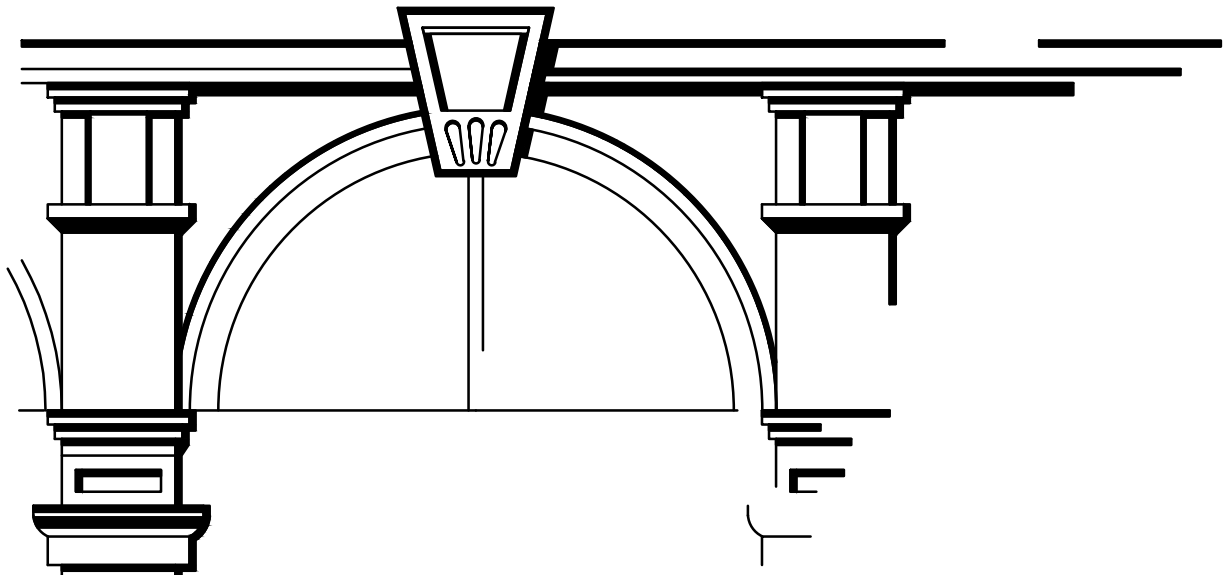

Maze
Design , Inc.

CITY OF RICHMOND, INDIANA

FIRE STATION #5 POLE BARN

RICHMOND, IN PROJECT #2367-1

OCTOBER, 2023

PROJECT MANUAL

VOLUME I

BIDDING REQUIREMENTS
CONDITIONS OF THE CONTRACT
SPECIFICATIONS

FOR

City of Richmond, Indiana
Fire Station #5 Pole Barn
RICHMOND, IN
PROJECT 2367-1

MAZE DESIGN, INC.
2601 National Road West
Richmond, Indiana 47374
Phone: (765)962-1300

Date: October, 2023

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DIVISION 6: WOOD AND PLASTICS

DIVISION 7: THERMAL AND MOISTURE PROTECTION

DIVISION 8: DOORS AND WINDOWS

END OF INDEX

CITY OF RICHMOND, INDIANA

INVITATION TO BID

Fire Station #5 Pole Barn

KARA NOE - PURCHASING MANAGER – (765) 983-7214

INVITATION FOR BID

This invitation is issued to establish a contract to supply the City of Richmond with a commodity or service in accordance with accompanying specifications.

Fire Station #5 Pole Barn

Submit Bids Until:
4:59 p.m. On Day of Bid Opening to: Purchasing Office
City of Richmond
50 North 5th Street
Richmond, IN 47374

Mandatory Pre-Bid: Time 10:00a.m.
Date: 10/31/2023
Location: Fire Station #5, 1971 W. Main Street, Richmond, IN 47374

Bid Opening: Time: 5:00 p.m.
Date: 11/09/2023

Location of Bid Opening: Common Council Chambers
City of Richmond
50 North 5th Street
Richmond, IN 47374

Bid Bond: 5% (See Section C.2)

Performance Bond: 100% (See Section C.2)

Labor & Materials Payment Bond: 100% (See Section C.2)

Supply Bond: N/A (See Section C.2)

Insurance/Workers' Compensation: Yes (See Section B.1.4 &F.2.1)

Bid Form Included: Form 96 (Revised 2013)

Schedule of Values: No

Please provide the following information:

1.) Earliest date available to begin project. _____

2.) Length of time to complete project. _____

3.) A certificate of insurance should be included with your bid.

4.) Guarantee information.

_____
Signature

_____ _____
Company Contact Person

_____ _____
Phone Number Date

CONTRACTOR'S BID FOR PUBLIC WORK – FORM 96

PART I
(To be completed for all bids. Please type or print)

Date:_____

1. Governmental Unit (Owner):_____
2. County :_____
3. Bidder (Firm):_____

   Address:_____

   City/State:_____
4. Telephone Number:_____
5. Agent of Bidder (if applicable):_____

Pursuant to notices given, the undersigned offers to furnish labor and/or material necessary to complete the public works project of _____

(Governmental Unit) in accordance with plans and specifications prepared by _____

_____ and dated _____ for the sum of

_____ $_____

The undersigned further agrees to furnish a bond or certified check with this bid for an amount specified in the notice of the letting. If alternative bids apply, the undersigned submits a proposal for each in accordance with the notice. Any addendums attached will be specifically referenced at the applicable page.

If additional units of material included in the contract are needed, the cost of units must be the same as that shown in the original contract if accepted by the governmental unit. If the bid is to be awarded on a unit basis, the itemization of the units shall be shown on a separate attachment.

The contractor and his subcontractors, if any, shall not discriminate against or intimidate any employee, or applicant for employment, to be employed in the performance of this contract, with respect to any matter directly or indirectly related to employment because of race, religion, color, sex, national origin or ancestry. Breach of this covenant may be regarded as a material breach of the contract.

CERTIFICATION OF USE OF UNITED STATES STEEL PRODUCTS
(If applicable)

I, the undersigned bidder or agent as a contractor on a public works project, understand my statutory obligation to use steel products made in the United States (I.C. 5-16-8-2). I hereby certify that I and all subcontractors employed by me for this project will use U.S. steel products on this project if awarded. I understand that violations hereunder may result in forfeiture of contractual payments.

ACCEPTANCE

The above bid is accepted this _____ day of _____, _____, subject to the following conditions: _____

_____

Contracting Authority Members:

_____ _____

_____ _____

_____ _____

PART II
(For projects of $100,000 or more – IC 36-1-12-4)

Governmental Unit: _____

Bidder (Firm) _____

Date: _____

These statements to be submitted under oath by each bidder with and as a part of his bid. Attach additional pages for each section as needed.

SECTION I EXPERIENCE QUESTIONNAIRE

1. What public works projects has your organization completed for the period of one (1) year prior to the date of the current bid?

Contract Amount	Class of Work	Completion Date	Name and Address of Owner

2. What public works projects are now in process of construction by your organization?

Contract Amount	Class of Work	Expected Completion Date	Name and Address of Owner

3. Have you ever failed to complete any work awarded to you? _____ If so, where and why?

_____

_____

_____

4. List references from private firms for which you have performed work.

_____

_____

_____

_____

_____

SECTION II PLAN AND EQUIPMENT QUESTIONNAIRE

1. Explain your plan or layout for performing proposed work. (Examples could include a narrative of when you could begin work, complete the project, number of workers, etc. and any other information which you believe would enable the governmental unit to consider your bid.)

2. Please list the names and addresses of all subcontractors (i.e. persons or firms outside your own firm who have performed part of the work) that you have used on public works projects during the past five (5) years along with a brief description of the work done by each subcontractor.

3. If you intend to sublet any portion of the work, state the name and address of each subcontractor, equipment to be used by the subcontractor, and whether you will require a bond. However, if you are unable to currently provide a listing, please understand a listing must be provided prior to contract approval. Until the completion of the proposed project, you are under a continuing obligation to immediately notify the governmental unit in the event that you subsequently determine that you will use a subcontractor on the proposed project.

4. What equipment do you have available to use for the proposed project? Any equipment to be used by subcontractors may also be required to be listed by the governmental unit.

5. Have you entered into contracts or received offers for all materials which substantiate the prices used in preparing your proposal? If not, please explain the rationale used which would corroborate the prices listed.

SECTION III CONTRACTOR'S FINANCIAL STATEMENT

Attachment of bidder's financial statement is mandatory. Any bid submitted without said financial statement as required by statute shall thereby be rendered invalid. The financial statement provided hereunder to the governing body awarding the contract must be specific enough in detail so that said governing body can make a proper determination of the bidder's capability for completing the project if awarded.

SECTION IV CONTRACTOR'S NON – COLLUSION AFFIDAVIT

The undersigned bidder or agent, being duly sworn on oath, says that he has not, nor has any other member, representative, or agent of the firm, company, corporation or partnership represented by him, entered into any combination, collusion or agreement with any person relative to the price to be bid by anyone at such letting nor to prevent any person from bidding nor to include anyone to refrain from bidding, and that this bid is made without reference to any other bid and without any agreement, understanding or combination with any other person in reference to such bidding.

He further says that no person or persons, firms, or corporation has, have or will receive directly or indirectly, any rebate, fee, gift, commission or thing of value on account of such sale.

SECTION V OATH AND AFFIRMATION

I HEREBY AFFIRM UNDER THE PENALTIES FOR PERJURY THAT THE FACTS AND INFORMATION CONTAINED IN THE FOREGOING BID FOR PUBLIC WORKS ARE TRUE AND CORRECT.

Dated at _____ this _____ day of _____, _____

_____
(Name of Organization)

By_____

_____
(Title of Person Signing)

ACKNOWLEDGEMENT

STATE OF _____)
) ss
COUNTY OF_____)

Before me, a Notary Public, personally appeared the above-named _____ and swore that the statements contained in the foregoing document are true and correct.

Subscribed and sworn to before me this _____ day of _____, _____.

_____
Notary Public

My Commission Expires:_____

County of Residence:_____

Form No. 96 (Revised 2005)

BID OF

_____
(Contractor)

_____
(Address)

_____

FOR

PUBLIC WORKS PROJECTS

OF

_____

_____

_____

Filed _____, _____

Action taken _____

_____

STANDARD TERMS & CONDITIONS

ARTICLE A

INSTRUCTION TO BIDDERS

A. 1 DEFINITION:

A. 1.1 City of Richmond

A. 1.2 The City is in Wayne County, a political subdivision of the State of Indiana.

A. 2 DEPARTMENTS:

A. 2.1 The following are the departments that are under Richmond Code 41.02 (h) Central Purchasing: Park and Recreation, Police, Fire, Sanitary District (Liquid & Solid Waste), Clerk, Attorney, Controller, Purchasing, Planning, Engineering, and all other City Government units such as Street, Rose View Transit, and the Airport.

A. 3 BIDDER AND CONTRACTOR:

A. 3.1 A bidder is a person or entity who submits a bid.

A. 3.2 The contractor is the person or entity who enters into a contract with the City of Richmond to furnish goods or services.

A.4 ESTIMATED QUANTITIES:

A. 4.1 If the quantity set forth in the Invitation to Bid and Proposal is approximate and represents the estimated requirements of the City for a specified period of time, the unit price and the extended total price thereof shall be used only as a basis for the evaluation of bids. The actual quantity of materials necessary may be more or less than the estimate, but the City shall neither be obligated nor limited to any specific amount. The city will, if at all possible, restrict increases to 20% of the estimated quantity and will, if at all possible, restrict decreases to 20% of the estimated quantity.

A.5 ADDENDA:

A. 5.1 An addendum is a written instrument issued by the City of Richmond prior to the date for receipt of bids which modify or interpret the bidding documents by addition, deletions, clarifications or corrections.

A. 5.2 Addenda will be mailed or delivered to all who are known by the Purchasing Department to have received a complete set of bidding documents.

A. 5.3 Copies of addenda will be made available for inspection in the Purchasing Department.

A. 5.4 No addendum will be issued later than forty-eight(48) hours prior to the date and time for receipt of bids except an addendum withdrawing the request for bids or one which includes postponement of the date of receipt of bids.

A. 5.5 Each bidder shall ascertain prior to submitting his bid that he has received all addenda issued, and he shall acknowledge their receipt on the proposal of this bid.

ARTICLE B

INSTRUCTIONS TO BIDDERS

B.1 BIDDING DOCUMENTS

B. 1.1 Bidders shall promptly notify the Purchasing Director of any ambiguity, inconsistency or error which they may discover upon examination of the bidding documents.

B. 1.2 Bidders desiring clarification or interpretation of the bidding documents shall make a written request which shall reach the Purchasing Director at least seven (7) days prior to the date and time for receipt of bids.

B. 1.3 Interpretations, corrections, and changes to the bidding documents will be made by addendum. Interpretations, and changes made in any other manner will not be binding and bidders shall not rely upon such interpretations, corrections and changes.

B. 1.4 Insofar as Worker's Compensation is concerned, the bidder or contractor agrees to furnish an official certificate or receipt of the Industrial Commission of Indiana, showing that he has paid into the State Insurance Fund the necessary premiums, whenever such certificates are required in the Invitation for Bid. (Section IC 22-3-2-14 will apply).

B. 1.5 All common construction wage requirements (IC 5-16-7-1) will apply when applicable in the bid. Should common construction wage be required, the City will attach that schedule to the bid package.

B.2 SUBSTITUTIONS

B. 2.1 The materials, products and equipment described in the bidding documents establish a standard of type, function, and quality to be met by any proposal substitution.

B. 2.2 Unless the particular specification prohibits substitutions, bidders are encouraged to propose materials, products or equipment of comparable type, function and quality.

B. 2.3 Bids for substitute items shall be stated in the appropriate blank or if the bid form does not contain blanks for substitutions, bidders shall attach to the bid on company letterhead a statement of the manufacturer and brand name of each proposed substitution plus a complete description of the item including descriptive literature, illustrations, performance and test data and any information necessary for an evaluation. The burden of proof of the merit of the proposed substitution is upon the bidder. Failure to comply could be grounds for rejection.

B.3 DEMONSTRATION/SAMPLES

B. 3.1 If required by the City, the bidders shall demonstrate the exact model(s) proposed within seven (7) calendar days from receipt of request from the City.

B. 3.2 Demonstration should be in the City designated by Purchasing Director.

B. 3.3 If bidder does not have a model in the Richmond area, it will be at the bidder's cost to send appropriate City personnel to the nearest location to view proposed item(s).

B. 3.4 If items being bid are small and mailable and bidder is bidding other than specified, the bidder must supply a sample of the item proposed.

B. 3.5 Sample must be supplied on or before the bid opening date.

B. 3.6 Samples supplied as requested will be returned at bidder's expense after receipt of goods.

B. 4 DATA PRIVACY

B. 4.1 Contractor agrees to abide by all applicable local, state and federal laws and regulations concerning the handling and disclosure of private and confidential information concerning individuals and corporations as to inventions, patents, and patent rights. Then contractor agrees to hold the City of Richmond harmless from any claims resulting from the contractor's unlawful disclosure or use of private or confidential information.

B. 4.2 All laws of the United States of America, the State of Indiana and City of Richmond are applicable to the products or services covered herein, are made a part there

ARTICLE C

INSTRUCTIONS TO BIDDERS

C.1 BIDDING PROCEDURE

C. 1.1 Bids shall be submitted on forms and proposal sheets included with the bidding documents.

C. 1.2 Appropriate blanks on the form shall be filled in by manually printing in ink or by typing the requested information.

C. 1.3 Any interlineation, alteration or erasure shall be initialed by the signer of the bid.

C. 1.4 Bidders shall not change the bid form nor make additional stipulations on the bid form. If a bidder wishes to amplify or qualify his bid, a statement that additional information is attached shall be made at the appropriate place on the bid form and the amplifying or qualifying information on the bidder's letterhead shall be attached to the bid form. The City of Richmond may accept or reject amplified or qualified bids.

C. 1.5 In case of discrepancy between the unit prices and the extended figures, the unit price shall govern unless otherwise provided elsewhere in the specifications; the prices of the bidder shall remain firm throughout the contract period and in any contract extension period.

C. 1.6 Each copy of the bid shall be signed by the person or persons legally authorized to bind the bidder to a contract. A bid submitted by an agent should have a current power of attorney attached certifying the agent's authority to bind the bidder.

C. 1.7 Bidder to submit bid in triplicate.

C.2 BID SECURITY

C.2.1 If so stipulated in the invitation for bids, each bid shall be accompanied by a certified check, cashier's check or bid bond executed by a surety authorized to do business in State of Indiana in the amount specified and made payable to the City of Richmond pledging that the bidder will enter into a contract with the city on terms stated in his bid and will, if required, furnish bonds as described in the invitation to bid governing the faithful performance of the contract and the payment of all obligations arising. Should the bidder refuse to enter into such a contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the City of Richmond as liquidated damages, not as a penalty.

C. 2.2 The City of Richmond shall have the right to retain the bid security of bidders to whom an award is being considered until either (a) the contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that the bids may be withdrawn, or (c) all bids have been rejected.

C.3 SUBMISSION OF BIDS

C. 3.1 The bidder shall assume full responsibility for timely delivery at the location designated for receipt of bids. Late bids will not be considered.

C. 3.2 Oral, telephone or telegraphic bids are invalid and will not receive consideration.

C.4 BIDDER'S REPRESENTATION

C. 4.1 Each bidder by making his bid represents that the bidder has read and understood the bidding documents and his bid has been made in accordance therein.

C. 4.2 Each bidder for services further represents that the bidder has familiarized himself with the local conditions under which the work is to be done and has correlated his observations with the requirements of the bidding documents.

C. 4.3 Each bidder agrees that he will not discriminate against any employee or applicant for employment because of race, color, religious creed, ancestry, physical handicap, sex or political affiliation, and that he will take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to race, color, religious creed, physical handicap, ancestry, sex or political affiliation.

C. 4.4 Each bidder shall be responsible for complying with any applicable affirmative action laws.

C.5 MODIFICATION OR WITHDRAWAL OF BID

C. 5.1 A bid may not be modified, withdrawn or canceled by the bidder following the time and date designated for receipt of bids and each bidder so agrees in submitting his bid.

C. 5.2 Prior to the time and date designated for receipt of bids, any bid submitted may be modified or withdrawn by notice to the Purchasing Director at the place designated for receipt of bids.

C. 5.3 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.

C.6 DELIVERY OF GOODS

C.6.1 All delivered goods are to be FOB Richmond, IN, unless otherwise stated in the bid.

C.6.2 The City reserves the right to inspect and have any goods tested after delivery for compliance with the specifications. Notice of latent defects, which would make the items unfit for the purposes for which they are required, may be given at any time within one (1) year after discovery of the defects.

C.6.3 All items rejected must be removed immediately by the contractor at the expense and risk of the contractor. If the contractor fails or refuses to remove the rejected items, they may be sold by the City and the proceeds used to cover all related expense incurred by the City.

C.6.4 In some cases, at the discretion of the City, inspection of the commodities or equipment will be made at the factory, plant, or other establishments where they are produced before shipment.

C.6.5 The above provisions shall not be constructed in limitation of any rights the City may have under any laws including the Uniform Commercial Code.

C.6.6 If applicable, State written approval is required before the release of any Bonds or payments will be made to contractor.

ARTICLE D

INSTRUCTIONS TO BIDDERS

D.1 CONSIDERATION OF BIDS

D 1.1 The properly identified bids which have been received on time will be opened publicly and will be read aloud. The bids are available for inspection after all bids have been read aloud.

D.2 REJECTION/ACCEPTANCE OF BIDS

D. 2.1 The City of Richmond shall have the right to accept or reject any and all bids. The City of Richmond shall reject any bid not accompanied by the required bid security, and shall reject bids that are incomplete or unsigned.

D. 2.2 The City of Richmond shall reject all bids from bidders where there has been collusion between the bidders.

D.3 BID AWARD

D. 3.1 It is the intent of the City of Richmond to award a contract to the lowest responsible and responsive bidder meeting specifications provided the bid has been submitted in accordance with the requirements of the bidding documents. The City shall have the right to waive any informality or irregularity in any bid(s) received; to accept or reject the bid(s) which in its judgment is in its own best interest; and to solicit new bids privately and to award to the best bid so received.

D. 3.2 Award will be based on the following (where applicable):

1. Adherence to all conditions and requirements of the bid specifications.
2. Total bid price (including any discounts), unit bid price or extended price.
3. General reputation and experience of bidders.
4. Hourly rates for specified personnel.
5. Evaluation of the bidder's ability to service the City.
6. Financial responsibility of the bidder.
7. Prior knowledge of an experience with the bidder in terms of past performance.
8. Needs and requirements of the City.
9. Experience with the products involved.
10. Nature and extent of company data furnished upon request of the City.
11. Quantity of merchandise.
12. Product appearance, workmanship, finish, taste, feel and results of any product testing.
13. Overall completeness of product line offered.
14. Locality in relation to the City, where prompt service may be required.
15. Bidder's ability to meet delivery and stocking requirements.
16. Delivery date.
17. Maintenance cost and warranty provisions.
18. Repurchase, trade-in or residual value.

D. 3.3 Unless otherwise indicated in the invitation for bids, the City reserves the right to award the contract in whole or in part, by item, by group of items or by section where such action serves the best interest of the City.

D. 3.4 Bids submitted on an “all or none” basis or similar basis will be evaluated against the total of the low bids for the individual items.

D.4 WARRANTIES, GUARANTEES AND MAINTENANCE

D. 4.1 A copy of the manufacturer’s warranties and/or guarantees for the items bid must accompany vendor’s bid. A copy of your company’s warranties and /or guarantees for the items bidding also must accompany vendor’s bid.

D. 4.2 As a minimum requirement of the City, the vendor will also guarantee, in writing, that any defective components discovered within a one (1) year period following the date of equipment acceptance shall be replaced by the vendor at no cost to the City.

D. 4.3 Replacement parts of defective components shall be shipped to the City of Richmond at no cost to the City. If defective parts are required to be returned to the vendor, the shipping costs shall be borne by the vendor.

ARTICLE E

INSTRUCTIONS TO BIDDERS

GENERAL CONDITIONS OF THE CONTRACT

E.1 CONTRACT DOCUMENTS

E. 1.1 Nothing in the contract documents shall create any contractual relationship between the City and the contractor's employees, subcontractors and their agents and employees and any other parties furnishing goods and services to the contractor and their agents and employees.

E. 1.2 The contract documents consist of the invitation for bids, instructions to bidders, contractor's bid form with attachments, if any, executed contract, conditions of the contract (general, supplementary and other conditions), the specifications, all addenda issued prior to receipt of the bids and all modifications issued after execution of the contract. A modification is (a) a written or supplement to the contract signed by both parties or (b) purchase release issued by the City or (c) change order.

E. 1.3 The contract documents form the contract. This contract represents the entire and integrated agreement between parties hereto and supersedes all prior negotiations, representations or agreements, either written or oral.

E. 1.4 The issue of a purchase order that is in accordance with the specifications represents a contract. Should vendor find purchase order to be incorrect, said vendor must notify Purchasing Director within twenty four (24) hours of purchase order date.

ARTICLE F

INSTRUCTIONS TO BIDDERS

INDEMNIFICATION, INSURANCE, AND PROTECTION OF LIVES AND PROPERTY

F.1 INDEMNIFICATION

F. 1.1 The contractor shall indemnify and hold harmless the City of Richmond and its officers and employees from and against all claims, damages, losses, expenses, including but not limited to attorney's fees, arising out of or resulting from the performance of the contract, provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than goods, materials and equipment furnished under this contract) including the loss of use resulting there from, and (b) is caused in whole or in part by any negligent act or omission of the contractor, any subcontractor, or anyone directly employed by any of them or anyone for whole acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

F. 1.2 In any and all claims against the City or any of its officers or employees by any employee of the contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this paragraph G. 1 shall not be limited in any way by any limitation of the amount or type of damages, compensation or benefits payable by or for the contractor or any sub-contractor under worker's or workmen's compensation acts, disability benefit acts or other employee benefit acts.

F.2 WORKER'S COMPENSATION INSURANCE

F. 2.1 For contracts involving performance of work pursuant to the provisions of Indiana Code IC 22-3-2-14 (a) bidders are required to furnish a certificate from the Indiana Worker's Board showing that such bidder has complied with IC 22-3-2-5, 22-3-5-1 and IC 22-3-5-2.

F.3 INSURANCE

F. 3.1 The Contractor shall, as prerequisite to this Agreement, purchase and thereafter maintain such insurance as will protect him from the claims set forth below which may arise out of or result from the Contractor's operations under this Agreement, whether such operations by the Contractor or by any Sub-contractors or by anyone who directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable.

F.3.1
(con't)

	Coverage		Limits
A.	Worker's Compensation & Disability Requirements		Statutory
B.	Employer's Liability		$100,000
C.	Comprehensive General Liability		
	Section 1.	Bodily Injury	$1,000,000 each occurrence $2,000,000 aggregate
	Section 2.	Property Damage	$1,000,000 each occurrence
D.	Comprehensive Auto Liability		
	Section 1.	Bodily Injury	$1,000,000 each person $1,000,000 each occurrence
	Section 2.	Property Damage	$1,000,000 each occurrence
E.	Comprehensive Umbrella Liability		$1,000,000 each occurrence $2,000,000 each aggregate
F.	Malpractice/Errors & Omissions Insurance		$1,000,000 per claim $2,000,000 each aggregate

ARTICLE G

INSTRUCTIONS TO BIDDERS

GENERAL CONDITIONS OF THE CONTRACT

G.1 PAYMENTS

G. 1.1 The City is not subject to federal excise taxes. Federal Tax Exemption Registry Number is 35-6001174.

G. 1.2 The City is not subject to the Indiana sales and use taxes on the purchase of goods and other materials. Where the contract includes the combination of labor and material, the contractor shall pay the Indiana sales and use taxes on the materials only.

G.2 METHOD OF INVOICING FOR PAYMENT

G. 2.1 No contract will be official for services or materials unless a purchase order has been issued.

G. 2.2 Contractor shall bill the City: (a) on regular invoice form giving a complete and detailed description of the goods delivered, including purchase order number; and (b) if the contractor allows a cash discount, the period of time in which the City must make payment to qualify for discounts shall be computed from the date the City received the invoice (completely filled out), or the date the goods are delivered and accepted, whichever may be later, and shall be for not less than thirty (30) days and (c) if more than one shipment is made under the contract, the City will make partial payments on a basis that is agreeable to both parties.

G. 2.3 Payments under this contract will be made in the manner provided by law for payments of claims against the City.

G. 2.4 No payment will be made for production overruns in excess of the quantity ordered by the City (unless with prior written approval).

G. 2.5 No payment shall constitute an acceptance of any goods or services not in accordance with the requirements of the contract.

G. 2.6 Schedule of values may be used in contractual work. City will so designate if applicable. (See Invitation for Bid Page)

BID FORM 96 Supplement

BID TO:
City of Richmond, Indiana
Fire Station #5 Pole Barn
Richmond, Indiana 47374

BID FROM: _____

Address _____

City / State _____

Telephone No. _____

BID FOR:

Fire Station #5 Pole Barn
Richmond, Indiana 47374
PROJECT 2367-1

The Undersigned, having visited the site of proposed construction of this project, and having familiarized himself with local conditions affecting the cost of the Work and with all requirements of the Contract Documents and Addenda thereto as prepared by Maze Design, Inc., hereby offers to furnish all labor and materials required by the Contract Documents and Addenda thereto for the completion of the Contracts below for which an amount is provided:

BID SCHEDULE

Base Bid

_____ Dollars ($_____)

ADDENDA RECEIVED

Receipt of Addendum Nos. _____, is hereby acknowledged.

BID ACCEPTANCE

If written notice of the acceptance of this Bid is received by the Undersigned within 60 days after the date for opening of Bids or any time thereafter before this Bid is withdrawn, the Undersigned will, execute the required Agreement and furnish Performance and Payment Bonds in accordance with the Contract Documents and Bid as

2367-1
accepted.

If Bidder is an individual complete the blanks in the following box.

IN TESTIMONY WHEREOF, the Bidder (an individual) has hereunto set his hand this _____ day of _____ 20____.

Individual _____

If Bidder is a partnership complete the blanks in the following box.

IN TESTIMONY WHEREOF, the Bidder (a Partnership) have hereunto set their hands this _____ day of _____ 20____.

Name of Partnership _____

Name of Partners _____

_____

If Bidder is a Corporation complete the blanks in the following box.

IN TESTIMONY WHEREOF, the Bidder (a Corporation) has caused this Bid to be signed by its President and Secretary and affixed its Corporate Seal this _____ day of _____ 20____.

Name of Corporation _____

President _____

Secretary _____

(Seal)

GENERAL CONDITIONS

1.1 An AIA 101-2017 Contract shall be utilized for this project. A 5% retainage will be withheld from each pay application.

1.2 General Conditions shall be AIA Document A201, 2017 edition, entitled, "General Conditions of the Contract for Construction".

SECTION 01011 - SUMMARY OF WORK - SINGLE PRIME CONTRACTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 PROJECT IDENTIFICATION

A. The Project consists of new construction of:

Fire Station #5 Pole Barn
RICHMOND, IN
PROJECT 2367-1

For: City of Richmond, Indiana
Fire Station #5
Richmond, Indiana,
Contract documents prepared by Maze Design, Inc.
Dated October 2023.

B. Single Prime Contracts, Represents a contract that combines all construction activities performed on the project under one Single Prime Contract. The Single Prime Contract for this project includes but not limited to:

The General Construction: Site work, Architectural, Structural, Plus all other activities traditionally recognized as general construction.

C. Definition of the extent of Single Prime Contract Work: The extent of The Single Prime Contract is indicated in the Contract Documents.

1. Local custom and trade-union jurisdictional settlements do not control the scope-of-Work included in each sub-Contract. When a potential jurisdictional dispute or similar interruption of construction activities is first identified or threatened, the affected Contractor shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and its delays.

END OF SECTION 01011

SECTION 01020 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements governing handling and processing allowances.

B. Types of allowances required include the following:

1. Contingency allowances.

C. Procedures for submitting and handling Change Orders are included in Section "Change Order Procedures."

1.3 SELECTION AND PURCHASE

A. At the earliest feasible date after Contract award, advise the Engineer of the date when the final selection and purchase of each product or system described by an allowance must be completed in order to avoid delay in performance of the Work.

1. When requested by the Engineer, obtain proposals for each allowance for use in making final selections; include recommendations that are relevant to performance of the Work.
2. Purchase products and systems as selected by the Engineer from the designated supplier.

1.4 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

B. Submit invoices or delivery slips to indicate actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.5 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed for the Owner's purposes, and only by Change Orders which designate amounts to be charged to the allowance.

1. The Contractor's related costs for products or equipment ordered by the Owner under the contingency allowance, including delivery, installation, taxes, insurance, equipment rental, and similar costs are not part of the Contract Sum.
2. Change Orders authorizing use of funds from the contingency allowance will include the Contractor's related costs and reasonable overhead and profit margins.
3. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect products covered by an allowance promptly upon delivery for damage or defects.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related construction activities.

3.3 SCHEDULE OF ALLOWANCES

Allowance No. 1: General Contractor shall include a Contingency Allowance of $10,000.00 for use upon the Owner's instructions.

Allowance No. 2: General Contractor shall include a Overhead door Allowance of $30,000.00 for use upon the Owner's instructions.

END OF SECTION 01020

SECTION 01035 - MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1. Single Prime Contracts: Provisions of this Section apply to the Work of prime contractor.

B. Related Sections: The following sections contain requirements that relate to this section:

1. Division 1 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
2. Division 1 Section "Submittals" for requirements for the Contractor's Construction Schedule.
3. Division 1 Section "Application for Payment" for administrative procedures governing applications for payment.

1.3 MINOR CHANGES IN THE WORK

A. Supplemental instructions authorizing minor changes in the Work, not involving an adjustment to the Contract Sum or Contract Time, will be issued by the Engineer on AIA form G710, Architect's Supplemental Instructions.

1.4 CHANGE ORDER PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time will be issued by the Engineer, with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.

1. Proposal requests issued by the Engineer are for

information only. Do not consider them an instruction either to stop work in progress, or to execute the proposed change.

2. Unless otherwise indicated in the proposal request, within 20 days of receipt of the proposal request, submit to the Engineer for the Owner's review an estimate of cost necessary to execute the proposed change.

    a. Include a list of quantities of products to be purchased and unit costs, along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.

B. Contractor-Initiated Change Order Proposal Requests: When latent or other unforseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Engineer.

1. Include a statement outlining the 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 Contract Time.
2. Include a list of quantities of products to be purchased and unit costs along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Comply with requirements in Section "Product Substitutions" if the proposed change in the Work requires the substitution of one product or system for a product or system specified.

C. Proposal Request Form: Use AIA Document G 709 for Change Order Proposal Requests.

1.5 ALLOWANCES

A. Allowance Adjustment: Base each Change Order Proposal Request for an allowance cost adjustment solely on the difference between the actual purchase amount and the allowance, multiplied by the final measurement of work-in-place, with reasonable allowances, where applicable, for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in the purchase amount only where indicated as part of the allowance.
2. When requested, prepare explanations and documentation to substantiate the margins claimed.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit, within 20 days of receipt of the change order or construction change directive authorizing work to proceed. Claims submitted later than 20 days will be rejected.

1. The Change Order cost amount shall not include the Contractor's or Subcontractor's indirect expense except when it is clearly demonstrated that either the nature or scope of work required was changed from that which could have been foreseen from the description of the allowance and other information in Contract Documents.
2. No change to the Contractor's indirect expense is permitted for selection of higher or lower priced materials or systems of the same scope and nature as originally indicated.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: When the Owner and Contractor are not in total agreement on the terms of a Change Order Proposal Request, the Engineer may issue a Construction Change Directive on AIA Form G714, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. The Construction Change Directive will contain a complete description of the change in the Work and designate the method to be followed to determine change in the Contract Sum or Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.7 CHANGE ORDER PROCEDURES

A. Upon the Owner's approval of a Change Order Proposal Request, the Engineer will issue a Change Order for signatures of the Owner and Contractor on AIA Form G701, as provided in the Conditions of the Contract.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01035

SECTION 01041 - PROJECT COORDINATION – SINGLE PRIME CONTRACT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies minimum administrative and supervisory requirements necessary for coordination on the Project to be fulfilled by the single prime Contractor.

B. Field engineering is included in Section "Field Engineering".

C. Progress meetings, coordination meetings and pre-installation conferences are included in Section "Project Meetings".

D. Requirement for the Contractor's Construction Schedule is included in Section "Submittals."

1.3 COORDINATION

A. Coordination: The Single Prime Contractor shall be responsible for overall coordination and shall coordinate Subcontractor’s construction activities with those of other Subcontractors and other entities involved to assure efficient and orderly installation of each part of the Work.

1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, Prime contractor shall schedule the construction activities in the sequence required to obtain the best results.
2. Where availability of space is limited, Prime contractor shall coordinate installation of different components with other Subcontractors to assure maximum accessibility for required maintenance, service, and repair.
3. Prime contractor shall make adequate provisions to accommodate items scheduled for later installation.

B. Where necessary, prepare memoranda for distribution to each

party involved outlining special procedures required for coordination. Include items such as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

C. Administrative Procedures: Prime contractor shall coordinate scheduling and timing of its administrative procedures with other construction activities and activities of other Subcontractors to avoid conflicts and ensure orderly progress of the Work.

D. Conservation: Prime contractor shall coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare and submit Coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the interrelationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Comply with requirements contained in Section "Submittals".
4. Preparation Responsibility: Preparation of Coordination Drawings is the responsibility of the prime Contractor.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: The prime contractor shall require the installer of each major component to

inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.

1. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject incorrect, damaged and defective items.

2. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

C. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Engineer for final decision.

D. Recheck measurements and dimensions, before starting each installation.

E. Install each component during weather conditions and project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

F. Enclosure of the Work: Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

G. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Engineer for final decision.

3.2 CLEANING AND PROTECTION

A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure freedom from damage or deterioration at Substantial Completion.

B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

C. Limiting Exposures: Prime contractor shall supervise its construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Thermal shock.
5. Excessively high or low humidity.
6. Air contamination or pollution.
7. Water or ice.
8. Solvents.
9. Chemicals.
10. Light.
11. Radiation.
12. Puncture.
13. Abrasion.
14. Heavy traffic.
15. Soiling, staining and corrosion.
16. Bacteria.
17. Rodent and insect infestation.
18. Combustion.
19. Electrical current.
20. High speed operation,
21. Improper lubrication,
22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft.
30. Vandalism.

END OF SECTION 01041

SECTION 01045 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for cutting and patching.

B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1. Requirements of this Section apply to mechanical and electrical installations. Refer to Division-15 and Division-16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

C. Demolition of selected portions of the building for alterations is included in Section "Selective Demolition."

1.3 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.

C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Engineer's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use materials that match existing adjacent materials to the fullest extent possible with regard to visual effect. Notify Engineer of existing materials which cannot be matched prior to proceeding. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.1 INSPECTION

A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.

1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
4. Comply with requirements of applicable Sections of Division-2 where cutting and patching requires excavating and backfilling.
5. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.

    a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after the patched area has received primer and second coat.

4. Patch, repair or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

3.4 CLEANING

A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01045

SECTION 01050 - FIELD ENGINEERING

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. General: This Section specifies administrative and procedural requirements for field engineering services.

1.3 SUBMITTALS

A. Project Record Documents: Submit a record of Work performed as required under provisions of Sections "Submittals" and "Project Closeout".

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. The Drawings identify the existing building location and elevations.

B. Verify layout information shown on the Drawings, in relation to existing benchmarks before proceeding to layout the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.

1. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points, or requirements to relocate reference points because of necessary changes in grades or locations.
2. Promptly replace lost or destroyed project control points. Base replacements on the original survey control points.

C. Establish and maintain a minimum of two permanent benchmarks on the site, referenced to data established by survey

control points.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

D. Existing utilities and equipment: 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.

1. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer and water service piping.

3.2 PERFORMANCE

A. Working from existing building, establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to properly locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.

1. Advise entities engaged in construction activities, of marked lines and levels provided for their use.
2. As construction proceeds, check every major element for line, level and plumb.

B. Surveyor's Log: Maintain a surveyor's log of control and other survey Work. Make this log available for reference.

1. Record deviations from required lines and levels, and advise the Engineer when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.

C. Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes and invert elevations by instrumentation and similar appropriate means.

D. Building Lines and Levels: Locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels and control lines and levels required for mechanical and electrical Work.

E. Existing Utilities: Furnish information necessary to adjust, move or relocate existing structures, utility poles, lines, services or other appurtenances located in, or affected by construction. Coordinate with local authorities having jurisdiction.

3.3 Only qualified and competent workmen shall be used to set lines, elevations and measurement.

END OF SECTION 01050

SECTION 01095 - REFERENCE STANDARDS AND DEFINITIONS

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. Indicated: The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as shown, noted, scheduled, and specified are used to help the reader locate the reference. There is no limitation on location.

C. Directed: Terms such as directed, requested, authorized, selected, approved, required, and permitted mean directed by the Engineer, requested by the Engineer, and similar phrases.

D. Approved: The term approved, when used in conjunction with the Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Engineer's duties and responsibilities as stated in the Conditions of the Contract.

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 supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. Install: The term install describes operations at the Project site including the actual unloading, unpacking, assembly, erection, 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.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16-Division format and MASTERFORMAT numbering system.

B. Specification Content: This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.

1.4 INDUSTRY STANDARDS

A. Applicability of Standards: Except where 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 the standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with two or more standards is specified and where the standards may establish different or conflicting requirements for minimum quantities or quality levels, refer requirements that are different but apparently equal and other uncertainties to the Engineer 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 the Engineer for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project is required to 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, the Contractor shall obtain copies directly from the publication source.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authority having jurisdiction, or other entity applicable to the context of the Text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

1.5 SUBMITTALS

A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01095

SECTION 01200 - PROJECT MEETINGS

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 project meetings.

B. Construction schedules are specified in other Division-1 Sections.

1.3 PRE-CONSTRUCTION CONFERENCE

A. Contractor for General Construction to schedule a pre-construction conference and organizational meeting at the Project site or other convenient location no later than 15 days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.

B. Attendees: The Owner, Engineer and their consultants, all Prime Contractors and their superintendents, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.

C. Agenda: Discuss items of significance that could affect progress including such topics as:

1. Tentative construction schedule.
2. Critical Work sequencing.
3. Designation of responsible personnel.
4. Procedures for processing field decisions and Change Orders.
5. Procedures for processing Applications for Payment.
6. Distribution of Contract Documents.
7. Submittal of Shop Drawings, Product Data and Samples.
8. Preparation of record documents.
9. Use of the premises.
10. Office, Work and storage areas.

11. Equipment deliveries and priorities.
12. Safety procedures.
13. First aid.
14. Security.
15. Housekeeping.
16. Working hours.

1.4 PRE-INSTALLATION CONFERENCES

A. Conduct a pre-installation conference at the site before each of the following construction activity:
    1. Site work, Concrete.
    2. Framing, Building enclosure.

1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:

    a. Contract Documents.
    b. Options.
    c. Related Change Orders.
    d. Purchases
    e. Deliveries.
    f. Shop Drawings, Product Data and quality control Samples.
    g. Possible conflicts.
    h. Compatibility problems.
    i. Time schedules.
    j. Weather limitations.
    k. Manufacturer's recommendations.
    l. Compatibility of materials.
    m. Acceptability of substrates.
    n. Temporary facilities.
    o. Space and access limitations.
    p. Governing regulations.
    q. Safety.
    r. Inspection and testing requirements.
    s. Required performance results.
    t. Recording requirements.
    u. Protection.

2. Record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner and Engineer.
3. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

1.5 COORDINATION MEETINGS

A. Conduct Project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.

B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.

C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.6 PROGRESS MEETINGS

A. Conduct bi-weekly progress meetings at the Project site. Notify the Owner and Engineer of scheduled meeting times. Coordinate dates of meetings with preparation of the payment request. The Contractor for General Construction is responsible for coordinating the meetings and taking minutes.

B. Attendees: In addition to representatives of the Owner and Engineer, each contractor, each major subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.

C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.

1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind 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.
2. Review the present and future needs of each entity present, including such items as:

    a. Interface requirements.
    b. Time.

c. Sequences.
d. Deliveries.
e. Off-site fabrication problems.
f. Access.
g. Site utilization.
h. Temporary facilities and services.
i. Hours of Work.
j. Hazards and risks.
k. Housekeeping.
l. Quality and Work standards.
m. Change Orders.
n. Documentation of information for payment requests.

D. Reporting: No later than 5 days after each progress meeting date, the Contractor for General Construction will have distributed copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

1. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01200

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including;

1. Contractor's construction schedule.
2. Submittal schedule.
3. Daily construction reports.
4. Shop Drawings.
5. Product Data.
6. Samples.

B. Administrative Submittals: Refer to other Division-1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:

1. Permits.
2. Applications for payment.
3. Performance and payment bonds.
4. Insurance certificates.
5. List of Subcontractors.

C. The Schedule of Values submittal is included in Section "Applications for Payment."

D. Inspection and test reports are included in Section "Quality Control Services."

1.3 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

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 elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

    a. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

3. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.

    a. Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals.
    b. If an intermediate submittal is necessary, process the same as the initial submittal.
    c. Allow two weeks for reprocessing each submittal.
    d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Engineer sufficiently in advance of the Work to permit processing.

B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

1. Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
2. Include the following information on the label for processing and recording action taken.

    a. Project name.
    b. Date.
    c. Name and address of Engineer.
    d. Name and address of Contractor.
    e. Name and address of subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Number and title of appropriate Specification Section.
    i. Drawing number and detail references, as appropriate.

C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Engineer using a transmittal form. Submittals

received from sources other than the Contractor will be returned without action.

D. All submittals shall be submitted to the Engineer by Email in PDF Format. Material Samples shall be submitted and delivered to the Engineers office as specified.

1. On the transmittal Record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. See Section 01315 for required CPM Schedule.

1.5 SUBMITTAL SCHEDULE

A. After development and acceptance of the Contractor's construction schedule, prepare a complete schedule of submittals. Submit the schedule no later than 10 days after the date required for establishment of the Contractor's construction schedule.

1. Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.
2. Prepare the schedule in chronological order; include submittals required during the first 90 days of construction. Provide the following information:

a. Scheduled date for the first submittal.
b. Related Section number.
c. Submittal category.
d. Name of subcontractor.
e. Description of the part of the Work covered.
f. Scheduled date for Engineer's final release or approval.

B. Distribution: Following response to initial submittal, print and distribute copies to the Engineer, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.

1. When revisions are made, distribute 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

construction activities.

C. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.6 DAILY CONSTRUCTION REPORTS

A. Prepare a daily construction report, recording the following information concerning events at the site; and submit one copy to the Engineer at weekly intervals:

1. List of subcontractors at the site.
2. Approximate count of personnel at the site.
3. High and low temperatures, general weather conditions.
4. Accidents and unusual events.
5. Meetings and significant decisions.
6. Stoppages, delays, shortages, losses.
7. Meter readings and similar recordings.
8. Emergency procedures.
9. Orders and requests of governing authorities.
10. Change Orders received, implemented.
11. Services connected, disconnected.
12. Equipment or system tests and start-ups.
13. Partial Completions, occupancies.
14. Substantial Completions authorized.

1.7 SHOP DRAWINGS

A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.

B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:

1. Dimensions.
2. Identification of products and materials included.
3. Compliance with specified standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.
6. Sheet Size: Except for templates, patterns and similar full- size Drawings, submit Shop Drawings on sheets at least 8-1/2" x 11" but no larger than 36" x 48".
7. Initial Submittal and Resubmittals: Submit one correctable translucent reproducible and one blue- or black-line print if possible, or seven blue or black-

line prints for the Engineer's review; the reproducible print will be returned.
8. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

C. Coordination drawings are a special type of Shop Drawing that show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or function as intended.

1. Preparation of coordination Drawings is specified in section "Project Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
2. Submit coordination Drawings for integration of different construction elements. Show sequences and relationships of separate components to avoid conflicts in use of space.

1.8 PRODUCT DATA

A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."

1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:

a. Manufacturer's printed recommendations.
b. Compliance with recognized trade association standards.
c. Compliance with recognized testing agency standards.
d. Application of testing agency labels and seals.
e. Notation of dimensions verified by field measurement.
f. Notation of coordination requirements.

2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
3. Preliminary Submittal: Submit a preliminary single-copy of Product Data where selection of options is required.

4. Submittals:
   a. Submit 7 copies of each required submittal.

   b. All submittals shall also be submitted to the Engineer by Email in PDF Format. Material Samples shall be submitted and delivered to the Engineers office as specified.

   c. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

5. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.

   a. Do not proceed with installation until an approved copy of Product Data is in the installer's possession.
   b. Do not permit use of unmarked copies of Product Data in connection with construction.

1.9 SAMPLES

A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.

   1. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to match the Engineer's Sample. Include the following:

      a. Generic description of the Sample.
      b. Sample source.
      c. Product name or name of manufacturer.
      d. Compliance with recognized standards.
      e. Availability and delivery time.

   2. 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 the final submittal and the actual component as delivered and installed.

      a. Where variation in color, pattern, texture or other characteristics are inherent in the material or product represented, submit multiple units (not less than 3), that show approximate limits of the

variations.
b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
c. Refer to other Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.

3. Preliminary submittals: Where Samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.

   a. Preliminary submittals will be reviewed and retained by the Engineer. The Engineer will return written response of selections and other actions.

4. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit 3 sets; one will be returned marked with the action taken.
5. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.

   a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
   b. Sample sets may be used to obtain final acceptance of the construction associated with each set.

B. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.

1. Field Samples specified in individual Sections are special types of Samples. Field Samples are full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the Work will be judged.

   a. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.10 ENGINEER'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Engineer will review each submittal, mark to indicate action taken, and return promptly.

1. Compliance with specified characteristics is the Contractor's responsibility.

B. Action Stamp: The Engineer will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

1. Final Unrestricted Release: Where submittals are marked "No Exceptions Taken," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
2. Final-But-Restricted Release: When submittals are marked "Make Corrections Noted," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
3. Returned for Resubmittal: When submittal is marked "Amend & Resubmit or Rejected - See Remarks," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.

a. Do not permit submittals marked "Not Approved, Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.

4. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Action Not Required".

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION (Not Applicable).

END OF SECTION 01300

SECTION 01400 - QUALITY CONTROL SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for quality control services.

B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Engineer.

C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.

D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.

1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
2. Inspections, test and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
3. Requirements for the Contractor to provide quality control services required by the Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 RESPONSIBILITIES

A. Contractor Responsibilities: The Contractor shall provide inspections, tests and similar quality control services,

specified in individual Specification Sections and required by governing authorities, except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity; these services include those specified to be performed by an independent agency and not by the Contractor. Costs for these services shall be included in the Contract Sum.

1. The Contractor shall employ and pay an independent agency, to perform specified quality control services.
2. The Owner will engage and pay for the services of an independent agency to perform inspections and tests specified as the Owner's responsibility.

    a. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.

3. Retesting: The Contractor is responsible for retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.

    a. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.

4. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:

    a. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
    b. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
    c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
    d. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.

e. Security and protection of samples and test equipment at the Project site.

B. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Engineer and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.

1. The agency shall notify the Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
3. The agency shall not perform any duties of the Contractor.

C. Coordination: The Contractor and each agency engaged to perform inspections, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

1.4 SUBMITTALS

A. The independent testing agency shall submit a certified written report of each inspection, test or similar service, to the Engineer, in duplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
2. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to:

a. Date of issue.
b. Project title and number.
c. Name, address and telephone number of testing agency.
d. Dates and locations of samples and tests or inspections.

e. Names of individuals making the inspection or test.
f. Designation of the Work and test method.
g. Identification of product and Specification Section.
h. Complete inspection or test data.
i. Test results and an interpretations of test results.
j. Ambient conditions at the time of sample-taking and testing.
k. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
l. Name and signature of laboratory inspector.
m. Recommendations on retesting.

1.5 QUALITY ASSURANCE

A. Qualification for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching."

B. Protect construction exposed by or for quality control service activities, and protect repaired construction.

C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION 01400

SECTION 01501 - TEMPORARY FACILITIES - SINGLE PRIME CONTRACTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.

B. Temporary utilities required include but are not limited to:

1. Temporary electric power and light.
2. Storm and sanitary sewer.

C. Temporary construction and support facilities required include but are not limited to:

1. Temporary heat.
2. Field offices and storage sheds.
3. Sanitary facilities, including drinking water.
4. Temporary enclosures.
5. Temporary project identification signs and bulletin boards.
6. Waste disposal services.
7. Rodent and pest control.
8. Construction aids and miscellaneous services and facilities.

D. Security and protection facilities required include but are not limited to:

1. Temporary fire protection.
2. Barricades, warning signs, lights.
3. Environmental protection.

1.3 DIVISION OF RESPONSIBILITIES

A. General: Prime contractor is assigned all responsibilities for certain temporary services and facilities used by other Subcontractors, and other entities at the site. The Contractor for General Construction is responsible for providing temporary services

and facilities that are not normal construction activities of other Contractors and are not specifically assigned otherwise by the Engineer.

B. Each contractor is responsible for:

1. Installation, operation, maintenance and removal of each temporary service or facility usually considered as its own normal construction activity, as well as the costs and use charges associated with each such service or facility.
2. Plug-in electric power cords and extension cords, and supplementary plug-in task lighting and special lighting necessary exclusively for its own activities.
3. Its own field office, complete with necessary furniture, utilities and telephone service.
4. Its own storage and fabrication sheds.
5. Temporary heat, ventilation, humidity control and enclosure of the building where these utilities are necessary for its construction activity, but where these utilities have not yet been installed by the responsible prime Contractor.
6. All of their own hoisting requirements, including hoisting material or equipment into spaces below grade, and hoisting requirements outside the building enclosure.
7. Collection and disposal of its own hazardous, dangerous, unsanitary or other harmful waste material.
8. Secure lockup of its own tools, materials and equipment.
9. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
10. Temporary telephone service.

C. The Single Prime Contractor is responsible for:

1. Temporary toilets, including disposable supplies.
2. Temporary wash facilities, including disposable supplies.
3. Containerized bottled-water type drinking water units.
4. Temporary enclosure of the building.
5. Project identification and temporary signs.
6. General collection and disposal of wastes.
7. Rodent and pest control.
8. Barricades, warning signs and lights.
9. Security enclosure and lockup.
10. Environmental protection.
11. Temporary heat, upon enclosure of the building.
12. Temporary ventilation, upon enclosure of the building.

D. The Mechanical Subcontractor is responsible for:

1. Piped temporary water service.
2.

E. The Electrical Subcontractor is responsible for:

1. Temporary electric power service and distribution.
2. Temporary lighting.

1.4 USE CHARGES

A. General: Cost or use charges for temporary facilities are not chargeable to the Owner or Engineer; Prime Contractor's cost or use charges for temporary services or facilities will not be accepted as a basis of claim for an adjustment in the Contract Sum or Contract Time.

B. Water Service: The Owner shall pay water service use charges.

C. Electric Power Service: The Owner shall pay electric power service use charges.

D. Except for those mentioned above the cost of providing and using any additional temporary services and facilities, including use charges, is solely to be borne by the Contractor for General Construction and shall be totally included in the Contract Sum.

E. Other entities using temporary services and facilities include, but are not limited to:

1. Other Subcontractors.
2 The Owner's work forces.
3. Occupants of the Project.
4. The Engineer.
5. Testing agencies.
6. Personnel of government agencies.

1.5 SUBMITTALS

A. Temporary Utilities: Each contractor shall submit reports of tests, inspections, meter readings and similar procedures performed on temporary utilities.

1.6 QUALITY ASSURANCE

A. Regulations: Each Subcontractor shall comply with industry standards and with applicable laws and regulations of authorities having jurisdiction, including but not limited to:

1. Building code requirements.
2. Health and safety regulations.
3. Utility company regulations.

4. Police, Fire Department and Rescue Squad rules.
5. Environmental protection regulations.

B. Standards: Each contractor shall comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities."

1. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by AGC and ASC for industry recommendations.
2. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with the normal application of trade regulations and union jurisdictions.
3. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).

C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.7 PROJECT CONDITIONS

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

1. Temporary use of permanent facilities: The Installer of each permanent service or facility shall assume responsibility for its operation, maintenance and protection during its use as a construction service or facility prior to the Owner's acceptance, regardless of previously assigned responsibilities.

B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

1.8 PROVISIONS FOR CONTRACTORS EMPLOYEES

A. It is required that all construction employees comply with The following rules.

1. Construction employees are to use their own toilet

facilities.
2. There is to be no smoking on the property.
3. Areas inside and out including streets and sidewalks surrounding construction, in which construction personnel are working or otherwise using, shall be policed daily to keep same free from debris, dust, mud, etc.
4. All construction personnel will conduct themselves in an unimpeachable manner while on the construction site, including proper language, etc.
5. All requirements of Occupational Safety and Health Act will be followed implicitly.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Each Subcontractor shall provide new materials; if acceptable to the Engineer, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.

B. Lumber and Plywood: Comply with requirements in Division-6 Section "Rough Carpentry."

1. For signs and directory boards, provide exterior type, Grade B-B High Density Concrete Form Overlay Plywood conforming to PS-1, of sizes and thickness indicated.
2. For fences and vision barriers, provide exterior type, minimum 3/8" thick plywood.
3. For safety barriers, similar uses, provide minimum 5/8" thick exterior plywood.

C. Water: Provide potable water approved by local health authorities.

D. Open-Mesh Fencing: Provide 11-gage, galvanized 2-inch, chain link fabric fencing 6 feet high with galvanized barbed wire top strand and galvanized steel pipe posts, 1-1/2" I.D. for line posts, and 2-1/2" I.D. for corner posts.

2.2 EQUIPMENT

A. General: Each Subcontractor shall provide new equipment; if acceptable to the Engineer, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for the use intended.

B. Water Hoses: Provide 3/4" heavy-duty, abrasion-resistant, flexible rubber hoses 100 ft. long, with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose

discharge.

C. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 125 volt AC plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.

D. Electrical Power Cords: Provide grounded extension cords, no less than 50 feet long; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.

E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.

F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM or another recognized trade association related to the type of fuel being consumed.

G. Temporary Offices: Contractor shall provide its own prefabricated or mobile units with lockable entrances, operable windows and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.

H. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material.

I. First Aid Supplies: Comply with regulations of authorities having jurisdiction.

J. Fire Extinguishers: Provide hand-carried, portable, UL-rated, class A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended types for the exposures.

1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they serve the project adequately and result in minimum interference with performance of construction activities. Relocate and modify facilities as required.

B. Each Subcontractor shall 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 the appropriate local utility company to install temporary service or connect to existing service. Where the company provides only part of the service, provide the remainder with matching, compatible materials and equipment; comply with the company's recommendations.

1. Arrange with the company and existing users for a time when service can be interrupted, where necessary, to make connections for temporary services.
2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.

B. Water Service: Install water service distribution piping of sizes and pressures adequate for construction until permanent water service is in use. The Owner will provide the source for the required construction water.

1. Sterilization: Sterilize temporary water piping prior to use.

C. Temporary Electric Power Service: The Owner will provide the source for temporary electrical service for power and lights. The Electrical Contractor will have the responsibility of installing all temporary wiring, panels, and devices for this system in compliance with all applicable safety regulations, and the National Electric Code.

1. Receptacles for power supply shall be provided within 100 feet of any point of the new building. Each Contractor or Trade in need thereof shall furnish any necessary extension cords to reach from the nearest outlet/s to his construction activity.

2. Adequate temporary lighting shall be continuously provided in all work areas for all contractors on the Project when conditions of enclosure merit this illumination.
3. The Electrical Contractor shall also provide, as needed: Area floor lights, guard lights at barricades, lighted drives and walks at all locations of hazard to the public and the construction personnel.
4. The Electrical Contractor shall be ultimately responsible for removal of all other temporary electric power system wiring and equipment related thereto at such time when turnover to permanent system is available.

D. Temporary Telephones: Provide temporary telephone service for all personnel engaged in construction activities, throughout the construction period. Install telephone on a separate line for each temporary office and first aid station. Where an office has more than two occupants, install a telephone for each additional occupant or pair of occupants.

1. At each telephone, post a list of important telephone numbers.

E. 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 the site in a lawful manner.

1. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge.
2. Connect temporary sewers to the municipal system as directed by the sewer department officials.
3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.

F. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

3.3 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

A. Locate field offices, storage sheds, sanitary facilities and other temporary construction and support facilities in locations as directed by Owner and Engineer.

1. Maintain temporary construction and support facilities until near Substantial Completion. Remove prior to Substantial Completion.

B. Provide incombustible construction for offices, shops and sheds located within the construction area, or within 30 feet of building lines. Comply with requirements of NFPA 241.

C. Temporary Heat: Provide temporary heat required by construction activities, for curing or drying of completed installations, or protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.

D. Heating Facilities: Except where use of the permanent system is authorized, provide properly vented self-contained LP gas or fuel oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, or open burning or salamander type heating units is prohibited.

E. Field Offices: The Prime Contractor for General Construction shall provide an insulated, weathertight temporary office of sufficient size to accommodate required office personnel at the Project site.
Keep the office clean and orderly for use for small progress meetings.

1. The Contractor for General Construction shall provide, either as a part of its field office, or as a separate facility, a conference area for project meetings. Furnish the room with a conference table, 8 folding chairs and a tackboard.

F. Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.

1. The Contractor for General Construction shall provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.

G. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.

H. Drinking Water Facilities: The Contractor for General Construction shall provide containerized tap-dispenser bottled-water type drinking water units, including paper supply.

I. Temporary Enclosures: Provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities.

1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 square feet or less with plywood or similar materials.
3. Close openings through floor or roof decks and horizontal surfaces with load-bearing wood-framed construction.

J. Project Identification and Temporary Signs: Prepare project identification and other signs as required; install in a location to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative treated wood or steel. Do not permit installation of unauthorized signs.

1. Project Identification Signs: Engage an experienced sign painter to apply graphics.
2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.

K. Building and Project Area Clean-up: Debris clean-up in connection with the work being done under the requirements of all Contracts shall be an administrative responsibility of the Contractor for General Construction; subject to the conditions stated in Paragraph 2 below.

The intent of clean-up assigned to the Contractor for General Construction is both interior and exterior area policing of the project done under the supervision of the Engineer. The clean-up and disposal by each Contractor and Subcontractor of boxes, wrappings, scraps of wall board, plaster, and masonry materials, metal waste, etc., shall be the responsibility of the relevant contractor or subcontractor involved. The project must be kept clean on a daily basis. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27

deg C). The frequency of clean-up will be strictly enforced by the Engineer.

If the Engineer and the Owner are in agreement that the project is not being kept sufficiently clean and that debris and/or other discarded materials impede the construction process or the completion of occupancy, the Engineer shall have the authority under this Contract to take means necessary to remedy this situation; such as hiring others to clean-up or move debris and/or materials whereby the entire cost of the above is to be charged against that Contractor whom in the Engineer's opinion is derelict.

Demolition debris and other bulky solid waste material shall be legally disposed of off the premises by the responsible Contractor. Comply with the requirements of NFPA 241 for removal of combustible waste material and debris.

L. Rodent and Pest Control: Before deep foundation Work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches and other pests. Employ this service to perform extermination and control procedures at regular intervals so the Project will be relatively free of pests and their residues at Substantial Completion. Perform control operations in a lawful manner using environmentally safe materials.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. General: Do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer as requested by the Engineer.

B. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."

1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
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 fighting fires. Prohibit smoking in hazardous fire exposure areas.

4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.

C. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public, of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.

D. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.

1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

E. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.5 OPERATION, TERMINATION AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B. Maintenance: Maintain facilities and good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.
2. Protection: Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. Termination and Removal: Unless the Engineer requests that

it be maintained longer, remove each temporary facility when the need has ended, or when 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 the temporary facility. Repair damaged Work, clean exposed surfaces and replace Work which cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of each Contractor. The Owner reserves the right to take possession of project identification signs.
2. At Substantial Completion, clean and renovate permanent facilities that have been used during the construction period, including but not limited to:
3. Replace air filters and clean inside of ductwork and housings.

    a. Replace significantly worn parts and parts that have been subject to unusual operating conditions.
    b. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

END OF SECTION 01501

SECTION 01600 - MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements governing each Prime Contractor's selection of products for use in the Project.

B. Standards: Refer to Section "Definitions and Standards" for applicability of industry standards to products specified.

C. Administrative procedures for handling requests for substitutions made after award of the Contract are included under Section "Product Substitutions."

1.3 DEFINITIONS

A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms such are self-explanatory and have well recognized meanings in the construction industry.

1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

    a. "Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.

2. "Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
3. "Equipment" is a product with operational parts, whether

motorized or manually operated, that requires service connections such as wiring or piping.

1.4 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.

B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each prime Contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other prime or separate Contractors.
2. If a dispute arises between prime Contractors over concurrently selectable, but incompatible products, the Engineer will determine which products shall be retained and which are incompatible and must be replaced.

C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:

a. Name of product and manufacturer.
b. Model and serial number.
c. Capacity.
d. Speed.
e. Ratings.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.

1. Schedule delivery to minimize long-term storage at the 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 the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
4. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected.
5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
6. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.

1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include the following:

1. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted.
2. Semiproprietary Specification Requirements: Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted.

a. Where products or manufacturers are specified by name, accompanied by the term "or equal," or "or approved equal" comply with the Contract Document

provisions concerning "substitutions" to obtain approval for use of an unnamed product.

3. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.

    a. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.

6. Compliance with Standards, Codes and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.
7. Visual Matching: Where Specifications require matching an established Sample, the Engineer's decision will be final on whether a proposed product matches satisfactorily.

    a. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category, or for noncompliance with specified requirements.

8. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Engineer will select the color, pattern and texture from the product line selected.

9. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division-1 for allowances that control product selection, and for procedures required for processing such selections.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS:

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01600

SECTION 01631 - PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling requests for substitutions made after award of the Contract.

1. Single Prime Contracts: Provisions of this Section apply to the construction activities of prime Contractor.

B. Standards: Refer to Section "Definitions and Standards" for applicability of industry standards to products specified.

C. Procedural requirements governing the Contractor's selection of products and product options are included under Section "Materials and Equipment."

1.3 DEFINITIONS

A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.

B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for "substitutions." The following are not considered substitutions:

1. Substitutions requested by Bidders during the bidding period, and accepted prior to award of Contract, are considered as included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
2. Revisions to Contract Documents requested by the Owner or Engineer.
3. Specified options of products and construction methods included in Contract Documents.
4. The Contractor's determination of and compliance with

governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

A. Substitution Request Submittal: Requests for substitution will be considered if received the first application for payment. Requests received after this time may be considered or rejected at the discretion of the Engineer.

1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required for Change Order proposals.
2. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

a. Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
b. Samples, where applicable or requested.
c. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
d. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors, that will become necessary to accommodate the proposed substitution.
e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
f. Cost information, including a proposal of the net change, if any in the Contract Sum.
g. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time, that may subsequently become necessary because of the failure of the substitution to perform adequately.

3. Engineer's Action: Within one week of receipt of the

request for substitution, the Engineer will request additional information or documentation necessary for evaluation of the request. Within 2 weeks of receipt of the request, or one week of receipt of the additional information or documentation, which ever is later, the Engineer will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name. Acceptance will be in the form of a Change Order.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Conditions: The Contractor's substitution request will be received and considered by the Engineer when one or more of the following conditions are satisfied, as determined by the Engineer; otherwise requests will be returned without action except to record noncompliance with these requirements.

1. Extensive revisions to Contract Documents are not required.
2. Proposed changes are in keeping with the general intent of Contract Documents.
3. The request is timely, fully documented and properly submitted.
4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
5. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
7. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Engineer for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.
8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
9. The specified product or method of construction cannot

be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.

10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.
11. Where a proposed substitution involves more than one prime Contractor, each Contractor shall cooperate with the other Contractors involved to coordinate the Work, provide uniformity and consistency, and to assure compatibility of products.

B. The Contractor's submittal and Engineer's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01631

SECTION 01700 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:

1. Inspection procedures.
2. Submittal of warranties.
3. Final cleaning.

B. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions-2 through -16.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.

1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.

    a. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.

2. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
3. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.

4. Submit record drawings, maintenance manuals and similar final record information.
5. Deliver tools, spare parts, extra stock, and similar items.
6. Make final change-over of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of change-over in security provisions.
7. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
8. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.

B. Inspection Procedures: On receipt of a request for inspection, the Engineer will either proceed with inspection or advise the Contractor of unfilled requirements. The Engineer will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Engineer will repeat inspection when assured that the Work has been substantially completed.
2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
3. Submit a certified copy of the Engineer's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Engineer.
4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the Work.
5. Submit consent of surety to final payment.
6. Submit evidence of final, continuing insurance coverage

complying with insurance requirements.

B. Reinspection Procedure: The Engineer will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Engineer.

1. Upon completion of reinspection, the Engineer will prepare a certificate of final acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
2. If necessary, reinspection will be repeated.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record documents.
3. Spare parts and materials.
4. Tools.
5. Lubricants.
6. Fuels.
7. Identification systems.
8. Control sequences.
9. Hazards.
10. Cleaning.
11. Warranties and bonds.
12. Maintenance agreements and similar continuing commitments.

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Start-up.
2. Shutdown.
3. Emergency operations.
4. Noise and vibration adjustments.
5. Safety procedures.
6. Economy and efficiency adjustments.
7. Effective energy utilization.

3.2 FINAL CLEANING

A. General: General cleaning during construction is required by the General Conditions and included in Section "Temporary Facilities".

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

1. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.

a. Remove labels that are not permanent labels.
b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
e. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

C. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

1. Where extra materials of value remaining after

completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

END OF SECTION 01700

SECTION 01720 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for Project Record Documents.

B. Project Record Documents required include:

1. Marked-up copies of Contract Drawings.
2. Marked-up copies of Shop Drawings.
3. Maintenance Manuals.
4. Scan PDF set of As-Built Record Drawings

C. Specific record copy requirements that expand requirements of this Section are included in the individual Sections of Divisions-2 through -16.

D. General project closeout requirements are included in Section "Project Closeout."

E. General requirements for submittal of Project Record Documents are included in Section "Submittals."

F. Each Contractor is responsible for obtaining, maintaining, and recording Project Record Document information for its own part of the Work. The Contractor for General Construction is responsible for coordination of Project Record Document information, where information from more than one prime Contractor is indicated to be integrated to form one combined record of the Work.

1.3 RECORD DOCUMENTS

A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure location; provide access to record documents for the Engineer's reference during normal working hours.

1.4 RECORD DRAWINGS

A. Mark-up Procedure: During the construction period, maintain a set of blue- or black-line white-prints of Contract Drawings and Shop Drawings for Project Record Document purposes.

1. Mark these Drawings to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements which would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:

    a. Dimensional changes to the Drawings.
    b. Revisions to details shown on the Drawings.
    c. Depths of foundations below the first floor.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by Change Order.
    k. Details not on original Contract Drawings.

2. Mark completely and accurately record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.
3. Mark record sets with red erasable colored pencil; use other colors to distinguish between changes for different categories of the Work at the same location.
4. Mark important additional information which was either shown schematically or omitted from original Drawings.
5. Note construction change directive numbers, alternate numbers, Change Order numbers and similar identification.
6. Submit the marked-up record set to the Engineer for Owner's records.
7. Submit CD containing electronic PDF as-built record prints at original full scale size.

1.5 MAINTENANCE MANUAL SUBMITTAL

A. When each construction activity that requires submittal of maintenance manuals is nominally complete, but before Substantial Completion, submit 3 copies of maintenance manuals specified.

1. Organize operating and maintenance manuals into suitable sets of manageable size.
2. Bind data into individual binders for each manual, properly identified on front and spine. For large manuals, provide an index sheet and thumb tabs for separate information categories.
3. Provide vinyl-covered, heavy-duty back cover mounted 3-ring slant type binders, 1" to 2" thick as required to contain information, sized for 8-1/2" x 11" paper with inside pockets or pocket folders for folded sheets.
4. In each maintenance manual include information specified in individual Specification Sections and the following:

    a. Emergency instructions.
    b. Spare parts list.
    c. Copies of specific warranties.
    d. Wiring diagrams.
    e. Recommended maintenance procedures and turn-around times.
    f. Inspection and system-test procedures.
    g. Copies of applicable Shop Drawings and Product Data.
    h. Listing of required maintenance materials and services.
    i. Names and addresses of sources of maintenance materials.
    j. Maintenance Drawings and diagrams.
    k. Precautions against improper maintenance and exposure.

5. Manuals for mechanical and electrical equipment items shall include the following additional information:

    a. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
    b. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operation instructions.
    c. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
    d. Servicing instructions and lubrication charts and schedules.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION

3.1 RECORDING

A. Post changes and modifications to the Documents as they occur. Do not wait until the end of the Project. The Engineer may periodically review record documents to assure compliance with this requirement.

END OF SECTION 01720

SECTION 02110 - SITE CLEARING

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 but is not limited to the following:

1. Protection of existing trees.
2. Removal of trees and other vegetation.
3. Topsoil stripping.
4. Clearing and grubbing.
5. Removing above-grade improvements.
6. Removing below-grade improvements.

1.3 PROJECT CONDITIONS

A. Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.

1. Protect improvements on adjoining properties and on Owner's property.
2. Restore damaged improvements to their original condition, as acceptable to property owners.

C. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

1. Water trees and other vegetation to remain within limits of contract work as required to maintain their health

during course of construction operations.

2. Provide protection for roots over 1-1/2 inch diameter that are cut during construction operations. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.
3. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Engineer.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

2.1 SITE CLEARING

A. General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as required to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. "Removal" includes digging out and off-site disposing of stumps and roots.

1. 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.

B. Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.

1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.

a. Remove heavy growths of grass from areas before stripping.
b. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.

2. Stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent wind erosion.

C. Clearing and Grubbing: Clear site of trees, shrubs and other

vegetation, except for those indicated to be left standing.

1. Completely remove stumps, roots, and other debris protruding through ground surface.
2. Use only hand methods for grubbing inside drip line of trees indicated to remain.
3. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

    a. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact to a density equal to adjacent original ground.

D. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.

1. Abandonment or removal of certain underground pipe or conduits may be indicated on mechanical or electrical drawings, and is included under work of related Division 15 and 16 sections. Removal of abandoned underground piping or conduit interfering with construction is included under this Section.
2. Removal of the existing adjacent building shall be completed In compliance with all applicable codes and government regulatory requirements. Contractor to obtain all approvals and pay for all permits and application fees required.

2.2 DISPOSAL OF WASTE MATERIALS

A. Burning on Owner's Property: Burning is not permitted on Owner's property.

B. Removal from Owner's Property: Remove waste materials and unsuitable or excess topsoil from Owner's property.

END OF SECTION 02110

SECTION 02200 - EARTHWORK

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 Earthwork as shown on the Drawings and specified herein.

B. Related Sections: The following Sections contain requirements that relate to this Section.

1. Division 2 Section "Site Clearing" for site stripping, grubbing, topsoil removal, and tree protection.

1.3 DEFINITIONS

A. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.

B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, or topsoil materials.

C. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.

D. Backfill and Fill: The soil material used to raise subgrades or excavations to required elevations prior to placing subbase or topsoil material.

E. Subbase Course: The layer of material placed upon the subgrade to support a structure.

F. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at the Contractor's expense.

G. Structures: Buildings, footings, foundations, retaining walls, slabs, pavements, tanks, curbs, mechanical and

electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

H. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.

B. Testing and Inspection Service: Owner will employ at his discretion a qualified independent geotechnical engineering testing agency to classify proposed on-site and borrow soils to verify that soils comply with specified requirements and to perform required field and laboratory testing.

1.5 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the Owner or others except when permitted in writing by the Engineer and then only after acceptable temporary utility services have been provided.

1. Provide a minimum 48-hours' notice to the Engineer and receive written notice to proceed before interrupting any utility.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations.

B. Satisfactory Soil Materials: ASTM D 2487 soil classification groups CL, GC, GW, GM, ML, SC, SM, and SW; free of rock or gravel larger than 1 inch in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.

C. Unsatisfactory Soil Materials: ASTM D 2487 soil classification groups GP, SP, MH, CH, OL, OH, and PT.

D. Backfill and Fill Materials: As indicated on Drawings or specified under "Part 3 - Execution" of this Section. If not indicated or specified use satisfactory soil materials.

E. Subbase Material:

1. Under Slabs-on-grade: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate grading size 57, with 100 percent passing a 1-1/2 inch sieve and not more than 5 percent passing a No. 8 sieve.
2. Under Walks: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, ASTM D 2940, with at least 98 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, ASTM D 2940, with at least 98 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Tree protection is specified in the Division 2 Section "Site Clearing."

3.2 DEWATERING

A. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

3.3 EXCAVATION

A. Excavation is unclassified and includes excavation to required subgrade elevations regardless of the character of materials and obstructions encountered.

B. Explosives: Do not use explosives.

3.4 STABILITY OF EXCAVATIONS

A. Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.10 foot. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated slopes, lines, depths, and invert elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit unless otherwise indicated.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove stones and sharp objects to avoid point loading.

3.8 APPROVAL OF SUBGRADE

A. Notify Engineer when excavations have reached required subgrade.

B. When Engineer determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted engineered fill or lean concrete fill (2000 psi) as directed.

1. Unforeseen additional excavation and replacement material will be paid according to the Contract provisions for changes in Work.

C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Engineer.

3.9 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevation of concrete foundation or footing to excavation bottom, without altering required top elevation. Lean concrete fill (2000 psi) may be used to bring elevations to proper position when acceptable to the Engineer.

1. Fill unauthorized excavations under other construction as directed by the Engineer.

3.10 STORAGE OF SOIL MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent wind-blown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

A. Backfill excavations promptly, but not before completing the following:

1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.

2. Surveying locations of underground utilities for record documents.
3. Testing, inspecting, and approval of underground utilities.
4. Concrete formwork removal.
5. Removal of trash and debris from excavation.
6. Removal of temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.12 UTILITY TRENCH BACKFILL

A. Place and compact bedding course on rock and other unyielding bearing surfaces and to fill unauthorized excavations. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

B. Concrete backfill trenches that carry below or pass under footings and that are excavated within 18 inches of footings. Place concrete to level of bottom of footings.

C. Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or conduit.

1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.

D. Coordinate backfilling with utilities testing.

E. Place and compact final backfill of satisfactory soil material to final subgrade.

3.13 FILL

A. Preparation: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills.

1. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing surface.

B. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface to depth required, pulverize, moisture-condition or aerate soil and recompact to required density.

C. Place fill material in layers to required elevations for each location listed below.

1. Under grass, use satisfactory excavated or borrow soil material.
2. Under building slabs and walks use satisfactory excavated or borrow soil material to establish subgrade elevation, then place subbase course of thickness indicated.
3. Under footings and foundations, use engineered fill.

3.14 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to specified density.

a. Stockpile or spread and dry removed wet satisfactory soil material.

3.15 COMPACTION

A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.

C. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to ASTM D 698:

1. Under structures, building slabs, steps, and pavements, compact the top 12 inches below subgrade and each layer of backfill or fill material at 100 percent maximum dry density.
2. Under walkways, compact the top 6 inches below subgrade and each layer of backfill or fill material at 98 percent maximum dry density.
3. Under lawn or unpaved areas, compact each layer of backfill or fill material at 90 percent maximum dry density.

3.16 GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between existing adjacent grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 0.10 foot.
2. Walks: Plus or minus 0.10 foot.
3. Pavements: Plus or minus 1/2 inch.

C. Grading Inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.17 SUBBASE COURSES

A. Place subbase course material on prepared subgrades.

1. Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections and thickness.
2. When thickness of compacted subbase course is 6 inches or less, place materials in a single layer.
3. When thickness of compacted subbase course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.

3.18 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace material to depth directed by the Engineer; reshape and recompact at optimum

moisture content to the required density.

C. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION 02200

SECTION 02282 - TERMITE CONTROL

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. Provide soil treatment for termite control, as herein specified.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and application instructions.

1.4 QUALITY ASSURANCE

A. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for work, including preparation of substrate and application.

B. Engage a professional pest control operator, licensed in accordance with regulations of governing authorities for application of soil treatment solution.

C. Use only termiticides which bear a Federal registration number of the U.S. Environmental Protection Agency.

1.5 JOB CONDITIONS

A. Restrictions: Do not apply soil treatment solution until excavating, filling and grading operations are completed, except as otherwise required in construction operations.

B. To insure penetration, do not apply soil treatment to frozen or excessively wet soils or during inclement weather. Comply with handling and application instructions of the soil toxicant manufacturer.

1.6 SPECIFIC PRODUCT WARRANTY

A. Furnish written warranty certifying that applied soil termiticide treatment will prevent infestation of subterranean termites and, that if subterranean termite activity is discovered during warranty period, Contractor will re-treat soil and repair or replace damage caused by termite infestation.

1. Provide warranty for a period of 5 years from date of treatment, signed by Applicator and Contractor.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT SOLUTION

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 APPLICATION

A. Surface Preparation: Remove foreign matter which could decrease effectiveness of treatment on areas to be treated. Loosen, rake and level soil to be treated, except previously compacted areas under slabs and foundations. Toxicants may be applied before placement of compacted fill under slabs, if recommended by toxicant manufacturer.

B. Application Rates: Apply soil treatment solution as follows:

C. Under new slab-on-grade structures, treat soil before concrete slabs are placed, using the following rates of application:

1. Apply 4 gallons of chemical solution per 10 lin. ft. to soil in critical areas under slab, including entire inside perimeter inside of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating slab, and around interior column footers.
2. Apply one gallon of chemical solution per 10 sq. ft. as an overall treatment under slab and attached slab areas where fill is soil or unwashed gravel. Apply 1-1/2 gallons of chemical solution to areas where fill is washed gravel or other coarse absorbent material.
3. Apply 4 gallons of chemical solution per 10 lin. ft. of trench, for each foot of depth from grade to footing, along outside edge of building. Dig a trench 6" to 8" wide along outside of foundation to a depth of not less than 12". Punch holes to top of footing at not more than 12" o.c. and apply chemical solution. Mix chemical solution with the soil as it is being replaced in trench.

D. At expansion joints, control joints, and areas where slabs will be penetrated, apply at rate of 4 gals. per 10 lin. ft. of penetration.

E. Post signs in areas of application to warn workers that soil termiticide treatment has been applied. Remove signs when areas are covered by other construction.

F. Reapply soil treatment solution to areas disturbed by subsequent excavation, landscape grading, or other construction activities following application.

END OF SECTION 02282

SECTION 02730 - FACILITY SANITARY SEWERS

PART 1 - GENERAL

1.1 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Nonpressure, Drainage-Piping Pressure Rating: 10-foot head of water.

1.2 SUBMITTALS

A. Product Data: For the following:

1. Pipe fittings.

B. Shop Drawings: For the following:

1.3 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic pipe, and fittings in direct sunlight.
B. Protect pipe, pipe fittings, and seals from dirt and damage.

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. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PVC PIPE AND FITTINGS

A. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D 3034, SDR 35, with bell-and-spigot ends for gasketed joints with ASTM F 477, elastomeric seals.

2.3 NONPRESSURE-TYPE PIPE COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant-metal tension band and tightening mechanism on each end.
B. Sleeve Materials:

1. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
2. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

2.4 CLEANOUTS

A. Gray-Iron Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug. Similar to Zurn Z-1440-BP-PW. Provide two (2) plug wrenches to Owner.

1. Manufacturers:

a. Josam Company.
b. MIFAB Manufacturing Inc.
c. Smith, Jay R. Mfg. Co.
d. Wade Div.; Tyler Pipe.
e. Watts Industries, Inc.
f. Watts Industries, Inc.; Enpoco, Inc. Div.
g. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.

2. Top-Loading Classifications:
a. Light Duty: In earth or grass foot-traffic areas.
b. Medium Duty: In paved foot-traffic areas.
c. Heavy Duty: In vehicle-traffic service areas.
d. Extra-Heavy Duty: In roads.

3. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Gravity-Flow, Nonpressure Sewer Piping: Use the following pipe materials for each size range:

1. PVC sewer pipe and fittings, gaskets, and gasketed joints.

3.2 PIPING INSTALLATION

A. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and

couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.

B. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

C. Install gravity-flow, nonpressure, drainage piping according to the following:

1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.
2. Install piping with 36-inch minimum cover, unless otherwise indicated.
3. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.

3.3 PIPE JOINT CONSTRUCTION

A. Where specific joint construction is not indicated, follow piping manufacturer's written instructions.

B. Join gravity-flow, nonpressure, drainage piping according to the following:

1. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
2. Join PVC profile gravity sewer piping according to ASTM D 2321 for elastomeric-seal joints or ASTM F 794 for gasketed joints.
3. Join dissimilar pipe materials with nonpressure-type, flexible couplings.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

1. Use light-duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
2. Use medium-duty, top-loading classification cleanouts in paved foot-traffic areas.
3. Use heavy-duty, top-loading classification cleanouts in vehicle-traffic service areas.
4. Use extra-heavy-duty, top-loading classification cleanouts in roads.

B. Set cleanout frames and covers in earth in cast-in-place-concrete, 24 by 24 by 12 inches deep. Set with tops 1 inch above surrounding grade.

C. Set cleanout frames and covers in concrete pavement with tops flush with pavement surface.

3.5 CONNECTIONS

A. Make connections to existing piping and underground manholes.

1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
3. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

B. Connect to interceptors, as indicated.

3.6 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate report for each system inspection.
2. Defects requiring correction include the following:

    a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    c. Crushed, broken, cracked, or otherwise damaged piping.
    d. Infiltration: Water leakage into piping.
    e. Exfiltration: Water leakage from or around piping.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems according to requirements of authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit separate report for each test.
5. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction and the following:

a. Allowable leakage is maximum of 50 gal./inch of nominal pipe size per mile of pipe, during 24-hour period.
b. Close openings in system and fill with water.
c. Purge air and refill with water.
d. Disconnect water supply.
e. Test and inspect joints for leaks.
f. Option: Test ductile-iron piping according to AWWA C600, "Hydrostatic Testing" Section. Use test pressure of at least 10 psig.

C. Leaks and loss in test pressure constitute defects that must be repaired.

3.7 CLEANING

A. Clean interior of piping of dirt and superfluous material.

END OF SECTION 331313

SECTION 02740 - STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Nonpressure, Drainage-Piping Pressure Rating: 10-foot head of water. Pipe joints shall be at least silttight, unless otherwise indicated.

1.2 SUBMITTALS

A. Product Data: For the following:

1. Pipe and Fittings.

B. Shop Drawings: For the following:
1. Catch Basins and Stormwater Inlets.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic pipe, and fittings in direct sunlight.
B. Protect pipe, pipe fittings, and seals from dirt and damage.
C. Handle manholes according to manufacturer's written rigging instructions.
D. Handle catch basins and stormwater inlets according to manufacturer's written rigging instructions.

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. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
2.

2.2 PVC PIPE AND FITTINGS

A. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D 3034, SDR 35, with bell-and-spigot ends for gasketed joints with ASTM F 477, elastomeric seals.

2.3 CONCRETE PIPE AND FITTINGS

A. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76, with bell-and-spigot or groove and tongue ends and gasketed joints with ASTM C 443, rubber gaskets.

1. Class III, Wall B.

2.4 NONPRESSURE-TYPE PIPE COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:

1. For Concrete Pipes: ASTM C 443, rubber.
2. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
3. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
4. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

C. Unshielded Flexible Couplings: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.

1. Manufacturers:

a. Dallas Specialty & Mfg. Co.
b. Fernco Inc.
c. Logan Clay Products Company (The).
d. Mission Rubber Company; a division of MCP Industries, Inc.
e. NDS Inc.
f. Plastic Oddities, Inc.
g. Material: ASTM A 536, Grade 60-40-18 ductile iron, unless otherwise indicated.

2.5 PIPE OUTLETS

A. Head Walls: Cast-in-place reinforced concrete, with apron and tapered sides.

B. Riprap Basins: Broken, irregular size and shape, graded stone according to NSSGA's "Quarried Stone for Erosion and Sediment Control."

1. Average Size: 8″ – 12″ minimum 12″ thick.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Pipe couplings and special pipe fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.

1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping, unless otherwise indicated.

a. Unshielded flexible couplings for same or minor difference OD pipes.
b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.

3.2 PIPING INSTALLATION

A. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
B. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
C. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
D. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both.
E. Install gravity-flow, nonpressure drainage piping according to the following:

1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.
2. Install piping with 24-inch minimum cover, unless otherwise indicated.
3. Install ductile-iron culvert piping according to ASTM A 716.
4. Install corrugated steel piping according to ASTM A 798/A 798M.
5. Install PE corrugated sewer piping according to CPPA's "Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings."
6. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.
7. Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."

3.3 PIPE JOINT CONSTRUCTION

A. Where specific joint construction is not indicated, follow piping manufacturer's written instructions.
B. Join gravity-flow, nonpressure drainage piping according to the following:

1. Join ductile-iron culvert piping according to AWWA C600 for push-on joints.
2. Join corrugated steel sewer piping according to ASTM A 798/A 798M.
3. Join corrugated PE piping according to CPPA 100 and the following:

   a. Use silttight couplings.

4. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric gasket joints.
5. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasket joints.
6. Join dissimilar pipe materials with nonpressure-type flexible couplings.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

1. Use light-duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
2. Use medium-duty, top-loading classification cleanouts in paved foot-traffic areas.
3. Use heavy-duty, top-loading classification cleanouts in vehicle-traffic service areas.
4. Use extra-heavy-duty, top-loading classification cleanouts in roads areas.

B. Set cleanout frames and covers in earth in cast-in-place concrete, 24 by 24 by 12 inches deep. Set with tops 1 inch above surrounding earth grade.
C. Set cleanout frames and covers in concrete pavement with tops flush with pavement surface.

3.5 CATCH BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated.
B. Set frames and grates to elevations indicated.

3.6 STORMWATER INLET AND OUTLET INSTALLATION

A. Construct inlet head walls, aprons, and sides of reinforced concrete, as indicated.
B. Construct riprap of broken stone, as indicated.

3.7 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping in building's storm building drains.

3.8 IDENTIFICATION

A. Materials and their installation are specified in Division 31 Section "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

    1. Use warning tape over ferrous piping.
    2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.9 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

    1. Submit separate reports for each system inspection.
    2. Defects requiring correction include the following:

        a. Alignment: Less than full diameter of inside of pipe is visible between structures.
        b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
        c. Crushed, broken, cracked, or otherwise damaged piping.
        d. Infiltration: Water leakage into piping.
        e. Exfiltration: Water leakage from or around piping.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

    1. Do not enclose, cover, or put into service before inspection and approval.
    2. Test completed piping systems according to authorities having jurisdiction.
    3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
    4. Submit separate report for each test.

5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:

    a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
    b. Option: Test plastic piping according to ASTM F 1417.
    c. Option: Test concrete piping according to ASTM C 924.

C. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.10 CLEANING

A. Clean interior of piping of dirt and superfluous materials.

END OF SECTION 334100

SECTION 02930 - LAWNS AND GRASSES

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. Extent of lawns and grasses is shown on drawings.

B. Types of work required include following:

1. Fine grading and preparing of lawn areas.
2. Furnishing and applying new topsoil.
3. Furnishing and applying fertilizers.
4. Seeding new lawn areas.
5. Replanting unsatisfactory or damaged lawns.

C. Refer to earthwork sections in this Division for requirements of general excavation, filling, and grading in areas to receive lawns and grasses.

D. Topsoil shall be stockpiled for reuse in lawns and grasses. Amount of existing topsoil is insufficient, provide additional topsoil to complete lawns and grasses.

1.3 SUBMITTALS

A. Certification of Grass Seed: Submit seed vendor's certified statement for each grass seed mixture required, stating botanical and common name, percentage by weight, and percentages of purity, germination, and weed seed for each grass seed species.

1.4 JOB CONDITIONS

A. Planting Time: Sow lawn seed only during normal planting seasons for each type of lawn work required. Correlate planting with specified maintenance periods to provide required maintenance from date of substantial completion.

1.5 SPECIAL PROJECT WARRANTY

A. Warranty lawns and grasses through specified maintenance period and until final acceptance.

PART 2 - PRODUCTS

2.1 ADDITIONAL TOPSOIL

A. Provide topsoil that is fertile, friable, naturally loamy, surface soil; reasonably free of subsoil, clay lumps, brush, weeds, and other litter; and free of roots, stumps, stones larger than 1-1/2 inches in any dimension, and other extraneous or toxic matter harmful to plant growth.

B. Obtain topsoil from local sources, or from areas having similar soil characteristics to that found at site of work. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4 inches deep; do not obtain from bogs or marshes.

2.2 FERTILIZER

A. Commercial Fertilizer: Complete fertilizer of neutral character, 12% Nitrogen, 12% Phosphorous, and 12% potash. Apply at a rate of 7 pounds per 1000SF.

2.3 GRASS MATERIALS

A. Grass Seed: Provide fresh, clean, new-crop seed complying with tolerance for purity and germination established by Official Seed Analysts of North America. Provide seed of grass species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed as specified.

   Seed mixture shall be applied at a rate of 10#/1000 SF which consists of 60% rye, 30% fescue, and 10% bluegrass.

B. Antierosion Mulch: Provide clean, seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

PART 3 - EXECUTION

3.1 SOIL PREPARATION

A. Limit preparation to areas that will be planted in immediate future.

B. Loosen subgrade to a minimum depth of 4 inches. Remove stones bigger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter.

C. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful or toxic to plant growth.

D. Mix soil amendments and fertilizers with topsoil at rates specified. Delay mixing of fertilizer if planting will not follow placing of topsoil mixture within a few days. Either mix soil before spreading or apply soil amendments on surface of spread topsoil and mix thoroughly into top 4 inches of topsoil before planting.

1. Mix lime with dry soil before mixing in fertilizer.
2. Apply phosphoric acid fertilizer (other than that constituting a portion of complete fertilizers) directly to subgrade before tilling.

E. Spread topsoil mixture to depth required to meet thickness, grades, and elevations shown, after light rolling and natural settlement. Do not spread if material or subgrade is frozen.

1. Place approximately 1/2 of total amount of topsoil mixture required. Work into top of loosened subgrade to create a transition layer, and then place remainder of topsoil mixture.

F. Preparation of Unchanged Grades: Where lawns are to be planted in areas that have not been altered or disturbed by excavating, grading, or stripping operations, prepare soil for lawn and grass planting as follows: Till to a depth of at least 6 inches. Apply soil amendments and initial fertilizers as specified and mix thoroughly into top 4 inches of soil. Remove high areas and fill in depressions; till soil to a homogenous mixture of fine texture, free of lumps, clods, stones, roots, and other extraneous matter.

1. Before preparing of unchanged areas, remove existing grass, vegetation, and turf. Dispose of such material outside of Owner's property; do not turn over into soil being prepared for lawns.

G. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted within immediate future. Remove trash, debris, stones larger than 1-1/2 inches diameter, and other objects that may interfere with planting or maintenance operations.

H. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry off before planting lawns. Do not create muddy soil.

I. Restore prepared areas to specified condition if eroded or otherwise disturbed after fine grading and before planting.

3.2 SEEDING NEW LAWNS

A. Sow seed with a spreader or a seeding machine. Do not seed when wind velocity exceeds 5 miles per hour. Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.
2. Sow no less than the quantity of seed specified.

B. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

C. Protect seeded areas against erosion by spreading specified lawn mulch after completion of seeding operations. Spread uniformly to form a continuous blanket at least 1-1/2 inches loose measurement over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor mulch by spraying with asphalt emulsion at the rate of 10 to 13 gallons per 1,000 sq. ft. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean such areas where damage occurs.

3.3 RECONDITIONING LAWNS

A. Recondition existing lawn areas damaged by Contractor's operations including storage of materials or equipment and movement of vehicles. Also recondition lawn areas where settlement or washouts occur or where minor regrading is required.

1. Recondition other existing lawn areas where indicated.

B. Provide fertilizer, seed or sod, and soil amendments as specified for new lawns and as required to provide satisfactorily reconditioned lawn. Provide new planting soil as required to fill low spots and meet new finish grades.

C. Cultivate bare and compacted areas thoroughly to provide a good, deep planting bed.

D. Remove diseased or unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from Contractor's operations including oil drippings, stone, gravel, and other construction materials;

replace with new topsoil.

E. Where substantial lawn remains (but is thin), mow, rake, aerate if compacted, fill low spots, remove humps, cultivate soil, fertilize, and seed. Remove weeds before seeding. If weeds are extensive, apply selective chemical weed killers as required. Apply a seedbed mulch, if required, to maintain moist condition.

F. Water newly planted areas and keep moist until new grass is established.

3.4 PROTECTION

A. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period until lawn is established.

3.5 MAINTENANCE

A. Begin maintenance of lawns immediately after each area is planted and continue for the periods required to establish acceptable lawn.

B. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, regrading, replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.

C. Remulch with new mulch in areas where mulch has been disturbed by wind or maintenance operations sufficiently to nullify its purpose. Anchor as required to prevent displacement.

D. Replant bare areas with same materials specified for lawns.

E. Watering: Provide and maintain temporary piping, hoses and lawn watering equipment to convey water from sources and to keep lawn areas uniformly moist as required for proper growth.

1. Mow grass from 1-1/2 inches to 2 inches high. Do not mow to less than 1-1/2 inches.

3.6 ACCEPTANCE

A. When work is substantially completed, including maintenance, Engineer will, upon request, make an inspection to determine acceptability.

1. Lawn work may be inspected for acceptance in parts

agreeable to Engineer, provided work offered for inspection is complete, including maintenance.

B. Replant rejected work and continue specified maintenance until reinspected by Engineer and found to be acceptable.

C. Seeded lawns will be acceptable provided requirements, including maintenance, have been met and healthy, uniform close stand of specified grass is established free of weeds, bare spots, and surface irregularities.

3.7 CLEANUP

A. Promptly remove soil and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto surface of roads, walks, or other paved areas.

END OF SECTION 02930

SECTION 03300 - CAST-IN-PLACE CONCRETE

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 specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.

B. Cast-in-place concrete includes, but is not limited to the following:

1. Foundations and footings.
2. Slabs-on-grade.
3. Foundation walls.
4. Equipment pads and bases.

C. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 2 Section "Portland Cement Concrete Paving" for concrete paving and walks.

1.3 SUBMITTALS

A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.

B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, and others if requested by Engineer.

C. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.

D. Samples of materials as requested by Engineer, including

names, sources, and descriptions, as follows:

1. Fiber reinforcement.
2. Reglets.
3. Waterstops.
4. Vapor retarder/barrier.

E. Laboratory test reports for concrete materials and mix design test.

F. Material certificates in lieu of material laboratory test reports when permitted by Engineer. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1. American Concrete Institute (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: Engage a testing agency acceptable to Engineer to perform material evaluation tests and to design concrete mixes.

C. Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Forms for Exposed Finish Concrete: 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.

1. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form," Class I.
2. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 mg/l volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to the plane of the exposed concrete surface.

1. Provide ties that, when removed, will leave holes not larger than 1 inch in diameter in the concrete surface.

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: 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.

1. For slabs-on-grade, use supports with sand plates or horizontal runners.
2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I.

1. Use one brand of cement throughout Project unless

otherwise acceptable to Engineer.

B. Fly Ash: ASTM C 618, Type F.

C. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.

1. For exposed exterior surfaces, use limestone aggregates.
2. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Engineer.

D. Water: Potable.

E. Fiber Reinforcement: Polypropylene fibers engineered and designed for secondary reinforcement of concrete slabs, complying with ASTM C 1116, Type III.

F. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

G. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

H. Water-Reducing Admixture: ASTM C 494, Type A.

I. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.

J. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.

K. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

2.4 RELATED MATERIALS

A. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch-thick (26-gage) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

B. Dovetail Anchor Slots: Hot-dip galvanized sheet steel, not less than 0.0336 inch thick (22 gage) with bent tab anchors. Fill slot with temporary filler or cover face opening to prevent intrusion of concrete or debris.

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

D. Polyvinyl Chloride Waterstops: Corps of Engineers CRD-C 572.

E. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested according to ASTM E 154, as follows:

1. Polyethylene sheet not less than 8 mils thick.

F. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.

1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 mg per liter.

G. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.

H. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

I. Underlayment Compound: Free-flowing, self-leveling, pumpable, cement-based compound for applications from 1 inch thick to feathered edges.

J. Bonding Agent: Polyvinyl acetate or acrylic base.

K. 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.

2.5 PROPORTIONING AND DESIGNING MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Engineer for preparing and reporting proposed mix designs.

1. Do not use the same testing agency for field quality control testing.
2. Limit use of fly ash to not exceed 25 percent of cement content by weight.

B. Submit written reports to Engineer of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Engineer.

C. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:

1. 4000-psi, 28-day compressive strength; water-cement ratio, 0.44 maximum (non-air-entrained), 0.35 maximum (air-entrained).
2. 3000-psi, 28-day compressive strength; water-cement ratio, 0.58 maximum (non-air-entrained), 0.46 maximum (air-entrained).

D. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

1. Ramps, slabs, and sloping surfaces: Not more than 3 inches.
2. Reinforced foundation systems: Not less than 1 inch and not more than 3 inches.
3. Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches after adding admixture to site-verified 2-to-3-inch slump concrete.
4. Other concrete: Not more than 4 inches.

E. 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, as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Engineer before using in Work.

F. Fiber Reinforcement: Add to mix at rate of 1.5 lb per cu. yd. unless otherwise recommended by manufacturer.

2.6 ADMIXTURES

A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.

B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).

C. Use high-range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water-cement ratios below 0.50.

D. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:

1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:

    a. 5.5 percent (severe exposure) for 1-1/2-inch maximum aggregate.
    b. 6.0 percent (severe exposure) for 1-inch maximum aggregate.
    c. 6.0 percent (severe exposure) for 3/4-inch maximum aggregate.
    d. 7.0 percent (severe exposure) for 1/2-inch maximum aggregate.

E. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.

1. 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 GENERAL

A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.2 FORMS

A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:

1. Provide Class A tolerances for concrete surfaces exposed to view.
2. Provide Class C tolerances for other concrete surfaces.

B. 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 the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

C. 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 for easy removal.

D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.

E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

F. 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.

G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 VAPOR RETARDER/BARRIER INSTALLATION

A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.

B. Lap joints 6 inches.

3.4 PLACING REINFORCEMENT

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.

   1. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Engineer.

D. Place reinforcement to maintain minimum coverages as indicated 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 lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Engineer.

B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.

C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise.

D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

E. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's printed instructions.

F. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

G. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.

1. 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.
2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
3. If joint pattern is not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
4. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

3.6 INSTALLING EMBEDDED ITEMS

A. General: Set and build into formwork 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.

B. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.

C. Install dovetail anchor slots in concrete structures as indicated on drawings.

D. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off

templates or compacting-type screeds.

3.7 PREPARING FORM SURFACES

A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.

B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

1. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.8 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.

C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches 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.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches 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 mix to segregate.

E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.

1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
3. Maintain reinforcing in proper position on chairs during concrete placement.

F. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

G. 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.

1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

H. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 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. Using liquid nitrogen to cool concrete is Contractor's option.
2. 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 embedding in concrete.
3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform

without puddles or dry areas.

4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Engineer.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. 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 inch in height rubbed down or chipped off.

B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or 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 another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces 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.

3.10 MONOLITHIC SLAB FINISHES

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.

1. After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E 1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or

sand-bed terrazzo; and where indicated.

1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.

1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness) measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.

D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.

E. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.

F. Nonslip Aggregate Finish: Apply nonslip aggregate finish to concrete stair treads, platforms, ramps, sloped walks, and where indicated.

1. After completing float finishing and before starting trowel finish, uniformly spread 25 lb of dampened nonslip aggregate per 100 sq. ft. of surface. Tamp aggregate flush with surface using a steel trowel, but

do not force below surface. After broadcasting and tamping, apply trowel finishing as specified.

2. After curing, lightly work surface with a steel wire brush or an abrasive stone, and water to expose nonslip aggregate.

3.11 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 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 by 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 diagrams or templates of manufacturer furnishing machines and equipment.

3.12 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

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. Curing Methods: Cure concrete by curing compound.

D. Provide moisture curing by the following methods:

1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to 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.

2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

E. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the 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, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.

1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.13 REMOVING FORMS

A. General: 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 (10 deg C) 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 or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.14 REUSING FORMS

A. Clean and repair surfaces of forms to be reused in the 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 Engineer.

3.15 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Engineer.

B. Mix dry-pack mortar, 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.

1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Engineer. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.

1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Engineer.
4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. 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.

E. Repair isolated random cracks and single holes 1 inch or less 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. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

F. Perform structural repairs with prior approval of Engineer for method and procedure, using specified epoxy adhesive and mortar.

G. Repair methods not specified above may be used, subject to acceptance of Engineer.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. General: The General Contractor will employ a testing agency to perform tests and to submit test reports.

B. Sampling and testing for quality control during concrete placement shall include the following, as directed by Engineer.

1. Sampling Fresh Concrete: ASTM C 172, except modified

for slump to comply with ASTM C 94.

a. 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.
b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
d. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
e. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
3. When total quantity of a given class of concrete is less than 50 cu. yd., Engineer may waive strength testing if adequate evidence of satisfactory strength is provided.
4. 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.
5. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.

C. Test results will be reported in writing to Engineer, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. 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.

D. 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.

E. Additional Tests: The testing agency 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 Engineer. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION 03300

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Wood grounds, nailers, and blocking.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 6 Section "Finish Carpentry".

1.3 DEFINITIONS

A. Rough carpentry includes carpentry work not specified as part of other Sections and generally not exposed, unless otherwise specified.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for the following products:

C. Wood treatment data as follows including chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of treated material:

1. For fire-retardant-treated wood products include certification by treating plant that treated material complies with specified standard and other requirements.

1.5 QUALITY ASSURANCE

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or

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

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

A. Lumber Standards: Furnish lumber manufactured to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

B. Grade Stamps: Provide lumber with each piece factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

C. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

1. Provide dressed lumber, S4S, unless otherwise indicated.
2. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated.

2.2 DIMENSION LUMBER

A. For light framing (2 to 4 inches thick, 2 to 4 inches wide) provide the following grade and species:

1. "Standard" grade.
2. Any species graded under WWPA or WCLIB rules.

2.3 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.

B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

C. Moisture content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.

D. Grade: "Standard" grade light-framing-size lumber of any species or board-size lumber as required. "No. 3 Common" or "Standard" grade boards per WCLIB or WWPA rules or "No. 2 Boards" per SPIB rules.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153.

B. Nails, Wire, Brads, and Staples: FS FF-N-105.

C. Power Driven Fasteners: National Evaluation Report NER-272.

D. Wood Screws: ANSI B18.6.1.

E. Lag Bolts: ANSI B18.2.1.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and where indicated, flat washers.

2.7 MISCELLANEOUS MATERIALS

A. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturer.

2.8 PRESERVATIVE WOOD TREATMENT BY PRESSURE PROCESS

A. General: Where lumber or plywood is indicated as preservative-treated wood or is specified herein to be treated, comply with applicable requirements of AWPA Standards C2 (Lumber) and C9 (Plywood). Mark each treated item with the AWPB or SPIB Quality Mark Requirements.

B. Pressure-treat above-ground items with water-borne preservatives to a minimum retention of 0.25 pcf. For interior uses, after treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19 percent and 15 percent. Treat indicated items 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.
3. Wood floor plates installed over concrete slabs directly in contact with earth.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.

B. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.

C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.

E. Countersink nail heads on exposed carpentry work and fill holes.

F. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

3.2 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

A. Install wood grounds, nailers, blocking, and sleepers where shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

END OF SECTION 06100

SECTION 06192 - PREFABRICATED METAL-PLATE-CONNECTED WOOD TRUSSES

PART 1 - GENERAL

1.1RELATED DOCUMENTS

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

1.2SUMMARY

A.This Section includes the following:

1.Gable-shaped trusses.

1.3DEFINITIONS

A.Prefabricated metal-plate-connected wood trusses include planar structural units consisting of metal-plate-connected members that are fabricated from dimension lumber and that have been cut and assembled prior to delivery to the project site.

1.4SUBMITTALS

A.General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for lumber, metal connector plates, hardware, fabrication process, and fasteners.

C.Shop drawings indicating species, species group, sizes, and stress grades of lumber to be used; pitch, span, camber, configuration, and spacing for each type of truss required; type, size, material, finish, design values, and location of metal connector plates; and bearing details.

1.To the extent engineering design considerations are indicated as fabricator's responsibility, include design analysis indicating loading, assumed allowable stress, stress diagrams and calculations, and other information needed for review that have been signed and sealed by a

qualified professional engineer responsible for their preparation.

2. Provide shop drawings that have been signed and stamped by a qualified professional engineer.

D. Product certificate, signed by officer of fabricating firm, certifying that metal-plate-connected wood trusses supplied for Project comply with specified requirements.

1.5 QUALITY ASSURANCE

A. TPI Standards: Comply with applicable requirements and recommendations of the following Truss Plate Institute (TPI) publications:

1. "Design Specification for Metal Plate Connected Wood Trusses."
2. "Commentary and Recommendations for Handling and Erecting Wood Trusses."
3. "Commentary and Recommendations for Bracing Wood Trusses."
4. "Quality Standard for Metal Plate Connected Wood Trusses."

B. Connector Plate Manufacturer's Qualifications: A manufacturer that is a member of TPI and that complies with TPI quality control procedures for manufacture of connector plates published in TPI "Quality Standard for Metal Connector Plate Manufacture."

C. Wood Structural Design Standard: Comply with applicable requirements of N.F.P.A. "National Design Specification for Wood Construction."

D. Single-Source Engineering Responsibility: Provide trusses engineered by the metal plate connector manufacturer to support superimposed dead and live loads indicated, with design approved and certified by a qualified professional engineer.

E. Engineer Qualifications: A professional engineer legally authorized to practice in jurisdiction where Project is located and experienced in providing engineering services of the kind indicated that have resulted in the installation of metal-plate-connected wood trusses similar to those of this Project and with a record of successful in-service performance.

F. Fabricator's Qualifications: A firm that complies with the following requirements for quality control and is

experienced in prefabricating metal-plate-connected wood trusses similar to those of this Project that have a record of successful in-service performance:

1. Fabricator participates in a recognized quality assurance program that involves inspection by SPIB; Timber Products Inspection, Inc.; Truss Plate Institute; or other independent inspection and testing agency acceptable to Engineer and authorities having jurisdiction.

G. Single Source Responsibility for Connector Plates: Provide metal connector plates from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle and store trusses with care and comply with manufacturer's instructions and TPI recommendations to avoid damage from bending, overturning, or other cause which trusses are not designed to resist or endure.

PART 2 - PRODUCTS

2.1 CONNECTOR PLATE MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide metal connector plates by one of the following:

1. Alpine Engineered Products, Inc.
2. Bemax of Florida, Inc.
3. Clary Corporation.
4. Computrus, Inc.
5. Gang-Nail Systems, Inc.
6. Hydro-Air Engineering, Inc.
7. Inter-Lock Steel Co., Inc.
8. Metal-Lock, Inc.
9. Robbins Manufacturing Co.
10. TEE-Lok Corp.
11. Truss Connectors of America.
12. Truswal Systems Corporation.

2.2 LUMBER

A. Factory mark each piece of lumber with type, grade, mill, and

grading agency.

B. Lumber Standard: Manufacture lumber to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

C. Inspection Agencies: Inspection agencies and the abbreviations used to reference them to lumber grades and species include the following:

1. NLGA - National Lumber Grades Authority (Canadian).
2. SPIB - Southern Pine Inspection Bureau.
3. WCLIB - West Coast Lumber Inspection Bureau.
4. WWPA - Western Wood Products Association.

D. Nominal sizes are indicated, except as shown by detail dimensions.

E. Provide dressed lumber, S4S, manufactured to actual sizes required by PS 20 to comply with requirements indicated below:

1. Moisture Content: Seasoned, with 19 percent maximum moisture content at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated.

2. Any species and grade that complies with the following requirements for species group as defined in Table 8.1a of N.F.P.A National Design Specification, for extreme fiber stress in bending "Fb" for single and repetitive members, and for modulus of elasticity "E":

2.3 METAL CONNECTOR PLATES

A. General: Fabricate connector plates from metal complying with requirements indicated in this article.

B. Hot-Dip Galvanized Steel Sheet: Structural (physical) quality steel sheet complying with ASTM A 446, Grade A; zinc coated by hot-dip process to comply with ASTM A 525, Designation G60; minimum coated metal thickness indicated but not less than 0.036 inch.

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 truss members are exposed to weather or to high relative humidities, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of AISI Type 304 stainless steel.

B.Nails, Wire, Brads, and Staples: FS FF-N-105.

C.Power Driven Fasteners: National Evaluation Report NER-272.

D.Wood Screws: ANSI B18.6.1.

E.Lag Bolts: ANSI B18.2.1.

F.Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and where indicated, flat washers.

2.5METAL FRAMING ANCHORS

A.General: Provide metal framing anchors of type, size, metal, and finish indicated that comply with requirements specified including the following:

1.Current Evaluation/Research Reports: Provide products for which reports exist from a model code organization acceptable to authorities having jurisdiction that evidence compliance of metal framing anchors for application indicated with the building code in effect for this Project.
2.Allowable Design Loads: Provide products for which manufacturer publishes allowable design loads that are determined from empirical data or by rational engineering analysis and that are demonstrated by comprehensive testing performed by a qualified independent testing laboratory.

B.Galvanized Steel Sheet: Steel sheet zinc-coated by hot-dip process on continuous lines prior to fabrication to comply with ASTM A 525 for Coating Designation G60 and with ASTM A 446, Grade A (structural quality); ASTM A 526 (commercial quality); or ASTM A 527 (lock-forming quality); as standard with manufacturer for type of anchor indicated.

2.6FABRICATION

A.Cut truss members to accurate lengths, angles, and sizes to

produce close-fitting joints with wood-to-wood bearing in assembled units.

B. Fabricate metal connector plates to size, configuration, thickness, and anchorage details required to withstand design loadings for types of joint designs indicated.

C. Assemble truss members in design configuration indicated using jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances specified in TPI "Quality Standard for Metal Plate Connected Wood Trusses." Position members to produce design camber indicated.

D. Connect truss members by means of metal connector plates accurately located and securely fastened to each side of wood members by means indicated or approved.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Erect and brace trusses to comply with applicable requirements of referenced TPI standards.

B. Where trusses do not fit, return them to fabricator and replace with trusses of correct size; do not alter trusses in the field.

C. Erect trusses with plane of truss webs vertical (plumb) and parallel to each other, located accurately at design spacings indicated.

D. Hoist trusses in place by means of lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

E. Anchor trusses securely at all bearing points to comply with methods and details indicated.

F. Install permanent bracing and related components to enable trusses to maintain design spacing, withstand live and dead loads including lateral loads, and to comply with other indicated requirements.

G. Do not cut or remove truss members.

END OF SECTION 06192

SECTION 07210 - BUILDING INSULATION

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. Foundation wall insulation.
2. Board wall insulation at exterior existing walls.
3. Safing insulation.
4. Building insulation in batt form.
5. Sound attenuation blankets.

B. Related Sections: The following sections contain requirements that relate to this section:

1. Division 4 Section "Unit Masonry" for polystyrene board insulation installed in cavity walls.
2. Division 7 Roofing Section indicated below for roof insulation specified as part of roofing construction:
3. Division 9 Section indicated below for thermal insulation and sound attenuation insulation installed as part of metal-framed wall and partition assemblies:

1.3 DEFINITIONS

A. Thermal Resistivity: Where the thermal resistivity of insulation products are designated by "r-values," they represent the reciprocal of thermal conductivity (k-values). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivities are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of insulation product specified.

1.5 QUALITY ASSURANCE

A. Fire Performance Characteristics: Provide insulation materials identical to those whose indicated fire performance characteristics have been determined per the ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting organization.

B. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

1.6 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 recommendations for handling, storage, and protection during installation.

B. Protect plastic insulation as follows:

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

2. Protect against ignition at all times. Do not deliver plastic insulating materials to project site ahead of installation time.

3. Complete installation and concealment of plastic materials as rapidly as possibly in each area of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Extruded Polystyrene Board Insulation:

a. Amoco Foam Products Co.
b. DiversiFoam Products.
c. Dow: The Dow Chemical Company.
d. UC Industries, Inc.

2. Manufacturers of Glass Fiber Insulation:

   a. CertainTeed Corp.
   b. Knauf Fiber Glass GmgH.
   c. Manville Building Insulations Div., Manville Sales Corp.
   d. Owens/Corning Fiberglass Corp.

2.2 INSULATING MATERIALS

A. General: Provide insulating materials that comply with requirements and with referenced standards.

B. Extruded Polystyrene Board Insulation: Rigid, cellular polystyrene thermal insulation with closed-cells and integral high density skin, formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578 for type indicated; with 5-year aged r-values of 5.4 and 5 at 40 and 75 deg F (4.4 and 23.9 deg C), respectively; and as follows:

   1. Type IV, 1.6 pcf min. density, unless otherwise indicated.
   2. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 75 and 450, respectively.

C. Sound Attenuation Blankets: FS HH-I-521 Type I; Semi-Rigid Mineral Fiber Blanket without membrane, Class 25 Flame-Spread, thickness to be 3-5/8" and 6".

D. Faced Mineral Fiber Blanket/Batt Insulation: Thermal insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type III, Class A (blankets with reflective vapor-retarder membrane facing with flame spread of 25 or less); scrim-kraft vapor-retarder membrane on one face, and as follows:

   1. Mineral Fiber Type: Fibers Manufactured from glass.

   2. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50, respectively.

2.3 SAFING INSULATION AND ACCESSORIES

A. Semi-Refractory Fiber Board Safing Insulation: Semi-rigid boards designed for use as a fire stop at openings between

top of wall and underside of deck, produced by combining semi-refractory mineral fiber manufactured from slag with thermosetting resin binders to comply with ASTM C 612, Class 1 and 2; nominal density of 4.0 pcf; passing ASTM E 136 for combustion characteristics; r-value of 4.0 at 75 deg F (23.9 deg C).

B. Caulking Compound: Material approved by manufacturer of safing insulation for sealing joint between foil backing of safing insulation and edge of concrete floor slab against penetration of smoke.

C. Safing Clips: Galvanized steel safing clips approved by manufacturer of safing insulation for holding safing insulation in place.

2.4 AUXILIARY INSULATING MATERIALS

A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation or mechanical anchors securely to substrates indicated without damaging or corroding either insulation, anchors, or substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions with Installer present, for compliance with requirements of the Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections that might puncture vapor retarders.

B. Close off openings in cavities receiving poured-in-place insulation to prevent the escape of insulation. Provide bronze or stainless steel screen (inside) where openings must be maintained for drainage or ventilation.

3.3 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's instructions

applicable to products and application indicated. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with installation of insulation.

B. Extend insulation full thickness as 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.

C. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

A. On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Use type of adhesive recommended by manufacturer of insulation.

3.5 INSTALLATION OF RIGID INSULATION AT EXISTING EXTERIOR MASONRY WALLS.

A. On units of plastic rigid insulation, install small pads of adhesive spaced approximately 1'-0" o.c. both ways on inside face, as recommended by manufacturer. Fit courses of insulation between metal studs and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against existing masonry wall. See drawings for details.

3.6 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. 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. Set vapor retarder faced units with vapor retarder to warm side of construction, except as otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.

C. Stuff glass fiber loose fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume (to a density of approximately 2.5 pcf).

3.7 PROTECTION

A. General: Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

Provide temporary coverings or enclosures where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07210

SECTION 08114 - CUSTOM 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 custom-fabricated, commercial-quality steel doors and frames for doors and related openings.

B. Customized hollow metal work for other than doors, panels, and frames are specified in a Division 5 Section.

C. Building in of anchors and grouting of frames in masonry construction are specified in a Division 4 Section.

D. Door hardware installation is specified in Division 8 Section "Door Hardware" or "Finish Hardware."

E. Related Sections: The following sections contain requirements that relate to this Section:

1. Division 8 Section "Door Hardware" for door hardware installed in doors and frames.
2. Division 8 Section "Flush Wood Door" for solid-core wood doors installed in steel frames.
3. Division 9 Section "Painting" for field painting of doors and frames.

F. Products furnished but not installed under this Section include steel doors and frames.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product Data: Manufacturer's specifications for fabrication and installation, including data substantiating that products comply with requirements.

1. Manufacturer's certificate stating that each assembly required to be fire rated but exceeding sizes of tested assemblies has been constructed to conform to design,

materials, and details of construction equivalent to requirements for labeled units.

C. Shop Drawings: For fabrication and installation of custom steel doors and frames work. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections.

1. Provide a schedule of doors and frames using same reference numbers for details and openings as those on the Contract Drawings.

1.4 QUALITY ASSURANCE

A. Provide custom steel doors and frames manufactured by a single firm specializing in the production of this type of work, unless otherwise acceptable to the Engineer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames palleted, wrapped, or crated to provide protection during transit and job storage.

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 the Engineer; otherwise remove and replace damaged items as directed.

C. Store doors and frames at the building site under cover. Place units on minimum 4-inch-high wood blocking. Avoid the use of nonvented plastic or canvas shelters that could create a humidity chamber. If cardboard wrappers on doors become wet, remove cartons immediately. Provide 1/4-inch spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Custom Steel Doors and Frames:

Curries
Mesker
Steel Craft Manufacturing Co.

2.2 MATERIALS

A. Cold-Rolled Steel Sheets: Commercial-quality, level, carbon steel, complying with ASTM A 366.

B. Hot-Rolled Steel Sheets and Strips: Commercial-quality carbon steel, pickled and oiled, complying with ASTM A 569, free of scale, pitting, or surface defects.

C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526 and ASTM A 525 with A60 or G60 coating designation, mill phosphatized.

D. Supports and Anchors: Fabricate of not less than 16-gage sheet metal. Galvanize after fabrication units to be built into exterior walls, complying with ASTM A 153, Class B.

E. Inserts, Bolts, and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.

F. Shop-Applied Paint: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as base for specified finish paints on steel surfaces.

2.3 DOORS

A. General: Provide flush design doors, 1-3/4 inches thick, seamless hollow construction, unless otherwise indicated.

1. For single-acting swing doors, bevel both vertical edges 1/8 inch in 2 inches. For double-acting swing doors, round vertical edges with 2-1/8-inch radius.
2. Unless otherwise required for acoustical or thermal doors, provide filler of fiberboard, mineral-wool board, or other insulating material solidly packed full door height to fill voids between inner core reinforcing members.
3. Reinforce doors with rigid tubular frame where stiles and rails are less than 8 inches wide. Form tubular frame with 16-gage steel, welded to outer sheets.

B. Painted Exterior Doors: Fabricate exterior doors of 2 outer, galvanized, stretcher-leveled steel sheets not less than 16 gage. Construct doors with smooth, flush surfaces without visible joints or seams on exposed faces or stile edges, except around glazed or louvered panel inserts. Provide thermal insulation. Provide weep-hole openings in the bottom of doors to permit escape of entrapped moisture.

1. Reinforce inside of doors with vertical galvanized sheet

steel sections not less than 22 gage. Space vertical reinforcing 6 inches o.c. and extend full door height. Spot weld at not more than 5 inches o.c. to both face sheets.

a. Continuous truss-form inner core of 28-gage galvanized sheet steel reinforcing may be provided as inner reinforcement, in lieu of above. Spot weld truss-form reinforcement 3 inches o.c. vertically and horizontally over entire surface of both sides.

2. Reinforce tops and bottoms of doors with 16-gage horizontal steel channels welded continuously to outer sheets. Close top and bottom edges to provide flush, waterproof weather seal, as integral part of door construction or by addition of inverted steel channels.

C. Painted Interior Doors: Fabricate interior doors of 2 outer, cold-rolled, stretcher-leveled steel sheets not less than 18 gage. Construct doors with smooth, flush surfaces, without visible joints or seams on exposed faces or stile edges, except around glazed or louvered panel inserts.

1. Reinforce inside of doors with vertical, hot-rolled, not less than 22-gage steel sections. Space vertical reinforcing 6 inches o.c. and extend full door height. Spot weld at not more than 5 inches o.c. to both face sheets.

a. Continuous truss-form inner core of 28-gage sheet metal reinforcing may be provided as inner reinforcement in lieu of above. Spot weld truss-form reinforcement 3 inches o.c. vertically and horizontally over entire surface of both sides.

2. Reinforce tops and bottoms of doors with 18-gage, horizontal steel channels, welded continuously to outer sheets.

D. Finish Hardware Reinforcement: Minimum gages of steel reinforcing plates for the following hardware:

1. Hinges and Pivots: 7 gage thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds. Note: Verify exterior doors with continuous hinge
2. Lock Face, Flush Bolts, Closers, and Concealed Holders: 12 gage.
3. All Other Surface-Mounted Hardware: 16 gage.

2.4 FRAMES

A. Fabricate frames of full-welded unit construction, with corners mitered, reinforced, continuously welded full depth

and width of frame. Knock-down type frames are not acceptable.

1. Form frames of minimum 14-gage galvanized steel sheets for exterior, and either cold or hot-rolled sheet steel of the following minimum gages for interior:

   a. Openings up to and including 4'-0" wide: 16 gage.
   b. Openings over 4'-0" wide: 14 gage.

B. Finish Hardware Reinforcement: Minimum gages of steel reinforcing plates for the following hardware:

1. Hinges and Pivots: 7 gage thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds. Note: Verify door frames for doors with continuous hinges
2. Strikes, Flush Bolts, and Closers: 12 gage.
3. Surface-Mounted Hold-Open Arms and Panic Devices: 12 gage.

C. Head Reinforcing: Where installed in masonry, leave vertical mullions in frames open at top for grouting.

D. Jamb Anchors: Furnish jamb anchors as required to secure frames to adjacent construction, formed of not less than 18-gage galvanized steel.

1. Masonry Construction: Adjustable, flat, corrugated, or perforated, t-shaped to suit frame size, with leg not less than 2 inches wide by 10 inches long. Furnish at least 3 anchors per jamb up to 7'-6" height; 4 anchors up to 8'-0" jamb height; one additional anchor for each 24 inches or fraction thereof over 8'-0" height.
2. Metal Stud Partitions: Insert type with notched clip to engage metal stud, welded to back of frames. Provide at least 4 anchors for each jamb for frames up to 7'-6" in height; 5 anchors up to 8'-0" jamb height; one additional anchor each 24 inches or fraction thereof over 8'-0" height.
3. In-Place Concrete or Masonry: Anchor frame jambs with minimum 3/8-inch concealed bolts into expansion shields or inserts at 6 inches from top and bottom and 26 inches o.c., unless otherwise shown. Reinforce frames at anchor locations. Except for fire-rated openings, apply removable stop to cover anchor bolts unless otherwise indicated.

E. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, formed of not less than 14-gage galvanized steel sheet, as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with 2 holes to receive fasteners, welded to bottom of jambs

and mullions.

F. Head Anchors: Provide 2 anchors at head of frames exceeding 42 inches wide for frames mounted in steel stud walls.

G. Structural Reinforcing Members: Provide as part of frame assembly, where indicated at mullions, transoms, or other locations that are to be built into frame.

H. Spreader Bars: Provide removable spreader bar across bottom of frames, tack welded to jambs and mullions.

I. Rubber Door Silencers: Except on weatherstripped doors, drill stop in strike jamb to receive 3 silencers on single-door frames and drill head jamb stop to receive 4 silencers on double-door frames. Install plastic plugs to keep holes clear during construction.

2.5 STOPS AND MOLDINGS

A. Provide removable stops and moldings where indicated or required, formed of not less than 20-gage steel sheets matching steel of frames. Secure with countersunk flat or oval head machine screws spaced uniformly not more than 12 inches o.c. **Form corners with butted hairline joints.**

B. Coordinate width of rabbet between fixed and removable stops with type of glass and type of installation indicated.

2.6 FABRICATION, GENERAL

A. Fabricate hollow metal units to be rigid, neat in appearance, and free from defects, warp, or buckle. Accurately form metal to required sizes and profiles. Wherever practicable, fit and assemble units in the manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at the project site. Weld exposed joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

1. Interior Doors: Minimum 18-gage face sheets.
2. Exterior Doors: Minimum 16-gage face sheets.

B. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

C. Thermal-Rated (Insulating) Assemblies: At exterior locations and elsewhere as shown or scheduled, provide doors **and frames** that have been fabricated as thermal insulating assemblies and tested in accordance with ASTM C 236 or C 976.

1. Unless otherwise indicated, provide assemblies U-value rating of 0.68 to .19 Btu/(hr by sq ft by deg F).

D. Finish Hardware Preparation: As follows:

1. Prepare doors and frames to receive finish hardware, including cutouts, reinforcing, mortising, drilling, and tapping in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A 115 series specifications for door and frame preparation for hardware.
2. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
3. Locate finish hardware as shown on final shop drawings, or if not shown, in accordance with "Recommended Locations for Builder's Hardware for Custom Steel Doors and Frames," published by Door and Hardware Institute.

E. Shop Painting: Clean, treat, and paint exposed surfaces of steel doors and frames, including galvanized surfaces.

1. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
2. Apply pretreatment to cleaned metal surfaces, using cold phosphate solution (SSPC-PT2), hot phosphate solution (SSPC-PT4), or basic zinc chromate-vinyl butyryl solution (SSPC-PT3).
3. Apply shop coat of prime paint within time limits recommended by pretreatment manufacturer. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mils.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Frames: Provide custom steel frames for doors, transoms, side lights, borrowed lights, and other openings, of size and profile as indicated.

1. Install frames and accessories in accordance with shop drawings, manufacturer's data, and as herein specified.
2. Setting Masonry Anchorage Devices: Provide masonry anchorage devices where required for securing frames to in-place concrete or masonry construction.
   a. Set anchorage devices opposite each anchor location, in accordance with details on final shop drawings and anchorage device manufacturer's instructions. Leave drilled holes rough, not

reamed, and free from dust and debris.

3. Floor anchors may be set with powder-actuated fasteners instead of masonry anchorage devices and machine screws, if so indicated on final shop drawings.
4. Placing Frames: Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
   a. At in-place concrete or masonry construction, set frames and secure in place with machine screws and masonry anchorage devices.
   b. Place frames at fire-rated openings in accordance with NFPA Standard No. 80.
   c. Make field splices in frames as detailed on final shop drawings, welded and finished to match factory work.
   d. Remove spreader bars only after frames or bucks have been properly set and secured.

B. Door: Fit non-fire-rated doors accurately in their respective frames, with the following clearances:

1. Jambs and Head: **3/32 inch.**
2. Meeting Edges, Pairs of Doors: **1/8 inch.**
3. Bottom: 3/8 inch, where no threshold or carpet.
4. Bottom: 1/8 inch, at threshold or carpet.

C. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.

3.2 ADJUST AND CLEAN

A. Final Adjustments: Check and readjust operating hardware items just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames that are warped, bowed, or otherwise unacceptable.

B. 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.

END OF SECTION 08114

SECTION 08710

DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Door hardware for doors specified in "Hardware Sets" and required by actual conditions. Include screws, bolts, expansion shields, electrified door hardware, and other devices for proper application of hardware.

1.2 REFERENCES

A. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI):
1. ANSI/BHMA A156.1 Butts & Hinges (2006).
2. ANSI/BHMA A156.2 Bored & Preassembled Locks & Latches (2011).
3. ANSI/BHMA A156.4 Door Controls - Closers (2008).
4. ANSI/BHMA A156.5 Cylinders and Input Devices for Locks (2010).
5. ANSI/BHMA A156.6 Architectural Door Trim (2010).
6. ANSI/BHMA A156.7 Template Hinge Dimensions (2009).
7. ANSI/BHMA A156.18 Materials & Finishes (2006).
8. ANSI/BHMA A156.21 Thresholds (2009).
9. ANSI/BHMA A156.22 Door Gasketing Systems (2012).
10. ANSI/BHMA A156.28 Keying Systems (2007).
11. ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Steel Frames (2006).
12. ANSI/BHMA A156.115W Hardware Preparation in Wood Doors with Wood or Steel Frames (2006).
13. ANSI/BHMA A250.13 Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies (2003).

B. International Code Council/American National Standards Institute (ICC/ANSI)/ADA:
1. ICC/ANSI A117.1 Standards for Accessible and Usable Buildings and Facilities
2. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

C. Underwriters Laboratories, Inc. (UL):
1. UL 1784 Air Leakage Test of Door Assemblies.
2. UL/ULC Listed.

D. Door and Hardware Institute (DHI):
1. DHI Publication - Keying Systems and Nomenclature (1989).
2. DHI Publication - Abbreviations and Symbols.
3. DHI Publication - Installation Guide for Doors and Hardware.
4. DHI Publication - Sequence and Format of Hardware Schedule (1996).

E. Building Codes
1. IBC Indiana Building Code.

1.3 SUBMITTALS

A. Submit in accordance with Conditions of the Contract and provisions of Section 01 30 00 - Administrative Requirements.

B. Shop Drawings: Hardware schedule shall be organized in vertical format illustrated in DHI Publications Sequence and Formatting for the Hardware Schedule. Include abbreviations and symbols page according to DHI Publications Abbreviations and Symbols. Complete nomenclature of items required for each door

opening as indicated
1. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of hardware.

C. Submit manufacturer's catalog sheet on design, grade and function of items listed in hardware schedule. Identify specific hardware item per sheet, provide index, and cover sheet.

D. Coordination: Distribute door hardware templates to related divisions within fourteen days of receiving approved door hardware submittals.

1.4 QUALITY ASSURANCE

A. Door hardware shall conform to ICC/ANSI A117.1. Handles, Pulls, Latches, Locks and operating devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.

B. Door hardware shall be certified to ANSI/BHMA standards as noted, participate and be listed in BHMA Certified Products Directory.

1.5 DELIVERY, STORAGE AND HANDLING

A. Provide a clean, dry and secure room for hardware delivered to Project but not yet installed.

B. Furnish hardware with each unit marked and numbered in accordance with approved finish hardware schedule. Include door and item number for each type of hardware.

C. Pack each item complete with necessary parts and fasteners in manufacturer's original packaging.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 WARRANTY

A. General Warranty: Owner may have under 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: Warranties specified in this article shall not deprive Owner of other rights. Contractor, hardware supplier, and hardware installer shall be responsible for servicing hardware and keying related problems.
1. Ten years for manual door closers.
2. Five years for mortise, auxiliary and bored locks.
3. Five years for exit devices.

C. Products judged defective during warranty period shall be replaced or repaired in accordance with manufacturer's warranty at no cost to Owner. There is no warranty against defects due to improper installation, abuse and failure to exercise normal maintenance.

PART 2 PRODUCTS

2.1 HINGES

A. Hinges, including electric hinges and self-closing hinges when scheduled, shall be of one manufacturer as listed for continuity of design and consideration of warranty and shall be certified and listed by the following:
   1. Butts and Hinges: ANSI/BHMA A156.1
   2. Template Hinge Dimensions: ANSI/BHMA A156.7

B. Butt Hinges:
   1. Hinge weight and size unless otherwise indicated in hardware sets:
      a. Doors up to 36 inches (914 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of .134 inch (3.4 mm) and a minimum of 4-1/2 inches (114 mm) in height.
   2. Base material unless otherwise indicated in hardware sets:
      a. Exterior Doors: 304 Stainless Steel, Brass or Bronze material.
      b. Interior Doors: Steel material.
      c. Stainless Steel ball bearing hinges shall have stainless steel ball bearings. Steel ball bearings are unacceptable.
   3. Quantity of hinges per door unless otherwise stated in hardware sets:
      a. Doors 60 inches (1524 mm) up to 90 inches (2286 mm) in height provide 3 hinges.
   4. Hinge design and options unless otherwise indicated in hardware sets:
      a. Hinges are to be of a square corner five-knuckle design, flat button tips and have ball bearings unless otherwise indicated in hardware sets.
      b. Out-swinging exterior and out-swinging access-controlled doors shall have non-removable pins (NRP) to prevent removal of pin while door is in closed position.
      c. When shims are necessary to correct frame or door irregularities, provide metal shims only.

   5. Acceptable Manufacturer:
      a. Hager Companies
      b. Ives
      c. McKinney

2.2 LOCKS AND LATCHES

A. Locks and latches shall be of one manufacturer as listed for continuity of design and consideration of warranty. Product to be certified and listed by following:
   1. ANSI/BHMA A156.2 Series 4000 Certified to Grade 1.
   2. ANSI/BHMA A250.13 Certified for a minimum design load of 1150lbf (100psf) for single out swinging doors measuring 36 inches (914 mm) in width and 84 inches (2134 mm) in height and a minimum design load of 1150lbf (70psf) for out swinging single doors measuring 48 inches (1219 mm) in width and 84 inches (2134 mm) in height.
   3. ICC/ANSI A117.1.

B. Lock and latch function numbers and descriptions of manufacturer's series as listed in hardware sets. Material and Design:
   1. Lock and Latch chassis to be Zinc dichromate for corrosion resistance.
   2. Keyed functions to be of a freewheeling design to help resists against vandalism.
   3. Non-handed, field reversible.
   4. Thru-bolt mounting with no exposed screws.
   5. Levers shall be Zinc cast and plated to match finish designation in hardware sets.
   6. Roses shall be of solid Brass or Stainless-Steel material.

C. Latch and Strike:
   1. Stainless Steel latch bolt with minimum of 1/2 inch (13 mm) throw and deadlocking for keyed and exterior functions. Provide 3/4-inch (19 mm) latch bolt for pairs of fire rated doors where required by

door manufacture. Standard backset to be 2-3/4 inches (70 mm) and faceplate shall be adjustable to accommodate a square edge door or a standard 1/8 inch (3 mm) beveled edge door.
2. Strike is to fit a standard ANSI A115 prep measuring 1-1/4 inches (32 mm) by 4-7/8 inches (124 mm) with proper lip length to protect surrounding trim.

D. Acceptable Manufacturer:
1. Hager Companies
2. Schlage
3. Best

2.3 CYLINDERS AND KEYING

A. Cylinders shall be of one manufacturer as listed for continuity of design and consideration of warranty.

B. Standards: Manufacturer shall meet the following:
1. Auxiliary Locks: ANSI/BHMA A156.5
2. DHI Handbook "Keying systems and nomenclature" (1989)

C. Cylinders:
1. Shall be furnished with cams/tailpieces as required for locking device that is being furnished for project.

D. Keying:
1. Key into Owner's existing keying system.
2. Keys to be shipped to Owner's representative, individually tag per keying conference.

E. Acceptable Manufacturer:
1. Hager Companies:
2. Schlage
3. Best

2.4 CLOSERS

A. Shall be product of one manufacturer. Unless otherwise indicated on hardware schedule, comply with manufacturer's recommendation for size of closer, depending on width of door, frequency of use, atmospheric pressure, ADAAG requirements, and fire rating. Manufacturer to be certified and or listed by the following:
1. BHMA Certified ANSI A156.4 Grade 1.
2. ADA Compliant ANSI A117.1.

B. Material and Design:
1. Provide cast iron non-handed bodies with full plastic covers.
2. Closers shall have separate staked adjustable valve screws for latch speed, sweep speed, and backcheck.
3. Provide Tri-Pack arms and brackets for regular arm, top jamb, and parallel arm mounting.
4. One-piece seamless steel spring tube sealed in hydraulic fluid.
5. Double heat-treated steel tempered springs.
6. Precision-machined heat-treated steel piston.
7. Triple heat-treated steel spindle.
8. Full rack and pinion operation.

C. Mounting:
1. Out swing doors shall have surface parallel arm mount closers except where noted on hardware schedule.
2. In swing doors shall have surface regular arm mount closers except where noted on hardware schedule.

D. Size closers in compliance with requirements for accessibility (ADDAG). Comply with following maximum opening force requirements. Interior hinged openings: 5.0 lb (2.25 Kg) Fire rated and exterior openings shall have minimum opening force allowable by authority having jurisdiction.

E. Fasteners: Provide self-reaming and self-tapping wood and machine screws and sex nuts and bolts for each closer.

F. Acceptable Manufacturer:
1. Hager Companies:
2. LCN
3. Sargent

2.5 STOPS AND HOLDERS

A. Wall Stops: Provide door stops wherever necessary to prevent door or hardware from striking an adjacent partition or obstruction. Provide wall stops when possible. Door stops and holders mounted in concrete floor or masonry walls shall have stainless steel machine screws and lead expansion shields. Manufacturer shall meet requirements for Auxiliary Hardware: ANSI/BHMA A156.16.

B. Acceptable Manufacturer:
1. Hager Companies
2. Rockwood
3. Burns

2.6 DOOR GASKETING AND WEATHERSTRIP

A. Provide continuous weatherstrip gasketing on exterior doors. Provide non-corrosive fasteners for exterior applications.
1. Perimeter gasketing: Apply to head and jamb, forming seal between door and frame.
2. Meeting stile gasketing: Fasten to meeting stiles, forming seal when doors are in closed position.
3. Door bottoms: Apply to bottom of door, forming seal with threshold or floor when door is in closed position.
4. Drip Guard: Apply to exterior face of frame header. Lip length to extend 4 inches (102 mm) beyond width of door.

B. Standards: Manufacturer shall meet requirements for:
1. Door Gasketing and Edge Seal Systems: ANSI/BHMA A156.22.
2. Shall be BHMA certified for door sweeps, automatic door bottoms, and adhesive applied gasketing.

C. Acceptable Manufacturer: Hager Companies, NGP, and Pemko
1. Perimeter Gasketing: Hager Companies: 726S adhesive applied, 881S stop applied.
2. Door Bottom Sweeps: Hager Companies: 759S.
3. Overhead Drip Guard: Hager Companies: 810S.

2.7 THRESHOLDS

A. Set thresholds for exterior and acoustical openings in full bed of sealant with lead expansion shields and stainless-steel machine screws complying with requirements specified in Division 7 Section "Joint Sealants". Notched in field to fit frame by hardware installer. Refer to Drawings for special details. Manufacturer shall meet requirements for:
1. Thresholds: ANSI/BHMA A156.21.
2. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

B. Acceptable Manufacturer:
1. Hager Companies
2. NGP
3. Pemko

2.8 SILENCERS

A. Where smoke, light, or weather seal are not required, provide three silencers per single door frame, two per double door frame and four per Dutch door frame. Manufacturer shall meet requirements for: Auxiliary Hardware: ANSI/BHMA A156.16.

B. Acceptable Manufacturer:
1. Hager Companies
2. Trimco
3. Burns

2.9 FINISHES

A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if within 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 range of approved Samples.

B. Comply with base material and finish requirements indicated by ANSI/BHMA A156.18 designations in hardware schedule.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install hardware per manufacturer's instructions and in compliance with the following as applicable:
1. NFPA 80; NFPA 105; ICC/ANSI A117.1; ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Steel Frames; ANSI/BHMA A156.115W Hardware Preparation in Wood Doors with Wood or Steel Frames; DHI Publication - Installation Guide for Doors and Hardware; UL10C/UBC7-2; Local building code.
2. Approved shop drawings.
3. Approved finish hardware schedule.

B. Do not install surface mounted items until finishes have been completed on substrates involved. Set unit level, plumb and true to line location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

3.5 ADJUSTMENT, CLEANING AND DEMONSTRATING

A. Adjustment: Adjust and check each opening to ensure proper operation of each item of finish hardware. Replace items that cannot be adjusted to operate freely and smoothly or as intended for application at no cost to Owner.

C. Cleaning: Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no cost to Owner.

3.6 PROTECTION

A. Leave manufacturer's protective film intact and provide proper protection for all other finish hardware items that do not have protective material from the manufacture until Owner accepts Project as complete.

3.7 HARDWARE SET SCHEDULE

A.. Leave manufacturer's protective film intact and provide proper protection for all other finish hardware items that do not have protective material from the manufacture until Owner accepts Project as complete.

3.8 PROTECTION

A. Guide: Door hardware items have been placed in sets which are intended to be a guide of design, grade, quality, function, operation, performance, exposure, and like characteristics of door hardware, and may not be complete. Provide door hardware required to make each set complete and operational.

B. Hardware schedule does not reflect handing, backset, method of fastening and like characteristics of door hardware and door operation.

C. Review door hardware sets with door types, frames, sizes and details on drawings. Verify suitability and adaptability of items specified in relation to details and surrounding conditions.

Hardware Sets

SET #A

Doors: 105 106

3	Hinge	BB1191 4 1/2 X 4 1/2 NRP	US32D	HA
1	Lockset	3480 WTN	US26D	HA
1	Closer	5100 5954-HDHOCS	ALM	HA
1	Drip Cap	810S 40"	MIL	HA
1	Set Weatherstrip	881S V 1 x 38" 2 x 84"	MIL	HA
1	Threshold	520S V 36"	MIL	HA
1	Door Sweep	759S V 36"	MIL	HA