO Steel
2. The cell desk top shall be constructed of 10 gauge HRPO Steel
3. Edges of the top shall be turned down 2"
4. End brackets shall be constructed of 7 gauge material
5. After fabrication, each cell desk shall receive (1) coat of primer
6. Finish painting shall be by Division 9 Contractor
7. Provide embeds as required

K. Wall Mounted Bench

1. The bench shall be constructed of 10 gauge HRPO Steel
2. The bench shall be 16" wide x 96" long
3. Edges of the top shall be turned down 2"
4. End and intermediate brackets shall be constructed of 7 gauge material
5. After fabrication, each bench shall receive (1) coat of primer
6. Finish painting shall be by Division 9 Contractor
7. Provide embeds as required

1.4 SUBMITTALS

- A. Submit each item in this article according to the Conditions of the General Contract and Division 1 Specification section.
- B. Product data for each different item, accessory and other manufactured product specifications.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Protection: Protect assemblies from damage, after delivery to site and, before installation.
- B. Embedded items of Detention Equipment that are to be set in concrete or masonry by the General Contractor shall be furnished, delivered, and located by the Detention Equipment Contractor, F.O.B. his truck or common carrier, to the building site and there unloaded by the General Contractor so as not to delay the truck's departure from the building site. General contractor shall be responsible for security of the embedded items of detention equipment at the job site.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. The following manufacturers are pre-approved to furnish detention furnishing for this project:
 1. Prison Enterprises
 2. Chief Industries
 3. R & S Corporation
 4. KLM Industries
 5. American Jail Products
- B. Substitutions: Submit proposed substitution in writing to the Architect within 7 working days of the bid due date. Submit samples and product data for Architects review and addendum approval.

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify field measurements on Shop Drawings.

3.2 INSTALLATION

- A. Install assemblies in accordance with manufacturer's instructions for each type of condition encountered.

3.3 PROTECTION

- A. Protect assemblies from damage until adjacent construction is complete.

3.4 CLEANING

- A. Do not remove protective material until finish work in adjacent areas is complete. When protective material is removed, clean exposed metal surface to comply with manufacturer's instructions.

END OF SECTION 11191

SECTION 11192 – ELECTRONIC CONTROLS

PART 1 – GENERAL

1.1 Description:

- A. This division of the specifications covers the complete security communication system as indicated on the drawings and specified herein. Provide all labor, materials, equipment and supervision to install specified systems.
- B. The Detention Systems Contractor (DSC) and the Electronic Systems Subcontractor (ESS) shall be responsible for device installation and system termination after the electrical contractor has completed the conduit system.
- C. The work shall consist of, but shall not be limited to, the furnishing and installation of the following systems:
 - 1. LCD Touchscreen Locking Control and Data Transmission
 - 2. Communications System – Intercom and Page
 - 3. Closed Circuit Television
 - 4. Lighting & HVAC Control
 - 5. Complete conduit system for Security Electronic items
 - 6. Plumbing Controls
 - 7. UPS Back-up for all Security Electronics
- D. The Electronic Systems Subcontractor (ESS) shall provide, in his bid package, a 2-year service contract on the security electronics herein specified.

The Detention Contractor shall furnish and install a complete conduit system for all items furnished under the Detention Package:

- a) Conduit from Relay Cabinets to all electric doors
 - b) Conduit from Relay Cabinets to all Intercoms
 - c) Conduit from Relay Cabinets to all Paging Speakers
 - d) Conduit from Relay Cabinets to all Security Plumbing Fixtures
 - e) Conduits for CCTV Rack in Room 208 to all CCTV Cameras
 - f) Conduits for Release Cabinets to all Relay Cabinets
 - g) Conduits for all inter-ties from Touch Screen Computers to Relay Cabinets, CCTV Rack, Lighting and Fan Relay Cabinets
 - h) Conduits from CCTV Rack in Room 208 to Monitors
 - i) Exposed wiring not in conduit will not be permitted
- E. Electrical Contractor
 - 1. Provide power raceway and wiring between circuit breaker panels and equipment (Detention Contractor shall make all connections to factory terminal strips).
 - 2. All lights shall be piped back to the Lighting Relay Cabinets (including power circuits) by Electrical Contractor. All wires shall be properly tagged by Electrical Contractor. The Detention Contractor shall make all connections in lighting Cabinets at Rooms 161 and 249.
 - 3. The electrical contractor shall provide all switch legs for power to all equipment at relay cabinets and exterior camera installations. Detention Contractor shall make all connections.

4. All work specified under this division of the specifications shall be in accordance with the following codes in the most recent edition:
 - The National Electrical Code
 - National Fire Code
 - Life Safety Code
 - Local Codes and Ordinances
 5. Coordinate required work to provide a complete and workable installation.
- F. Other Related work specified elsewhere.
1. Concrete, See specification section 03300.
 2. Painting, See specification section 09900.
 3. Hardware, See specification section 08700.
 4. Mechanical, See specifications Division 15.
 5. Emergency Generator, See specification section 16600.

1.2 Qualifications of Manufacturer:

Products described hereunder shall be produced by a firm with at least five years successful experience in the manufacture of integrated control systems, and who is listed herein as an approved manufacturer. Request for approval as a manufacturer must be received no later than 7 days prior to bidding, and must include catalog data, length of time the firm has been in business, list of 5 installations of similar size and scope with name/address/phone number of Architect and Owner's representative, current financial statement, bonding rating, a sample of workmanship, and evidence of compliance with these specifications.

1.3 Submittals:

A. Pre-Construction Submittals:

Submit complete shop drawings, which reflect all details of construction. Submittals shall include but not be limited to complete engineering data for each system; schedules; catalog data; block diagrams of this specific project indicating interconnections of system components, number of conductors, size of raceway required; complete electrical characteristics; physical dimensions of components; and sample of equipment.

The project superintendent shall be available at the Architect's Office at the submittal review to explain the entire system operation, equipment and drawings; and provide a physical system demonstration.

Each individual submittal item shall be marked to show specification section and paragraph number, which pertains to the item. Each operational feature of the system shall be addressed in narrative form and related to specific system requirements described in the plans and specifications. All drawing submittals shall be submitted on same size sheets, identified by system, and sequentially numbered throughout the entire set. These shop drawings shall be submitted at the same time in one packaged submittal.

Review the electrical and operational characteristics of each electrically controlled and monitored hardware type to be installed. Submit certification that the locking control system has been configured to be both electrically and functionally compatible with the hardware

B. Post Construction Submittals:

Provide 3 sets of complete data on all equipment. Data shall be in bound form and shall include all revised shop drawings required for this project. Shop drawings shall be revised to indicate the type and use of each point module, and shall be arranged by system, cabinet, and I/O interface module.

Provide 3 Operation and Maintenance Manuals for the Locking Control System including layout drawings of each panel with each item identified and cross-referenced with equipment data sheets. Provide Source Code for all program software. Provide "as built" system interconnection diagrams with major components identified and number and type of interconnecting conductors; maintenance and operating instructions on all systems; control wiring diagrams for all locking systems with each system identified; certification from the system manufacturers that the systems are installed in accordance with the manufacturer's recommendations and are functioning correctly. Include complete terminal block schedule for each panel with the following data for each point:

- Type of Point, i.e., input, output, analog, etc.
- Schedule Relating Points, Terminal Block Numbers, and Signal Source or Destination
- Input or Output Circuit Configuration with Nominal Resistance or Voltage Values
- Location and type of Input Source Device
- Location and type of Output Device Controlled
- Annotated and cross referenced PLC program printout

Instruction shall be provided to the Owner to instruct his staff in the proper operation and maintenance of the systems. Provide 2 working days instruction by a qualified technician not to include time spent onsite trouble shooting the system prior to completion.

Included in this instruction shall be training for trouble shooting including, but not limited to, the detection and correction of faulty modules, boards, processors, wiring, and power supplies.

C. System Equipment:

Materials or equipment specified by manufacturer's name shall be provided, unless approval of other manufacturers is listed in addendum.

Where substitution of materials alters space requirements indicated on the drawings, submit shop drawings indicating proposed layout of space, all equipment to be installed therein and clearances between equipment.

All materials shall be new and shall conform to the appropriate applicable standards.
UL listed material shall bear UL label.

PART 2 – EQUIPMENT

2.1 LCD Touch Screen Controls:

A. Acceptable Manufacturers:

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.

B. Acceptable Manufacturer:

Montgomery Technology, Inc., Greenville, Alabama
Southern Steel Company, San Antonio, Texas
Secure Control Systems, LLC

C. General:

Touch Screen Control Stations: The touch screen control station shall consist of an 18.25" LCD color monitor with Touch Screen overlay in locations as shown on the drawing and specified in the following sections. The LCD monitor shall be in a metal housing. The LCD color monitor and touch screen switching system shall be interfaced to a standard PLC control system via an RS232 serial communications link. Submit screen layout graphics for approval. The contractor shall make final modifications to the graphics and screen navigation features as required by the Owner or Architect at job end.

NOTE: There are two touch screen panels. They all shall have the capability of controlling the entire building, but will normally be operating the areas indicated on the drawings.

D. Control Functions:

The functions of the touch screen control stations shall be identical to the functions described under the membrane switch control panel section described later.

- a. The LCD panel at Main Control will have the capability of operating each remote area.
- b. Navigation between screens or areas shall be designed to be intuitive and will incorporate the use of a site map or home screen for this purpose.
- c. The touch screen video display will have the capability of 'screen-in-screen' video, so that any selected CCTV camera can be viewed from a 'pop-up' window on the LCD monitor. The video window can be called up when a CCTV icon is directly selected or automatically when an associated intercom station is answered. The video screen will be user sizeable and can be 'drag & dropped' to any location on the touch screen monitor.

E. Construction Description:

The control system shall be capable of operating with a mixture of membrane switch control panels and touch screen control stations. The control panel schedule / drawings will delineate the type of operator interface to be utilized at each station. In addition, the control panel schedule / drawings will delineate all devices to be controlled from each control station.

1. The video display shall consist of 18.25" LCD color monitor with resistive touch screen overlay. The monitor shall be designed to with stand the constant use required for detention facility control. The LCD touch screen shall be enclosed in a metal housing for increased protection against EMI interference. The LCD monitor shall have several mounting options, including stands, arms or rack-mountable with these additional specifications:
 - Display Resolution – 1280 x 1084
 - Speakers mounted in metal housing
 - Input signal compatibility with SVGA
 - Power input 12VDC
 - On screen colors – 256
 - Metal housing
2. The touch screen switching shall be accomplished utilizing a resistive touch switching system with less than +/- 1% error within the active area. The system shall have a resolution of not less than 1024 touchpoints per axis within the calibrated area. The touch life shall be greater than 20 million touches in any one location.

3. Environmental protection – the system shall operate in an environment of –15 degrees C to 70 degrees C and relative humidity of 8-95% relative humidity non-condensing. The environmental shall be dust free.
4. The microprocessor interface shall consist of necessary microprocessors to interface the video graphics driver with the PLC control system and the touch screen switching system to the PLC control system. The microprocessor interface shall have programmed in EPROM all necessary software for system operation. The processor interface shall provide for high speed data communication such that the changing of the video display shall take less than one second and control activations of the system shall take less than 250 milliseconds.
5. The Video Control Station computer shall be IBM compatible and housed in an industrial chassis. The chassis shall meet EIA RS-310C rack-mounted standard, shall support 8/14 slot ISA or PCI/ISA passive backplanes and Baby-AT or ATX motherboards. The CPU case shall be furnished with lockable front disk drive door for anti-dust and security. The unit shall be provided with integral front cooling fan with removable air filter. Provide hold-down clamp design to protect the plug-in cards by eliminating vibration.
6. The video control station computer shall meet the following minimum requirements:
 - Pentium 4 Single Board Controller with min 2 GHz CPU
 - 256 MB PC 133 memory
 - 64 MB ATI Video
 - 60 GB Ultra DMA Hard Drive
 - CDRW Drive
 - 120 MB LS 120 Floppy Drive
 - 32 Bit PCI Sound Card
 - 56 KB PCI Modem
 - Windows Keyboard
 - PS2 Mouse
 - Y2K compliant
 - Windows 2000 Pro
7. Environmental Operation:
 - Temperature – 32-113 F
 - Humidity – 5% to 95% non-condensing
 - Shock – 1G @ 10ms duration
 - Vibration – 0.25 @ 5 to 200 Hz
 - Altitude – 0 to 15,000 ft.
8. Touch Screen Switch Functions:
 1. Doors and Gate Controls:
 - (a) Unlock Switch - Momentarily activating an unlock switch shall apply power for approximately one second to the lock and start the lock motor through its unlocking cycle. Activation of the unlock switch shall be annunciated by an audible beep.
 - (b) Lock /Unlock Switch - Momentarily activating the unlock switch shall apply power to the device, thus, allowing the open cycle. Momentarily activating the associated lock switch shall apply power to the device for activation of its

locking cycle. Activation of the switch shall be annunciated by an audible beep.

- (c) Open -Close-Stop Switches - Momentarily activating the open switch shall apply power to the gate or door allowing the device to open. Momentarily activating the close switch shall apply power to the device, thus, allowing the device to close. Momentarily activating the stop switch shall immediately remove power and stop operated door or gate from further travel in either the open or close direction. Activation of the switch shall be annunciated by an audible beep. The device shall not be allowed to reverse operation without first going through approximately one-second stop time.
- (d) Inmate Access - Inmate access control shall be provided utilizing two switches on the graphic control panel. The first switch will be an unlock switch for unlocking of the cell door. The second switch shall be an access switch. Depressing the access switch will place the inmate cell in access mode. While in access mode, if the inmate access switch located in the cell area is depressed, the door will be electrically unlocked through the control system. The individual cell may be taken out of access mode by depressing the access switch a second time. The indicator lamp associated with the access switch will illuminate when the cell is in access mode and will extinguish when the cell is not in access mode. Depressing the inmate switch located near the door while not in access mode will cause a call in tone on the graphic annunciator and the lamp associated with the specific cell area will flash until the call acknowledge switch has been depressed.
- (e) Group Release - Group release switches will be provided allowing for group opening and/or closing of specified doors. Depressing the group switch will immediately unlock all doors associated with the group.

F. Software Description:

1. Video Control System Software: The Software shall be 32-bit format and be able to operate in a Windows 98, Windows 2000 or Windows NT environment. Acceptable software is MTI ProVision/ProDesign or Trentech VMC. All other proposed software packages must be demonstrated and approved by the Architect/Engineer. Any approved packages shall be listed in an addendum as so at least seven days prior to bid date.
2. Alarm Reporting Software: The Alarm Reporting Software provides easy access to the alarm reporting log database, which is generated by the Touch screen Software. The touch screen software generates a Microsoft Access compatible database file, which contains date and time stamp, along with a tag, which identifies the specific device. The alarm reporting system allows for a search of the current events database and any prior month's database, which are still present in the working directory. The Search Database screen is utilized for performing all searches. The type of device being searched for may be selected from a checklist menu or specific device names can be entered and searched in a date and time sensitive search. After the search report is complete, the report may be printed on the system printer.

Maintenance Reports are available utilizing the system. The system will compile a total number of door activations that is recorded by the system on the maintenance reports. A door count limit may be set to allow for preventative maintenance reports generations. In addition, a total door cycle count is maintained for all doors within the system.

The Maintenance Records portion of the program provides for the recording of all

maintenance activity within the system. The maintenance records window provides for data entry and recovery along with printing of the individual maintenance records.

Password Protection is available on the system. The system is shipped with password protection set to any access level. The password protection is activated moving to the set up screen and activating the password button.

3. Acceptable Manufacturers: Montgomery Technology, Inc., Protrak software or Trentech, all other proposed software packages must be demonstrated and approved for use by the Architect/Engineer a minimum of seven days prior to the bid date. Any approved packages will be listed by addendum prior to bid. No substitutions shall be considered after the bid.
4. Required Training: The software developer shall provide free training in the use of the Video Control Software application in conjunction with the PLC software package furnished for the project. Training shall be provided which will allow the owners' personnel to make routine changes to items such as interlock and emergency release groupings. Using the PLC and the Video Control Software, the interlock and emergency release grouping changes will be accomplished within ten minutes from start to finish. This standard is set forth to insure that the integrated software packages remain simple to use. Complex ladder logic programming is strongly discouraged but may be considered if the contractor can demonstrate the ability to interface the necessary packages and make the changes described above within the time frames set forth.

2.2 System Switch Functions:

A. Door and Gate Control:

1. Unlock icon – Momentarily activating an unlock icon shall apply power for approximately one second to the lock and start the lock motor through its unlocking cycle. Activation of the unlock icon shall be annunciated by an audible beep.
2. Lock/Unlock icon - Momentarily activating the unlock icon shall apply power to the device, thus, allowing the open cycle. Momentarily activating the associated lock icon shall apply power to the device for activation of its locking cycle. Activation of the icon shall be annunciated by an audible beep.
3. Open-Close – Stop icon – Momentarily activating the open icon shall apply power to the gate or door allowing the device to open. Momentarily activating the close icon shall apply power to the device, thus, allowing the device to close. Momentarily activating the stop icon shall immediately remove power and stop operated door or gate from further travel in either the open or close direction. Activation of an icon shall be annunciated by an audible beep. The device shall not be allowed to reverse operation without first going through approximately one second stop time.
4. Group Release - Group release icons will be provided allowing for group opening and/or closing of specified doors. Activating the group icon will bring up on screen an acknowledge dialog box. Touching the "YES" check box will immediately unlock all doors associated with the group. Touching the "NO" check box will abort the group release process and return the system to normal status.

B. Interlock Override Icons:

1. The door interlock system shall interconnect a group of locks to prevent electrically unlocking more than one door at a time. Yellow halos shall be located around each door control icon in the interlock group. All yellow halos of an interlock group shall be illuminated when any one door within the group is unsecured.

2. The two interlock override icon, when depressed, shall bring up on screen an acknowledge dialog box. Touching the "YES" check box shall allow the opening or unlocking of any or all other locks or doors in an interlock group when one or more doors in the group has previously been unlocked. While the override function is activated, a pulsating, audible tone shall be sounded. The yellow interlock halos located around each door control icon shall flash while the interlock override function is active.

C. Emergency Release Icons:

1. The emergency release icons, when activated, shall bring up on screen an acknowledge dialog box. The "YES" check box located in the acknowledge dialog box, when activated, shall apply power to all locks and doors assigned to this function. All devices activated by this function shall have their associated icon continuously flash, and the audio alarm shall sound until the switch is deactivated by activating the reset switch. All locks and doors connected to these groups shall remain unlocked and open until the emergency system is reset. Activating the "NO" check box shall return the system to normal status.

D. General Switches:

1. CCTV Cameras Switch: There shall be camera icon shown graphically on the touch screen for each CCTV camera. The Camera Icon shall illuminate any time the camera is automatically switched to the incident or spot monitor.
2. Satellite Power Cutoff: The satellite power cutoff shall turn off control power to the associated satellite control station when activated and turn on control power when deactivated. The switch icon shall illuminate yellow when the switch is activated. When the satellite station has control, the illuminated icon shall return to its normal color.
3. Miscellaneous Control Icons: Icons on the touch screen graphic control station shall illuminate when the controlled device is activated and shall extinguish when the device activated is returned to its secure or deactivated state.
4. Audio Annunciator: Audio annunciation of all functions shall be accomplished via the speakers, which are built into the LCD touch screen. An annunciation shall occur when any icon is activated or an alarmed device changes status.
5. PROTECT Button: When pressing first the 'Protect' button on the touch screen control station and then a cell door icon will remove that cell door from GROUP release. (The 'protected' door will still operate during emergency release and by individual door icon activation.) When pressing the 'protect' button and then an intercom station, this will disable/silence that intercom station until the touch screen operator reinstates it. To remove the 'Protect' function, repeat the process by activating the 'Protect' button and then the door or intercom icon. This activity will be recorded to the event log in the touch screen computer.
6. INFO Button: The 'INFO' icon/button on the touch screen control station, when activated, sets the system to access inmate information from the ProTrak Management database. Information pertaining to a particular inmate is then obtained by activating the associated cell icon. Real time inmate data such as medical schedules, daily class schedules, court schedules, commissary accounts, medication schedules, disciplinary actions, inmate photographs and to the moment accounting of each inmate's location is instantly available to the operating officer from the touch screen control station.
7. Light/Power Controls: On/Off icons - activating the Light Bulb Icon shall apply and maintain power to the designated light fixture or group of fixtures and activating the Light Bulb Icon again shall remove power from the light fixtures. The icon will illuminate when

light fixture is on. Same conditions applies for receptacles and water valves. Any device activation shall be annunciated by an audible beep.

2.3 PLC Control Unit:

A. Acceptable Manufacturers:

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.

Montgomery Technology, Inc., Greenville, Alabama
Securplex, Rauland-Borg, Skokie, Illinois
Secure Control Systems, LLC, San Antonio, Texas

B. Type and Function of Circuit Boards: The control system shall be a microprocessor based system utilizing multiplex data transfer of all data rather than individual conductor transfer. All data transferred to the faceplate or the relay control system shall be accomplished via RS485 serial communications over the CAN Highway. All system components shall be the standard product of one manufacturer.

C. Logic Control: The processor card shall contain all programs necessary to control the system. The processor shall communicate with all other devices via multiplex data transfer. All system boards shall be capable of operation from supply voltage of seven to thirty-six volts DC.

D. Logic Controller: All microprocessor-based equipment supplied shall be certified by the manufacturer to meet or exceed the following environmental operating specifications:

Ambient Temperature - Operational 0 to 60 C.
Storage 40 to +80 C.
Ambient Humidity - 50 to 95%, RH non-condensing
Noise - Passed the following tests: NEMA ICS2-230 (Showering Arch)
ANSI C37.90a, IEEE 472 (Surge Withstand Capability)

E. Multiplex Encoder/Decoders: The remote multiplex encoder/decoders shall be powered via the data loop wiring and will require no additional power for operation. The multiplex circuit boards shall decode and output data received from the microprocessor card and shall encode local data to the multiplex data loop. The encoder/decoders shall be interchangeable between all systems, such as locking, lighting and intercom control systems.

All I/O devices shall be equipped with system self diagnostic capabilities. The controlling processor shall, on a time interval not to exceed three seconds, pole all input/output devices for a diagnostic test. Each input/output device shall respond to the processor to indicate either clear or trouble. The condition of all I/O devices shall be indicated on the graphic control panel upon the depression of the test switch. Please refer to the section describing the system processor.

F. Programming – Programming of the programmable controller shall be accomplished utilizing a spreadsheet type layout for all programs. The software shall be capable of reading an address schedule and converting the information contained within the schedule into machine code. The software shall convert functions associated with locking and intercom control features in an automated method. The system shall read the spreadsheets and compile the necessary logic steps to perform the minimum following instructions:

Timed Outputs
Emergency Release Grouping
Interlock Grouping and Interlock Override
Field Device Supervision
Remote Processor Communications

In addition, the system shall be capable of scheduling any logic function necessary for a jail locking and/or intercom system without utilizing any other means of programming. The system shall also be able to incorporate standard logic functions such as and/or exclusive and shift register calculations.

A complete package of the software shall be provided to the Owner.

- G. Training - The programmable controller manufacturer shall provide a regularly scheduled training class, which shall consist of training for both the hardware and the software contained within the system. The training class shall be free of charge to the owner with the owner covering only the travel expenses necessary for the personnel to travel to the manufacturer's facilities. The training classes shall be made available on a long-term basis and shall be provided upon request to the owner without limit to number of people attending or number of classes attended.
- H. Construction: The programmable controller manufacturer shall provide a regularly scheduled training class, which shall consist of training for both the hardware and the software contained within the system. The training class shall be free of charge to the owner with the owner covering only the travel expenses necessary for the personnel to travel to the manufacturer's facilities. The training classes shall be made available on a long-term basis and shall be provided upon request to the owner without limit to number of people attending or number of classes attended.
- I. Lighting Protection: All control systems will be protected with several levels of lightning protection. Protection will be provided for the AC power connections. All transmission lines, terminations, all external control devices, such as gates, monitors, etc. A floating ground system for all control systems will be utilized. All connections to any grounded system will be through an optically isolated coupler. All relays shall be minimum 7,500V isolation and optically coupled. Lightning protection will be a standard part of the system and shall be the standard product of one manufacturer. Protection levels shall protect the system against 95% of all lightning strikes within 1/4 of a mile. Lightning strike levels shall be 100 KV strike. The protection shall, in case of failure, control the mode of failures. First protection level shall be a fuse protected system. Secondly, the power supplies will then be sacrificed and thirdly, a shunt on the DC side of the power supply shall clamp all power to the electronics. Only in the most severe strike shall any electronics actually be damaged.

2.4 Electronic Control Relay System:

A. General:

The electronic relay shall do the actual switching of the power to the locks, lights, etc. All relays shall be mounted in NEMA-1 type cabinets with removable steel mounting plate. The cabinet shall be sized according to the number of relays required by the job and constructed of code grade steel. The cabinets shall be mounted where shown on the drawings in Rooms 161 and 249.

B. Locking Relay Construction:

- 1. Relays: The control relays shall be optically isolated, solid state type that are rated for at least 50% more current capacity than required for any given control function, but in no case less than 8 amps. The relays shall be capable of operating on any input signal between 3 VDC and 32 VDC, and the output shall be capable of switching any voltage between 24 VAC and 140 VAC, at the rated output current. The unit shall have a minimum of 7,500 VAC isolation between the input and output. Electro-mechanical or other than optically isolated solid state relays are not acceptable.

2. The following requirements must be met for all locking control relays:

- a. Input indication must be given at the relay location.
- b. 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.
- c. Each relay shall be socketed to facilitate easy field replacement.
- d. All relays and terminations are to be labeled clearly to show all field terminations.
- e. A relay panel must be capable of withstanding a 120V short dead to ground without damaging the relays or tripping the main circuit breaker. All low voltage wiring connections made to the relay boards shall be made with connectors utilizing captive clamp screws.
- f. The relay panel shall be protected from a 100 kilo volt lightning strike one-half of one mile away from the location.
- g. All control wiring in the relay cabinet shall be grouped and laced with nylon tie straps with a maximum spacing of one inch. Straps will be placed within 1/2" on each side of all bundle breakouts. Wiring will be supported at intervals not exceeding four inches and labeled at both ends. Provide two spare relays to be turned over to the Owner.

C. Wiring:

The wiring that extends from the electronic control relay terminal strips to the locks, lights, etc., shall be Class 1,2 or 3 as defined in Article 725 of the National Electric Code. All conductors 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.

1. All control wiring systems shall use solid or stranded copper conductors. Stranded conductors shall be acceptable only where all terminations can be made to lugs. Where stranded conductors are used, all terminations shall be made with crimp type lugs, correctly sized for termination, and applied to conductor with crimping tool intended for use with the lug used. (Number of wires per lock or device, nominally six, shall be determined by Security Contractor).
2. All wiring systems shall be labeled and color coded with labeling and coding shown on shop drawings. White conductors shall be used only for neutral conductors and green only for grounding conductors. All conductors within junction boxes, pull boxes and equipment enclosures shall be grouped and laced with nylon tie straps with identification tabs in individual sets, serving individual locks or groups. Conductor group shall be identified on the tab with respect to room or area served. Control system conductors shall not be spliced; control conductors shall be continuous between the control panel and the relay cabinet.

2.5 Electronic Logic System Power:

A. General:

1. Provide an un-interruptible power system to supply 12 volts DC power for all systems logic signal devices and intercommunications. Output capability of the 12 volt supply shall have not less than 150% ampere rating of the total load of the logic system and shall be fused. Output shall be constantly regulated.
2. The electronic logic system power shall be completely isolated from building ground. The system shall meet the requirements of a "floating" ground system. The electronic logic

system power shall be protected against shorting of 120 volts to either the DC common or the DC positive line.

3. The electronic logic system power shall be protected from surges caused by lightning with three levels of protection. The first level of protection shall utilize a fast blow fuse and a metal oxide varistor capable of conducting current in excess of 1,000 amps. The fuse and varistor shall be sized to withstand a 100 kilo volt lightning strike one quarter of a mile away. The second level of protection shall utilize a metal oxide varistor on the low voltage side of the AC transformer. This varistor shall be capable of conducting surge currents twenty times that of the rating of the AC transformer. The third level of protection shall be accomplished with an electronic DC voltage clamping circuit capable of conducting in excess of 1,000 amps of surge current. This circuitry shall provide protection of the electronic logic system even if the two previously mentioned protection circuits fail.

B. Lightning Protection:

All control systems will be protected with several levels of lightning protection. Protection will be provided for the AC power connections. All transmission lines, terminations, all external control devices, such as gates, monitors, etc. A floating ground system for all control systems will be utilized. All connections to any grounded system will be through an optically isolated coupler. All relays shall be minimum 7,500V isolation and optically coupled. Lightning protection will be a standard part of the system and shall be the standard product of the controller manufacturer. For controller manufacturers not supplying their systems with integrated lightning protection circuitry, provide separate units from Northern Technologies, Transtector or Edco.

1. The electronic logic system power shall have the capacity to furnish total logic and signal power for not less than four (4) hours in the event of failure of the normal and emergency power source. The load side of the UPS system shall be continuously connected to the load so that no signal or other alarms or indicators shall be lost during the switch-over from normal to emergency power for total power outages.

C. Charger:

The normal AC power shall be converted to regulated DC by the battery charger to maintain the batteries in a fully charged state. If the normal AC power fails or drops more than 15% below normal, the operator shall be notified by visual indicator on the panel. The charger shall automatically recharge the batteries after normal power is restored.

2.6 Operational Intercom System:

A. Acceptable Manufacturers:

Except as otherwise specified, herein, or in the General Conditions, the equipment and materials of this Section shall be products of the following manufacturer, subject to compliance with specification requirements and provided each manufacturer meets all requirements of the Quality Assurance Section of this specifications.

Montgomery Technology, Inc., Greenville, Alabama
Southern Steel Controls, San Antonio, Texas
Securplex, Rauland-Borg, Skokie, Illinois
Secure Control Systems, LLC, San Antonio, Texas

B. Logic and Control Unit:

The programmable controller utilized for intercom control shall be of identical make as the controller utilized for the locking control system. The intercom system shall be controlled by a controller which is dedicated to the intercom system. The intercom system controller shall communicate with the locking system controller by serial communication.

C. Type and Function of Circuit Boards:

The control system shall be a microprocessor based system utilizing multiplex data transfer of all data rather than individual conductor transfer. All data transferred to the faceplate or the relay control system shall be accomplished via multiplex data transfer. All system components shall be the standard product of one manufacturer. The control system including multiplex data cards, processor cards, relay cards, intercom cards, power supply etc., shall have no more than seven total types of circuit boards.

D. Logic Control:

The processor card shall contain all programs necessary to control the system. The program shall be non-erasable. The processor shall communicate with all other devices via multiplex data transfer. All system boards shall be capable of operation from supply voltage of seven to thirty-six volts DC.

E. Logic Controller:

All microprocessor-based equipment supplied shall be certified by the manufacturer to meet or exceed the following environmental operating specifications:

Ambient Temperature - Operational 0 to 60 C.
Storage 40 to +80 C.
Ambient Humidity - 50 to 95%, RH non-condensing
Noise - Passed the following tests:
NEMA ICS2-230 (Showering Arch)
ANSI C37.90a, IEEE 472 (Surge Withstand Capability)

F. Multiplex Encoder/Decoders:

The remote multiplex encoder/decoders shall be powered via the data loop wiring and will require no additional power for operation. The multiplex circuit boards shall decode and output data received from the microprocessor card and shall encode local data to the multiplex data loop. The encoder/decoders shall be interchangeable between all systems, such as locking, lighting and intercom control systems.

G. Construction:

1. The electronic control circuit components shall be mounted on a printed circuit board of glass/epoxy construction. The card shall be connected with gold plated connectors. These cards shall be capable of quick removal and replacement without the desoldering of wires. The boards shall be construction utilizing plated through hole technology with a solder mask on both the solder and the component's side. A component silk screen of high contrast color shall be used on the component side with all components numbered and labeled visibly. All circuit boards shall be capable of maintaining operations with a supply voltage from seven volts DC to thirty-six volts DC. Logic control circuits shall utilize CMOS integrated circuit technology with silicon bipolar transistor isolation. All components are to be direct soldered into circuit boards. All flux is to be cleaned from solder joints sufficiently to allow for no detectable corrosion after three years of service. Provide as many circuit boards as required for the number of annunciating and control functions specified, herein, plus two (2) spare circuit boards of each type to be turned over to the Owner.

2. The system shall be multi-link to allow one conversation per master station to occur simultaneously. The system shall allow all staff stations directly connected to a master to communicate with that master. The control master shall display the staff stations on the digital readout in the order in which they are received. Staff stations shall always appear on the multi-digital readout and shall graphically appear on the panel. The system shall have an answer switch to allow automatically answering the calls in order, or the calls can be selected manually in any order. A scroll switch shall allow scrolling through the calls. The system shall allow master stations to direct dial each other. The system shall be capable of assigning architectural room numbers to any staff or master station. The number shall be a 1 to 4 digit number consisting of any combination of the numbers 0 through 9 and/or letters A thru F.
3. In the master control room, the master intercom station shall be located as shown on Touch Screen graphic control panel. The master station shall provide a hexadecimal keypad, talk/listen switch, an automatic answer button, scroll button, a systems busy tone, a call waiting annunciation and a multi- digital readout. The hexadecimal keypad, which is an integral part of the graphic panel, shall provide for dialing all individual staff and master stations. The multi-digital readout shall display the station number with which a link has been established through use of the hexadecimal keypad.
4. A speaker shall be mounted near the graphic control panel faceplate. A microphone with a push to talk switch will be mounted on or near the control panel turret.
5. The master station in the master control room shall also have capabilities of remote redundant locking control via use of the hexadecimal keypad by dialing in the door number and pressing the unlock switch. Any door within the facility may be unlocked from master control.
6. The satellite master stations shall be located as shown on the drawings flush mounted in the graphic control panels. The master station shall provide a selector switch in-line with each staff station or speaker intercom to establish communication link. Also, provide a talk/listen switch and volume control switches. Provide a speaker and microphone which shall be constructed and mounted as described above. The system shall be capable of assigning architectural room numbers to any staff or master station.

H. Staff Stations:

Staff stations shall be flush mounted where shown on the drawings with push button call origination to the master station.

1. The staff station shall comply with the following specifications:
 - (a) Speaker – 3" nominal
 - (b) Impedance – 25 volts
 - (c) Sound level – 102 Db @ 4/1 Khz, 2 watts
 - (d) Finish – brushed stainless steel, 11 gauge
 - (e) Push button – normally open
 - (f) Sensitivity – (microphone) – 26 dbm
 - (g) Backbox – compatible to speaker assembly supplied

I. Intercom, Paging and Monitoring Speaker/Baffle:

The speaker/baffle shall comply with the following specifications:

- (a) Continuous power rating – 15 watts RMS

- (b) Frequency response – 400 - 5,000 Hz
- (c) Speaker Diameter – nominal 8" – water resistant
- (d) Sound level – 109 Db @ 4/1 Khz, 15 watts
- (e) Impedance – 25 volts
- (f) Finish – Brushed aluminum, 1/8 inch
- (g) Dimensions – 12-3/4" h x 12-3/4" w
- (h) Sensitivity (microphone) 26 Dbm
- (i) Backbox – 12" h x 12" w, maximum

J. Speaker/Microphone:

The speaker/microphone shall comply with the following specifications:

- (a) Speaker – 4" nominal, water resistant
- (b) Impedance – 8 ohms
- (c) Sound Level – 102 Db @ 4/1 Khz, 2 watts
- (d) Dimensions – 4" h x 4" w x 3.5" d
- (e) Sensitivity – (microphone) – 26 Dbm

2.7 Closed Circuit Television System:

A. Description:

The system shall be a Hi-Resolution color system consisting of color CCD cameras, Vari-focal lens, housings, mounts, matrix switchers, keypads, LCD Flat Screen monitors, power supplies, surge protection, cable, connectors, and mounting equipment. All cameras monitors and equipment shall be mounted as shown on the drawings. In addition to all cameras having rack mounted surge protection at the CCTV Equipment Rack, any camera mounted outside the building shall have additional surge protection on the video, power, and control lines and cables. At central control Provide 8 – 15" LCD Flat Screen monitors and 2 keyboards. Install matrix video switcher in Room 208 mounted in 72" CCTV Equipment Rack with Plexiglas Door. Provide UPS for Monitors, Power Supplies and all equipment in CCTV Rack.

B. Acceptable Manufacturers:

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.

Pelco, Clovis, CA
Kalatel, Corvallis
Phillips

C. Cameras:

CCTV cameras shall be U.L. listed and shall be the standard product of one manufacturer complying with not less than the specifications contained herein. Installation of each camera shall include mounting brackets and/or camera housings fully compatible with the camera provided. Cameras shall be color 1/3" charged coupled device.

1. All camera installations shall be securely attached to mounting surface. Use lead shields on solid masonry, toggle bolts for hollow masonry, and machine bolts for steel. All anchoring devices shall be rated to support not less than five times the total equipment weight. Cameras shall have automatic iris control and shall be for interior or exterior use under normal and low light conditions of illumination and shall be provided with a weatherproof or

tamper-proof housing as specified. Camera shall be mounted as shown and shall include electronic components for automatic adjustment of iris to varying levels of illumination. Installation of each camera shall include mounting brackets and/or camera housings fully compatible with the camera provided. Provide high security and environmental type where required. Cameras shall be 1/3" charged coupled device.

2. Camera shall be solid state CCD type, interior hi-resolution color, with auto iris vari-focal lens, with adjustable focal length to provide optimum field of view for each camera location as directed by Architect. (Approximately 85 degree field of view.) Power supplies shall be internally protected. Cameras shall have linelock to avoid roll during switching operations.
3. The camera shall have the following minimum specifications:
 - (a) Horizontal resolution – 480 lines min. color
 - (b) Signal to noise ratio – 48 db min.
 - (c) Composite video signal – Adj. To 1 volt, peak to peak
 - (d) Sensitivity – 1 lux
 - (e) White Balance – auto
 - (f) Scanning System – 2:1 interlace
 - (g) Operating temperature range – 4 to 131° F
 - (h) Line voltage – 24 VAC
 - (i) Power consumption – 7 watts

All exterior and cell cameras shall be special Low-Light high Resolution Color Cameras (down to 0.01 lux at f1.2, 35 IRE/0.5 second integration. PELCO CC3751H-2 or equal.

D. Camera Housings and Supports:

All camera housings and support brackets shall be compatible with CCTV camera specified to be installed within housings and/or mounted on brackets. Housings shall be provided with all cable entrance facilities for camera control and shall be adaptable to mounting devices used with cameras. All camera housings and support brackets shall be securely attached to mounting surfaces. Escutcheon plates attached with security screws shall be used to conceal holes in walls or ceilings.

1. Weatherproof-tamper proof housings shall be constructed of aluminum and finished with a weatherproof, heat reflecting paint. Housing shall be internally insulated. Hinged cover shall be secured in place with tamper proof bolts.
2. Interior tamper proof housings for cameras shall be constructed of a minimum 16 gauge sheet steel, all joints welded, with all surfaces finished with rust inhibiting prime coat and baked on vinyl finished coat. Access shall be through locked hinged continuous side panels. All locks shall be keyed alike for similar camera enclosures on this project. Knockouts shall be provided for entry of power control and video wiring.
3. High Security Corner Mount Enclosure: - Design of enclosure shall be for corner mount applications and for providing maximum protection against vandalism. Design features shall include no exposed mounting hardware, tamper switch and camera mount. Mounting of the enclosure to the mounting surface shall be accomplished by installing the mounting hardware from the inside through the enclosure into the mounting surface, providing non-accessibility to the mounting hardware with the access cover closed. Access cover shall contain the viewing window and securing of the access cover shall be accomplished using one (1) 1/4-20 stainless steel tamper proof type screw with assembly tool supplied with the enclosure. Cable/wiring shall enter from the rear or top of enclosure and in such a manner that once enclosure is completely installed there shall be no

exposed wiring. Tamper switch shall provide for a means of remotely indicating open or closed status of the access cover. Camera mount shall have an adjustable tilt table.

An optional hood shall be available and required for use when enclosure is not mounted up against ceiling. Hood shall be assembled onto the enclosure with hardware assembled from inside the enclosure so that it is not accessible when access cover is closed. Construction: Body shall be 10gauge (.134") steel. Window shall be optically clear .2500" (1.27 cm) thick, UV stabilized, extruded polycarbonate. Finish on exterior shall be a self-textured semi-gloss beige enamel paint, Enclosure shall be U.L. listed.

Camera mounting brackets shall be heavy duty type and shall be suitable for outdoor use. Bracket shall be provided with locking, swivel, adjustable head for maximum tilt angle of 60 degrees.

Wall mounting brackets shall be suitable for camera and enclosures specified and shall be rated for support of not less than 150 lbs. Brackets with extension of 24" or larger shall be provided with support strut.

E. Television Monitors:

CCTV LCD Flat Screen Monitors shall be the standard products of one manufacturer and compatible with the total system specified, herein, and complying with these specifications. Monitors and cameras shall be provided by the same manufacturer.

1. CCTV monitors shall be solid state type with exception of picture tube, mounted as indicated on the drawings and as specified herein. Monitor controls shall be on-off, brightness, contrast, vertical hold and horizontal hold. Controls shall be mounted behind cover on front of unit. Monitors shall contain differential input amplifier, voltage regulation, and shall be rated for continuous duty. All monitors shall be U.L. listed.
2. 15 inch color hi-res LCD monitors shall be mounted where indicated on the drawings and shall conform to not less than the following specifications:
 - (a) Resolution – 540 lines at screen center
 - (b) Input impedance – 75 ohms
 - (c) Video input – 1.0V composite P/P
 - (d) Power Consumption – less than 35W
 - (e) Brightness – more than 250 lux
 - (f) Sync Range – 3.579 MHZ
 - (g) Operating temperature – 50 to 104 degrees F

F. Matrix Video Switcher:

The matrix video switcher shall have as a minimum 64 inputs by 16 outputs. Standard features include looping video inputs, programmable alarm inputs, and an RS232 port for operation from a computer. Control is via twisted pair cable from as many as 64 keypad locations. The switcher standard protocol shall allow it to be programmed for camera sequence, tours, alphanumeric titling, individual, or universal dwell times, pan tilt controls, presets, tours, etc. PELCO 9740L or equal.

Microprocessor-based circuitry allows the switcher to receive commands from the controller keypad. A separate serial data port is provided for relay follow communication. All IC's shall be socketed for easy removal and replacement. The switcher shall receive commands from the GCP for selection of the cameras to the spot monitor. Provide controller keypad for control of all pan-tilt-zoom cameras.

Furnish all accessories to fully integrate with other CCTV components and security controls. Incorporate RS232 communication for incoming intercom calls to bring the associated camera up on the spot monitor.

1. The switcher shall have high impedance looping with 75 ohm outputs, unit gain with a flat frequency response of +/- 1 Db to 10 MHz. The cross talk shall be better than - 50 Db (input to output) and less than 2 % t l l t .
2. Switches and indicators shall be provided in the graphic control panel for each camera. The switches and indicators shall comply with the graphic control panel specification previously stated. A camera may be manually selected to the spot monitor by depressing the associated switch. When selected, the LED indicator will illuminate. On selection of a second camera, the first selection will be automatically canceled and the second camera selected. Cameras will also be automatically selected to the spot monitor on selection of an associated intercom station. This will be accomplished by intercom station selection only with no secondary operation needed.
3. Provide controller keypads at all locations where shown on the drawings

G. Power Supplies:

All cameras shall be powered from a central area. All cameras shall be individually protected. Provide automatic reset type circuit breakers in lieu of fuses. Power supplies shall be UL listed.

H. Surge Protection:

Provide additional lightning surge protection for all data, power and video cables on cameras and devices located outside the building. The surge protection shall be located both at the camera equipment and at the equipment rack. All surge protection shall be properly grounded per manufacturers instructions.

All matrix switchers, monitors, and power supplies shall be rack mounted where shown on the drawings.

I. Cable:

Video cable shall be RG59U (solid copper) with a #20AWG center conductor for runs under 750 feet and an RG11 for runs over 750 feet. The video cable shall not be run in the same conduit with 120 volt power. The cable shall be run continuous with no splices. Power cables shall be a min of a #14AWG. Provide surge protection on all video, power, and data cables for all cameras located in the building.

2.8 Equipment Consoles:

A. Acceptable Manufacturers:

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.

Cabtron Systems, Inc., Northbrook, Illinois
Emcor Products, Chicago, Illinois
House of Metal Enclosures, Hermann, MO

B. Components:

Metal case work to be slim line modular type constructed in accordance with the best practices of the metal case work industry.

1. Each unit to be completely welded structure with removable applied panels at backs. Provide louvered panels where blank on rear.
2. All members shall be designed, formed, welded and reinforced rigid construction.

C. Metal Gauges:

CCTV Equipment Cabinet – 16 gauge.

D. Finish:

All units to be welded into one basic modular frame and finished in standard vinyl textured paint finish in color selected by the Architect. Door pull and/or handles to be satin aluminum anodized finish.

PART 3 – EXECUTION

3.1 General Requirements:

- A. Examine and inspect all surfaces, anchors and grounds that are to receive materials, fixtures, assemblies and equipment specified herein. Report all unsatisfactory conditions in writing to the Architect and Construction Manager.
- B. Check location, “roughing-in”, and field dimensions prior to beginning work.
- C. Do not begin installation until all unsatisfactory conditions have been corrected.

3.2 Responsibilities:

- A. The Electrical Contractor shall be responsible for the following:
 1. The electrical contractor provide all switch legs for power and lighting control.
- B. The DEC shall be responsible for the installation and final adjustments of the following items:
 1. Security doors and locking systems
 2. Finish hardware for security doors
 3. Security glass
 4. Security furniture and accessories
 5. Security hollow metal frames
 6. Embedded items

3.3 Installation of Security Electronics System:

- A. The quality of workmanship and fabrication performed on all equipment and also that of components which are custom fabricated shall be comparable to that of professional equipment as produced by specialized manufacturers of electronic apparatus. Only skilled craftsmen shall be employed for all aspects of the fabrication of custom assemblies. System manufacturer(s) shall supply photographs and other documentation as requested to establish quality of his workmanship to satisfaction of Architect and Engineer.
 1. All switches, connectors, jacks, receptacles, outlets, cables and cable terminations shall be clearly, logically and permanently identified.

2. All equipment, materials, construction and installation methods, tests and definitions shall be in strict conformity with design criteria established by applicable organizations among the following: Institute of Electrical and Electronics Engineers; American National Standard Institute; International Standards Organization; National Electrical Manufacturers Association; Underwriters Laboratories, Inc.; Industries Association.
 3. All electronic equipment or other supplies furnished for this system must be solid state type new and in current production by manufacturer and each component shall bear manufacturer's model number and serial number on chassis or nameplate securely attached to component.
 4. Transformers shall be an integral part of equipment insofar as possible. Plug in units are acceptable. All circuits of + 3 0 D b m or less shall be balanced both within and external to rack cabinets.
- B. All equipment cabinet wiring shall be laced and fastened in place of using tie raps or equal. Cabled runs shall be straight and either parallel or perpendicular to cabinet sides. Use of plastic wireways to contain signal wiring is encouraged in lieu of cabling and lacing, but cabling and fastening requirements shall still apply to wiring after emergence from raceway. Microphone and line level wiring shall be on right side (viewed from rear) and output, power and control wiring on left. Plugmold Series 2000 shall be installed on left side of each cabinet for AC power. All signal wiring shall be shielded. Microphone circuits, line level circuits and loudspeaker circuits shall be well spaced from each other and from power circuits. All wire-to-wire junctions in rack cabinet shall be made using connector suitable for application such as barrier terminal strip or Christmas Tree block. Twisted pigtail type wirenut splices are NOT acceptable except on ceiling mounted devices.
1. All connections performed to screw type terminals shall be by suitable crimp lugs soldered with resin core solder. All cable ends shall be protected with shrink tubing.
 2. Christmas Tree block or Barrier trip terminal blocks shall be used for all other connections except where plug-in connections are required.
 3. Conduit sizing shall be the Electrical Contractor's responsibility. Size of conduit shall be based upon manufacturer's system requirements and shall comply with full rules of NEC. Minimum conduit size shall be 3/4".
 4. Separate conduit must be employed for low level runs (-50 dbm); line level runs (-10 to +20 Dbm); and high level (+30 Dbm or greater).
 5. All devices located in secure areas shall be secured with approved tamper proof screws. Screws shall be Allen head type with center reject pin.
 6. All microphone and line level signal runs shall be balanced. Characteristics shall be that microphones maintain nominal impedance of 150 ohms. Line level circuits may be terminated with resistive load of 600 ohms.
 7. Microphone lines and line level lines shall be free from splices.
 8. Continuity of shield shall be maintained at all connecting points, subject to rules of good grounding practice.
- C. Frame and external surfaces of all rack cabinets, chassis and rack panels shall be grounded by copper wire having protection and gauge complying with local code or NEC requirements for grounding of switch or breaker panels. Separate ground wires from each rack shall be brought together at common grounding point not part of any rack and ground line carried to cold water pipe or other ground as specified by local code or NEC.
1. Supports and fastening for all fixed equipment components shall provide safety factor of 3 or greater.
 2. All equipment shall be designed to operate from 120 volts, 60 Hz, single phase electrical power. Line voltage variations of +10% from nominal value shall not affect operation.
 3. System shall be free of interference and covered modulation from radio frequency signals including AM, FM and TV broadcasts, communications systems, radar, diathermy, etc.

Adequate suppression of interference shall be considered to have been achieved when spurious or interfering signals or recovered modulation are from a minimum of 60 Db below level of desired signal at output of system.

- D. Control and other panels shall be mounted with sufficient clearance for observation and testing. Junction boxes must be clearly marked for easy identification. Wiring shall be in conduit; EMT thin wall or other approved methods. Flexible connectors shall be used for devices mounted in suspended, lay-in ceiling panels. Conduit, mounting boxes, junction boxes and panels, shall be securely hung and fastened with appropriate fittings to ensure positive grounding throughout entire system.
- E. Wiring other than that directly associated with security component's functions shall not be permitted in security system conduits. Wiring splices are to be avoided to extent possible, and if needed must be made only in junction boxes and shall use crimp connections only. Transposing or changing color coding or wires shall not be permitted. Conductors in conduit containing more than one wire shall be labeled on each end with EZ markers or equivalent. Conductors in cabinets shall be carefully formed and harnessed so each drops off directly opposite to its terminal. Cabinet terminals shall be numbered and coded. Controls, function switches, etc., shall be labeled on respective equipment panels.
 - 1. Cables shall be grouped and neatly bundled as to type and routed from source to termination in a uniform manner throughout all equipment housing. Care shall be taken not to break the insulation or deform the cable by harness supports.
 - 2. High and low or medium level audio cable shall not be grouped together.
 - 3. Cable support bars shall be installed to support audio or control cables in areas of dense harness breakouts such as behind panels, distribution amplifiers and other multiple input/output devices.
 - 4. Control cables and power distribution wiring shall not be installed adjacent to signal cables. Power distribution cabling shall be on the opposite side from signal wiring equipment enclosures and shall be uniformly located throughout an installation.
- F. The Detention Contractor shall employ the latest installation practices and materials. Coaxial connectors shall be screw-on. Audio and control wires shall be terminated in crimp-on lugs at terminal strips or with other approved devices. Connectors shall be properly utilized. For example, use of "F" type connectors in base band video cabling is prohibited.
 - 1. Audio and control cable ends shall be neatly formed and shrinkable tubing applied where necessary to secure the insulation against fraying or raveling.
 - 2. All wire and cable utilized in systems interconnection shall be of the flame retardant type (pass FR-1 flame test).
 - 3. All low and line level audio cables shall be foil shielded twisted pair, 20 gauge minimum.
 - 4. All cabling or system interconnection which passes through or into acoustically isolated areas, such as the lineup room, shall be suitably sealed after cable has been installed.

END OF SECTION 11192

SECTION 11193 –DETENTION WINDOWS - FIXED

PART-1 GENERAL

1.1 DETENTION WINDOW

A. DESCRIPTION

1. This section must be provided by the DEC contractor.
2. Provide detention windows in accordance with the contract documents. The work of this section shall include but not be limited to the following:
 - a. Exterior steel windows fixed.
 - b. Interior steel frame detention windows
3. Related Work:
 - a. Section 07900 – joint sealers, for joint sealers to be installed after windows are installed.
 - b. Section 08800- glass and glazing
 - c. The following sections shall be provided by one DEC contractor:
 1. Section 11190 – Detention Equipment
 2. Section 11191 – Detention Furnishings
 3. Section 11192 – Electronic Controls
 4. Section 11193 – Detention Windows
 5. Section 11194 – Security Glazing
 6. Section 11199 – Operable Detention Windows

B. QUALITY ASSURANCE, PERFORMANCE REQUIREMENTS

1. References: Application, latest names and titles of general standards are referred to by accepted abbreviations.
 - a. AISI Type 304 – Stainless Steel
 - b. ASTM E283
 - c. ASTM E330
 - d. ASTM E331

Test method for performance of Exterior Windows, Curtain Walls and Doors.

ASTM A-627-88, Testing of security steel (homogeneous tool-resisting steel – round bars)

ASTM A-629-88, Testing of security steel (homogeneous tool-resisting steel – flat bars)
2. Performance Requirements: Window shall meet or exceed the following.
 - a. Air Infiltration Test, ASTM E283-91; maximum air infiltration; 0.055 CFM\FT. of crack length, with differential pressure across the window unit, of 1.56 psf (25 mph) and 0.135 of 6.24 psf (50 mph).

- b. Water Resistance Test, ASTM E 331-93; no water penetration for 15 minutes when window is subjected to rate of flow of 5 gallons/hr/sq. ft. with differential pressure across the window unit of 1.56 psf (25 mph) and 6.24 psf (50 mph)
- c. Structural Requirements, uniform load structural test ASTM E330-90; No permanent deformation or breakage of any components within window assembly when subjected to a pressure difference of 100 psf (200 mph).
- d. Security Performance Requirements: Tool-resistant Steel Bars for Security Applications, ASTM A-627-88 and ASTM A-629-88.
- e. Deflection & Drop Weight Test: Test 1" dia. round, tool-resisting steel security bar by performing "Deflection Test" and "Drop Weight Test" as described in ASTM standard A 627-88.
- f. Cutting Test: Test 1" dia. round and 2 ¼" x 5/16" flat tool-resisting steel security bar for cutting resistance by performing in ASTM standard A-627-88 and A-629-88.
- g. Manufacturer: All windows and other related components shall be the products of a well known manufacture of high quality detention windows, security screens and composite tool-resistant steels for security application.
- h. Factory Test of Mock-up: A mock-up of windows and screens will be made in the window fabricator's factory and tested in the presence of and inspected by the client's representatives. Test mock-up for weather and security performance as specified. Test units and make all corrections until the units passes test.
- i. Site Mock-up: Prior to general window installation erect full size mockup at the project site of a typical condition as selected by the architect. Each mock-up to be constructed with adjacent materials, showing the relationship to the windows. Locate mock-ups on site where directed by the general contractor. Remove and dispose mock-ups off site when directed by the general contractor.

C. SUBMITTALS

1. Product Data: Submit manufacturer's specifications, recommendations and standard details for each type of window required. Include information on fabrication, finishing, hardware and accessories.
2. Shop Drawings: Submit drawings including window elevations and full size details of every typical member. Show anchors, hardware, operators and accessories which are not fully detailed in manufacturer's product data. Include glazing details.
3. Samples: Submit a typical, complete window and screen sample of specified finish. Submit additional samples which will show fabrication techniques and workmanship, and design of hardware and accessories when requested.
4. Certificates: Where windows and security bars have been tested in accordance with specified test and comply with requirements, provide certification of compliance with such test; otherwise, perform required test through a recognized testing agency and provide certified test results.

5. Laboratory Test Reports, and Certificates shall be submitted by the manufacturer to the architect for review and approval, 2 weeks prior to bid closing. An omission of an item or items does not relieve the manufacturer from this responsibility and for compliance with the contract document of which this is a part.

D. GUARANTEE

1. In accordance with article on "GUARANTEES" of the "General Conditions Governing All Contracts," the manufacturer hereby guarantees that all work specified in the Section will be free from defects of materials and workmanship for a period of three (3) years.
2. Furnish a guarantee in the form specified in Article on "GUARANTEES" of the "GENERAL CONDITIONS GOVERNING ALL CONTRACTS".
3. The following types of failure will be adjudged as defective work:
 - a. Structural failures, including excessive deflections.
 - b. Excessive leakage or air infiltration.
 - c. Faulty operation of sash and hardware.
 - d. Deterioration of metals and finishes beyond normal weathering.

E. Scope of Work:

- a. The work included in this section shall consist of all the labor and material necessary to complete the fabrication and delivery of the detention windows as shown on the drawings and specified herein. All items, which are to be embedded in masonry or concrete, shall be furnished and installed by others. The detention window manufacturer shall furnish all anchor bars necessary for connecting the window units to the embedded steel, masonry or concrete work. When anchor bolts are specified, 3/8" diameter bolts of a type and length suitable for the wall construction type are to be provided by others.
- b. Windows shall be furnished in type and sizes indicated on drawings and herein described, including all necessary equipment, hardware, mullions and special accessories where shown for a complete installation.

PART 2 - PRODUCT

2.1 DETENTION WINDOWS

1. Manufacturer:
 - a. Windows shall be type AST as manufactured by:
 1. Hope Manufacturing
 2. Balley
 3. Trussbilt
 4. Chief Industries
 5. CM Security
 6. R&S Corporation

2. Qualifications:

- a. Manufacturers desiring to submit prior approvals on equal construction and quality may do so, subject to conforming to all phases of these specifications and qualifications and approval procedure noted.
- b. Manufacturers shall submit detailed drawings of their product conforming to these specifications with certified copies of test required herein for written approval at least seven (7) working days prior to bid opening dates.

3. General:

- a. All windows included in this section shall be fixed sash Steel Windows.

4. Materials:

- a. Frame and trim pieces are 12 gauge steel (as indicated in window schedule.) Intermediate horizontal members are 10 gauge steel or stainless steel tubes (as indicated on window schedule), 2-1/2" x 1-1/2", spaced 6" on center, with 1" diameter tool-resisting steel bars complying with ASTM A627 concealed inside. Security at jamb is provided by 3/8" x 2-1/2" tool resisting flat bars complying with ASTM A629.

5. Anchors:

- a. All bars for anchoring the window units to the building walls shall be of steel not less in size than 1/8" x 1-1/2".

7. Security Steel Members

- a. Horizontal security members in top rail of sash shall be 1" diameter, homogenous tool-resisting steel round bars complying with ASTM standard A627, spaced not over 6" on centers, concealed in 10 gauge horizontal Stainless Steel square tubes.

8. Laboratory Tests for Tool-Resisting Steel Round Bars:

- a. Laboratory tests complying with ASTM Standard A627 shall be conducted on all tool-resisting steel round bars for security applications to insure minimum performance standards. A recognized independent testing laboratory capable of complying with ASTM standard E329 shall conduct these tests. Certification and reports complying with ASTM A627 shall be furnished direct to the window manufacturer with a copy for transmittal to the Architect.

9. Construction:

- a. All frame members are to be welded at corners for maximum strength. Security flat bars shall be attached to main frame members by tamper resistant fasteners. All sash members shall be rigidly connected at corners by argon shielded arc welds with connection to top rails. Horizontal security members shall be continuous, passing through jamb frame member security bar and fastened to frame.

10. Finish:

- a. All steel members, except stainless steel, shall be free from scale and thoroughly cleaned primed and painted.
- b. Caulking, glass and glazing shall be furnished and installed complete.

Part 3 – EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's specification and recommendations for installation of window units, hardware, operators, and other components of the work.
- B. Set units plumb, level and true to line, without warp or rack of frames or sash. Anchor securely in place, by methods shown on shop drawings. Separate zinc-coated steel and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other metals, by bituminous or paint coating, or plastic materials.
- C. Set sill members (when required) and other members with joint fillers or gaskets, to provide weathertight construction. Refer to "joint sealer" section of division 7 for sealants, fillers and gaskets to be installed concurrently with window units. Coordinate installation with wall flashing and other components of the work.
- D. Adjust operating vent and hardware to provide a tight fit at contact points and at weatherstripping, for smooth operation and weathertight closure.
- E. Clean surfaces promptly after installation of windows, exercising care to avoid finish damage. Remove excess sealant, dirt and other substances.
- F. After erection of the windows, clean and touch-up any abraded surfaces, as approved by the manufacturer, to match factory applied finish.
- G. Installer shall advise contractor of protection and other precautions required through remainder of construction period, to ensure that window units would be without damage or deterioration (other than normal weathering) at time of substantial completion.

END OF SECTION 11193

SECTION 11194 – SECURITY GLAZING

PART - 1 GENERAL

1.1 DESCRIPTION

A. Related Documents

1. Detention Contractors Work:

- a. The work consists of the provision and installation of all detention items delineated within the detention drawings and specifications.
- b. The scope of the work includes all work required for the complete installation of a detention hollow metal doors, detention frames and detention hardware, detention hollow metal window frames.
- c. The following sections shall be provided by one DEC contractor:
 - a. Section 11190 – Detention Equipment
 - b. Section 11191 – Detention Furnishing
 - c. Section 11192 – Electronic Controls
 - d. Section 11193 – Detention Windows
 - e. Section 11194 – Security Glazing
 - f. Section 11199 – Operable Detention Windows

2. The detention contractor shall be responsible for the coordination, supply and layout of all steel imbeds as required for a complete installation of detention doors, frames, windows and furnishings.

B. SUMMARY

1. This section includes, but is not limited to the following items to be furnished and installed:
 - a. Security type glass and glazing for security hollow metal doors, frames.
 - b. Refer to schedules on drawings for glass type and location.

1.2 REFERENCES

- A. ANSI Z97.LA-1977 – Safety glazing materials used in buildings.
- B. FGMA – Glazing Manual, 1986 Edition.

1.3 SUBMITTAL

A. Shop Drawings:

1. Required for glazing material indicating types, locations, sizes and manufacturer's recommendations for support, clearances, and sealing in frame members.
2. Coordinate with shop drawings for window, door and frame assemblies to receive glazing material.

- B. Product Data: Manufacturer's product sheets for glazing material and for glazing accessories.

- C. Samples: 12" x 12" of each type glass.
- D. Quality control submittal: For information only.
 - 1. Test reports: Manufacturer's certification accompanies with evidence of test reports that bullet-resistant glazing furnished meets specification requirements.
 - 2. Certification: Manufacturer's certification attesting to ability to furnish replacement glass units within 4 weeks of notification.

1.4 QUALITY ASSURANCE

- A. Manufacturer's experience criteria:
 - 1. Experience manufacturing specified security glass.
 - 2. Successful installation of specified security glass on an existing correctional facility.
- B. Manufacturer's replacement capability: Capable of furnishing owner with replacement components.

1.5 DELIVERY, STORAGE & HANDLING

- A. Delivery materials to job site protected to prevent breakage or damage. Deliver with manufacturer's shipping material, packaging and labels intact. Do not remove labels until material has been installed.
- B. Protect glazing materials before, during and after installation. Keep material free from contamination by materials capable of staining plastic.
- C. Handle glazing materials to prevent scratching or marring of surfaces, and to prevent edge damage.
- D. Delivery compounds in manufacturer's unopened, labeled containers.

1.6 COORDINATION

- A. Coordinate size and thickness of specified glazing materials with frames or retainers to receive glazing material.
- B. Coordinate sizes with fabricators of windows and doors that are not factory pre-glazed.

1.7 WARRANTY

- A. Manufacturer: Written one (1) year warranty signed by manufacturer against delaminating or becoming opaque under normal wear and tear. Warranty shall include labor to remove failed units and replacement with new units.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. The following manufacturers are approved to furnish security glazing on this project:
 - 1. Globe-Amerada Glass Company
 - 2. Viracon, Inc.

3. Falconer Glass Company
4. HPG Industries

Other manufacturers may submit evidence of compliance with specification Section 11190, paragraph 2.1 and with paragraph 1.4 of this section for consideration as equal.

- B. Security glazing furnished on project shall be products of a single manufacturer.

2.2 GENERAL REQUIREMENTS

- A. Glass and other glazing materials shall be from new stock, free from chips, cracks, scratches, or other defects that mar appearance or impair strength and performance. Factory label each glass pane showing type, strength grade and thickness.

2.3 MATERIALS

- A. Security Glass

SECURITY GLASS & GLAZING: ***See Plans for Glass Type and Locations.

TYPE "A": 15/16" Glass Clad Polycarbonate

TYPE "B": 15/16" Glass Clad Polycarbonate with 1 way Mirror

TYPE "C": 1 1/4" Glass Clad Polycarbonate with 1/4" Wire Glass

- B. Glazing Accessories

1. Neoprene setting blocks.
 2. Neoprene spacers.
 3. Silicone sealant, GE 1200 or Dow Corning 999.
 4. Resilient, non-hardening tapes. (Pre-shimmed tape optional).
- C. Heat-strengthened and fully tempered glass shall be free of tong marks unless tong marks would otherwise be concealed in retainer or glazing stops.
- D. Sealants for use with laminated glass material shall be compatible with plastic interlayer of laminated unit.

PART 3 – EXECUTION

3.2 EXAMINATION

- A. Examine premises before start of work and ascertain conditions, as they actually exist.
- a. Verify that other related work has been completed.
- B. Examine glazing surfaces to ascertain that surfaces will assure quality application of glass.
- C. Verify that glazing channels and glass are free of imperfections or damage that would prevent quality installation of glass.

- D. Carefully field measure glass opening and provide minimum required tolerances and clearances as recommended by glass manufacturer.
- E. Clean metal and glass surfaces free of foreign matter and coatings.

3.2 GLAZING

- A. Do not install materials with edge damage.
- B. Install glazing material and related glazing accessories in strict accordance with respective manufacturer's instructions, applicable procedures recommended in FGMA Glazing Manual and reviewed shop drawings. Provide watertight and airtight installation exposed to weather provide airtight installation elsewhere for interior locations.
- C. Verify size required prior to cutting or fabrication of glazing material.
- D. Set and block to provide equal margins at perimeter, with glass not in contact with frames, and without springing. Install plumb, straight, square and level and in proper alignment with related work. Install securely to prevent rattling, breakage or displacement and yet allow for expansion and contraction. Maintain required clearance and support of glazing units in accordance with shop drawings and manufacturer's instructions.
- E. Wet glaze metal frames with glazing tape and silicone sealant. Verify with glazing manufacturer that selected tapes and sealants are compatible with laminated sheets.
- F. Use sealing and glazing accessories in strict accordance with recommendations and instructions of manufacturer for condition applicable to this project.

3.3 ADJUSTING AND CLEANING

- A. Check installed glazing material for looseness and weather tightness. Correct deficiencies.
- B. Clean glazing material in accordance with glass manufacturer's instructions and recommendations.
 - 1. Remove excess glazing sealants from installed glazing materials.
 - 2. Remove labels from glazing materials.
 - 3. Thoroughly wash and polish both faces in glazing.
- C. Remove debris from site.

3.4 PROTECTION

- A. Attach bright color crossed streamers away from face.
- B. Replace broken, scratched, chipped or otherwise-damaged glazing material.

END OF SECTION 11194

SECTION 11199- OPERABLE DETENTION WINDOWS

PART 1 – GENERAL

PART 2 – PRODUCT

2.1 MATERIALS

- A. The perimeter framing and removable covers shall be formed from 12-gauge steel.
- B. Ventilator jamb and sill sections shall be hot rolled steel. Sections shall weigh not less than 1.65 pounds per foot and be not less than 1-7/16" front to back.
- C. Ventilator head rails shall be specially formed from not less than 12-gauge steel.
- D. Maximum detention windows shall have detention bars of 7/8" round and 1/4" x 2" flat tool-resisting steel conforming to ASTM specifications A627 and A629.
- A. Glazing beads shall be formed from 12-gauge steel.
- B. Weather stripping shall be neoprene.
- C. The power shall be a worm gear self-locking type with bronze bearings and provide continuous operation in either direction.
- D. All linkage arms shall be steel not less than 3/16" x 1-3/8" and located at both jambs of each unit.
- E. All vertical connecting bars shall be not less than 3/16" x 1-1/4" and located at both jambs of each unit.
- F. Brass or bronze bearings shall be provided at all wearing points on the pivotal bars and linkage mechanism.
- G. Anchors shall be fabricated from steel angles with a minimum thickness of 3/16".
- H. Security and detention screens
 - 1. Fixed angle frame
 - a. Frames shall be steel angles formed from 12-gauge steel.
 - b. Steel clamp strip shall be 12-gauge steel.
 - c. Screen cloth shall be steel. Type 18/8 Alloy #304, woven 12 mesh to the inch from 0.028" diameter wire, double crimped.
- M. All screws shall be tamper-resistant truss-head stainless steel.
- N. Windows shall be factory primed and painted in field by Division 9 contractor.

2.2 FABRICATION

- A. Fabricate windows in accordance with approved shop drawings.
- B. Frame members shall be coped and welded at corners the full depth of the frame for maximum strength and weather-tightness and exposed face welds dressed smooth.
- C. Anchors shall be located a maximum of 18" on center and shall be a minimum of 2" long.

- D. All removeable covers and trim, either exterior or interior, shall be field attached with tamper-resistant screws, spaced not more than 9" on centers at the interior and spaced not more than 12" on centers at the exterior.
- E. The horizontal 7/8" round detention bars shall penetrate the vertical 1/4" x 2" flat detention bars concealed within the jambs.
- F. Ventilator jamb and sill bar shall be solidly welded and exposed faces and contact surfaces dressed smooth. The head rail shall be coped and welded to the jamb bar. The jamb and head bars shall be welded to the 7/8" round pivotal bars.
- G. Operating hardware:
 - 1. The 7/8" round pivotal bars shall be continuous and have a welded linkage near each end. The linkage arms at each jamb shall be attached to flat connecting bar by a pivot pin controlling the ventilators in unison to a maximum opening of 50 degrees.
 - 2. The linkage arms of the lower ventilator shall be connected to bell cranks by means of an adjustable link, which provides for adjustment of the ventilators.
 - 3. A bell crank shall be welded to each end of the 3/4" diameter power shaft.
 - 4. The 3/4" power shaft shall be connected to the power with an overload safety device.
 - 5. The power unit shall be located and concealed within the sub-frame of the window.
 - 6. Opening and closing of the ventilators shall be accomplished by rotating the operating cone or crank in either direction.
 - 7. The 3/4" diameter shaft, power unit, bell cranks and adjuster links shall be removable from the window.
- H. Weather-stripping shall be factory applied in the same plane around the interior contact surface of the ventilator.
- I. Glazing:
 - 1. All ventilators shall be designed for outside glazing.
 - 2. Provide replaceable continuous glazing beads to suit the glass as specified.
 - 3. Glazing beads shall be cut and shop fitted to each glass lite prior to shipment.
 - 4. Glazing beads shall be attached with tamper-resisting screws spaced a maximum of 9" on center.
- J. Security and detention screens
 - 1. Fixed angle frame
 - a. Frames shall be welded solid at corners and welds dressed smooth.
 - b. Secure screen cloth to frame using special security screws spaced 4" on centers, which penetrate the frame, screen cloth and clamp strip.
 - c. The screen frame and clamp strip shall be factory finished to match the window finish.
- K. Windows shall be factory primed and painted in field by Division 9 contractor.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Window opening shall conform to details, dimensions and tolerances shown on the window manufacturer's approved shop drawings.
- B. The general contractor must correct conditions, which may adversely affect the window installation, before installation commences.

3.2 INSTALLATION

- A. Experienced personnel shall install windows specified under this section.
- B. Install windows in openings in strict accordance with approved shop drawings.
 - 1. Set window plumb, level and true to line without warp or rack of frames or ventilators.
 - 2. Anchor windows securely to surrounding construction with minimum 1" long welds at anchor points. Maximum distance between weld points will be 18".
 - 3. The exterior joints between the windows, trim and mullions shall be properly sealed watertight with an approved sealant and neatly pointed.
 - 4. All windows shall be completely checked and adjusted after installation and before glazing to assure proper fit of ventilator to frame and to assure the opening mechanism works freely and satisfactorily.
- C. Install security or detention screens.
- D. Repair any abraded areas of the factory finish.

3.3 CLEANING

- A. Window installer shall leave the window surfaces clean after installation and ready to receive glass and glazing. The window installer shall not be responsible for final cleaning.
- B. Any protection necessary due to cleaning adjacent materials shall be the responsibility of the general contractor.

END OF SECTION 11199

SECTION 11200 – DETENTION SLIDING CELL AND CORRIDOR DOORS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Prior to final acceptance, Detention Equipment Contractor and the manufacturer shall provide a written warranty-covering door operating and locking mechanisms. Warranty shall guarantee the satisfactory operation of all doors operating and locking mechanisms for a period of five (5) years (except on paint finish) after final acceptance. During this period, Detention Equipment Contractor and/or the manufacturer shall, without cost to Owner, make annual inspections, and make any necessary adjustments to the mechanism or replace any worn or broken parts due either to faulty material or defective construction. The Detention Equipment Contractor and/or the manufacturer shall also, in addition to the annual inspections and without cost to Owner, make any necessary adjustments to the mechanism or replace any worn or broken parts due either to faulty material or defective construction within twenty-four (24) hours of notification, 365 days a year.
- B. This Section consists of furnishing all plant, labor equipment, appliances, services and materials to perform all work in connection with the installation of detention equipment complete, in strict accordance with the specifications and the applicable drawings. The types of work included in this section are as follows:
 - 1. Detention Sliding Cell Door Operators.
 - 2. Detention Corridor Cell Door Operators.
 - 3. 3/16" channel frames at Cell Sliders.
 - 4. Embed Plates for all sliding door devices.
- C. The following items of work specified in other sections of these project specifications shall be the responsibility of the Detention Equipment Contractor:
 - 1. Electronic Detention Locking System Controls and Indicators.
 - 2. Electronic Detention Intercommunications.
 - 3. Electronic CCTV System.
 - 4. Electronic Controls and relays for Lighting and TV.
 - 5. Electronic Detention Plumbing Fixture Water metering Control System.
 - 6. Electronic Wiring and termination for all above controls.
 - 7. UPS Back-up for all of the Security Electronics.
 - 8. Complete Conduit System for all Security Electronics.
 - 9. Detention Furnishings.
- D. Related items of work to be performed by others include the following:
 - 1. Unloading, handling and setting of items, which are to be embedded in masonry or concrete.
 - 2. Field cleaning, touch-up and finish painting.
 - 3. Forming recess in slab for grating cell line and grouting after grating is installed.
 - 4. Installation of all mechanical connections and plumbing connections.
 - 5. All concrete, masonry work and caulking.
- E. Related Documents:
 - 1. Detention Contractors Work:
 - a. The work consists of the provision and installation of all detention items delineated within the detention drawings and specifications.

2. The following sections shall be provided by one DEC contractor:
 - a. Section 11190 – Detention Equipment
 - b. Section 11191 – Detention Furnishings
 - c. Section 11192 – Electronic Controls
 - d. Section 11193 – Detention Windows – Fixed
 - e. Section 11194 – Security Glazing
 - f. Section 11199 – Operable Detention Windows
 - g. Section 11200 – Detention Sliding Cell and Corridor Doors
 3. The detention contractor shall be responsible to supply and provide layout drawings of all steel imbeds as required for a complete installation of windows and furnishings. The General Contractor shall be responsible for the supervision and installation of embed plates per Approved Shop Drawings provided by the Detention Contractor.
 4. Detention contractor shall set, brace, level and plumb all Security Door Frames. The General Contractor shall layout and pop lines for all walls and mark the location of each door opening.
 5. The detention contractor shall be responsible for all electronic wiring and conduit related to detention locking system controls and indicators, detention intercommunications, CCTV and electronic lighting controls.
 6. If the Detention Contractor needs additional AC Power other than as shown on drawings, the cost of additional power shall be responsibility of the Detention Contractor.
- F. The following items are by the General Contractor:
- a. Provide block-out in the slab for the Grating Cell Front installation (if applicable).
 - b. Grouting the trough after the Grating Cell Front is installed.
 - c. All Security Caulking.
 - d. All Finish Painting.
 - e. Grouting of all Detention Hollow Metal Door Frames and Windows.
 - f. General Contractor shall layout and pop lines for all walls and mark the location of each door opening.
- G. The General Contractor shall note the layout of door frames for sliding doors may change due to clearance requirements of sliding grating mechanisms. Successful Detention Contractor shall provide layout of door prior to masonry work.
- H. The following items are furnished and installed by the Detention Equipment Contractor:
- a. Sliding Corridor Doors Devices with Vertical Release Columns.
 - b. Sliding Cell Door Devices with Release Cabinets.
 - c. Special 3/16" Steel Security Relay Cabinets. Provide A full height 3/16" Steel Plate hinged door with F/A #82 Security Lock.
- I. The DEC is to do the following items prior to Shop Drawings being approved:
- a. The DEC is to provide a full size working mock up of corridor and cell sliders.
 - b. Provide written documentation that the device meets all items in the specifications.
 - c. Provide a 2-year warranty (from manufacturer and installer) at the time the on-site mock up is ready for review.
 - d. The device is to remain in place until completion of installation of all sliding devices.

- e. The DEC is to provide a 2 year unconditional Labor and Material warranty from the manufacturer and the installer on all items Installed by the DEC.

J. Repair Deadline

- a. The DEC is to be on site within 24 hours from notice to repair; DEC shall maintain stock for all parts required. Repairs to be completed within 48 hours from notice.

1.2 QUALITY ASSURANCE

A. Qualification of the Detention Equipment Contractor, Manufacturer: Throughout the specification and drawings, type of material may be specified by the manufacturer's name and catalog number in order to establish standards of quality and performance. The bidder shall include all items as specified. Substitutions must be submitted seven (7) working days prior to receipt of bids. Approved products, items will be published and issued by addenda (only). Substitutions will not be considered after deadline. Should the substituted items not be accepted, the bidder must provide, furnish and install the specified approved product, item. The following submittal requirements must be strictly adhered to when submitting a substitute product to the Architect for approval.

1. Submittal Requirements: In addition to a written request for equality, a sample of each lock, device, control, etc. performance data, catalog information, and a written list showing names, locations, and Architects, engineers of seven (7) institutions of which similar materials have been installed for a period of seven (7) years shall also be submitted.
2. Operating and Maintenance Manuals: Detention equipment contractor shall furnish three (3) copies of a parts manual for all security locks, hardware, control systems equipment and provide instructions for the operation and care of the equipment.
3. The manufacturer shall submit the following:
 - a. List of (7) institutions of equal size and magnitude where the proposed device has been in operation for a period of 3 years.
 - b. List of institutions with project location, number of cells devices, architect, facility contact person and a list of service complaints.
 - c. Complete copy of device specifications modified to incorporate the proposed device manufactures' compliance certification for each item, paragraph by paragraph. Should proposed manufacturer take exception to any minimum standard in the project specifications, exception must be noted in writing.
 - d. **All DEC contractors shall provide a full size operating mock-up of sliding device and control system a minimum of 7 days prior to bid, in the Baton Rouge area. Provide documentation that all items in the specifications are met prior to mock-up delivery. A representative of each company, which constructs a mock-up, shall be present at the mock-up demonstration.**

B. Device manufacturer shall be required to supervise the installation of Sliding Devices. The Manufacturer must certify to the Architect and Owner that devices have been installed in total compliance of the manufacturer's installation procedures and tolerance.

C. In addition to Louisiana Contractors Licensing, the Locking System Installer must also have license issued by the Louisiana Fire Marshals Office as required by state law.

1.3 CODES

A. All work shall be in compliance with the latest editions (and revisions thereto) of the following codes and requirements:

1. State and Local codes and ordinances.
 2. National Electrical Code.
 3. Local electrical code at location of installation.
 4. Occupational Safety and Health Administration, U.S. Department of Labor.
- B. Test Reports: As required herein.

1.4 GUARANTEE

- A. Prior to final acceptance, Detention Equipment Contractor shall provide a written warranty-covering door operating and locking mechanisms. Warranty shall guarantee the satisfactory operation of all doors operating and locking mechanisms for a period of two (2) years (except on paint finish) after final acceptance. During this period, Detention Equipment Contractor shall, without cost to Owner, make any necessary adjustments to the mechanism or replace any worn or broken parts due either to faulty material or defective construction within twenty-four (24) hours of notification, 365 days a year.
- B. The Detention Equipment Contractor is to warranty his material and workmanship on this project for a period of two (2) years (except on paint finish) after date of acceptance by Owner. Detention Equipment Contractor agrees to repair replace any defective security materials and to correct any defective security work when given written notice during the warranty period. In no event shall the Detention Equipment Contractor be liable for consequential, incidental special damages. Vandalism, misuse or excessive abuse is also excluded from this warranty.

1.5 DELVIERY AND HANDLING OF DETENTION EQUIPMENT

- A. Embedded items of Detention Equipment that are to be set in concrete or masonry by the General Contractor shall be furnished and delivered by the Detention Equipment Contractor, F.O.B. his truck or common carrier, to the building site and there unloaded by the General Contractor so as not to delay the truck's departure from the building site. General contractor shall be responsible for security of the embedded items of detention equipment at the job site.
- B. The General Contractor shall provide the required openings of sufficient size through the outside walls to permit the placing of the detention equipment in the areas of the building where it is to be installed, as designated by Detention Equipment Contractor.
- C. The Detention Contractor shall not start installation of the Locking System or Electronic Control Systems until the building is reasonably weatherproof and cleaned.
- D. The Detention Equipment Contractor shall deliver and be responsible for placing in the building, all Detention Equipment that he is to install as part of his contract.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. All materials required for the work specified herein shall be new and produced especially for the detention use or shall conform to accepted standards of the detention equipment industry.
- B. Electrical components, including motors, switches and relays, shall be the best of their kind and quality manufactured by nationally recognized manufacturers.

- C. Cell Sliding Door Devices: To be approved, manufacturers must meet submittal requirements of Section 1.2. System shall be rack and pinion driven and controlled electrically by remote means through the operation of an individual motor above the door. System shall allow for unlocking at the door by the use of a Special or Paracentric key in the event of power failure. The use of chain and sprocket, air or screw type drives system, as a means of propelling cell door will not be acceptable. All specification items listed, even if not part of the Manufacturer's standard device shall be included in the provided device.

General Scope:

1. Vertical Release Column (Cell Sliders)
2. Electronic Door Control (See Section 11192)
3. Electric Rack and pinion corridor Sliding Device
4. Door Hanger, Receiver Channel, Mounting Angle, Drop Bar, Wall & Door Guides

a. General:

1. Each Cell Door slider will be rack and pinion driven and controlled electrically by remote means through the operation of an individual motor above the door.
2. Corridor Sliding Door System allows for unlocking at the door by the use of a Paracentric key at the vertical release column in the event of a power failure.
3. Cell Sliding Door shall have an emergency release cabinet for each cell line that will release all doors in the case of a power failure.
4. The use of chain and sprocket, screw type drive of air system, as a means to propel cell doors will not be acceptable.
5. Devices using springs to assist operation will not be allowed. (A spring will be allowed on the motor hold down).
6. Cast or nylon parts will not be allowed on carriage unit.
7. While in operation there shall be no more than ¼" over-travel movement at the door.

b. Electrical Functions:

1. Unlock, open and lock open or unlock, close and lock closed. Reverse the direction of travel (with 1-1/2 second delay) at any time of run. Time to open a 3' door will not exceed 7 seconds.
2. Mechanical Functions: Manually unlocks, open and lock open, or unlock, close and lock closed.
3. Mechanically locked door in the closed or open position at no less than two points at the head and at one point at the bottom of the door. Bottom locking point will be at the rear of the door and operate automatically in a vertical tamper proof column. Lock bar shall engage a minimum of 3/4" into the door guide in the locked open or locked closed position.
4. The loss of electrical power will cause a door in transit to be held in that location (device which all "free-wheeling" will not be accepted).
5. Provide fully mechanical emergency release system ERC to open door. This function will not allow door to relock until guard takes specific action at ERC to relock doors. Use of battery or stored air supply to release doors will not be allowed.
6. A door may be stopped in mid travel by exerting a force of 40 lbs. of pressure. After the blocking obstruction is removed, the door will continue to move in the selected direction and lock automatically. The blocking of one or more door will not affect the operation of the other doors.
7. Although the door movement can be stopped by the application of approximately 40 lbs. of pressure, the direction can not be reversed at the door. However, the operator can reverse the direction electrically from the control panel.

c. Mechanical Functions:

1. With the lever in the Release Cabinet in the "ELECTRIC" Position the Officer can electrically unlock, open and lock open, or unlock, close and lock close door at the door by use of the switch on the Control Panel. Handle must lock in Electric Position.
2. With the level in the Release Cabinet in the "KEY" Position the Officer can manually unlock, open and lock open, or unlock, close and lock close door at the door by use of a special key. Handle must lock in Key Position.
3. With the Lever on the Release Cabinet in the "RELEASE" Position the system will mechanically unlock all cell doors. Handle must lock in Release Position.
4. Mechanically lock door in the closed or open position at no less than three points at the head and at one point at the bottom of the door. Bottom locking will be at the rear of the door and operate automatically in a vertical tamperproof column. Lock bar shall engage a minimum of 3/4" into the door guide in the locked open or locked closed position.
5. Rear locking bar shall be one piece steel bar with bearing at the top for lifting and guiding the locking bar. The bearing on the locking bar shall roll in an encased raceway to control the lifting, lowering and locking down the locking bar. Lock bar shall have positive lock down in the open and closed positions. Free falling or multiple piece locking bars will not be acceptable.
6. The loss of electrical power will cause will cause a door or doors in transit to be held in that location (devices which allows "free-wheeling" will not be accepted). Further movement of a door or doors during power failure can only be accomplished by use of the "KEY" or "RELEASE" mode from the Release Cabinet.

d. Components:

1. Cell door motor is to be a minimum of 1/20 HP, 115 VAC, Single Phase, 1.1 Amp, intermit duty and provided with thermal overload protection. All gears shall be steel and shall run thru an oil reserve. Motor shall be mounted on a bracket formed from 1/4" Steel Plate. The bracket shall pivot on a 3/4" stud securely attached the Transom Plate. Motor Bracket shall have a 1 1/2" long sleeve with a pressed-in Bronze Bushing to swivel on 3/4" Stud. Bracket shall also have a Roller Bearing to assist lifting the motor mount bracket when the Main Bar is moved from Electric to Key or Release. There shall be no movement in the motor or motor bracket when the door is operating.
2. Locking Device shall be machined from Cold Rolled Steel. Carriage shall be 3/8" x 4" cold roll and over travel slide bar shall be 3/8" x 3 1/2" machined cold roll material. All holes and slotted holes shall be machined. Punching or stamping will not be allowed. Provide machined bronze bushings with nettle bearings at all slide points. There shall be minimal steel to steel contact at slide points. Nylon at slide points is not acceptable.
3. Door wheels shall be hardened machined steel wheels 3 3/4" in diameter and provided with a lubricated roller bearing. Wheels shall lap track 3/8". Provide grease fittings on the special wheel bolt to allow re-greasing on the bearing without removing unit.
4. Track shall be 1/2" Round hardened steel welded to a 1/4" support angle, securely attached to transom plate. 1/2" Round shall be elevated (full length support) 1" above support angle. Track shall be true and straight with no more than 1/32" variation over the length of the track. Cold Rolled Formed tracks are not acceptable.
5. Door hanger shall be 1/4" formed steel (full width of door opening) and securely attached to the door. (Example – 36" Door = 36" Hanger). Provide tool resistant steel to protect the door hanger from being cut by Inmate.
6. Provide 7 Ga. Steel full length Door & Wall Guides with end stop. Guides shall be a minimum of 7 Ga. formed steel and are to be designed to prevent the dislodging of the door roller assembly from the track. Door and wall guides shall interlock a minimum of

1" and the door guide shall be engaged a minimum of 4" with the wall guide when the door is in the closed position.

7. Indication and control switches (15 Amp rating) will be provided to satisfy all specified functions. Switches shall be adjustable and brackets shall be mounted off back of housing. Provide switch ramps on rack to make contact with limit switch roller.
8. Provide indication switch at the bottom of the door to detect presence of the door. Switch shall be tied to the Touch Screen in the Control Room to provide an Audible Alarm in the event of a breach of the door.
9. Gear & Rack – minimum of 10 pitch and shall supported at 12" o.c. Rack shall be 1" x 1". When assembled the rack shall be true and straight with no more than 1/32" variation over the length of the rack.
10. Capacitor (10 MFD)
11. Provide spring bumpers at open & closed positions, mounted on 5/8" steel blocks.
12. Provide single main bar (3/8" x 1 1/2" FB) full length of device. Provide (3) supports per device with roller bearings for Main Bar to roll on. Provide adjustable 10 Ga. Retainer clips to hold main bar in place.
13. All locking System Components shall be factory primed.
14. All bolts on units shall be secured with Lock-Nuts.

e. Horizontal Housing:

1. A continuous housing will be provided above the door and extending from the control cabinet to the opposite end of the door. Provide additional reinforcing in dummy housing as required to hold straight & true.
2. The back portion of the enclosure, or transom, will be 3/16" steel plate. Provide additional reinforcing at dummy housing for stability.
3. The removable housing (10 Ga. steel minimum) will be locked in place by mechanical means accessible only from the control cabinet. Provide (Hand Pull) pull lever within control cabinet to lock device covers securely in place. Concealed cover lock system requiring tools to unlock cover lock-bar will not be accepted.
4. The 10 Ga. Housing cover will be held in place by (4) Security Screws.

f. Horizontal Raceway:

1. A continuous 12 ga. raceway will be provided within the horizontal housing and will extend the full length of the housing.
2. Provide rubber grommets at wire openings in bottom of raceway.

g. Release Cabinet:

- D. The Release Cabinets are located at the end of each Cell Run. Wall mounted Release Cabinet shall be fabricated from 3/16" steel plate and securely house the Mechanical Controls and Cover Release Pull Handle. Provide #82 Lock, Raised Pull Handle & Continuous Piano Hinge.

- a. Provide Pull Handle for Cover Release.
- b. Provide Bar or crank to manually control Main Bar. Positions shall be:
 1. ELECTRIC – Normal operating position.
 2. KEY – Uncovers access port allow for key operation above the door.
 3. RELEASE – Mechanically unlocks all cell doors on the cell run.
 4. Handle shall have positive stop at each position.

E. Fabrication:

1. Detention Doors:

- a. General: Provide detention-type hollow metal doors and related frames where designated on drawings.
- b. Door Construction:
 1. Type: Detention hollow metal doors, nominal 2" thick jambs and 4" head sections as designated on drawings; flush design, with smooth seamless steel faces and side edges of 12 gauge steel unless otherwise noted. Use galvanized steel at exterior doors.
 2. Vertical steel channel or steel hat sections full height of door with flanges occurring against each door face at not more than 3" on centers, each welded to face sheets at maximum 4" o/c., or inner reinforcements may be a continuous true truss design form with flat apexes occurring against each door face at not more than 3" o/c. and each apex spot welded to face sheet at maximum 4" o/c.
 3. Channel perimeter reinforcement: Minimum 10 gauge welded to face sheets at maximum 4" o/c. around full perimeter of door.
 4. Insulation: 6 lb. Density mineral wool filling voids within door panel
- c. Hardware Preparation:
 1. Prepare and reinforce doors for operation and hardware specified in detention door hardware schedule.
 2. Where hardware requires fastener attachment, provide additional concealed reinforcing, drill and tap to receive tamper-resistant security fasteners. Through bolting will not be accepted in place of additional reinforcing.
 3. For mortise hinges, provide back-up reinforcement of 3/16" x 1-1/2" x 9" steel plate at each hinge, welded to perimeter channel of door.
 4. For surface hinges when applicable, provide additional back-up reinforcement of minimum 3/8" x 9" steel plate at each hinge, welded into door between vertical reinforcement.
 5. Provide special reinforced lock pockets where detention locks are required consisting 3/16" steel plate on sides and perimeter edges of pocket, and provide for removable lock cover plate on secure side of door to be flush with door face.
- d. Door Edges:
 1. Bevel vertical edges of swinging doors as required to prevent binding, but no greater than 1/8" in 2".
 2. Top and bottom edges of door of flush construction, top watertight when exposed to weather elements. Side edges flush and seamless produced by continuously welding joint of face sheets and grinding smooth. Furnish astragal for door pairs in exterior walls.
- e. Vision Panels:
 1. Prepare and reinforce doors for vision panels where required. Provide frame and stops to accommodate glazing.
 2. Weld frame and stop to door on "detention" side. Attach frame and stop on "non-secure" side with tamper-resistant security fasteners at 4" o.c. maximum.
- f. Accessory Items:
 1. Provide for installation of accessory items for doors.
 2. Prepare and reinforce doors for these accessory items to maintain rigidity and security of basic door construction.
 3. Provide flush side edges at opening, welded and ground smooth.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS:

- A. Examine and inspect all surfaces, anchors and grounds that are to receive materials, fixtures, assemblies and equipment specified herein. Report all unsatisfactory conditions in writing to the Architect and Construction Manager.
- B. Check location, "roughing in", and field dimensions prior to beginning work.
- C. Do not begin installation until all satisfactory conditions have been corrected

3.2 RESPONSIBILITIES:

- A. The Electrical Contractor shall be responsible for the following:
 1. Electrical power to factory installed terminal blocks and power outlets including cut-off switches and all other electrical equipment incidental to supply power. Power shall be provided for the control console, locks, amplifiers and Paging Amps.
- B. The DEC shall be responsible for the installation and final adjustments of the following items:
 1. Security doors and locking systems
 2. Finish hardware for security doors
 3. Security glass
 4. Electronic controls, intercom, Paging and associated control wiring and conduits.

CONDUIT AND WIRING:

All conduit and wiring associated with the Detention Equipment Contractor work to be provided and installed by **DEC**.

Minimum DEC conduit Requirements:

General: All Conduit and wiring associated with the DEC work to be provided and installed by DEC.

- 1) Conduits for Electric Swing Door Locks and Electric Sliding Corridor Doors shall be minimum of 3/4".
- 2) A maximum of (2) Doors can be pulled in a 3/4" homerun conduit to the Locking Relay Cabinet.
- 3) Conduits for Intercom shall be minimum of 3/4".
- 4) A maximum of (4) Intercoms (2 Doors with double intercoms) can be pulled in a 3/4" homerun conduit to the Intercom Relay Cabinet.
- 5) Conduits for Paging shall be minimum of 3/4".
- 6) Conduits for Cameras shall be minimum of 1".
- 7) A maximum of (4) Cameras (RG59 + (8) #14 Ga. 24V Power Wires) can be pulled in a 1" homerun conduit.
- 8) For ease of maintenance and troubleshooting all swing door and Sliding Door wiring shall be pre-bundled 6 wires per door.
- 9) Provide 8" x 8" Wire Trough above and below each Relay Cabinet.
- 10) Provide separate conduits for the following systems:

LOCKING SYSTEM
INTERCOM/PAGING SYSTEM
CCTV SYSTEM
PLUMBING CONTROL SYSTEM

END OF SECTION 11200

SECTION 11450 – TELEVISION AND VIDEO MONITOR SUPPORTS

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes: Prefab wall mounted video monitor or television support.
- B. Related Sections
 - 1. Electrical

1.2 SUBMITTALS

- A. Submit product data for video monitor supports in accordance with the conditions of Contract and Division/Specification Section.
- B. Submit Manufacturer's full range of platform sizes for Architect's final selection on support sizes.
- C. Submit the Manufacturer's detailed technical product data, installation instructions and recommendations, details of construction relative to fastening and structural support.

1.3 WARRANTY

- A. The mounting bracket used shall be supplied with a warranty against defects in workmanship and materials for at least 5 years.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. T.V./Video monitor supports:
 - a. R & S Corporation
 - b. Securtec

2.2 PRODUCT SUBSTITUTIONS

- A. Prior approved equals.

2.3 MATERIALS

Supports: Construction of brackets shall be heavy gauge steel with MIG welds, shop primed and final painting in field.

- A. 1/4" plate steel as detailed on drawing.

PART 3 – EXECUTION

3.1 MANUFACTURERS INSTRUCTIONS

- A. Comply with Manufacturers Product Data including Product Catalog installation instructions, and Product Carton instructions.

3.2 EXAMINATION

- A. Site verification of conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with Manufacturers instructions.

3.3 INSTALLATION

- A. TV Monitor mount shall be installed where indicated on plans. All fasteners and components for the assembly of the bracket shall be furnished by the Manufacturer. Fasteners for affixing the bracket to the wall or ceiling shall be furnished by the Manufacturer. (Specify construction type to order appropriate fasteners).

3.4 PROTECTION

- A. Protection: Protect installed product and finish surfaces from damage during construction.

END OF SECTION 11450

SECTION 13120 - PRE-ENGINEERED BUILDING SYSTEM

PART 1 - GENERAL

1.1_ DESCRIPTION

1. Pre-engineered building system components include, but not limited to:
 1. Steel structure including anchor bolts, tie-rods, bracing, girts and purlins
 2. Panels.
 1. Wall and Roof Panels, including Skylight Panels.
 2. Wall liners.
 3. Perforated panels.
 3. Insulations and Retainers.
 4. Overhead Doors.
 5. Gutters and Downspouts.
 6. Sealants.
 7. Standing Seam Roof System.
 8. Closures, Trim and Accessories.
 9. Flashing Jackets.

1.2 DESIGN REQUIREMENTS

1. Loads: Unless otherwise specified herein, design pre-engineered building in accordance with the MBMA publication, Metal Building Systems Manual. Design rigid frame type buildings to the requirements of paragraph AFraming and Structural Members@ below. Design loads as indicated below:
 1. Live Load: 20 psf (with reductions allowed by Standard Building Code).
 2. Wind Load: 110 mph.
 3. Roof System: Equivalent to forces for UL wind uplift rating of UL 90.
2. Framing and Structural Members:
 1. Structural Steel: Comply with AISC publications, Specification for the Design, fabrication, and Erection of Structural Steel for Buildings.
 2. Structural Cold Formed Steel Framing: Comply with AISI publication, Specification for design of Cold-Formed Steel Structural Members.
 3. Framed Openings: Design to structurally replace the panels and framing displaced.

4. Welding of Steel: Comply with AWS publication D1.1.
3. Exterior Covering: Except as modified hereinafter:
 1. Steel Panels: Design in accordance with AISI publications, Specification for the Design of Cold-Formed Steel Structural Members.
 2. Maximum Live Load Deflection for Roof Panels: Do not exceed 1/240th of the span between supports.
 3. Maximum Deflections: Base on panels continuous across 2 or more supports with sheets unfastened and fully free to deflect.
 4. Maximum Windload Deflection: Limit wind deflection of metal building to H/240.
4. Gutters and Downspouts: Design for rain falling at the rate of 8 inches per hour for a 5 minute duration.
5. Pre-engineered Building Manufactures: Subject to compliance with requirements specified, use system by one of the following manufacturers or approved equivalent:
 1. American Building Systems.
 2. Ceco Building Systems.
 3. Ludwig Building Systems.
 4. Southern Structures, Inc.

1.3 SUBMITTALS

1. Shop Drawings:
 1. Pre-engineered Building: Submit catalog cuts, design and erection drawings, mill certification for structural bolts, framing steel, wall and roof panels, wall liner panels, instruction manuals and other data as required to clearly describe design, materials, sizes, layouts, construction details, fasteners and erection.
 2. Standing Seam Roofing System: Submit catalog cuts, design and erection drawings, clip-tab-fastener information, including certification indicating compliance to required wind uplift requirement.
 3. Manufacturer=s Suggested installation Details: In addition to usual details, include the following:
 1. Standing seam roof to roof panel transition detail.
 2. Standing seam roof to roof panel transition detail at roof ridge.
 3. Standing seam roof lap treatment where eave-to-ridge lengths are more than 40 feet.
 4. Roof eave details.
 5. Roof penetrations.
2. Certified Calculations - Pre-engineered Building: Submit engineering design calculations for structural and panels components, including stress and deflection values and a certificate. Items sealed and signed by a registered professional engineer licensed to practice in this state,

stating the design criteria and procedures used and attesting to the adequacy and accuracy of the design.

1.4 QUALITY ASSURANCE

1. **Installer Qualifications:** Engage an experienced installer to erect the pre-engineered metal building who has specialized in the erection and installation of types of metal buildings systems similar to that required for this project.
2. **Single-Source Responsibility:** Obtain the metal building system components, including structural framing, and roof covering, and accessory components, from one source from a single manufacturer.
3. **Metal Building shall match existing buildings; i.e.:**
 1. Girts and purlins color and gage.
 2. Roof and wall panels color and gage.
 3. Louver and fan size.
 4. Insulation.
 5. Doors size and type.

1.5 DELIVERY AND STORAGE

1. Deliver materials to the site in a dry and undamaged condition.
2. Store out of contact with the ground. Cover materials other than framing and structural members with weathertight panels and kept dry. Provide good air circulation and protection from surface staining at storage accommodations for roof and wall panels.

1.6 GUARANTEE

1. **Roofing and Siding Panel Finish Warranty:** Furnish the roofing and siding panel manufacturer's written warranty, covering failure of the factory-applied exterior finish on metal wall and roof panels within the warranty period. This warranty shall be in addition to and not a limitation of other rights the Owner may have under the Contract Documents.
 1. Manufacturer's standard warranty period for specified finishes for wall and roof panels; warranty period beginning after the date of Substantial Completion.
2. **Leaks:** Provide a manufacturer's 20 year weathertightness guarantee that protects the building against water leaks for a period of 20 years. Start guarantee upon date of substantial completion of the work. In addition, the contractor shall provide a standard 2 year guarantee on the enclosed Roofing Guarantee R-3 form.

PART 2 - MATERIALS

2.1 PRE-ENGINEERED BUILDING MATERIALS AND COMPONENTS

1. General: Shop fabricate components to facilitate handling in the field and suitable for transportation by commercial carrier. Clearly and legibly mark each piece or part of the assembly to correspond with the shop drawings.
2. Framing and Structural Materials and Components:
 1. Materials:
 1. Steel (1/8" thick or more): ASTM A36, A529, A572 or A588.
 2. Uncoated Steel (less than 1/8" thick): ASTM A570, A606 or A607.
 3. Galvanized Light Gage Steel: ASTM A446, G90 coating designation, 18 galvanized sheet gage or heavier.
 4. Structural Steel Pipe: ASTM A53, A252, A500, A501, A618, B221, B241 or B429.
 5. Steel Shop Connections: Conform to the AISC publications, Specification for the Design, Fabrication, and Erection of Structural Steel for Building, or the AISI publication, Specification for the Design of Cold-Formed Steel, as applicable.
 6. Erection and Anchor Bolts: Of standard sized and types. Make holes for the bolts in the shop, prior to field assembly of structural members.
 2. Components:
 1. Rigid Frames: Fabricate from hot-rolled structural steel shapes. Provide factory-welded, shop-painted, built-up I-beam@ - shape or open-web-type frames consisting of tapered or parallel flange beams and tapered columns. Furnish frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly.
 1. Provide length of span and spacing of frames indicated. Slight variations in length of span and frame spacing may be acceptable if necessary to meet manufacturer=s standard.
 2. Provide rigid frames at endwalls where indicated.
 2. Secondary Framing: Provide the following:
 1. Roof Purlins, Sidewall and Endwall Girts: AC@ - or AZ@ - shaped sections fabricated from 16 gage (0.0598 inch) shop-painted roll-formed steel. Purlin spacers shall be fabricated from 14-gage (0.0747 inch) cold-formed galvanized steel sections.
 2. Eave Struts: Unequal flange AC@ - shaped sections formed to provide adequate backup for both wall and roof panels. Fabricate from 16-gage (0.0598 inch) shop-painted roll-formed steel.
 3. Flange and Sag Bracing: 1-5/8 - by 1-5/8 inch angles fabricated from 16-gage (0.0598 inch) shop-painted roll-formed steel.
 4. Base or Sill Angles: Fabricate from 14-gage (0.0747 inch) cold-formed galvanized steel sections.
 5. Secondary endwall structural members, except columns and beams, shall be the manufacturer=s standard sections fabricated from 14-gage (0.0747 inch) cold-formed galvanized steel.
 3. Wind Bracing: Adjustable wind bracing, 2 inch diameter threaded steel rods; comply with ASTM A36 or ASTM A575, Grade D. Locate interior end bay bracing to avoid openings and equipment.
 4. Bolts: Shop-painted bolts except when structural framing components are in direct contact with roofing and siding panels. Provide zinc-plated or cadmium-plated bolts when structural framing components are in direct contact with roofing and siding panels.
3. Roof Panels (Standard Panels - see below, Perforated and Standing Seam Roof Panels): Zinc-coated steel, ASTM A446, G90 coating designation, factory-color finished, 26 galvanized sheet gage or thicker.

1. Steel in configurations for overlapping adjacent sheets or interlocking ribs for securing adjacent sheets.
 2. Width of sheets with overlapping configurations of not less than 24 inches of coverage in place. Width of sheets with interlocking ribs of not less than 12 inches of coverage in place.
 3. Depth of configurations for roof panels of not less than 1 inch.
 4. Fabricate length of sheets sufficient to cover the entire length of unbroken roof slopes of the entire height of unbroken wall surfaces when such slopes or heights are 25 feet or less. Fabricate to allow for thermal expansion and contraction consistent with the type of system to be used. Square cut sheets except gable end wall sheets may be cut in the shop to correspond to the roof slope and may have a horizontal joint at the eave line.
4. Accessories:
1. Flashing, Trim, Metal Closure Strips, Caps, and Similar Metal Accessories: Not less than the minimum thickness specified for panels.
 2. Molded closure strips: Bituminous-saturated fiber, closed-cell or solid-cell synthetic rubber or neoprene, or polyvinyl chloride premolded to match configuration of the panels.
5. Fasteners: Types and sizes best suited for purpose. 300/400 series corrosion resisting steel with gasketed washers to waterproof fastener penetration on exterior side for exposed fastener for securing panels and accessory items. Washer material compatible with the panels with a minimum diameter of 3/8 inch for structural connections. Use neoprene washers for other equally durable elastomeric material approximately 1/8 inch thick. Factory color finish exposed wall fasteners or provide with plastic color caps to match the panels.
6. Gutters and Downspouts: Zinc-coated steel, minimum thickness as specified for panels.
7. Roof Ventilators: Zinc-coated steel and minimum thickness as specified for roof panels, complete with bird screens and chain operated dampers, and furnished in 8 to 10 feet long sections braced at midlength. Factory Finish roof ventilators.
8. Skylight Panels: Manufacturer=s structural translucent plastic panels conforming to ASTM D3841, white.
9. Wall Liner: Zinc-coated steel, ASTM A446, G90 coating designation, factory color finished, 26 galvanized sheet gage or thicker steel of composition specified for panels, and formed or patterned to prevent waviness and distortion.
1. Extend from floor to a height of 8 feet high, unless indicated otherwise.
 2. Provide matching metal trim at base of wall liner, top of wall liner, around openings in walls, and over interior and exterior corners.
10. Perforated Panels: Manufacturer=s recommended perforated ceiling panels of pre-finished galvanized steel. Ceiling suspension and support assembly capable of sustaining wind loads.
1. Include suspension assembly and pre-finished trim for joints, transitions, perimeter and penetrations.
 2. Access Hatch: Ceiling access hatch, nominal 2 ft. square opening unless indicated otherwise, complete with hardware - hinged door with latch. Finish to match ceiling

panels.

2.2 STANDING SEAM ROOFING SYSTEM

1. Design system for load requirements as described in paragraph 1.2-A.
 1. Subject to compliance with specified requirements, provide standing seam roof system by approved pre-engineered building manufacturer.
 2. Panels: 50,000 psi yield strength steel; galvanized per ASTM A446, grade C with G90 coating, or Galvalume; 24 gage minimum; factory roll-formed, nominal 24" wide seam-to-seam with nominal 2" high box rib and nominal 1" high seam. Fabricate for continuous runs from ridge to eave up to a maximum of 40'.
 3. Clips, Tabs and Fasteners: Fabricate clips from minimum 16 gage formed galvanized steel. Clip/tab configuration of 2 piece design to support roof panels nominal 1" above structure to allow separation to allow separation of movement of roof panels from building structure.
 4. Trim and Accessories: Provide trim, sealing tape, sealants and other items as required for complete watertight installation.
 1. Ridge Cover: Expansion joint type design to accommodate the expansion and contraction movement of roof panels.
 5. Finish and Color: Finish panels, trim and exposed items per article 2.6.

2.3 OVERHEAD DOORS

1. Industrial type to match existing building adjacent to new structure.

2.4 INSULATION AND ACCESSORIES

1. Thermal Insulation: Glass fiber blanket insulation, complying with ASTM C 991, of 0.5lb. per cu. ft. density, thickness as indicated, with UL flame spread classification of 25 or less, and 2 inch wide continuous vapor-tight edge tabs.
 1. Thickness: 3" unless indicated otherwise.
 2. Insulation Retainers: Of type, size and design necessary to adequately hold the insulation and to provide a neat appearance. Coat metallic retaining members with nonferrous coating. Nonmetallic retaining members, including adhesives used in conjunction with mechanical retainers or at insulation seams, shall have a fire resistance classification not less than that permitted for the insulation.

2.5 ACCESSORIES AND MISCELLANEOUS ITEMS

1. Sealants: Elastomeric type, as recommended by the manufacturer, as best suited for the particular joint.
2. Gaskets and Insulating Compounds: Nonabsorptive and suitable for insulating contact points of incompatible materials. Use nonrunning type insulating compounds.

3. Flashings at Roof Penetrations: EPDM rubber or similar material pipe flashing jacket unit with ductile metal reinforcing ring bonded to rubber flange on base of unit.
4. All curbs shall be fully welded to roofing panels that match the profile of the roofing panels and are installed in a lapping method matching the adjacent roofing panels.

2.6 SHOP PAINTING - PRIMING AND COLOR FINISH

1. General: Clean ferrous surfaces of oil, grease, loose rust, loose mill scale, and other foreign substances and shop primed. Prime coat in accordance with the manufacturer=s standard system.
2. Shop Prime - Primary and Secondary Structural Steel: Clean surfaces to be primed of loose mill scale, rust, dirt, oil, grease, and other matter precluding paint bond. Follow procedures of SSPC-SP3 for power-tool cleaning, SSPC-SP7 for brush-off blast cleaning, and SSPC-SP1 for solvent cleaning.
 1. Prime structural steel primary and secondary framing members with the manufacturer=s standard rust-inhibitive primer.
 2. Prime galvanized members, after phosphoric acid pretreatment, with manufacturer=s standard zinc dust-zinc oxide primer.
3. Finished Panels - Factory Color Finish:
 1. Color finish wall and roof panels on both sides at the factory. Prepare surfaces for coating by thoroughly cleaning, pretreating, and priming, to provide a film which is compatible with the metal surface and the color finish.
 2. Color Finish: Synthetic resin base coating that has been suitably plasticized against heat and light. Dry-film coating thickness of the color coat of not less than 0.8 mil for exterior surface finish and not less than 0.5 mil for interior surface finish.
 3. Color: As selected by Architect from manufacturer=s standard available colors. Different colors may be selected for roof and panels, and trim.

PART 3 - EXECUTION

3.1 ERECTION

1. General: Erect in accordance with approved erection instructions and drawings, manufacturer=s instructions, and the requirements herein.
 1. Insulate dissimilar materials which are not compatible when contacting each other from each other by means of gaskets or insulating compounds.
 2. Plug improper or mislocated drill holes with an oversize screw fastener, with a gasketed washer; however, sheets with an excess of such holes or with such holes in critical locations will be rejected.
 3. Keep exposed surfaces clean and free from sealant, metal cuttings, and other foreign materials.

2. Framing and Structural Members: Accurately set anchor bolts by template while the concrete is in a plastic state. Accurately space members to assure proper fitting of panels. As erection progresses, securely fasten the work to resist the dead load and wind and erection stresses.
 1. Framing: Erect framing true to line, level, plumb, rigid, and secure. Level base plates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use a nonshrinking grout to obtain uniform bearing and to maintain a level base line elevation. Moist cure grout for not less than 7 days after placement.
3. Purlins and Girts: Provide rake or gable purlins with tight-fitting closure channels and fascias. Locate and space wall girts to suit wall opening arrangements and heights. Secure purlins and girts to structural framing and hold rigidly to a straight line by sag rods.
4. Bracing: Provide angle bracing in roof and sidewalls.
 1. Moment-resisting frames may be used in lieu of sidewall rod bracing, to suit manufacturer=s standards.
 2. Where diaphragm strength of roof or wall covering is adequate to resist wind forces, angle bracing will not be required.
5. Framed Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to building structural frame.

3.2 WALL AND ROOF PANELS, WALL LINERS, PERFORATED PANELS

1. Examine supporting structure and sub-structure items to verify that proper tolerances are provided. Make corrections to unsatisfactory conditions.
2. Standing Seam Roof Panel System: Fasten roof panels to purlins with concealed clips in accordance with the manufacturer=s instructions.
 1. Install clips at each support with self-drilling fasteners. Fasten clip base to building structure. Space clips as recommended by manufacturer to meet required wind uplift rating.
 2. At end laps of panels, install tape caulk between panels. Install panels by interlocking and seaming. At end laps, install tape caulk between panels.
 3. Seam panels to provide a weathertight joint.
 4. Ridge Cover: Apply self-frilling type fasteners in conjunction with clamping plates and sealant.
3. Roof Panels - General: Arrange and nest sidelap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply panels and associated items for neat and weathertight enclosure. Avoid Apanel creep@ or application not true to line. Protect factory finishes from damage.
 1. Field cutting of exterior panels by torch is not permitted.
 2. Provide wetherseal under ridge cap. Flash and seal roof panels at eave and rake with rubber, neoprene, or other closures to exclude weather.

3. Remove stained, discolored or damaged sheets from the site.
4. Roof Panels - Lap Seam Type: Provide sealant tape at lapped joints of ribbed or fluted roof sheets and between roof sheets and protruding equipment, vents, and accessories.
 1. Apply a continuous ribbon of sealant tape to clean, dry surface of the weather side of fastenings on end laps, and on side laps of corrugated nesting-type, ribbed, or fluted panels and elsewhere as needed to make roof sheets weatherproof to driving rains.
 2. Make end laps over framing members with fasteners into framing members approximately 2 inches from the end of the overlapping sheet. Lap distances for sides, ends, joint sealing, and space fasteners in accordance with the manufacturer's standard practice insofar as the maximum fastener spacings specified are not exceeded and provided such standard practice will result in a structure which will be free from water leaks and meet design requirements.
 3. Space fasteners to present an orderly appearance. Do not exceed 8 inches on center at end laps of panels, 12 inches on center at connection of panels to intermediate supports, 12 inches on center at side laps of roof panels, and 18 inches on center at side laps of wall panels except when otherwise approved. Install fasteners in straight lines within a tolerance of 2 inch in the length of a bay.
 4. Drive fasteners normal to the surface and to a uniform depth to properly seat the gasketed washers. Fasten accessories into framing members, except as otherwise approved.
5. Skylight Panels: Locate and install as indicated. Attach plastic panels to structural framing in accordance with the manufacturer's instructions.
 1. Provide end laps of not less than 6 inches and side laps of not less than 1-1/2 inch corrugations for translucent roofing panels.
 2. Align horizontal laps with adjacent panels.
 3. Seal intermediate end laps and side laps of translucent panels with translucent mastic.
 4. Clean panels in accordance with manufacturer's instructions.
6. Perforated Panels: Install ceiling panels, suspension assembly and prefinished trim for perimeter and penetrations in accordance with manufacturer's instructions. Locate ceiling access hatch at location designated by Architect.

3.3 INSTALLATION OF ACCESSORIES

1. Sheet Metal Accessories: Install gutters, downspouts, ventilators, and other sheet metal accessories in accordance with manufacturer's recommendations for positive anchorage to building and weathertight mounting. Adjust operating mechanism for precise operation.
 1. Gutters and Downspouts: Install gutters with positive slopes to downspouts. Provide adequate provisions for expansion and contraction.
 2. Flashings at Roof Penetrations: Install pipe flashing jacket in accordance with manufacturer's instructions. Set flange in contact with roof panel on bed of sealant.

3.4 INSTALLATION OF INSULATION

1. General: Install insulation against panels and between supporting members in a manner to present a neat appearance.
2. Roof Panels: Install insulation concurrently with installation of roof panels in accordance with manufacturer=s directions. Install blankets straight and true in one-piece lengths with both sets of tabs sealed to provide a complete vapor barrier. Locate insulation on underside of roof sheets, extending across the top flange of purlin members and held taut and snug to roofing panels with retainer clips. Install retainer strips at each longitudinal joint, straight and taut, nesting with roof rib to hold insulation in place.
 1. Where roof insulation is exposed such as Shop and Parts areas, install insulation form rolls spanning continuously, without laps between supporting members.
 2. Omit insulation at skylight panels. Provide neat trim edge around skylights.

3.5 FIELD TOUCH-UP PAINTING

1. Immediately upon detection, abraded or corroded spots on shop-painted surfaces, wire brush and touch up with the same material used for the shop coat. Touch-up factory color finished surfaces with the manufacturer=s recommended touch-up paint.

3.6 CLEAN, REPAIR AND PROTECTION

1. Repair or replace damaged components to approval of Architect. Maintain protective measures until acceptance by Owner.
2. Clean building for Owner=s acceptance.

END OF SECTION 13120