



**CITY OF GREENVILLE**

**RECREATION AND PARKS**  
**WILDWOOD PARK WELCOME CENTER**  
**AND PLAYGROUND SITE**

**Greenville, NC 27858**

**PROJECT MANUAL**

**TEG PROJECT NO. 20220005**

**Issue for Bid**  
**May 27, 2022**



**324 Evans Street**  
**Greenville, NC 27858**  
**Tel (252) 758-3746**  
**[www.eastgroup.com](http://www.eastgroup.com)**  
**NC Engineering License No. C-0206**  
**NC Landscape Architectural License No. C-427**



# **CITY OF GREENVILLE**

## **RECREATION AND PARKS WILDWOOD PARK WELCOME CENTER AND PLAYGROUND SITE**

### **PROJECT MANUAL**

**TEG PROJECT NO. 20220005**

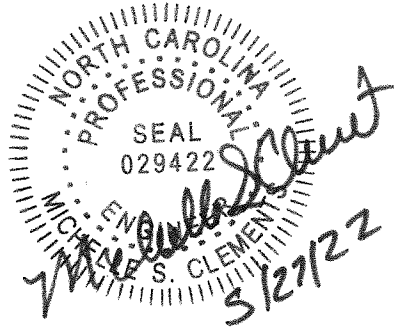
**ISSUE FOR BID  
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### **THE EAST GROUP**

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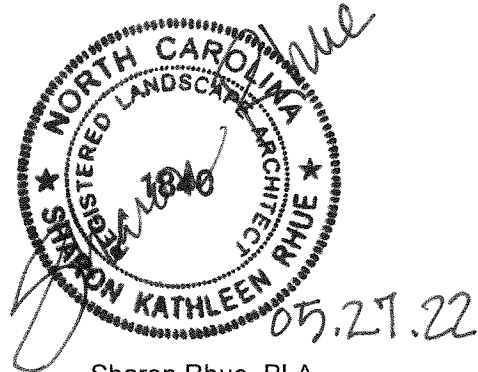
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Civil Engineering



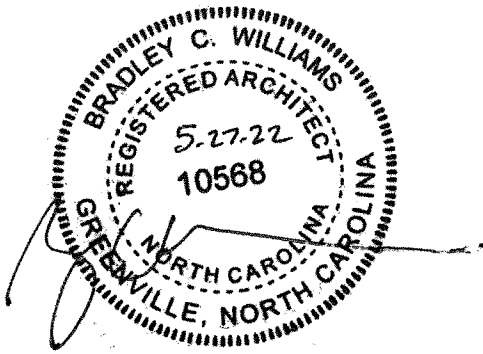
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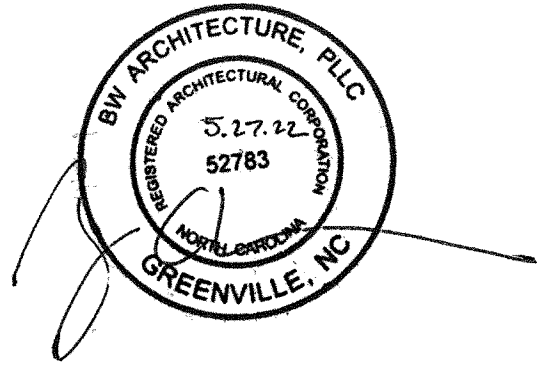


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**CITY OF GREENVILLE  
RECREATION AND PARKS  
WILDWOOD PARK WELCOME CENTER AND PLAYGROUND SITE**

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**SECTION 00100 - INVITATION TO BID**

Sealed proposals will be received by The City of Greenville up until 2:00 PM, June 30, 2022, in Jaycee Park Administration Building, 2000 Cedar Lane, Greenville NC 27835 for furnishing all labor, materials and equipment entering into the construction of the **Wildwood Park Welcome Center and Playground Site** in accordance with the documents prepared by The East Group, PA.

The bids will be publicly opened after 2:00PM on the date of the bid.

The basis of the contract will be a Single Prime General Contract.

**A Pre-Bid Conference** will be held at 2:00 PM, June 15, 2022, Wildwood Park, 3450 Blue Heron Dr., Greenville, NC. A site visit will be held immediately after the pre-bid or as agreed and scheduled times by the owner at the pre-bid.

A Bid Bond in the amount of 5% of the base bid will be required with each bid.

The Owner reserves the right to reject any or all bids and waive any and all defects and informalities in the submission of any bid.

**END OF SECTION 00100**

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**CITY OF GREENVILLE  
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**Advertisement for Bids**

Sealed bids will be received by The City of Greenville until 2:00 PM for Single Prime Bids, June 30, 2022, at Jaycee Park Administration Building, 2000 Cedar Lane, Greenville, NC. The bids will, immediately thereafter, be publicly opened and read aloud for furnishing all labor, materials and equipment entering into the construction of the

**City of Greenville Recreation and Parks, Wildwood Park Welcome Center and Playground Site**

**GREENVILLE, NORTH CAROLINA**

**A Pre-Bid Conference** will be held at 2:00 PM, June 15, 2022, in the Wildwood Park, 3450 Blue Heron Dr., Greenville, NC. A site visit will be held immediately after pre-bid or as agreed and scheduled times by the owner at the pre-bid.

All times are Eastern Daylight Savings time

Lump sum proposals will be received for the following:

- Single Prime Bids will also be received for all Contract work

Digital Complete Plans, Specifications and Contract Documents will be available free from the **City of Greenville's Website** and at McGee Cadd, 2095 Evans St. Greenville, NC 27834 (252-752-4400).

All questions regarding plans are to be referred to The East Group's Project Manager, Myriah Shewchuk, via **email** at [myriah.shewchuk@eastgroup.com](mailto:myriah.shewchuk@eastgroup.com).

The Owner reserves the right to reject any and/or all bids and to waive any and all defects and informalities in the submission of any bid.

Abbreviated Written Summary: Briefly and without force and effect upon the contract documents, the work of the Prime Contracts can be summarized as follows:

The project involves a new recreation and parks building at Wildwood Park. The building includes staff office space, storage, restrooms, and an attached covered shelter. Site utilities include a sewer force main, septic system, and water main. The site also includes improvements and infrastructure for a playground. The playground equipment and installation will be provided by others and coordinated with this contract.

All contractors must be properly licensed under the State Laws governing their respective trades.

All contractors are advised that the Owner has a minority and women participation policy for construction projects. Refer to the specifications for a detailed description of this policy.

The Owner reserves the right to reject any and/or all bids and to waive any and all defects and informalities in the submission of any bid.

Each proposal shall be accompanied by a cash deposit or a certified check drawn on some bank or trust company insured by the Federal Deposit Insurance Corporation, of an amount equal to not less than 5 percent of the proposal. In lieu thereof a bidder may offer a bid bond of 5 percent of the bid executed by a surety company licensed under the Laws of North Carolina to execute such bond conditioned that the surety will upon demand forthwith make payment to the obligee upon said bond if the bidder fails to execute the contract in accordance with the bid bond, and upon failure to forthwith make payment, the surety shall pay to the obligee an amount equal to double the amount of said bond. Said deposits shall

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be retained by the Owner as liquidated damages in event of failure of the successful bidder to execute the contract within ten days after the award or to give satisfactory surety as required by law.

Payment will be made on the basis of ninety percent (90%) of monthly estimates and final payment made upon completion and acceptance of work.

A contractor Reference Form, listing 3 client references of similar work is required.

No bid may be withdrawn after the scheduled closing time for the receipt of bids for a period of 60 days.

The Owner encourages the participation of MBE and WBE firms. Refer to the project manual for specific requirements.

# CITY OF GREENVILLE MBE/WBE PLAN

## POLICY STATEMENT

It is the policy of the City of Greenville to provide minorities and women equal opportunity for participating in all aspects of the City's contracting and procurement programs, including but not limited to, construction projects, supplies and materials purchase, and professional and personal service contracts.

## OVERVIEW

The City of Greenville Minority and Women Business Enterprise Program (M/WBE) is a voluntary goals program in construction, purchasing, and professional and personal services based on "good-faith efforts". These goals are established for a three-year period and achievement will be evaluated annually.

The goals of the City for utilization of minority and women business enterprises are:

Minority business participation in construction services. . . . .	10%
Women business participation in construction services . . . . .	6%
Minority business participation in supplies and materials purchases. . . . .	2%
Women business participation in supplies and materials purchases. . . . .	2%
Minority business participation in professional and personal services. . . . .	4%
Women business participation in professional and personal services. . . . .	4%

# CITY OF GREENVILLE MBE/WBE PLAN

## I. INTRODUCTION

Efforts have been made by the City's staff to increase the amount of business the City awards to minority and women owned businesses. These efforts have produced minimal results.

In 1989, the North Carolina General Assembly amended G.S. 143-128 requiring the establishment of "verifiable percentage goals for minority business participation in contracts for the erection, construction, alteration or repair of public buildings" where the cost exceeded \$100,000.

Cities and other governmental bodies were to adopt a verifiable goal for participation by minority businesses after notice and public hearing. On December 12, 1989, the City of Greenville adopted an interim Minority Business Enterprise Participation Plan with a goal of ten (10) percent participation by minority individuals and businesses until a sufficient factual data base was collected to establish verifiable goals.

The City of Greenville conducted a Utilization Study of minority businesses in the City's purchasing programs based on an appropriate pool of qualified M/WBES. The City of Greenville contracted with the North Carolina Institute of Minority Economic Development to assist the City in establishing a verifiable Minority and Women Business Enterprise Goals Plan based on the statistical evidence of the study. The City of Greenville, in setting verifiable goals for the City's M/WBE Plan, considered statistical data derived from the Utilization Study and available potential M/WBES that could perform work in the disciplines germane to the City itself. The goals of the City do not require nor provide for racially based set-asides; rather they require a good faith effort by the City and its contractors to recruit and select minorities and women businesses, consistent with North Carolina General Statutes and the Constitution of the United States as interpreted by the **Croson Decision**.

## II. ADMINISTRATION

The City Manager is authorized to take all usual and legal administrative actions necessary to implement this Plan. The ultimate responsibility for the MBE/WBE Plan's administration is assigned to the City Manager. The City Manager is either to be personally responsible or to designate a specific person to coordinate and manage this Plan. The City Manager or his designee is responsible for determining whether a contractor has complied with the provisions of this Plan or has shown good-faith effort to do so. Except for those staff services specifically assigned by this Plan to other departments, the heads of departments responsible for construction, procurement of services and materials shall be responsible to the City Manager or his designee and shall cooperate with the City Manager in implementing this Plan.

The M/WBE Plan shall apply to all contracts for construction, supplies, and

## CITY OF GREENVILLE MBE/WBE PLAN

Services as specified in Sections IV through VI. The provisions of this Plan take precedence over any other department plans or procedures in conflict herewith, except specific requirements mandated by terms or conditions of agreements in force between the City and the federal government or the State of North Carolina that require different procedures than those described in this Plan. This Plan will be evaluated at the end of three years to determine its effectiveness and what adjustments are required.

### III. DEFINITIONS

**Affirmative Action** - Specific steps to eliminate discrimination and efforts to ensure nondiscriminatory results and practices in the future, and to fully involve minority business enterprises and women business enterprises in contracts and programs.

**Bidder/Participant** - Any person, firm, partnership, corporation, association, or joint venture seeking to be awarded a public contract or subcontract.

**Contract** - A mutually binding legal relationship or any modification thereof obligating the seller to furnish equipment or service, including construction and leases, and obligating the buyer to pay for them.

**Contractor** - Any person, firm, partnership, corporation, association, or joint venture that has been awarded a public contract or lease, including every subcontract on such a contract.

**Discrimination** - To distinguish, differentiate, separate and/or segregate on the basis of age, race, religion, color, sex, national origin, handicap and/or veteran status.

**Equipment** - Includes materials, supplies, commodities, and apparatus.

**Goal** - A voluntary percentage or quantitative objective.

**Joint Venture** - An association of two or more businesses to carry out a single business enterprise for profit, for which purpose they combine their property, capital, efforts, skills, and knowledge.

**Lessee** - A business that leases, or is negotiating to lease, property from the City or equipment or services to the City of Greenville, or to the public on City property.

**Minority** - A person who is a citizen or lawful permanent resident of the United States and who is:

- a. Black (a person having origins in any of the black racial groups of Africa);
- b. Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);

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- c. Portuguese (a person of Portuguese, Brazilian, or other Portuguese culture origin, regardless of race);
- d. Asian (a person having origins in any of the original people of the Far East, Southeast Asia, the Indian sub-continent, or the Pacific Islands); and
- e. American Indian and Alaskan Native (a person having origins in any of the original people of North America).

**MBE/WBE** - Any minority or women business enterprise.

**Minority or Women Business Enterprise (MBE/WBE)** - A business that is at least fifty-one (51) percent owned and controlled by minority group members or women. An MBE/WBE is **bona fide** only if the minority group or female ownership interests are real and continuing and not created solely to meet the MBE/WBE requirement. In addition, the MBE/WBE must itself perform satisfactory work or services or provide supplies under the contract and not act as a mere conduit. In short, the contractual relationship must also be **bona fide**.

### IV. PROCEDURES FOR CONSTRUCTION CONTRACTS

#### A. Purpose and Application

1. The general purpose of this Plan is to help develop and support Minority and Women Business Enterprises (MBE and WBE) by providing opportunities for participation in the performance of all construction contracts financed entirely with City funds.
2. This Plan shall apply to construction contracts when the City's estimated contract cost is \$50,000 or more, except when a contract is exempt from competitive bidding under the General Statutes of North Carolina. Contracts between \$5,000 and \$50,000 that are negotiated will also be covered.
3. Where contracts are financed in whole or in part with federal or state funds, including grants, loans, or other funding sources containing MBE and WBE Programs, the City will, where permitted by the grantor, meet the Plan requirements with the highest MBE/WBE goals. The City Manager will be responsible for monitoring the Plan to ensure the goals are met.
4. Since City construction contracts are prepared and administered by the Engineering Department and various other departments, each of these departments shall prepare such departmental procedures for bidding and outreach as are required to implement this Plan.
  - a. Within ninety (90) days of City approval of this Program, appropriate staff and equipment will be in place for full implementation.



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- b. The departmental procedures and contract provisions shall be in effect for all bid documents Issued after the date of the City's approval.

### B. MBE/WBE Goals

1. To implement the purpose of this Plan, the goal shall be to award at least ten (10) percent of the total of all construction contract award amounts in each fiscal year in each department to MBE firms and at least four (6) percent to WBE firms.
2. The City Manager and/or M/WBE Plan Coordinator may determine that higher or lower goals are appropriate on a project by-project basis, where it can be shown that the type, size, or location of the project will affect the availability of MBE and WBE firms, so long as the aggregate of all contracts does not lower the annual goals.

### C. Bid Documents

1. Bidders shall submit MBE/WBE information with their bids. Such information shall be subject to verification by the City prior to the awarding of the contract. The information shall include names of MBE/WBES to be used and the dollar value of each such MBE/WBE transaction.
2. Contractors, subcontractors, suppliers, or MBE/WBE members of a joint venture intended to satisfy the City's MBE/WBE goals shall be certified by the State Department of Transportation (DOT) or shall be listed on another Public Agency certified list. The City may accept any of the following as alternate sources of certified MBES and WBES:
  - a. Listing in a City or certified registry established in accordance with Section IV, 0(2) of this Plan.
  - b. A self-certification form for a MBE/WBE or a MBE/WBE member of a joint venture not already listed in the Registry or certified by the State.
  - c. Evidence of certification or the self-certification form submitted to the City at or before the bid opening.

### D. City of Greenville Responsibilities

1. **MBE/WBE Registry** - The City will establish and maintain a registry of certified Minority and Women Business Enterprises. The purpose of the registry is to provide a resource for prime bidders on City's construction projects who intend to solicit bids from MBE and WBE subcontractors and suppliers to

## **CITY OF GREENVILLE MBE/WBE PLAN**

meet the City's MBE and WBE goals. The registry will not constitute a recommendation or endorsement of any listed firm. The registry will be developed and maintained by advertising at least annually, for letters of interest from MBE and WBE firms and community organizations wishing to be included in the registry and notified of construction contracts and sole source contracts (one source). Advertisements will be placed in at least one newspaper of general circulation and in at least one minority newspaper in the state.

### **2. Certification**

- (a) The certification process will involve submission of a completed City certification form or inclusion on another acceptable public agency registry. All businesses must be recertified every twenty-four (24) months. The submitted form will be subject to approval by the City Manager or his designee. The City may accept proof of certification from the following:
- North Carolina Department of Transportation
  - North Carolina Department of Administration
  - Other North Carolina cities with established certification procedures.
- (b) Certification decisions made by the City can be appealed by the applicant or a third-party challenger. Protests must be delivered to the MIWBE Office in writing or forwarded to the City Manager's Office. MBE/WBE applicants for certification with the City are allowed ten (10) days after the receipt of the certification decision to protest. A third-party challenge can be submitted at any time. Written protests will be reviewed by the City Manager, who will render a final decision.

### **3. Certification Eligibility Standards**

- (a) The eligibility of a business is determined by the ownership and control of the business.
- (b) An eligible Minority Business Enterprise owner is a citizen or lawful permanent resident of the United States, a member of a recognized ethnic or racial group, and fifty one (51) percent owner of the business.

The eligible ethnic or racial groups are:

- Black

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- . Hispanic
- . Portuguese
- . Asian/Pacific Islander
- . American Indian/Alaskan Native

(c) An eligible Women Business Enterprise owner is a citizen or lawful resident of the United States and a fifty-one (51) percent owner of the business and is female.

4. **Decertification Procedures** - A firm certified as a MBE/WBE may be decertified by the City Manager or his designee after an investigation and hearing for anyone of the following reasons:
- a. Change of Status - The City Manager or his designee may decertify a MBE/WBE if he finds that the ownership or control of the business changes so that the business no longer meets the requirements of Section IV, 0(3) (b) and (c) above.
  - b. Failure to comply with the MBE/WBE Plan - The certification of a business as a MBE/WBE may be revoked by the City Manager or his designee if he finds any of the following conditions:
    - 1. That a business has submitted inaccurate, false or incomplete information to the City;
    - 2. That in performance of a contract, a business has failed to comply with requirements of the contract with the City;
    - 3. That in performance of a contract, a business has failed to comply with MBE/WBE requirements of a contract established by a contractor with the City in response to City requirements; or
    - 4. That a business has otherwise failed to comply with the provisions of this MBE/WBE Plan.
  - c. Appeal of Decertification - A business may appeal a determination to decertify as a MBE/WBE by utilizing the procedures described in Section IV, D(2) above.
5. **Pre-bid Conference** - The City may hold a pre-bid conference on all formal bid contracts for all prospective bidders, subcontractors, and MBE/WBES for the purpose of explaining the provisions of the MBE/WBE Plan, the process for bidding, and the contract to be performed. Available data on MBE/WBES interested and/or capable of engaging in the prospective contract

## CITY OF GREENVILLE MBE/WBE PLAN

shall be made available to prospective bidders, contractors, and subcontractors.

### **E. Contractor Responsibilities**

1. The contractor (bidder) shall make good-faith efforts to encourage participation of MBE/WBES in projects prior to submission of bids in order to be considered as a responsive bidder. A good-faith effort shall include, at a minimum, specific affirmative action steps and complete documentation thereof. The following list of factors to determine good-faith effort is not exclusive or exhaustive:
  - a. Whether the bidder attended any pre-solicitation or pre-bid meetings, if scheduled by the City;
  - b. Whether the bidder identified and selected specific items of the project for which the contract could be performed by Minority and/or Women Business Enterprises, to provide an opportunity for participation by those enterprises (including, where appropriate, breaking down contracts into economically feasible units to facilitate MBE/WBE participation);
  - c. Whether the bidder advertised, a reasonable time before the date the bids are opened, in one or more daily or minority weekly newspaper or trade association (i.e., N.C. Minority Business Association), trade journal or other media;
  - d. Whether the bidder provided mail notice of his or her interest in bidding on the contract to at least three (3) Minority or Women Business Enterprises (for each identified sub-item of the contract) licensed to provide the specific items of the project a reasonable time prior to the opening of bids;
  - e. Whether the bidder provided interested Minority and Women Business Enterprises with information about the plans, specifications, and requirements for the selected subcontracting or material supply work;
  - f. Whether the bidder contacted the City's MIWBE Office for assistance in identifying minority and women businesses certified with the City and three (3) approved public agencies as referenced in Section IV, D(2)a;
  - g. Whether the bidder negotiated in good-faith with Minority or Women Business Enterprises and did not unjustifiably reject as unsatisfactory bids prepared by Minority or

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Women Business Enterprises, as defined by the City;

- h. Whether the bidder, where applicable, advised and made efforts to assist interested Minority and Women Business Enterprises in obtaining bonds, lines of credit, or insurance required by the City or contractor;
- i. Whether the bidder's efforts to obtain Minority and Women Business Enterprise participation could reasonably be expected by the City to produce a level of participation sufficient to meet the goals of the City.

Bidders are cautioned that even though their submittal indicates they will meet the MBE/WBE goals, they should document their good-faith efforts and be prepared to submit this information to protect their eligibility for award of the contract in the event the City questions whether the good-faith requirement has been met.

- 2. Performance of MBE and WBE Subcontractors and Suppliers The MBE/WBES listed by the contractor on the Schedule of MBE/WBE Participation, which are determined by the City to be certified, shall perform the work and supply the materials for which they are listed unless the contractor has received prior written authorization from the City to perform the work with other forces or to obtain the materials from other sources.

The contractor shall enter into and supply copies of fully executed subcontracts with each MBE/WBE listed on the "Bidder MBE/WBE Information" form to the City's MIWBE Plan Coordinator after award of the contract and prior to the issuance of a Notice to Proceed. Any amendments to the subcontracts shall be submitted to the MIWBE Office within five (5) days of execution.

Authorization to utilize other forces or sources of materials may be requested for the following reasons:

- a. The listed MBE/WBE, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract, when such written contract, based upon the general terms, conditions, plans and specifications for the project, or on the terms of such subcontractor's or supplier's written bid, is presented by the contractor.
- b. The listed MBE/WBE becomes bankrupt or insolvent.
- c. The listed MBE/WBE fails or refuses to perform his/her subcontract or furnish the listed materials.

## CITY OF GREENVILLE MBE/WBE PLAN

- d. The work performed by the listed subcontractor is unsatisfactory according to industry standards and is not in accordance with the plans and specifications; or the subcontractor is substantially delaying or disrupting the progress of the work.

### **F. Awarding of Contracts**

1. If a construction contract is to be awarded, it shall be awarded in accordance with North Carolina General Statutes to the lowest responsible bidder who complies with all of the prescribed requirements and either:
  - a. Made a good-faith effort to comply with these goals and requirements before the time bids are opened as described above. Where a good-faith effort is claimed by the apparent lowest responsible bidder, the bidder shall be required to submit documentation WITHIN TWENTY-FOUR (24) HOURS OF THE CITY'S NOTIFICATION, which in most instances will occur the day of bid opening to show that the criteria for good-faith efforts have been met, or
  - b. Once a firm is determined to be an eligible MBE/WBE, and before the contract is awarded, the total dollar value to be paid to the MBE/WBE shall be evaluated by the MIWBE Office to ensure that it is in accordance with the bidder's proposal.

If the evaluation shows that the bidder has misrepresented MBE/WBE participation or has not made a good-faith effort to meet the contract goals for MBE and WBE participation, the bidder may be disqualified.

### **G. Counting MBE/WBE Participation Toward Meeting the Goals –**

The degree of participation by MBE/WBE contractors, subcontractors, suppliers, or joint-venture partners in contract awards shall be counted in the following manner:

1. Once a firm is determined to be an eligible MBE/WBE contractor in accordance with this Plan, the total dollar value of the contract awarded to the MBE/WBE is counted as participation.
2. The goals can be met by any certified MBE/WBE contractor, subcontractor, supplier, trucker, or joint venture partner as listed in the City and agency directory. All MBE/WBES used to meet the goal must be certified by the City or an approved agency at the time of bid opening. Only certified firms listed in the directory can be

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counted toward the goal. The standard for certification is set forth in this Plan.

3. The total dollar value of a contract with a business owned and controlled by a minority woman is counted toward either the minority goal or the goal for women, but not toward both. The contractor or City employing the firm may choose the goal to which the value is applied.
4. In the case of a joint venture, the joint venture recipient or contractor may count toward its MBE/WBE goals a portion of the total dollar value of the contract that the MBE/WBE partner's participation in the joint venture represents. Credit will be given equal to the minority partner's percentage of ownership in the joint venture. A MBE/WBE joint-venture partner must be responsible for a clearly defined portion of the work to be performed in addition to satisfying requirements for ownership and control.
5. A recipient or contractor may count toward its MBE/WBE goals only expenditures to MBE/WBE whose ownership interests are real and continuing and not created solely to meet the City's goals for participation, and that perform a commercially useful function in the work of a contract. A MBE/WBE is considered to perform a commercially useful function when it is responsible for execution of a distinct element of the work of a contract and carries out its responsibilities by actually performing, managing, and supervising the work involved. To determine whether a MBE/WBE is performing a commercially useful function, the M/WBE Office shall evaluate the amount of work subcontracted, industry practices, and other relevant factors. Consistent with normal industry practices, an MBE/WBE may enter into subcontracts. If a MBE/WBE contractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of normal industry practices, the MBE/WBE shall be presumed not to be performing a commercially useful function. Evidence to rebut this presumption may be presented to the City. The MBE/WBE may present evidence to rebut this presumption. The M/WBE Office's decision on the rebuttal of this presumption is subject to review by the City Manager or his designated representative. Once a firm is determined to be an eligible MBE/WBE in accordance with this section, the total dollar value of the contract awarded to MBE/WBE is counted toward the applicable MBE/WBE goals, except as provided in the provisions of this section.

## CITY OF GREENVILLE MBE/WBE PLAN

6. A contractor may count toward its MBE/WBE goals expenditures for materials and supplies obtained from MBE/WBE suppliers and manufacturers, provided that the MBE/WBE assumes the actual and contractual responsibility for the provision of the materials and supplies.

**H. Documentation of Attainment of MBE/WBE Participation Requirements** - In order that the City Manager may make a recommendation to the City as to the responsiveness of bidders, bidders shall be required to submit the following information on each MIWBE-related subcontract:

1. A description of the subcontract and purchase(s) of significant equipment and supplies to be used to perform the subcontract or prime contract, including the name and address of each MBE/WBE firm selected, and the name and telephone number of a contact person;
2. The dollar amount of participation of each MBE/WBE;
3. A statement of intent from the MBE/WBE subcontractor or material supplier as
  - a. Identified in Section IV, H(1) above that they intend to contract or supply the materials, or
  - b. Sworn statements, with appropriate documentation, showing that the contractor made a good-faith effort to comply with the MBE/WBE Plan in accordance with Section IV, E of this Plan.

### **VII. GRIEVANCE PROCEDURE**

Any participant feeling himself/herself aggrieved by implementation of the MBE/WBE Program may present such grievance to the City. The grievance (except for certification as a MBE/WBE) shall be first discussed with the responsible operating department. If the grievance is not resolved, a written description of the grievance with appropriate supporting evidence shall be presented to the M/WBE Program Coordinator. The M/WBE Program Coordinator will review the grievance and supporting evidence and make a written response to the participant within ten (10) working days. In the event the participant is not satisfied, said participant may appeal the grievance by filing a written description thereof and supporting evidence with the City Manager. The City Manager shall hear the grievance within ten (10) working days and shall make a decision thereon, which shall be final.



**CITY OF GREENVILLE  
RECREATION AND PARKS  
WILDWOOD PARK WELCOME CENTER AND PLAYGROUND SITE**

**SECTION 00215 - DOCUMENT CLARIFICATION REQUEST (DCR)**

**PART 1 - GENERAL**

**1.1 DESCRIPTION OF WORK**

- A. Work Specified This Section:
  - 1. This Section specifies administrative and procedural requirements for disposition of Document Clarification Request (DCRs) during the Bidding Phase.

**1.2 SUBMITTALS**

- A. Submit each request (DCR) on the form included this in section.
- B. Provide only one request on each form.
- C. Email DCR form to Myriah Shewchuk at myriah.shewchuk@eastgroup.com.

**PART 2 - PRODUCTS (NOT APPLICABLE)**

**PART 3 - EXECUTION**

**3.1 CONDITIONS:**

- A. Submit requests to the Architect as soon as possible.
- B. DCRs will be received up to seven (7) calendar days prior to the Bid date. DCRs received after that date will not be reviewed.

**3.2 ARCHITECT'S ACTION:**

- A. The Architect will review the information requested.
  - 1. If, after researching the issue, if the information is found within the Contract Documents, then no formal response will be forth coming.
- B. The Architect's response will be in the space provided on the DCR form included this in section.

**CITY OF GREENVILLE  
RECREATION AND PARKS  
WILDWOOD PARK WELCOME CENTER AND PLAYGROUND SITE**  
00215 – DOCUMENT CLARIFICATION REQUEST (DCR)

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<b>DOCUMENT CLARIFICATION REQUEST</b>		<b>Date:</b>
Attention: Myriah Shewchuk The East Group, PA 324 Evans Street Greenville NC 27835	Submitted By:	
Subject:  Specification Number:  Drawing Sheet Number:		
<b>INFORMATION REQUESTED</b>		
Signed: _____		
<b>RESPONSE</b>		
<input type="checkbox"/> See Drawings/Specifications _____ <input type="checkbox"/> See Addenda to be issued <input type="checkbox"/> Other		

Answered By: \_\_\_\_\_

Date: \_\_\_\_\_

**END OF DOCUMENT 00215**

**CITY OF GREENVILLE  
RECREATION AND PARKS  
WILDWOOD PARK WELCOME CENTER AND PLAYGROUND SITE**

**SECTION 00231 - PRODUCT SUBSTITUTIONS DURING BID**

**PART 1 - GENERAL**

**1.1 DESCRIPTION OF WORK**

A. Work Specified This Section:

1. This Section specifies administrative and procedural requirements for submitting requests for substitutions prior to Bid.

**1.2 SUBMITTALS**

A. Substitution Request Submittal:

1. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
2. Provide complete documentation showing compliance with the requirements for substitutions, and the following information:
  - a) Original copies of Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
  - b) Samples.
  - c) A detailed point by point comparison of the proposed substitution and the specified product detailing the significant qualities of both products. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
  - d) Ensure the product fits in the designated space.
  - e) The manufacturer or fabricator shall certify or guarantee the specified product as required by the Documents.
  - f) The substitution is in compliance with applicable code requirements.
  - g) Coordination information:
    - 1) Including a list of changes or modifications required to other parts of the Work and to construction performed by the Owner and separate Contractors, which will become necessary to accommodate the proposed substitution.
  - h) Certification by the Bidder that the substitution proposed is equal-to or better in every significant respect to that required by the Documents, and that it will perform adequately in the application indicated.

B. Architect's Action:

1. After receipt of the request for substitution, the Architect may request additional information or documentation for evaluation.
2. If a proposed substitute is accepted, it will be indicated in an upcoming Addendum.
3. Architect's decision is final and such reasons, if not approved, will not be furnished.

**PART 2 - PRODUCTS** (Not Applicable).

**PART 3 - EXECUTION** (Not Applicable).

**END OF SECTION 00231**

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**CITY OF GREENVILLE  
RECREATION AND PARKS  
WILDWOOD PARK WELCOME CENTER AND PLAYGROUND SITE**

**BID FORM**

TO: **City of Greenville, Recreation and Parks**  
herein called "OWNER"

1. Pursuant to and in compliance with the invitation to bid and the proposed Contract Documents relating to construction of:

**City of Greenville  
Recreation and Parks  
Wildwood Park Welcome Center and Playground Site  
Greenville, North Carolina**

the undersigned, having become thoroughly familiar with the terms and conditions of the proposed Contract Documents and with local conditions affecting the performance and costs of the Work at the place where the Work is to be completed, and having fully inspected the site in all particulars, hereby proposes and agrees to fully perform the Work within the time allowed and in strict accordance with proposed Contract Documents, including furnishing any and all labor and materials, and to do all of the work required to construct and complete said Work in accordance with the Contract Documents, for the following sum of money:

**Single Prime Bid:**  
BIDDER'S COMPANY  
NAME: \_\_\_\_\_

	Amount	<u>Duration (days)</u>
<b>BASE BID</b>	(\$ _____ )	_____

	Amount	<u>Duration (days)</u>
<b>ADD ALTERNATE-1</b>	(\$ _____ )	_____

Site Pole Lighting and Associated Feeders

	Amount	<u>Duration (days)</u>
<b>ADD ALTERNATE-2</b>	(\$ _____ )	_____

Welded Wire Fence (4' Ht.)

**CITY OF GREENVILLE  
RECREATION AND PARKS  
WILDWOOD PARK WELCOME CENTER AND PLAYGROUND SITE**

**UNIT PRICES**

Unit prices quoted and accepted shall apply throughout the life of the contract, except as otherwise specifically noted. Unit prices shall be applied, as appropriate, to compute the total value of changes in the base bid quantity of the work all in accordance with the contract documents

No. 1 Unclassified Excavation (Disposal off Site)                      Cubic Yards      Unit Price (\$)\_\_\_\_\_

Earthwork excavation as defined and specified in  
02200 Earthwork

No. 2 Off-Site Select Borrow Fill (installed)                      Cubic Yards      Unit Price (\$)\_\_\_\_\_

Earthwork fill as defined and specified in  
02200 Earthwork

No. 3 #57 or #67 Stone (installed)                      Ton                      Unit Price (\$)\_\_\_\_\_

Class 1, ASTM C33, coarse aggregate No. 57 stone  
Backfill as directed by the Engineer

LIST OF SUBCONTRACORS			
	NAME OF COMPANY/ADDRESS		BID
Plumbing			
Electrical			
Mechanical			
Site			
Landscape			

**ATTACH CHECK, CASH OR BID BOND TO THIS PROPOSAL.**

2. I understand that the Owner reserves the right to reject this bid, but that this bid shall remain open and not be withdrawn for a period of 60 days from the date prescribed for its opening.
3. If written notice of the acceptance of this bid is mailed or delivered to the undersigned within 45 days after the date set for the opening of this bid, or at any other time thereafter before it is withdrawn, the undersigned will execute and deliver the Contract Documents to Owner in accordance with this bid accepted, and will also furnish and deliver proof of insurance coverage, all within ten days after deposit in the mails of the notification of acceptance of this bid.
4. Notice of acceptance, or request for additional information, may be addressed to the undersigned at the address set forth below.
5. The bidder acknowledges receipt of the following Addenda and has incorporated bid revisions in this bid proposal.

Addendum No. Dated Received	Addendum No. Dated Received
_____	_____
_____	_____
_____	_____

**CITY OF GREENVILLE  
RECREATION AND PARKS  
WILDWOOD PARK WELCOME CENTER AND PLAYGROUND SITE**

6. Construction Time: The undersigned agrees if he is the successful bidder to commence work under this contract on a date to be specified by the Owner and to fully complete all work on the Project within the following period set forth below.

Consecutive Calendar Days Provided in the Bid (not to exceed (TBD) for both base bid and alternate combined).

7. The bidder further agrees that the Owner has the right to withhold from compensation otherwise to be paid the amount of five hundred dollars (**\$500.00**) per day that the work is not completed after the completion date defined above as liquidated damages reasonably determined to be incurred by the Owner as a result of such delay.

8. The names of all persons interested in the foregoing bid as principals are:

IMPORTANT NOTICE: If bidder or other interested persons is a corporation, give legal name of corporation, state in where incorporated, and names of president and secretary; if a partnership, give names of firm and names of all individual co-partners composing the firm; if bidder or other interested person is an individual, give first and last names in full.)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Licensed in accordance with an act for the registration of contractors, and with N.C. license number \_\_\_\_\_.

Sales and use tax registration number \_\_\_\_\_.

SIGN HERE:

\_\_\_\_\_  
Signature of Bidder

NOTE: If bidder is a corporation, set forth the legal name of the corporation together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. If bidder is a partnership, set forth the name of the firm together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership.

Business address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Corporate Seal)

Telephone number: \_\_\_\_\_ Date of proposal: \_\_\_\_\_

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**CITY OF GREENVILLE  
RECREATION AND PARKS  
WILDWOOD PARK WELCOME CENTER AND PLAYGROUND SITE**

**REFERENCE INFORMATION**

All bidders must provide a list of three (3) client references of similar work. The reference information must include the company's name, a contact person's name with his or her title and their telephone number. Contractor must provide the information below with their bid sheet.

1. COMPANY  
NAME: \_\_\_\_\_

CONTACT PERSON: \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_ MOBILE PHONE NO. \_\_\_\_\_

EMAIL: \_\_\_\_\_ BUSINESS FAX NO. \_\_\_\_\_

2. COMPANY  
NAME: \_\_\_\_\_

CONTACT PERSON: \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_ MOBILE PHONE NO. \_\_\_\_\_

EMAIL: \_\_\_\_\_ BUSINESS FAX NO. \_\_\_\_\_

3. COMPANY  
NAME: \_\_\_\_\_

CONTACT PERSON: \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_ MOBILE PHONE NO. \_\_\_\_\_

EMAIL: \_\_\_\_\_ BUSINESS FAX NO. \_\_\_\_\_

**CITY OF GREENVILLE  
RECREATION AND PARKS  
WILDWOOD PARK WELCOME CENTER AND PLAYGROUND SITE**

**CONTRACTOR INFORMATION**

Contractor must provide the information below with the bid sheet.

**PROSPECTIVE CONTRACTOR DATA FORM**

COMPANY NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_ MOBILE PHONE NO. \_\_\_\_\_

EMAIL: \_\_\_\_\_ BUSINESS FAX NO. \_\_\_\_\_

TAX ID#: \_\_\_\_\_

Corporation Or Partnership: \_\_\_\_\_

Number of Years in Business: \_\_\_\_\_

Number of Years in Greenville Area: \_\_\_\_\_

Number of Permanent Employees: \_\_\_\_\_

Number of Part-time Employees: \_\_\_\_\_

**City of Greenville/Greenville Utilities Commission  
Minority and Women Business Enterprise (MWBE) Program**

**City of Greenville  
Construction Guidelines and Affidavits  
\$100,000 and above**

These instructions shall be included with each bid solicitation.

## City of Greenville/Greenville Utilities Commission Minority and Women Business Enterprise Program

### \$100,000 and Construction Guidelines for MWBE Participants

**Policy Statement**

It is the policy of the City of Greenville and Greenville Utilities Commission to provide minorities and women equal opportunity for participating in all aspects of the City’s and Utilities’ contracting and procurement programs, including but not limited to, construction projects, supplies and materials purchases, and professional and personal service contracts.

**Goals and Good Faith Efforts**

Bidders responding to this solicitation shall comply with the MWBE program by making Good Faith Efforts to achieve the following aspiration goals for participation.

	CITY	
	MBE	WBE
<b>Construction</b> This goal includes Construction Manager at Risk.	10%	6%

Bidders shall submit MWBE information with their bids on the forms provided. This information will be subject to verification by the City prior to contract award. **As of July 1, 2009, contractors, subcontractors, suppliers, service providers, or MWBE members of joint ventures intended to satisfy City MWBE goals shall be certified by the NC Office of Historically Underutilized Businesses (NC HUB) only.** Firms qualifying as “WBE” for City’s goals must be designated as a “women-owned business” by the HUB Office. Firms qualifying as “MBE” for the City’s goals must be certified in one of the other categories (i.e.: Black, Hispanic, Asian American, American Indian, Disabled, or Socially and Economically Disadvantaged). Those firms who are certified as both a “WBE” and “MBE” may only satisfy the “MBE” requirement. **Each goal must be met separately. Exceeding one goal does not satisfy requirements for the other.** A complete database of NC HUB certified firms may be found at <http://www.doa.nc.gov/hub/>. An internal database of firms who have expressed interest to do business with the City and GUC is available at [www.greenvillenc.gov](http://www.greenvillenc.gov). However, the HUB status of these firms must be verified by the HUB database. The City shall accept NCDOT certified firms on federally funded projects only. Please note: A contractor may utilize any firm desired. However, for participation purposes, all MWBE vendors who wish to do business as a minority or female must be certified by NC HUB.

The Bidder shall make good faith efforts to encourage participation of MWBEs prior to submission of bids in order to be considered as a responsive bidder. Bidders are cautioned that even though their submittal indicates they will meet the MWBE goal, they should document their good faith efforts and be prepared to submit this information, if requested.

The MWBE’s listed by the Contractor on the **Identification of Minority/Women Business Participation** which are determined by the City to be certified shall perform the work and supply the materials for which they are listed unless the Contractors receive prior authorization from the City to perform the work with other forces or to obtain materials from other sources. If a contractor is proposing to perform all elements of the work with his own forces, he must be prepared to document evidence satisfactory to the owner of similar government contracts where he has self-performed.

Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid  
The Contractor shall enter into and supply copies of fully executed subcontracts with each MWBE or supply signed Letter(s) of Intent to the Project Manager after award of contract and prior to Notice to Proceed. Any amendments to subcontracts shall be submitted to the Project Manager prior to execution.

### Instructions

The Bidder shall provide with the bid the following documentation:

- Identification of Minority/Women Business Participation  
(if participation is zero, please mark zero—Blank forms will be considered nonresponsive)
- Affidavit A (if subcontracting)

OR

- Identification of Minority/Women Business Participation  
(if participation is zero, please mark zero—Blank forms will be considered nonresponsive)
- Affidavit B (if self-performing; will need to provide documentation of similar projects in scope, scale and cost)

Within 72 hours or 3 business days after notification of being the apparent low bidder who is subcontracting anything must provide the following information:

- Affidavit C (if aspirational goals are met or are exceeded)

OR

- Affidavit D (if aspirational goals are not met)

After award of contract and prior to issuance of notice to proceed:

- Letter(s) of Intent or Executed Contracts

**\*\*With each pay request, the prime contractors will submit the Proof of Payment Certification, listing payments made to MWBE subcontractors.**

**\*\*\*If a change is needed in MWBE Participation, submit a Request to Change MWBE Participation Form. Good Faith Efforts to substitute with another MWBE contractor must be demonstrated.**

### Minimum Compliance Requirements:

**All written statements, affidavits, or intentions made by the Bidder shall become a part of the agreement between the Contractor and the City for performance of contracts. Failure to comply with any of these statements, affidavits or intentions or with the minority business guidelines shall constitute a breach of the contract. A finding by the City that any information submitted (either prior to award of the contract or during the performance of the contract) is inaccurate, false, or incomplete, shall also constitute a breach of the contract. Any such breach may result in termination of the contract in accordance with the termination provisions contained in the contract. It shall be solely at the option of the City whether to terminate the contract for breach or not. In determining whether a contractor has made Good Faith Efforts, the CITY will evaluate all efforts made by the Contractor and will determine compliance in regard to quantity, intensity, and results of these efforts.**

MBForms 2002-  
Revised July 2010  
Updated 2019



# City of Greenville **AFFIDAVIT A – Listing of Good Faith Efforts**

County of \_\_\_\_\_

(Name of Bidder)

Affidavit of \_\_\_\_\_

I have made a good faith effort to comply under the following areas checked:

**Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive.** (1 NC Administrative Code 30 I.0101)

- 1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- 2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- 3 – (15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- 4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- 5 – (10 pts)** Attended prebid meetings scheduled by the public owner.
- 6 – (20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- 7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- 8 – (25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- 9 – (20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- 10 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

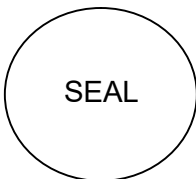
The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority/Women Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority/women business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: \_\_\_\_\_ Name of Authorized Officer: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_



State of \_\_\_\_\_, County of \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_

Notary Public \_\_\_\_\_

My commission expires \_\_\_\_\_

**City of Greenville --AFFIDAVIT B-- Intent to Perform  
Contract with Own Workforce.**

County of \_\_\_\_\_

Affidavit of \_\_\_\_\_

(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the \_\_\_\_\_

\_\_\_\_\_ contract.

(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

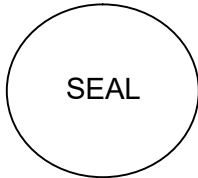
The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: \_\_\_\_\_ Name of Authorized Officer: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_



State of \_\_\_\_\_, County of \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_

Notary Public \_\_\_\_\_

My commission expires \_\_\_\_\_



## City of Greenville - **AFFIDAVIT C** - Portion of the Work to be Performed by MWBE Firms

County of \_\_\_\_\_

**(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)**

If the portion of the work to be executed by MWBE businesses as defined in GS143-128.2(g) and the COG/CITY MWBE Plan sec. III is equal to or greater than 16% of the bidders total contract price, then the bidder must complete this affidavit. This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

Affidavit of \_\_\_\_\_ I do hereby certify that on the \_\_\_\_\_  
 (Name of Bidder)

Project ID# \_\_\_\_\_ (Project Name) Amount of Bid \$ \_\_\_\_\_

I will expend a minimum of \_\_\_\_\_% of the total dollar amount of the contract with minority business enterprises and a minimum of \_\_\_\_\_% of the total dollar amount of the contract with women business enterprises. Minority/women businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. Attach additional sheets if required

Name and Phone Number	*MWBE Category	Work description	Dollar Value

\*Minority categories: Black, African American (**B**), Hispanic or Latino (**L**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**S**) Disabled (**D**)

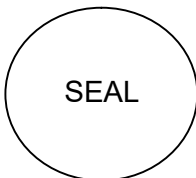
Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with MWBE Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: \_\_\_\_\_ Name of Authorized Officer: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_



State of \_\_\_\_\_, County of \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_

Notary Public \_\_\_\_\_

My commission expires \_\_\_\_\_

# City of Greenville **AFFIDAVIT D – Good Faith Efforts**

County of \_\_\_\_\_

**(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)**

If the goal of 16% participation by minority/women business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of \_\_\_\_\_ I do hereby certify  
that on the \_\_\_\_\_  
(Name of Bidder)

Project ID# \_\_\_\_\_ (Project Name) \_\_\_\_\_  
Amount of Bid \$ \_\_\_\_\_

I will expend a minimum of \_\_\_\_\_% of the total dollar amount of the contract with minority business enterprises and a minimum of \_\_\_\_\_% of the total dollar amount of the contract with women business enterprises. Minority/women businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. (Attach additional sheets if required)

Name and Phone Number	*MWBE Category	Work description	Dollar Value

\*Minority categories: Black, African American (**B**), Hispanic or Latino (**L**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**S**) Disabled (**D**)

**Examples** of documentation required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

- A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.
- B. Copies of quotes or responses received from each firm responding to the solicitation.
- C. A telephone log of follow-up calls to each firm sent a solicitation.
- D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
  - E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.
- F. Copy of pre-bid roster.
- G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.
- H. Letter detailing reasons for rejection of minority business due to lack of qualification.
- I. Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the

Do not submit with the bid Do not submit with the bid Do not submit with the bid Do not submit with the bid

next lowest responsible and responsive bidder.

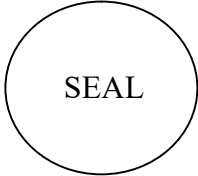
Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with MWBE Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: \_\_\_\_\_ Name of Authorized Officer: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_



State of \_\_\_\_\_, County of \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_

Notary Public \_\_\_\_\_

My commission expires \_\_\_\_\_

## LETTER OF INTENT MWBE Subcontractor Performance

**Please submit this form or executed subcontracts with MWBE firms after award of contract and prior to issuance of notice to proceed.**

PROJECT: \_\_\_\_\_  
(Project Name)

TO: \_\_\_\_\_  
(Name of Prime Bidder/Architect)

The undersigned intends to perform work in connection with the above project as a:

\_\_\_\_ Minority Business Enterprise                      \_\_\_\_\_ Women Business Enterprise

The MWBE status of the undersigned is certified the NC Office of Historically Underutilized Businesses (required).    \_\_\_ Yes    \_\_\_ No

The undersigned is prepared to perform the following described work or provide materials or services in connection with the above project at the following dollar amount:

Work/Materials/Service Provided	Dollar Amount of Contract	Projected Start Date	Projected End Date

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(Name & Phone No. of MWBE Firm)

\_\_\_\_\_  
(Name & Title of Authorized Representative of MWBE)

\_\_\_\_\_  
(Signature of Authorized Representative of MWBE)

## REQUEST TO CHANGE MWBE PARTICIPATION

(Submit changes only if notified as apparent lowest bidder, continuing through project completion)

**Project:** \_\_\_\_\_

**Bidder or Prime Contractor:** \_\_\_\_\_

**Name & Title of Authorized Representative:** \_\_\_\_\_

**Address:** \_\_\_\_\_ **Phone #:** \_\_\_\_\_

\_\_\_\_\_ **Email Address:** \_\_\_\_\_

**Total Contract Amount (including approved change orders or amendments):** \$ \_\_\_\_\_

Name of subcontractor: \_\_\_\_\_

Good or service provided: \_\_\_\_\_

### Proposed Action:

Replace subcontractor

Perform work with own forces

For the above actions, you must provide one of the following reasons (Please check applicable reason):

The listed MBE/WBE, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract.

The listed MBE/WBE is bankrupt or insolvent.

The listed MBE/WBE fails or refuses to perform his/her subcontract or furnish the listed materials.

The work performed by the listed subcontractor is unsatisfactory according to industry standards and is not in accordance with the plans and specifications; or the subcontractor is substantially delaying or disrupting the progress of the work.

*If replacing subcontractor:*

Name of replacement subcontractor: \_\_\_\_\_

The MWBE status of the contractor is certified by the NC Office of Historically Underutilized Businesses (required). \_\_\_ Yes \_\_\_ No

Dollar amount of original contract \$ \_\_\_\_\_

Dollar amount of amended contract \$ \_\_\_\_\_

**Other Proposed Action:**

\_\_\_ Increase total dollar amount of work

\_\_\_ Add additional subcontractor

\_\_\_ Decrease total dollar amount of work

\_\_\_ Other

Please describe reason for requested action: \_\_\_\_\_

*If adding\* additional subcontractor:*

The MWBE status of the contractor is certified by the NC Office of Historically Underutilized Businesses (required). \_\_\_ Yes \_\_\_ No

*\*Please attach Letter of Intent or executed contract document*

Dollar amount of original contract \$ \_\_\_\_\_

Dollar amount of amended contract \$ \_\_\_\_\_

**Interoffice Use Only:**

**Approval** \_\_\_ Y \_\_\_ N

**Date** \_\_\_\_\_

**Signature** \_\_\_\_\_

**Pay Application No.** \_\_\_\_\_  
**Purchase Order No.** \_\_\_\_\_

## Proof of Payment Certification

### MWBE Contractors, Suppliers, Service Providers

Project Name: \_\_\_\_\_

Prime Contractor: \_\_\_\_\_

Current Contract Amount (including change orders): \$ \_\_\_\_\_

Requested Payment Amount for this Period: \$ \_\_\_\_\_

Is this the final payment?  Yes  No

Firm Name	MWBE Category*	Total Amount Paid from this Pay Request	Total Contract Amount (including changes)	Total Amount Remaining

\*Minority categories: Black, African American (**B**), Hispanic or Latino (**L**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**S**) Disabled (**D**)

Date: \_\_\_\_\_

Certified By: \_\_\_\_\_

Name

Title

Signature

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## **LOCAL PREFERENCE POLICY**

The City of Greenville has adopted a Local Preference Policy, Resolution No. 056-13, and a Professional and other Services Policy, Resolution No. 057-13 that will pertain to this project. For more information, please see the City of Greenville's webpage at [www.greenvillenc.gov/financialservices/purchasingdivision](http://www.greenvillenc.gov/financialservices/purchasingdivision).

## **E-VERIFY COMPLIANCE**

The Contractor shall comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes. Further, if the Contractor utilizes a Subcontractor, the Contractor shall require the Subcontractor to comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes. By submitting a proposal, The Proposer represents that their firm and its Subcontractors are in compliance with the requirements of Article 2 Chapter 64 of the North Carolina General Statutes.

## **IRAN DIVESTMENT ACT**

Vendor certifies that; (i) it is not on the Iran Final Divestment List created by the North Carolina State Treasurer pursuant to N.C.G.S. 143-86.58; (ii) it will not take any actions causing it to appear on said list during the terms of this Purchase Order, and (iii) it will not utilize any subcontractor to provide goods and services hereunder that is identified on said list.

All firms that are submitting a bid are required to complete the Iran Divestment Act Certification form included and shall be included with the bid package. Failure to include the form may deem the bid unresponsive.

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**CITY OF GREENVILLE  
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**A.I.A. DOCUMENT A310  
BID BOND**

The above document is hereby made a part of these contract documents. Copies of this standard document are available from:

1. The American Institute of Architects  
1735 New York Ave., N.W.  
Washington, D.C. 20006
2. North Carolina AIA  
115 W. Morgan Street  
Raleigh, NC 27601
3. The East Group, P.A.  
324 Evans Street  
Greenville, NC 27858

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**DOCUMENT A312  
PERFORMANCE BOND  
LABOR AND MATERIAL PAYMENT BOND**

The above document is hereby made a part of these contract documents. Copies of this standard document are available from:

1. The American Institute of Architects  
1735 New York Ave., N.W.  
Washington, D.C. 20006
2. North Carolina AIA  
115 W. Morgan Street  
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324 Evans Street  
Greenville, NC 27858

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**A.I.A. DOCUMENT A701  
INSTRUCTIONS TO BIDDERS  
1997 EDITION**

The above document is hereby made a part of these contract documents. Copies of this standard document are available from:

1. The American Institute of Architects  
1735 New York Ave., N.W.  
Washington, D.C. 20006
2. North Carolina AIA  
115 W. Morgan Street  
Raleigh, NC 27601
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324 Evans Street  
Greenville, NC 27858

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**A.I.A. DOCUMENT A101  
STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR  
1997 EDITION**

The above document is hereby made a part of these contract documents. Copies of this standard document are available from:

1. The American Institute of Architects  
1735 New York Ave., N.W.  
Washington, D.C. 20006
2. North Carolina AIA  
115 W. Morgan Street  
Raleigh, NC 27601
3. The East Group, P.A.  
324 Evans Street  
Greenville, NC 27858

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**A.I.A. DOCUMENT A201  
GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION  
1997 EDITION**

The above document is hereby made a part of these contract documents. Copies of this standard document are available from:

1. The American Institute of Architects  
1735 New York Ave., N.W.  
Washington, D.C. 20006
2. North Carolina AIA  
115 W. Morgan Street  
Raleigh, NC 27601
3. The East Group, P.A.  
324 Evans Street  
Greenville, NC 27858

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**Exhibit "A"  
SUPPLEMENTARY CONDITIONS  
TO GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION AIA DOCUMENT  
A201 – 1997 EDITION**

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

**ARTICLE 3 CONTRACTOR**

**3.5 WARRANTY**

**3.5.2** Add the following Subparagraph: "The Contractor will assign to the Owner at the time of final completion of the Work, any and all manufacturer's warranties relating to materials and labor used in the Work and further agrees to perform the Work in such manner so as to preserve any and all such manufacturer's warranties."

**3.6.1** Add the following at the end of the Subparagraph: "North Carolina and county sales taxes are included within the Contract Sum and are not in addition to the Contract Sum. The Contractor shall make a monthly accounting of the taxes paid so the Owner may file for reimbursement."

**3.18 INDEMNIFICATION**

**3.18.1** In line 8 after the words "(other than the Work itself)" delete "but only to the extent caused by the negligent acts or omissions" and substitute "caused by acts or omissions of".

**ARTICLE 4 ADMINISTRATION OF THE CONTRACT**

**4.3 CLAIMS AND DISPUTES**

**4.3.2** Add at the end of the Subparagraph: "Failure of the Contractor to give timely notice of a claim shall constitute waiver of the claim."

**4.3.4** In Line 19 delete: ",subject to further proceedings pursuant to Paragraph 4.4."

**4.3.7.2** Add at the end of the Clause: "Claims for extension of the Contract Time, described in Subparagraph 4.3.7.1 for "Bad Weather" shall be submitted by the Contractor for consideration by the Architect when the weather has an adverse effect on the scheduled construction only under the following conditions:

1. If the number of days during which there was in excess of .02 inches of rain per day, exceeds by 105% the average number of days during which there was in excess of .02 inches of rain per day for that same month for the immediately preceding five (5) years.

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2. If the number of days during which the temperature did not exceed 32.0° F in the period from 7:00 a.m. to 5:00 p.m., exceeds by 105% the average number of days during which the temperature did not exceed 32.0° F in the period from 7:00 a.m. to 5:00 p.m. for that same month for the immediately preceding five (5) years.

The Architect will not consider any claims for extension of time due to “Bad Weather”, except as outlined in this section.”

#### **4.4 RESOLUTION OF CLAIMS AND DISPUTES**

**4.4.1** Delete 1<sup>st</sup> and 2<sup>nd</sup> sentences and substitute: “Claims shall be submitted to the Architect for decision. Notwithstanding any other provision of the Contract, the Architect will render to the parties the Architect's written decision relative to the claim, including any change in the Contract Sum or Contract Time or both, within 30 days after the claim is made, unless the Architect is granted an extension of time to render a decision by mutual agreement of the parties.”

**4.4.5** Delete the Subparagraph as written and substitute: “The Architect will approve or reject Claims by written decision. The decision shall state the reasons for approval or rejection and shall notify the parties of any change in the Contract Sum or Contract Time or both. The decision of the Architect shall be final and binding on the parties but subject to voluntary arbitration or litigation.”

**4.4.6** Delete this Subparagraph in its entirety.

**4.4.8** Delete: “,by mediation or by arbitration.”

#### **4.5 MEDIATION**

Delete this Paragraph in its entirety.

#### **4.6 ARBITRATION**

Delete this Paragraph in its entirety.

### **ARTICLE 5 SUBCONTRACTORS**

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

**5.2.3** Delete the 2<sup>nd</sup> sentence and substitute: “If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum shall be increased by the lesser of the following: (1) the difference between the subcontract amount proposed by the person or entity recommended by the Contractor and the subcontract amount proposed by the person or entity accepted or designated by the Owner and the Architect; or (2) the amount by which the subcontract amount proposed by the person or entity accepted or designated by the Owner and the Architect exceeds the amount set forth in the Schedule of Values, if any, which is applicable to the Work covered by such subcontract.”

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**5.3 SUBCONTRACTUAL RELATIONS**

**5.3.1** Add at the end of the Subparagraph: "The agreement between the Contractor and Subcontractor shall include but are not limited to the requirements of liability insurance and workers' compensation insurance either as part of the Contractor's policies or by separate policy provided by the Subcontractor, an indemnification agreement for injuries or damages caused by the acts or omissions of the Subcontractor, and that no privity exists between the Subcontractor and the Owner."

**ARTICLE 7 CHANGES IN THE WORK**

**7.1 GENERAL**

**7.1.3** At the end of the Subparagraph: "Except as permitted in Paragraph 7.3 and Subparagraph 9.7.1, a change in the Contract Sum or the Contract Time shall be accomplished only by Change Order. Accordingly, no course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that the Owner has been unjustly enriched by any alteration or addition to the Work, whether or not there is, in fact, any unjust enrichment to the Work, shall be the basis of any claim to an increase in any amounts due under the Contract Documents or a change in any time period provided for in the Contract Documents."

**7.2 CHANGE ORDERS**

**7.2.3** Add the following Subparagraph: "Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work which is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contact Sum and the construction schedule. In the event a Change Order increases the Contract Sum, Contractor shall include the Work covered by such Change Orders in Applications for Payment as if such Work were originally part of the Contract Documents."

**7.3 CONSTRUCTION CHANGE DIRECTIVES**

**7.3.10** Add the following Subparagraph: "The term, "allowance for overhead and profit," wherever mentioned in this Contract, shall be limited by the following conditions:

"Overhead Costs" shall include the following: Supervision, superintendent, wages of timekeepers, watchmen and clerks, hand tools, incidentals, general office expense, and all other expenses not included in "cost" as defined in Subparagraph 7.3.6 and including all costs associated with time extensions granted as a part of change orders.

Overhead and profit shall not exceed 15% of the value of labor and material for Work performed by the Contractor. If the work is performed by a Subcontractor, the Contractor's overhead and profit shall not exceed 7 ½ %."

**ARTICLE 8 TIME**

**8.3 DELAYS AND EXTENSIONS OF TIME**

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**8.3.1** In Line 5 delete: "pending mediation and arbitration, or".

**ARTICLE 9 PAYMENTS AND COMPLETION**

**9.7 FAILURE OF PAYMENT**

**9.7.1** In Line 4, delete the phrase: "or awarded by arbitration".

**9.8 SUBSTANTIAL COMPLETION**

**9.8.1** Add after the phrase "for its intended use": "; provided, however, that as a condition precedent to Substantial Completion, the Owner has received all certificates of occupancy and any other permits, approvals, licenses, and other documents from any governmental authority having jurisdiction thereof necessary for the beneficial occupancy of the Project."

**9.10 FINAL COMPLETION AND FINAL PAYMENT**

**9.10.1** Add at the end of the Subparagraph: "All warranties and guarantees required under or pursuant to the Contract Documents shall be assembled and delivered by the Contractor to the Architect as part of the final Application for Payment. The final Certificate for Payment will not be issued by the Architect until all warranties and guarantees have been received by the Owner."

**ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY**

**10.1 SAFETY PRECAUTIONS AND PROGRAMS**

**10.1.1** Add at the end of the Subparagraph: "In no event, however, shall the Owner have any responsibility for any substance or material that is brought to the Project site by the Contractor, any Subcontractor, any materialman or supplier or any entity for whom any of them is responsible. The Contractor agrees not to use any fill or other materials to be incorporated into the Work which are hazardous, toxic or comprised of any items that are hazardous or toxic."

**ARTICLE 11 INSURANCE AND BONDS**

**11.1 CONTRACTOR'S LIABILITY INSURANCE**

**11.1.2.1** Add the following Clause: "The insurance required by Subparagraph 11.1.1 shall be written with an "A" rated company and written for not less than the following, or greater if required by law:

1. Worker's Compensation – State, Statutory
2. Comprehensive General Liability (including Premises – Operations; Independent Contractors' Protective; Products and Completed Operations; All Risk Property Damage):
  - a. Bodily Injury/Property Damage: \$2,000,000 each occurrence

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\$2,000,000 annual aggregate

- b. Property Damage Liability Insurance will provide X, C, or U coverage as applicable.
- 3. Contractual Liability:
  - a. Bodily Injury/Property Damage: \$2,000,000 each occurrence  
\$2,000,000 annual aggregate
- 4. Personal Injury, with Employment Exclusion deleted  
- \$1,000,000 annual aggregate
- 5. Comprehensive Automobile Liability:
  - a. Bodily Injury/Property Damage: \$1,000,000 each person  
\$1,000,000 each occurrence

**11.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE**

**11.3.3** Delete this Subparagraph in its entirety.

**11.4 PROPERTY INSURANCE**

**11.4.1** In the first sentence, delete “Unless otherwise provided, the Owner “ and substitute “The Contractor”. Add at the end of the Subparagraph:

“The form of policy for this coverage shall be completed value. If the Owner is damaged by the failure of the Contractor to maintain such insurance, then the Contractor shall bear all reasonable costs properly attributable thereto.”

**11.4.1.2** Delete Clause 11.4.1.2 in its entirety.

**11.4.1.3** Delete Clause 11.4.1.3 in its entirety.

**11.4.4** Delete Subparagraph 11.4.4 in its entirety.

**11.4.6** Delete Subparagraph 11.4.6 and substitute the following: “Before an exposure to loss may occur, the Contractor shall file with the Owner two (2) certified copies of the policy or policies providing this Property Insurance coverage, each containing those endorsements specifically related to the Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire until at least thirty (30) days prior written notice has been given to the Contractor.”

**11.4.7** Modify Subparagraph 11.4.7 by substituting “Contractor” for “Owner” at the end of the first sentence.

**11.4.8** Modify Subparagraph 11.4.8 by substituting “Contractor” for “Owner” as fiduciary; except that at the first reference to “Owner” in the first sentence, the word “this” should be substituted for “Owner’s”.

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**11.4.9** Modify Subparagraph 11.4.9 by substituting “Contractor” for “Owner” each time the latter word appears and in line 5 delete the phrase “or in accordance with an arbitration award in which case the procedure shall be as provided in paragraph 4.6.”

**11.4.10** Modify Subparagraph 11.4.10 by substituting “Contractor” for “Owner” each time the latter word appears and deleting all words in the Subparagraph after the word “power” in the third line.

**END OF SUPPLEMENTARY CONDITIONS**

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**SECTION 01110 - SUMMARY OF WORK**

**PART 1 - GENERAL**

**1.1 SCOPE OF WORK**

The project involves a new recreation and parks building at Wildwood Park. The building includes staff office space, storage, restrooms, and an attached covered shelter. Site utilities include a sewer force main, septic system, and water main. The site also includes improvements and infrastructure for a playground. The playground equipment and installation will be provided by others and coordinated with this contract.

**1.2 SINGLE PRIME CONTRACT**

A. These documents form the Contract Documents for the Contract with the Owner as follows:

1. The Agreement;
2. The Addenda;
3. The General Conditions of the Contract;
4. Technical Specifications Divisions One thru 16;
5. Drawings;
  - a) Cover Sheet;
  - b) G series sheets;
  - c) L series sheets;
  - d) A series sheets;
  - e) C series sheets;
  - f) S series sheets;
  - g) E series sheets;
  - h) M series sheets;
  - i) P series sheets;

**1.3 CONTRACTOR'S USE OF PREMISES**

A. General:

1. Confine operations to areas within Contract limits indicated. Portions of the site beyond these limits shall not be disturbed.
- B. Keep driveways and entrances serving the premises clear and available to the Owner at all times.
- C. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.
- D. Maintain the existing building in a weather tight condition throughout the construction period. Repair damage caused by construction operations immediately. Take all precautions necessary to protect the building and its occupants during the construction period.

**1.4 OWNER OCCUPANCY:**

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- A. Full Owner Occupancy:
  - 1. The Owner will occupy the site and existing building during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate Owner usage. Schedule and perform the Work so as not to interfere with the Owner's operations.
  
- B. A Certificate of Substantial Completion will be executed for each specific phase of the Work. Obtain a Certificate of Occupancy from local building officials prior to Owner occupancy.
  
- C. Prior to partial Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been completed. Upon partial occupancy the Owner will provide operation and maintenance of mechanical and electrical systems in occupied portions of the building.

**1.5 OWNER-FURNISHED ITEMS**

- A. The Contractor is responsible for designating the delivery dates of Owner-furnished items in the Contractor's Construction Schedule and for receiving, unloading and handling Owner-furnished items at the site. The Contractor is responsible for protecting Owner-furnished items from damage, including damage from exposure to the elements, and to repair or replace items damaged as a result of his operations. The Contractor is responsible for installation of these items unless otherwise indicated.

**PART 2 - PRODUCTS** (Not Applicable).

**PART 3 - EXECUTION** (Not Applicable).

**END OF SECTION 01110**



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**SECTION 01230 - ALTERNATES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

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

**1.2 DEFINITIONS**

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

**1.3 PROCEDURES**

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

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PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

**3.1 SCHEDULE OF ALTERNATES**

Alternate No.1 Site Pole Lights and Associated Feeders

Alternate No.2 Woven Wire Fence (4' Ht.)

**END OF SECTION 01230**

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**SECTION 01250 - CONTRACT MODIFICATION PROCEDURES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. See Division 1 Section "Allowances" for procedural requirements for handling and processing allowances.
- C. See Division 1 Section "Unit Prices" for administrative requirements for using unit prices.

**1.2 MINOR CHANGES IN THE WORK**

- A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

**1.3 PROPOSAL REQUESTS**

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
  - 2. Within 20 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change.
  - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

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2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  4. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  5. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- C. Proposal Request Form: Use AIA Document G709.

**1.4 ALLOWANCES**

- A. Allowance Adjustment: To adjust allowance amounts, base each Change Order proposal on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
1. Include installation costs in purchase amount only where indicated as part of the allowance.
  2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
  3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
  4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- 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. Submit claims within 21 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed.

**1.5 CHANGE ORDER PROCEDURES**

- A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

**1.6 CONSTRUCTION CHANGE DIRECTIVE**

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

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

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01250**

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**SECTION 01270 - UNIT PRICES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for unit prices.
- B. See Division 1 Section "Allowances" for procedures for using unit prices to adjust quantity allowances.

**1.2 DEFINITIONS**

- A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

**1.3 PROCEDURES**

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not used)**

**END OF SECTION 01270**

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**SECTION 01290 - PAYMENT PROCEDURES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

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

**1.2 SCHEDULE OF VALUES**

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including Application for Payment forms with Continuation Sheets.
  2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
  3. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
1. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
    - a. Related Specification Section or Division.
    - b. Description of the Work.
    - c. Dollar value.
      - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
  2. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
  3. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
  4. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
  5. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
  6. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
  7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

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- a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
- 8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

**1.3 APPLICATIONS FOR PAYMENT**

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
  - 1. Stating that Surety agrees to payment of the sum requested, that the value of the work stated in the Contractor's request is a true statement, and that the sums requested for stored materials (if any) are correct.
  - 2. Provide Certified Sales Tax Report.
  - 3. Lien waivers.
  - 4. Proof of Payment Certification form (in accordance with section 00102).
  - 5. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements: See related sections below.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
  - 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
  - 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 48 hours. One copy shall include waivers of lien and similar attachments if required.
  - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

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1. List of subcontractors.
  2. Schedule of Values.
  3. Contractor's Construction Schedule (preliminary if not final).
  4. Submittals Schedule (preliminary if not final).
  5. Certificates of insurance and insurance policies before construction starts.
- G. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- H. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
  2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  3. Updated final statement, accounting for final changes to the Contract Sum.
  4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
  5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
  6. AIA Document G707, "Consent of Surety to Final Payment."
  7. Evidence that claims have been settled.
  8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01290**

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**SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION**

**PART 1 - GENERAL**

**1.1 SUMMARY**

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

**1.2 COORDINATION**

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

**1.3 SUBMITTALS**

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**1.4 PROJECT MEETINGS**

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
  2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within 3 days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
    - b. Phasing.
    - c. Critical work sequencing.
    - d. Designation of responsible personnel.
    - e. Procedures for processing field decisions and Change Orders.
    - f. Procedures for processing Applications for Payment.
    - g. Distribution of the Contract Documents.
    - h. Submittal procedures.
    - i. Preparation of Record Documents.
    - j. Use of the premises.
    - k. Responsibility for temporary facilities and controls.
    - l. Parking availability.
    - m. Office, work, and storage areas.
    - n. Equipment deliveries and priorities.
    - o. First aid.
    - p. Security.
    - q. Progress cleaning.
    - r. Working hours.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
  2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.

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- c. Related Change Orders.
  - d. Purchases.
  - e. Deliveries.
  - f. Submittals.
  - g. Review of mockups.
  - h. Possible conflicts.
  - i. Compatibility problems.
  - j. Time schedules.
  - k. Weather limitations.
  - l. Manufacturer's written recommendations.
  - m. Warranty requirements.
  - n. Compatibility of materials.
  - o. Acceptability of substrates.
  - p. Temporary facilities and controls.
  - q. Space and access limitations.
  - r. Regulations of authorities having jurisdiction.
  - s. Testing and inspecting requirements.
  - t. Required performance results.
  - u. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements.
4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at monthly intervals. Coordinate dates of meetings with preparation of payment requests.
- 1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication.
      - 6) Access.
      - 7) Site utilization.
      - 8) Temporary facilities and controls.
      - 9) Work hours.
      - 10) Hazards and risks.

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- 11) Progress cleaning.
  - 12) Quality and work standards.
  - 13) Change Orders.
  - 14) Documentation of information for payment requests.
3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
- a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01310**



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**SECTION 01315 - PROJECT MEETINGS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION OF WORK**

A. Work Included This Section:

1. This Section specifies administrative and procedural requirements for project meetings including but not limited to:
  - a) Pre-Construction Conference.
  - b) Coordination Meetings.
  - c) Progress Meetings.

**1.2 PRE-CONSTRUCTION CONFERENCE**

A. A pre-construction conference shall be scheduled by the Architect and held at the Project site or other convenient location after execution of the Agreement or Notice To Proceed, whichever comes first and prior to commencement of construction activities.

B. Attendees:

1. The Owner, Architect, the Contractor(s) and its superintendent(s) shall each be represented at the conference by persons authorized to conclude matters relating to the Work.

C. Agenda:

1. Discuss items of significance that could affect progress including such topics as:
  - a) Work sequencing.
  - b) Tentative construction schedule.
  - c) Designation of responsible personnel.
  - d) Procedures for processing Change Proposal Requests and Change orders.
  - e) Procedures for processing Applications for Payment.
  - f) Submittal of Shop Drawings, Product Data and Samples.
  - g) Preparation of record documents.
  - h) Use of the premises.
  - i) Staging areas.
  - j) Security.
  - k) Housekeeping.

**1.3 COORDINATION MEETINGS**

A. The General Contractor shall 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.

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- B. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting, such as the Owner and Architect.
  
- C. Weekly Progress Meetings:
  - 1. To enable orderly review of progress during construction and to provide for systematic discussion of problems, weekly project meetings shall be held throughout the construction period.
  - 2. Persons designated by each Subcontractor shall attend and participate in weekly project meetings shall have all required authority to commit the Contractor or Subcontractor to decisions agreed upon in the project meetings.
  - 3. The General Contractor shall conduct the meetings, compile minutes of each meeting and will distribute copies to the Owner and the Architect. The General Contractor shall distribute such other copies as he wishes. Each Contractor shall, to the maximum extent practicable, assign the same person or persons to represent the Contractor or Subcontractor at project meetings throughout the construction period.
  
- D. Owner, Architect, Contractor (OAC) Project Meetings:
  - 1. To enable orderly review of progress during construction and to provide for systematic discussion of problems, project meetings shall be held throughout the construction period at intervals determined prior to construction.
  - 2. The General Contractor shall attend and participate in the OAC project meetings and shall have all required authority to commit the Contractor and Subcontractor(s) to decisions agreed upon in the project meetings.
  - 3. The Architect will conduct the OAC meetings and compile minutes of each meeting and will distribute copies to the Owner and Contractor. The Contractor shall distribute such other copies as required. The General Contractor shall, to the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout the construction period.

**PART 2 - PRODUCTS** (Not Applicable)

**PART 3 - EXECUTION** (Not Applicable)

**END OF SECTION 01315**

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**SECTION 01330 - SUBMITTAL PROCEDURES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.
- B. See Division 1 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
- C. See Division 1 Section "Closeout Procedures" for submitting warranties Project Record Documents and operation and maintenance manuals.

**1.2 DEFINITIONS**

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

**1.3 SUBMITTAL PROCEDURES**

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.
  - 1. If intermediate submittal is necessary, process it in same manner as initial submittal.
  - 2. Allow 21 days for processing each resubmittal.
  - 3. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- D. Identification: Place a permanent label or title block on each submittal for identification.
  - 1. Indicate name of firm or entity that prepared each submittal on label or title block.

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2. Provide a space approximately 4 by 5 inches (100 by 125 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information on label for processing and recording action taken:
  - a. Project name.
  - b. Date.
  - c. Name and address of supplier.
  - d. Name of manufacturer.
  - e. Unique identifier, including revision number.
  - f. Number and title of appropriate Specification Section.
  - g. Drawing number and detail references, as appropriate.
  - h. Other necessary identification.
- E. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- F. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions of the Contract Documents, initial submittal (preferably digital in pdf format) may serve as final submittal.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
  1. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

**PART 2 - PRODUCTS**

**2.1 ACTION SUBMITTALS**

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
  1. Number of Copies: Submit 1 digital copy in pdf format via email or unless a digital copy cannot be processed then provide three copies of each submittal by exception, unless otherwise indicated. Architect will return a digital copy via email. Mark up and retain one returned copy as a Project Record Document.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
  2. Mark each copy of each submittal to show which products and options are applicable.
  3. Include the following information, as applicable:

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- a. Manufacturer's written recommendations.
  - b. Manufacturer's product specifications.
  - c. Manufacturer's installation instructions.
  - d. Manufacturer's catalog cuts.
  - e. Wiring diagrams showing factory-installed wiring.
  - f. Printed performance curves.
  - g. Operational range diagrams.
  - h. Compliance with recognized trade association standards.
  - i. Compliance with recognized testing agency standards.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Include the following information, as applicable:
    - a. Dimensions.
    - b. Identification of products.
    - c. Fabrication and installation drawings.
    - d. Roughing-in and setting diagrams.
    - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    - f. Shopwork manufacturing instructions.
    - g. Templates and patterns.
    - h. Schedules.
    - i. Notation of coordination requirements.
    - j. Notation of dimensions established by field measurement.
  2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
  3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).
- D. Samples: Prepare physical units of materials or products, including the following:
1. Comply with requirements in Division 1 Section "Quality Requirements" for mockups.
  2. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
  3. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
    - a. Submit 3 sets of Samples. Architect will retain 1 Sample set; 2 will be returned to contractor, one of which will remain at job site.
  4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side.

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5. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
  6. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
- E. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location.
- F. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."

**2.2 INFORMATIONAL SUBMITTALS**

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

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manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

- J. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 1 Section "Closeout Procedures."
- K. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- L. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.
- M. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections.
- N. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

**PART 3 - EXECUTION**

**3.1 CONTRACTOR'S REVIEW**

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

**3.2 ARCHITECT'S ACTION**

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

**END OF SECTION 01330**

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**SECTION 01400 - QUALITY REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
  - 2. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. See Divisions 2 through 16 Sections for specific test and inspection requirements.

**1.2 DEFINITIONS**

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

**1.3 DELEGATED DESIGN**

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

**1.4 SUBMITTALS**

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

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- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.
- C. Reports: Prepare and submit certified written reports that include the following:
1. Date of issue.
  2. Project title and number.
  3. Name, address, and telephone number of testing agency.
  4. Dates and locations of samples and tests or inspections.
  5. Names of individuals making tests and inspections.
  6. Description of the Work and test and inspection method.
  7. Identification of product and Specification Section.
  8. Complete test or inspection data.
  9. Test and inspection results and an interpretation of test results.
  10. Ambient conditions at time of sample taking and testing and inspecting.
  11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations on retesting and re-inspecting.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

**1.5 QUALITY ASSURANCE**

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

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- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.
- G. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.
- H. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
  2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
  3. Demonstrate the proposed range of aesthetic effects and workmanship.
  4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
  5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  6. Demolish and remove mockups when directed.

**1.6 QUALITY CONTROL**

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
  2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
  2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

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- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
  - 1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  - 2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  - 3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  - 4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
  - 5. Do not perform any duties of Contractor.
- F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

**3.1 REPAIR AND PROTECTION**

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

**END OF SECTION 01400**

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**SECTION 01420 - REFERENCES**

**PART 1 - GENERAL**

**1.1 DEFINITIONS**

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Installer": Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- J. "Experienced": When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- K. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

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**1.2 INDUSTRY STANDARDS**

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
  - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source and make them available on request.
- E. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list.

ADAAG	Americans with Disabilities Act (ADA)
CFR	Code of Federal Regulations
CRD	Handbook for Concrete and Cement
DOD	Department of Defense Specifications and Standards
FED-STD	Federal Standard (See FS)
FS	Federal Specification
FTMS	Federal Test Method Standard (See FS)
MILSPEC	Military Specification and Standards
UFAS	Uniform Federal Accessibility Standards

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**1.3 ABBREVIATIONS AND ACRONYMS**

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

AA	Aluminum Association, Inc. (The)
AAADM	American Association of Automatic Door Manufacturers
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AAN	American Association of Nurserymen (See ANLA)
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists (The)
ABMA	American Bearing Manufacturers Association
ACI	American Concrete Institute/ACI International
ACPA	American Concrete Pipe Association
AEIC	Association of Edison Illuminating Companies, Inc. (The)
AFPA	American Forest & Paper Association (See AF&PA)
AF&PA	American Forest & Paper Association
AGA	American Gas Association
AGC	Associated General Contractors of America (The)
AHA	American Hardboard Association
AHAM	Association of Home Appliance Manufacturers
AI	Asphalt Institute
AIA	American Institute of Architects (The)
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction

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ALCA	Associated Landscape Contractors of America
ALSC	American Lumber Standard Committee
AMCA	Air Movement and Control Association International, Inc.
ANLA	American Nursery & Landscape Association (Formerly: AAN - American Association of Nurserymen)
ANSI	American National Standards Institute
AOSA	Association of Official Seed Analysts
APA	APA - The Engineered Wood Association
APA	Architectural Precast Association
API	American Petroleum Institute
ARI	Air-Conditioning & Refrigeration Institute
ASCA	Architectural Spray Coaters Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	ASME International (The American Society of Mechanical Engineers International)
ASSE	American Society of Sanitary Engineering
ASTM	ASTM International (American Society for Testing and Materials International)
AWCI	AWCI International (Association of the Wall and Ceiling Industries International)
AWCMA	American Window Covering Manufacturers Association (See WCMA)
AWI	Architectural Woodwork Institute
AWPA	American Wood-Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Industry Association (The)
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International)



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CCC	Carpet Cushion Council
CCFSS	Center for Cold-Formed Steel Structures
CDA	Copper Development Association Inc.
CEA	Canadian Electricity Association
CFFA	Chemical Fabrics & Film Association, Inc.
CGA	Compressed Gas Association
CGSB	Canadian General Standards Board
CIMA	Cellulose Insulation Manufacturers Association
CISCA	Ceilings & Interior Systems Construction Association
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CPPA	Corrugated Polyethylene Pipe Association
CRI	Carpet & Rug Institute (The)
CRSI	Concrete Reinforcing Steel Institute
CSA	CSA International (Formerly: IAS - International Approval Services)
CSI	Construction Specifications Institute (The)
CSSB	Cedar Shake & Shingle Bureau
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute)
DHI	Door and Hardware Institute
EIA	Electronic Industries Alliance
EIMA	EIFS Industry Members Association
EJMA	Expansion Joint Manufacturers Association, Inc.
FCI	Fluid Controls Institute
FGMA	Flat Glass Marketing Association (See GANA)
FM	Factory Mutual System (See FMG)
FMG	FM Global

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(Formerly: FM - Factory Mutual System)

FSC	Forest Stewardship Council
GA	Gypsum Association
GANA	Glass Association of North America (Formerly: FGMA - Flat Glass Marketing Association)
GRI	Geosynthetic Research Institute
GTA	Glass Tempering Division of Glass Association of North America (See GANA)
HI	Hydraulic Institute
HI	Hydronics Institute
HMMA	Hollow Metal Manufacturers Association (See NAAMM)
HPVA	Hardwood Plywood & Veneer Association
HPW	H. P. White Laboratory, Inc.
IAS	International Approval Services (See CSA)
ICEA	Insulated Cable Engineers Association, Inc.
ICRI	International Concrete Repair Institute, Inc.
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The)
IESNA	Illuminating Engineering Society of North America
IGCC	Insulating Glass Certification Council
IGMA	Insulating Glass Manufacturers Alliance (The)
ILI	Indiana Limestone Institute of America, Inc.
ISSFA	International Solid Surface Fabricators Association
I3A	International Imaging Industry Association (Formerly: PIMA - Photographic & Imaging Manufacturers Association)
ITS	Intertek Testing Services
IWS	Insect Screening Weavers Association (Now defunct)
KCMA	Kitchen Cabinet Manufacturers Association
LMA	Laminating Materials Association

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(Formerly: ALA - American Laminators Association)

LPI	Lightning Protection Institute
LSGA	Laminated Safety Glass Association (See GANA)
MBMA	Metal Building Manufacturers Association
MFMA	Maple Flooring Manufacturers Association
MFMA	Metal Framing Manufacturers Association
MHIA	Material Handling Industry of America
MIA	Marble Institute of America
ML/SFA	Metal Lath/Steel Framing Association (See SSMA)
MPI	Master Painters Institute
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc.
NAAMM	National Association of Architectural Metal Manufacturers
NAAMM	North American Association of Mirror Manufacturers (See GANA)
NACE	NACE International (National Association of Corrosion Engineers International)
NAIMA	North American Insulation Manufacturers Association (The)
NAMI	National Accreditation and Management Institute, Inc.
NBGQA	National Building Granite Quarries Association, Inc.
NCMA	National Concrete Masonry Association
NCPI	National Clay Pipe Institute
NCTA	National Cable & Telecommunications Association
NEBB	National Environmental Balancing Bureau
NECA	National Electrical Contractors Association
NeLMA	Northeastern Lumber Manufacturers' Association
NEMA	National Electrical Manufacturers Association
NETA	InterNational Electrical Testing Association
NFPA	National Fire Protection Association

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NFRC	National Fenestration Rating Council
NGA	National Glass Association
NHLA	National Hardwood Lumber Association
NLGA	National Lumber Grades Authority
NOFMA	National Oak Flooring Manufacturers Association
NRCA	National Roofing Contractors Association
NRMCA	National Ready Mixed Concrete Association
NSA	National Stone Association (See NSSGA)
NSF	NSF International (National Sanitation Foundation International)
NSSGA	National Stone, Sand & Gravel Association (Formerly: NSA - National Stone Association)
NTMA	National Terrazzo and Mosaic Association, Inc.
NWWDA	National Wood Window and Door Association (See WDMA)
PCI	Precast/Prestressed Concrete Institute
PDCA	Painting and Decorating Contractors of America
PDI	Plumbing & Drainage Institute
PGI	PVC Geomembrane Institute
RCSC	Research Council on Structural Connections
RFCI	Resilient Floor Covering Institute
RIS	Redwood Inspection Service
SAE	SAE International
SDI	Steel Deck Institute
SDI	Steel Door Institute
SEFA	Scientific Equipment and Furniture Association
SGCC	Safety Glazing Certification Council
SIGMA	Sealed Insulating Glass Manufacturers Association (See IGMA)
SJI	Steel Joist Institute

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SMA	Screen Manufacturers Association
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division)
SPIB	Southern Pine Inspection Bureau (The)
SPI/SPFD	Society of the Plastics Industry (The) Spray Polyurethane Foam Division (See SPFA)
SPRI	SPRI (Single Ply Roofing Institute)
SSINA	Specialty Steel Industry of North America
SSMA	Steel Stud Manufacturers Association (Formerly: ML/SFA - Metal Lath/Steel Framing Association)
SSPC	SSPC: The Society for Protective Coatings
STI	Steel Tank Institute
SWI	Steel Window Institute
SWRI	Sealant, Waterproofing, and Restoration Institute
TCA	Tile Council of America, Inc.
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance
TPI	Truss Plate Institute
TPI	Turfgrass Producers International
UL	Underwriters Laboratories Inc.
UNI	Uni-Bell PVC Pipe Association
USITT	United States Institute for Theatre Technology, Inc.
WASTEC	Waste Equipment Technology Association
WCLIB	West Coast Lumber Inspection Bureau
WCMA	Window Covering Manufacturers Association (See WCSC)
WCSC	Window Covering Safety Council (Formerly: WCMA - Window Covering Manufacturers Association)
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association)

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WIC	Woodwork Institute of California
WMMPA	Wood Moulding & Millwork Producers Association
WWPA	Western Wood Products Association

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

BOCA	BOCA International, Inc.
CABO	Council of American Building Officials (See ICC)
IAPMO	International Association of Plumbing and Mechanical Officials (The)
ICBO	International Conference of Building Officials
ICC	International Code Council, Inc. (Formerly: CABO - Council of American Building Officials)
SBCCI	Southern Building Code Congress International, Inc.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

CE	Army Corps of Engineers
CPSC	Consumer Product Safety Commission
DOC	Department of Commerce
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FDA	Food and Drug Administration
GSA	General Services Administration
HUD	Department of Housing and Urban Development
LBL	Lawrence Berkeley Laboratory (See LBNL)
LBNL	Lawrence Berkeley National Laboratory
NCHRP	National Cooperative Highway Research Program (See TRB)
NIST	National Institute of Standards and Technology
OSHA	Occupational Safety & Health Administration

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PBS            Public Building Service (See GSA)  
RUS            Rural Utilities Service (See USDA)  
TRB            Transportation Research Board  
USDA          Department of Agriculture  
USPS          Postal Service

E.    State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

CAPUC        (See CPUC)  
CBHF          State of California, Department of Consumer Affairs  
                Bureau of Home Furnishings and Thermal Insulation  
CPUC          California Public Utilities Commission  
TFS            Texas Forest Service  
                Forest Products Laboratory

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01420**

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**SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.

**1.2 DEFINITIONS**

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

**1.3 USE CHARGES**

- A. General: Installation and installation costs of temporary electrical service and facilities shall be by electrical contractor. Installation and installation costs of heating and cooling facilities shall be by Mechanical Contractor. All other temporary facilities shall be provided by contractor for General Work. Cost and use charges for all temporary facilities are not chargeable to Owner or Architect and shall be included in the Contract Sum for the General Contractor's work. Allow other entities to use temporary services and facilities without cost, including, but not limited to, other prime contractors, Owner's construction forces, Architect, testing and inspecting agencies, and personnel of authorities having jurisdiction.

**1.4 QUALITY ASSURANCE**

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
  - 1. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

**1.5 PROJECT CONDITIONS**

- A. Temporary Utilities: At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.
  - 1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

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- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
1. Keep temporary services and facilities clean and neat.
  2. Relocate temporary services and facilities as required by progress of the Work.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.

**2.2 EQUIPMENT**

- A. Field Offices: Mobile units with lockable entrances, operable windows, and serviceable finishes; heated and air conditioned; on foundations adequate for normal loading.
- B. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- C. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- D. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water, drinking-water units, including paper cup supply.
- E. Heating Equipment: Unless Owner authorizes use of permanent heating system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  2. Heating Units: Listed and labeled, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use for type of fuel being consumed.
- F. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
- G. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

**PART 3 - EXECUTION**

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**3.1 INSTALLATION, GENERAL**

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

**3.2 TEMPORARY UTILITY INSTALLATION**

- A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
  - 2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
  - 3. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.
- B. Sewers and Drainage:
  - 1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
  - 2. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
- C. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
  - 1. Provide rubber hoses as necessary to serve Project site.
  - 2. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
  - 1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
  - 2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy.
  - 3. Drinking-Water Facilities: Provide bottled-water, drinking-water units.
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from

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adverse effects of low temperatures or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed.

1. Maintain a minimum temperature of 50 deg F (10 deg C) in permanently enclosed portions of building for normal construction activities, and 65 deg F (18.3 deg C) for finishing activities and areas where finished Work has been installed.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- G. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.
1. Install power distribution wiring overhead and rise vertically where least exposed to damage.
- H. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
  2. Provide one 100-W incandescent lamp per 500 sq. ft. (45 sq. m), uniformly distributed, for general lighting, or equivalent illumination.
  3. Provide one 100-W incandescent lamp every 50 feet (15 m) in traffic areas.
  4. Provide one 100-W incandescent lamp per story in stairways and ladder runs, located to illuminate each landing and flight.
  5. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the Work is being performed.
- J. Telephone Service: Provide temporary telephone service throughout construction period for common-use facilities used by all personnel engaged in construction activities. Install separate telephone line for each field office and first-aid station.
1. Provide additional telephone lines for the following:
    - a. In field office with more than two occupants, install a telephone for each additional occupant or pair of occupants.
    - b. Provide a dedicated telephone line for each facsimile machine and computer with modem in each field office.
  2. At each telephone, post a list of important telephone numbers, including police and fire departments ambulance service Contractor's home office Architect's office Engineers' offices Owner's office and principal subcontractors' field and home offices.
  3. Provide voice-mail service on superintendent's telephone.

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4. Provide a portable cellular telephone for superintendent's use in making and receiving telephone calls when away from field office.

**3.3 SUPPORT FACILITIES INSTALLATION**

A. General: Comply with the following:

1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
2. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines. Comply with NFPA 241.
3. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
4. of final course according to Division 2 Section "Hot-Mix Asphalt Paving ."
5. Prepare temporary signs to provide directional information to construction personnel and visitors.

B. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section "Execution Requirements " for progress cleaning requirements.

1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.

C. Common-Use Field Office: Provide an insulated, weathertight, heated and air-conditioned field office for use as a common facility by all personnel engaged in construction activities; of sufficient size to accommodate required office personnel and meetings of 10 persons at Project site. Keep office clean and orderly.

D. Lifts and Hoists: Provide facilities for hoisting materials and personnel. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

**3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION**

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.

B. Stormwater Control: Provide storm water and erosion control measures indicated on drawings.

C. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from construction damage. Protect tree root systems from damage, flooding, and erosion.

D. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning

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signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.

- E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
  - 1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
  - 2. Vertical Openings: Close openings of 25 sq. ft. (2.3 sq. m) or less with plywood or similar materials.
  - 3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
  - 4. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
  
- F. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
  - 1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
    - a. Locate fire extinguishers where convenient and effective for their intended purpose; provide 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 firefighting. Prohibit smoking in hazardous fire-exposure areas.
  - 4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
  - 5. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
  - 6. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

**3.5 OPERATION, TERMINATION, AND REMOVAL**

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
  
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.
  - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
  - 2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

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- C. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
  
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification signs.
  - 2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

**END OF SECTION 01500**

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**SECTION 01600 - PRODUCT REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for selecting products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. See Division 1 Section "Closeout Procedures" for submitting warranties for contract closeout.
- C. See Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.

**1.2 DEFINITIONS**

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
  - 2. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.
- D. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
- E. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

**1.3 SUBMITTALS**

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

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1. Substitution Request Form: Use CSI Form 13.1A .
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
  - a. Statement indicating why specified material or product cannot be provided.
  - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
  - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - e. Samples, where applicable or requested.
  - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
  - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
  - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time.
  - j. Cost information, including a proposal of change, if any, in the Contract Sum.
  - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
  - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 21 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
  - a. Form of Acceptance: Change Order.
  - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

**1.4 QUALITY ASSURANCE**

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

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**1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
  5. Store products to allow for inspection and measurement of quantity or counting of units.
  6. Store materials in a manner that will not endanger Project structure.
  7. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
  8. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  9. Protect stored products from damage.

**1.6 PRODUCT WARRANTIES**

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  2. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

**PART 2 - PRODUCTS**

**2.1 PRODUCT OPTIONS**

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

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4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

**2.2 PRODUCT SUBSTITUTIONS**

- A. Timing: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
  1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
  2. Requested substitution does not require extensive revisions to the Contract Documents.
  3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
  4. Substitution request is fully documented and properly submitted.
  5. Requested substitution will not adversely affect Contractor's Construction Schedule.
  6. Requested substitution has received necessary approvals of authorities having jurisdiction.
  7. Requested substitution is compatible with other portions of the Work.
  8. Requested substitution has been coordinated with other portions of the Work.
  9. Requested substitution provides specified warranty.

**2.3 COMPARABLE PRODUCTS**

- A. Where products or manufacturers are specified by name, submit the following, in addition to other required submittals, to obtain approval of an unnamed product:
  1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
  2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  3. Evidence that proposed product provides specified warranty.
  4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  5. Samples, if requested.

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01600**

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**SECTION 01631 - PRODUCT SUBSTITUTIONS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION OF WORK**

A. Work Specified This Section:

1. This Section specifies administrative and procedural requirements for handling requests as a substitution request made after the Notice to Proceed or award of the Contract as a CPR.

**1.2 SUBMITTALS**

A. Substitution Request Submittal:

1. Submit 3 copies of each request for substitution for consideration.
2. Submit each request on the attached form and in accordance with procedures required for Change Proposal Requests (CPR). See Section 01250 for additional information.
3. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
4. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
  - a) Original copies of Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
  - b) Samples, where applicable or requested.
  - c) A detailed point by point comparison of the proposed substitution and the specified product detailing the significant qualities of both products.
    - 1) 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 substitutions effect on the Contractor's Construction Schedule.
  - f) Cost information, including a proposal of the net deduct change 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.
    - 1) 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.

B. Architect's Action:

1. After receipt of the request for substitution, the Architect may request additional information or documentation necessary for evaluation of the request.
2. If a decision on use of a proposed substitute is not made or obtained within sufficient time to have no adverse impact on the construction schedule, the Contractor shall use the product specified in the Contract Documents.

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**PART 2 - PRODUCTS (NOT APPLICABLE)**

**PART 3 - EXECUTION**

**3.1 SUBSTITUTIONS:**

A. Conditions:

1. No substitution will be considered unless such request include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for a complete comparison with the specified products or materials and an evaluation of the proposed products or materials.
2. A statement setting forth changes in other materials, equipment or other portions of the Work including changes in the work of other contracts that incorporation of the proposed substitution would require shall be included.
3. Savings or Credit to Owner for accepting substitution
4. The burden of proof of the merit of the proposed substitution is upon the proposer.
5. In addition to the requirements in the Supplemental General Conditions, the following items will apply:
  - a) The substitution is in compliance with subsequent interpretations of code or insurance requirements.
  - b) The manufacturer or fabricator shall certify or guarantee the specified product as required by the Contract Documents.
  - c) Product shall perform properly and fit in the designated space.

B. The Contractor shall bear all expenses resulting from substitutions including the cost of work in general, structural, plumbing, mechanical and electrical trades required due to the substitution and the cost of any Architect's services made necessary by the substitution.

C. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

**3.2 SUBMITTAL FORMS:**

A. All proposed substitutions shall use the following form.

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**SUBSTITUTION  
REQUEST**

---

Project: \_\_\_\_\_ Substitution Request No. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ CPR No. (After Bid) \_\_\_\_\_  
\_\_\_\_\_ From: \_\_\_\_\_  
To: \_\_\_\_\_ Date: \_\_\_\_\_  
\_\_\_\_\_ A/E Project No. \_\_\_\_\_  
Re: \_\_\_\_\_ Contract For: \_\_\_\_\_

---

Specification Title/or Drawing Sheet: \_\_\_\_\_

Section No.: \_\_\_\_\_ Page No.: \_\_\_\_\_ Article/Paragraph: \_\_\_\_\_

---

Proposed Substitution: \_\_\_\_\_

Manufacturer: \_\_\_\_\_ Address: \_\_\_\_\_ Phone #: \_\_\_\_\_

Trade Name: \_\_\_\_\_ Model #: \_\_\_\_\_

Installer: \_\_\_\_\_ Address: \_\_\_\_\_ Phone #: \_\_\_\_\_

History: New Product:      2 -5 years old      5-10 years old      More than ten years old

Briefly explain differences between proposed substitution and specified product \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Point-by-Point comparative data attached - REQUIRED BY A/E

---

Reason for not providing specified item: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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**Similar Installation:**

Project: \_\_\_\_\_ Architect: \_\_\_\_\_

Address: \_\_\_\_\_ Owner: \_\_\_\_\_

Telephone: \_\_\_\_\_ Owner Representative: \_\_\_\_\_

Date Installed: \_\_\_\_\_

Proposed substitution affects other parts of Work: No Yes; explain \_\_\_\_\_

Savings or Credit to Owner for accepting substitution: \_\_\_\_\_ (\$ \_\_\_\_\_)

**(MUST BE FILLED OUT TO RECEIVE REVIEW.)**

Proposed substitution changes Contract Time: No Yes; Add/Deduct \_\_\_\_\_ days.

Supporting Data Attached:

Product Data Drawings Tests Reports Samples \_\_\_\_\_

Fire Tests Acoustical Tests

ASTM Tests UL, FM or WHI listed: provide copy of test reports.

Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same or better warranty will be furnished for proposed substitution as for specified product.
- Same or better maintenance service and source of replacement parts, as applicable is available.
- Proposed substitution will not affect or delay Progress Schedule.
- Cost data as stated above is complete. Contractor (s) claims for additional costs related to accepted substitution, which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for A/E changes to building design, including architectural or engineering design, detailing, and construction costs caused by the requested substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted By: \_\_\_\_\_

Signature: \_\_\_\_\_

Firm: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ Approved By: \_\_\_\_\_

General Contractor

Date



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Attachments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**ARCHITECT'S REVIEW AND ACTION**

Substitution approved - Make submittals in accordance with Division One.

Substitution approved as noted - Make submittals in accordance with Division One.

Substitution rejected - Use specified materials.

Signed by: \_\_\_\_\_ Date: \_\_\_\_\_

Additional Comments   Contractor   Subcontractor   Supplier   Manufacturer   A/E \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**END OF SECTION 01631**

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**SECTION 01700 - EXECUTION REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. General installation of products.
  - 4. Progress cleaning.
  - 5. Starting and adjusting.
  - 6. Protection of installed construction.
  - 7. Correction of the Work.
  
- B. See Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

**1.2 QUALITY ASSURANCE**

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

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
  - 1. Before construction, verify the location and points of connection of utility services.
  
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
  - 1. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

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- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  3. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

**3.2 PREPARATION**

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Owner not less than 7 days in advance of proposed utility interruptions.
  2. Do not proceed with utility interruptions without Owner's written permission.
- C. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- E. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

**3.3 CONSTRUCTION LAYOUT**

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  3. Inform installers of lines and levels to which they must comply.
  4. Check the location, level and plumb, of every major element as the Work progresses.

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5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
  6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

**3.4 FIELD ENGINEERING**

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

**3.5 INSTALLATION**

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
  2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

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1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  2. Allow for building movement, including thermal expansion and contraction.
- F. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- G. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

**3.6 PROGRESS CLEANING**

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- G. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- H. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

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- I. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

**3.7 STARTING AND ADJUSTING**

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

**3.8 PROTECTION OF INSTALLED CONSTRUCTION**

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

**3.9 CORRECTION OF THE WORK**

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

**END OF SECTION 01700**

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**SECTION 01731 - CUTTING AND PATCHING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes procedural requirements for cutting and patching.
- B. See Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
- C. Requirements in this Section apply to mechanical and electrical installations. See Divisions 15 and 16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

**1.2 SUBMITTALS**

**1.3 QUALITY ASSURANCE**

- A. Structural Elements: Do not cut and patch structural elements.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
- C. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

**1.4 WARRANTY**

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

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

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1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

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

**3.2 PREPARATION**

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

**3.3 PERFORMANCE**

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

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3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
  5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
  3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
  5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

**END OF SECTION 01731**

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**SECTION 01732 - SELECTIVE DEMOLITION**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes the following:
  - 1. Demolition and removal of selected portions of building or structure.
  - 2. Demolition and removal of selected site elements.
- B. See Division 2 Section "Site Clearing" for site clearing and removal of above- and below-grade improvements.

**1.2 DEFINITIONS**

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

**1.3 QUALITY ASSURANCE**

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Standards: Comply with ANSI A10.6 and NFPA 241.

**1.4 PROJECT CONDITIONS**

- A. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- B. Hazardous Materials: It is unknown whether hazardous materials will be encountered in the Work.
  - 1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.
- C. Hazardous Materials: The owner will identify and remove all hazardous materials requiring removal.

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- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities that are incorporated in new work and protect them against damage during selective demolition operations.

**1.5 WARRANTY**

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

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

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

**3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS**

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

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**3.3 PREPARATION**

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

**3.4 SELECTIVE DEMOLITION**

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
  - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  - 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
  - 4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  - 5. Dispose of demolished items and materials promptly.
- B. Reuse of Building Elements: Do not demolish building elements beyond what is indicated on Drawings without Architect's approval.
- C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

**3.5 DISPOSAL OF DEMOLISHED MATERIALS**

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

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1. Comply with requirements specified in Division 1 Section "Construction Waste Management."
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

**3.6 CLEANING**

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

**END OF SECTION 01732**



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**SECTION 01770 - CLOSEOUT PROCEDURES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Inspection procedures.
  - 2. Project Record Documents.
  - 3. Operation and maintenance manuals.
  - 4. Warranties.
  - 5. Instruction of Owner's personnel.
  - 6. Final cleaning.
- B. See Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
- C. See Division 1 Section "Construction Progress Documentation" for submitting Final Completion construction photographs and negatives.
- D. See Divisions 2 through 16 Sections for specific closeout and special cleaning requirements for products of those Sections.

**1.2 SUBSTANTIAL COMPLETION**

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
  - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
  - 2. Advise Owner of pending insurance changeover requirements.
  - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
  - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
  - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  - 8. Complete startup testing of systems.
  - 9. Submit test/adjust/balance records.
  - 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  - 11. Advise Owner of changeover in heat and other utilities.

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12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

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

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

**1.3 FINAL COMPLETION**

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

1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

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

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

**1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)**

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

**1.5 PROJECT RECORD DOCUMENTS**

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- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.
  
- B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
  - 1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
    - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
    - b. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
  - 2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
  - 3. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
  - 4. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
  
- C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  - 3. Note related Change Orders and Record Drawings, where applicable.
  
- D. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

**1.6 OPERATION AND MAINTENANCE MANUALS**

- A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
  - 1. Operation Data: Include emergency instructions and procedures, system and equipment descriptions, operating procedures, and sequence of operations.
  - 2. Maintenance Data: Include manufacturer's information, list of spare parts, maintenance procedures, maintenance and service schedules for preventive and routine maintenance, and copies of warranties and bonds.

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- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

**1.7 WARRANTIES**

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
  - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (115-by-280-mm) paper.
  - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

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

**PART 3 - EXECUTION**

**3.1 DEMONSTRATION AND TRAINING**

- A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Provide instructors experienced in operation and maintenance procedures.
  - 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
  - 3. Schedule training with Owner, through Architect, with at least 21 days' advance notice.
  - 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.

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**3.2 FINAL CLEANING**

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - g. Sweep concrete floors broom-clean in unoccupied spaces.
    - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
    - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - j. Remove labels that are not permanent.
    - k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
      - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
    - l. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - m. Replace parts subject to unusual operating conditions.
    - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

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- q. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

**END OF SECTION 01770**

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**SECTION 01788 - WARRANTIES AND BONDS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION OF WORK**

A. Work Included This Section:

1. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
2. Specific requirements for warranties for the Work and products and installations that are specified to be warranted are included in the individual Sections of Divisions 2 through 16.
3. Certifications and other commitments and agreements for continuing services to Owner are specified in the Contract Documents.

B. Disclaimers and Limitations:

1. Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign warranties with the Contractor.
2. At no time shall any warranties/guarantees be submitted to the Owner for this project which supercedes or voids any of the Owners rights as established by the state's General Statutes for which the project is located.
3. Failure of the Contractor and/or its suppliers, manufacturers and its sub-contractors to enter into such warranties as required by the Contract Documents shall be considered a breach of contract.

**1.2 WARRANTY REQUIREMENTS**

A. Related Damages and Losses:

1. When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work. Do not reuse damaged materials.

**1.3 SUBMITTALS**

A. Written Warranties:

1. Submit written warranties to the Architect prior to Substantial Completion in a separate three ring binder. The Architect's Certificate of Substantial Completion designates a commencement date for warranties.
2. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or the Contractor and subcontractor, supplier or manufacturer.
3. Refer to individual Sections for specific content requirements, and particular requirements for submittal of special warranties.

B. Form of Submittal:

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1. At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the Table of Contents of the Project Manual. Deliver all warranties to the Architect before or with the Request for Substantial Completion.

C. Reinstatement of Warranty:

1. When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement.
2. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

D. Replacement Cost:

1. Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents.
2. The Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the Owner has benefited from use of Work through a portion of its anticipated useful service life.

E. Owner's Recourse:

1. Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

F. Rejection of Warranties:

1. The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

**PART 2 - PRODUCTS** (Not Applicable)

**PART 3 - EXECUTION** (Not Applicable)

**END OF SECTION 01788**





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**2.1 SILT FENCES**

- A. Posts: Steel posts shall be 5' in height and be of self-fastener angle steel type.
- B. Posts shall be spaced at 8' maximum when silt fence is backed with wire mesh, and 6' when no wire mesh is used or as required by the Engineer.
- C. Woven Wire: Woven wire fencing shall conform to ASTM A116 for Class 3 galvanizing. Fabric shall be a minimum of 32" in width and shall have a minimum of 6 line wires with 12" stay spacing. The top and bottom wires shall be 10 gauge while the intermediate wires shall be 12-1/2 gauge. Wire fabric shall be fastened to wood posts with not less than 9 wire staples 1-1/2" long.
- D. Fabric: Provide woven synthetic fiber designed specifically for silt fence conforming to NCDOT specifications.

**2.2 DRAINAGE STONE**

- A. Class I material NCDOT No. 57.

**2.3 TEMPORARY SEEDING:**

- A. Temporary seeding, when required, shall be performed in accordance with the recommendations contained in "Guide for Sediment Control on Construction Sites in North Carolina", published by the Soil Conservation Service and Section 02228 of these specifications.

**PART 3 - EXECUTION**

**3.1 GENERAL**

The Contractor shall take whatever measures are necessary to minimize soil erosion and siltation, and water, air, and noise pollution caused by his operations. The Contractor shall also comply with the applicable regulations of all legally constituted authorities relating to pollution prevention and control. The Contractor shall keep himself fully informed of all such regulations which in any way affect the conduct of the work, and shall at all times observe and comply with all such regulations. In the event of conflict between such regulations and the requirements of the specifications, the more restrictive requirements shall apply.

**3.2 EROSIONS AND SILTATION CONTROL**

- A. The Contractor shall exercise every reasonable precaution throughout the life of the project to prevent the eroding of soil and the silting of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces, or other property.
- B. Prior to suspension of operations on the project or any portion thereof, the Contractor shall take all necessary measures to protect the construction area, including but not limited to borrow sources, soil type base course sources, and waste areas, from erosion during the period of suspension.
- C. Provide diversion ditches and berms as necessary to prevent concentrated flow of water across disturbed areas.
- D. Stockpile excavated material on the opposite side of the utility trenches from the watercourses to the extent that is possible.

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- E. In the event that stockpiles are placed on the watercourse side of the trench, provide silt fence or silt berms with stone filter outlets along the entire length of the stockpile that is on the watercourse side of the trench. Upon the completion of backfilling, the measures shall be removed and the site graded to its natural grade or as shown on plans.
- F. Maintain natural buffer zones along all watercourses sufficient to retain all visible siltation within the first 25 percent of the buffer width.
- G. Provide a settling basin with a gravel filter outlet for all water pumped from trenches or dewatering equipment. Pumping of that water directly into any stream, pond, or watercourse is prohibited.
- H. Temp, fertilize, seed and mulch the disturbed areas as soon as practicable after line is installed and, in all cases, no later than 21 days after completion of the line segment or work at a particular site.
- I. When construction operations are suspended for more than 21 days, provide temporary seeding and mulching of all disturbed areas including those areas in which further construction is necessary.
- J. Erosion control measures installed by the Contractor shall be acceptably maintained by the Contractor.
- K. Silt fences shall be provided where shown on the drawings and/or as necessary to prevent erosion.
- L. Catch basins shall be protected from silt by placing straw bales or silt fence around the opening until vegetative cover is established.

**3.3 WATER AND AIR POLLUTION**

- A. The Contractor shall exercise every reasonable precaution throughout the life of the project to prevent pollution of rivers, streams, and water impoundments. Pollutions such as chemicals, fuels, lubricants, bitumens, raw sewage, and other harmful waste shall not be discharged into or alongside of rivers, streams, or impoundments, or into natural or manmade channels leading thereto.

**3.4 DUST CONTROL**

- A. The Contractor shall control dust throughout the life of the project within the project area and at all other areas affected by the construction of the project, including, but not specifically limited to, unpaved secondary roads, haul roads, access roads, disposal sites, borrow and material sources, and production sites. Dust control shall not be considered effective where the amount of dust creates a potential or actual unsafe condition, public nuisance, or condition endangering the value, utility, or appearance of any property.

**3.5 NOISE CONTROL**

- A. The Contractor shall exercise every reasonable precaution throughout the life of the project to prevent excessive and unnecessary noise. The Contractor shall choose his methods so as to minimize the disturbance of area residents.

**END OF SECTION 02120**

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**SECTION 2228 – CLEAN UP AND SEEDING**

**PART 1 - GENERAL**

**1.1 RELATED WORK SPECIFIED ELSEWHERE**

- A. Erosion Control: Section 02120

**1.2 DESCRIPTION**

- A. The work covered by this section consists of disposal of waste and debris, preparing seedbeds, furnishing, placing, and covering limestone, fertilizer, and seed; compacting seedbeds; furnishing, placing, and securing mulch; and other operations necessary for the permanent establishment of grasses from seed; all in accordance with these specifications and drawings.
- B. Waste will be considered to be all excavated materials which are not utilized in the construction of the project.
- C. Debris will be considered to be all undesirable material encountered or left on the project site.
- D. Permanent Seeding is required for all areas disturbed by construction, except for areas covered by structures, pavements, etc.
- E. Temporary Seeding of disturbed areas shall be performed whenever one or more of the following conditions exist.
  - 1. The Engineer determines that temporary seeding is necessary to prevent or stop erosion of disturbed areas.
  - 2. Work is suspended or delayed on any portion of the project for 15 calendar days (10 calendar days within NCDOT right of way) and the potential for erosion exists.
  - 3. Whenever permanent seeding is delayed beyond that required by the Contract Documents.
- F. The Contractor shall adapt his operations to variations in weather or soil conditions as necessary for the successful establishment and growth of the grasses.
- G. In all operations covered by this section, care shall be taken to preserve the required line, grade, and cross section of the work area.

**1.3 QUALITY ASSURANCE**

- A. All work done in this section shall be performed in accordance with all applicable Sections and Provisions of the North Carolina State Department of Transportation Standard Specifications for Roads and Structures, latest revision.
- B. All materials required in this section shall meet or exceed the requirements of Division X: Section 1060 of the North Carolina State Department of Transportation Standard Specifications for Roads and Structures, latest revision.

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**PART 2 - PRODUCTS**

**2.1 MATERIALS**

A. Fertilizer:

1. Provide commercial fertilizer conforming to statutory requirements and all rules and regulations adopted by the North Carolina Board of Agriculture for all seeding/sodding.

B. Limestone: Provide agricultural limestone conforming to all statutory requirements and all rules and regulations adopted by the North Carolina Board of Agriculture.

C. Seed: Provide seed conforming to all statutory requirement and all rules and regulations adopted by the North Carolina Board of Agriculture.

1. Provide seed in accordance with requirements shown below. Deliver to site in original containers, labeled to show that the requirements of the N.C. Seed Law are met.
2. Quality of seed shall conform to the following:

<u>Common Name</u>	<u>Minimum Seed Purity</u> %	<u>Minimum Germination</u> %	<u>Maximum Weed Seed</u> %
<u>Grasses</u>			
Fescue Tall (KY.-31)	98	90	1.00
Common Bermudagrass	98	90	1.00

3. Seed containing prohibited noxious weed seed shall not be accepted. Seed shall be in conformance with state seed law restrictions for restricted noxious weeds.
4. If seed of the accepted quality cannot be bought, secure prior approval before making changes or exceptions.

D. Mulch:

1. Mulch for erosion control shall consist of grain straw or other acceptable material, and shall have been approved by the Architect/Engineer before being used. All mulch shall be reasonably free from mature seedbearing stalks, roots, or bulbets of Johnson Grass, Nutgrass, Sandbur, Wild Garlic, Wild Onion, Bermuda Grass, Cortalaria, and Witch weed, and free of excessive amount of restricted noxious weeds as defined by the North Carolina Board of Agriculture at the time of use of the mulch. Also there shall be compliance with all applicable State and Federal domestic plant quarantines. Straw mulch that is matted or lumpy shall be loosened and separated before being used.
2. Material for holding mulch in place shall be asphalt or other approved binding material applied in accordance with this section.

**PART 3 – EXECUTION**

**3.1 GENERAL**

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- A. Follow procedures set forth in the publication "Guide for Sediment Control on Construction Sites in North Carolina" by the United States Department of Agriculture, Soil Conservation Service, and as specified herein.
- B. Scarify soil to a depth of three (3) inches and work into a satisfactory seed bed by disking, use of cultipackers, harrows, drags and other approved means.
- C. Preparation outlined above shall not be done when the soil is frozen, wet or otherwise in an unfavorable condition.
- D. Begin and complete seeding operations as outlined below as soon as possible after final grading is completed, but in no event later than 15 calendar days after completion of final grading.
- E. Disturbed areas within the right of way of the North Carolina Department of Transportation shall be graded, dressed, seeded, mulched, and tacked with liquid asphalt or other approved means within 10 calendar days of completion of work in any area.
- F. Seeding and mulching operations shall not begin until electrical service has been installed within the project, unless directed by the Engineer.
- G. Distribute lime and fertilizer, uniformly over seed bed and harrow, rake, or otherwise work same into seed beds.
- H. Distribute seed uniformly over seed bed. Cover seed lightly after seeding.
- I. No lime, fertilizer, or seed shall be applied during a strong wind, when soil is wet or otherwise unworkable. Should rain follow seeding before rolling is begun, the bed shall not be rolled.
- J. The kinds of seed and the rates of application of seed, fertilizer, and limestone shall be as stated below.

- 1. Seeding Schedule: See L2.1

**3.2 WASTE MATERIAL DISPOSAL**

- A. Waste material not utilized in the construction of the project shall be removed from the project site and disposed of by the Contractor in areas provided by him.
- B. The Contractor shall hold the Owner harmless of any damages which might occur through the disposal of the waste and debris.
- C. Construction debris and all broken concrete, masonry, etc. shall be removed from the project as soon as possible.
- D. Where the Owner has granted permission to dispose of waste and debris within the project area, the Owner will have authority to establish whatever additional requirements that may be necessary to insure the satisfactory appearance of the area.

**3.3 SEEDING AND MULCHING**

- A. Seeding and mulching shall be performed in accordance with all applicable provisions of Section 1660 of the North Carolina State Department of Transportation's Standard Specifications for Roads and Structures, latest revision.

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- B. Seeding and mulching shall be done on all earth areas disturbed by construction not destined for construction of structures or paving.
- C. Apply mulch immediately after permanent seeding at a uniform rate sufficient to achieve approximately 80% coverage of ground surface. Care must be taken to prevent the mulch from being applied too thickly and smothering the seedlings. Mulch for temporary seeding should be applied based upon the recommendations of the Soil Conservation Service for the particular type of seed to be used.
- D. Denuded slopes must be seeded within 21 calendar days (10 calendar days within NCDOT right of way) following completion of any phase of development.

**3.4 TEMPORARY SEEDING**

- A. Temporary seeding shall be performed in accordance with the requirements of Section 01620 of the North Carolina State Department of Transportation's Standard Specifications for Roads and Structures, latest revisions and with Soil Conservation Service recommendations with regard to seed type, rate of application, fertilizer, etc.
- B. The kinds of seed and the rates of application of seed and fertilizer shall be as stated below.

1. Seeding Schedule

<u>Date</u>		
Apr 15 – Aug 14	German Millet	50 lbs./Acre
Aug 15 - Apr 14	Rye (Grain)	120 lbs./Acre

2. Year Round                      Fertilizer 10-10-10 Analysis                      1000 lbs./acre

**3.5 TEMPORARY MULCHING**

- A. Temporary mulch may be used for the prevention of excessive soil erosion during construction operations where it is impossible or impractical to perform permanent seeding and mulching.
- B. Temporary mulch shall be placed promptly at the location and times directed by the Engineer.
- C. The temporary mulch may be required on previously seeded areas or on areas which have not been seeded.
- D. Temporary mulches may be straw, fiber mats, netting or other suitable material acceptable to the Engineer and shall be reasonably clean and free of noxious weeds and deleterious material. Mulch shall be spread uniformly over the area by hand or by means of approximate mechanical spreaders or blowers to obtain an application satisfactory to the Engineer. On seeded areas, satisfactory application of temporary mulch shall allow some sunlight to penetrate and air to circulate, but also partially shade the ground, reduce erosion and conserve soil moisture.
- E. When temporary mulching is being performed in connection with temporary seeding, no seeded areas shall be allowed to remain more than 24 hours without mulching having been completed.
- F. If seeding has been performed previously, care shall be exercised to prevent displacement of soil or seed, or other damage to the seeded area during temporary mulching operations.



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- G. The Contractor shall take sufficient precautions to prevent temporary mulch from entering pipe lines and drainage structures through displacement by wind, water or other causes.
- H. The Contractor shall apply a sufficient amount of asphalt or other type material to assure that the temporary mulch is properly held in place.
- I. In the application of asphalt materials during temporary mulching operations, adequate precautions shall be taken to prevent damage to traffic; and to any private or public property. Such property shall be adequately covered, or application methods changed, so as to avoid damage. Where any damage occurs as a result of the Contractor's failure to take adequate precautions, the Contractor will be required to repair such damage, including any cleaning that may be necessary, before final acceptance of the work will be made.

**3.6 REPAIR SEEDING & MAINTENANCE**

- A. Maintain the grass on the areas for a period of 90 days after the grass growth appears. Reseed bare areas and repair all eroded areas during that period.
- B. Inspect all seeded areas and make necessary repairs or reseedings within the planting season, if possible. If stand should be over 60% damaged, reestablish following original lime, fertilizer and seeding recommendations.
- C. All areas which do not exhibit satisfactory ground cover within 45 days of seed application shall be replanted.
- D. Repair seeding shall be performed in accordance with the requirements of Section 1661 of the North Carolina State Department of Transportation's Standard Specifications for Roads and Structures, latest revision.
- E. The kinds of seed and fertilizer shall be the same as specified for permanent "seeding and mulching". The rates of application of the various kinds of seed specified for "seeding and mulching" may vary as directed by the Engineer, however the total rate shall be substantially the same as for "seeding and mulching", but in no case will the total rate of seed and fertilizer vary more or less than twenty-five (25%) percent of that specified for "seeding and mulching".

**3.7 SUPPLEMENTAL SEEDING**

- A. The work covered by this section consists of the application of additional seed to an area already seeded with permanent seed but on which there is not a satisfactory cover of grass.
- B. The work of supplemental seeding does not include seedbed preparation, fertilizer, limestone, or mulch, and is intended only to provide an additional amount of seed to the Fertilizer Top dressing operation on projects that do not have a stand of grass thick enough to cover the ground in a reasonable length of time. This work does not conflict with nor replace repair seeding as its purpose is entirely different.
- C. The kinds of seed shall be the same as for "seeding and mulching", and the rate of application may vary from 25 pounds to 75 pounds per acre. The final rate per acre; if needed, will be determined by the Engineer prior to the time of top dressing and the Contractor will be notified in writing of the rate per acre, total quantity needed and areas on which to apply the supplemental seed.

**3.8 FERTILIZER TOP DRESSING:**

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- A. Fertilizer top dressing shall be performed in accordance with the requirements of Section 1665 of the North Carolina State Department of Transportation's Standard Specifications for Roads and Structures, latest revision.

**END OF SECTION 02228**

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**SECTION 2230 – SITE CLEARING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes the following:
1. Removal of trees and other vegetation.
  2. Stripping and stockpiling topsoil.

**1.2 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.

**PART 2 - PRODUCTS (Not Applicable)**

**PART 3 - EXECUTION**

**3.1 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 disposal of stumps and roots.
- B. Refer to Section 2300 Part 3 for specific direction as to when clearing on portions of the site may commence.
- C. 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. Remove heavy growths of grass from areas before stripping.
  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.
  3. Dispose of unsuitable or excess topsoil as specified for disposal of waste material.
- D. 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.

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2. 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 each layer to a density equal to adjacent original ground.

**3.2 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 and dispose of at a permitted site.

**END OF SECTION 02230**

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**SECTION 2300 - EARTHWORK**

**PART 1 - GENERAL**

**1.1 SUMMARY**

A. This Section includes the following:

1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns, and plantings.
2. Excavating and backfilling for buildings and structures.
3. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.

B. Related Sections include the following:

1. Division 2 Section "Site Clearing" for site stripping, grubbing, removing topsoil, and protecting trees to remain.

**1.2 DEFINITIONS**

A. Backfill: Soil materials used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Layer placed between the subgrade course and asphalt paving.

C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

E. Excavation: Removal of material encountered above subgrade elevations.

1. Additional Excavation: Excavation below subgrade elevations as directed by Engineer.
2. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
3. Bulk Excavation: Excavations more than 10 feet (3 m) in width and pits more than 30 feet (9 m) in either length or width.
4. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

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- H. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below base, drainage fill, or topsoil materials.
- I. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

**1.3 SUBMITTALS**

- A. Product Data: For the following:
  - 1. Each type of plastic warning tape.
  - 2. Drainage fabric.
- B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
  - 1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill, backfill, and embankment fill.
  - 2. Laboratory compaction curve according to ASTM D 698 for each on-site or borrow soil material proposed for fill, backfill, and embankment fill.

**1.4 QUALITY ASSURANCE**

- A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials testing, as documented according to ASTM D 3740 and ASTM E 548.
- B. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

**1.5 PROJECT CONDITIONS**

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Engineer not less than two days in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Engineer's written permission.
  - 3. Contact utility-locator service for area where Project is located before excavating.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

**PART 2 - PRODUCTS**

**2.1 SOIL MATERIALS**

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

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- or
- B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, a combination of these group symbols; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
  - C. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.
  - D. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
  - E. Backfill and Fill: Satisfactory soil materials.
  - F. Base: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch (38-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
  - G. 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 90 percent passing a 1-1/2-inch (38-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
  - H. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
  - I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.

## **2.2 ACCESSORIES**

- A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:
  - 1. Red: Electric.
  - 2. Yellow: Gas, oil, steam, and dangerous materials.
  - 3. Orange: Telephone and other communications.
  - 4. Blue: Water systems.
  - 5. Green: Sewer systems.
- B. Drainage Fabric: Nonwoven geotextile, specifically manufactured as a drainage geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:
  - 1. Grab Tensile Strength: 110 lbf (490 N); ASTM D 4632.
  - 2. Tear Strength: 40 lbf (178 N); ASTM D 4533.

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3. Puncture Resistance: 50 lbf (222 N); ASTM D 4833.
4. Water Flow Rate: 150 gpm per sq. ft. (100 L/s per sq. m); ASTM D 4491.
5. Apparent Opening Size: No. 50 (0.3 mm); ASTM D 4751.

**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. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- C. 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.

**3.2 DEWATERING**

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
  1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
  2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

**3.3 ENGINEERED FILL AND FOUNDATION SURCHARGE REQUIREMENTS**

The following requirements apply to the work depicted on Sheet L2.1:

1. Establish drainage and erosion and sedimentation controls shown prior to earthwork operations.
2. Positive drainage shall be maintained on all building pad and pavement locations during the work. The Contractor shall not leave excavations, trenches, or pits open overnight. Slopes shall be maintained **daily** during the fill process in a manner that provides positive drainage of the filled surface and adjacent areas.
3. Protect bioretention facility from sedimentation with perimeter silt fence or other effective means. Sediment contaminated media shall be excavated, discarded and replaced as required to achieve required infiltration rate.



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**3.4 EXPLOSIVES**

- A. Explosives: Do not use explosives.

**3.5 EXCAVATION, GENERAL**

- A. Unclassified Excavation: All excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

**3.6 EXCAVATION FOR STRUCTURES**

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures.
2. Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch (25 mm). Do not disturb bottom of excavations intended for bearing surface.

**3.7 EXCAVATION FOR WALKS AND PAVEMENTS**

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

**3.8 EXCAVATION FOR UTILITY TRENCHES**

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. 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 (300 mm) higher than top of pipe or conduit, unless otherwise indicated.

1. Clearance: As 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 projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 6 inches (150 mm) in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
2. For pipes and conduit 6 inches (150 mm) or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
3. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

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**3.9 APPROVAL OF SUBGRADE**

- A. Notify Engineer when excavations have reached required subgrade.
- B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
  - 1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades. Contractor shall contact the Engineer 48 hours prior to performing proof roll to coordinate time.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer.

**3.10 UNAUTHORIZED EXCAVATION**

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Engineer.
  - 1. Fill unauthorized excavations under other construction or utility pipe as directed by Engineer.

**3.11 STORAGE OF SOIL MATERIALS**

- A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

**3.12 BACKFILL**

- A. Place and compact backfill in excavations promptly, but not before completing the following:
  - 1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
  - 2. Surveying locations of underground utilities for record documents.
  - 3. Inspecting and testing underground utilities.
  - 4. Removing concrete formwork.
  - 5. Removing trash and debris.
  - 6. Removing temporary shoring and bracing, and sheeting.
  - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

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**3.13 UTILITY TRENCH BACKFILL**

- A. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- B. Backfill trenches excavated under footings and within 18 inches (450 mm) of bottom of footings; fill with concrete to elevation of bottom of footings.
- C. Place and compact initial backfill of base material, free of particles larger than 1 inch (25 mm), to a height of 12 inches (300 mm) 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. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.
- F. Place and compact final backfill of satisfactory soil material to final subgrade.
- G. Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

**3.14 FILL**

- A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.
- B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- C. Place and compact fill material in layers to required elevations as follows:
  - 1. Under grass and planted areas, use satisfactory soil material.
  - 2. Under walks and pavements, use satisfactory soil material.

**3.15 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, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

**3.16 COMPACTION OF BACKFILLS AND FILLS**

- A. Place backfill and fill materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.

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- B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
  - 1. Under pavements, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill material at 95 percent.
  - 2. Under walkways, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 92 percent.
  - 3. Under lawn or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 85 percent.
  - 4. Bioretention media and subgrade shall not be compacted. Mechanized equipment is prohibited from traversing the infiltration measure.

**3.17 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 adjacent existing grades and new grades.
  - 2. Cut out soft spots, fill low spots, and trim high spots to comply with 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 1 inch (25 mm).
  - 2. Walks: Plus or minus 1 inch (25 mm).
  - 3. Pavements: Plus or minus 1/2 inch (13 mm).

**3.18 BASE COURSES**

- A. Under pavements, place base course on prepared subgrade and as follows:
  - 1. Place base course material over subgrade.
  - 2. Compact base courses at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
  - 3. Shape base to required crown elevations and cross-slope grades.
  - 4. When thickness of compacted base course is 6 inches (150 mm) or less, place materials in a single layer.

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5. When thickness of compacted base course exceeds 6 inches (150 mm), place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick when compacted.
- B. Pavement Shoulders: Place shoulders along edges of base course to prevent lateral movement. Construct shoulders, at least 12 inches (300 mm) wide, of satisfactory soil materials and compact simultaneously with each base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

**3.19 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
  1. Paved Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. (186 sq. m) or less of paved area or building slab, but in no case fewer than three tests.
  2. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 150 feet (46 m) or less of trench length, but no fewer than two tests.
- D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

**3.20 PROTECTION**

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
  1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil 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.

**3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Disposal: Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Engineer.

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1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

**END OF SECTION 02300**

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**SECTION 2510 - WATER DISTRIBUTION**

**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 water-distribution piping and related components outside the building for water service and fire-service mains.
- B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.
- C. Note that force mains such as the discharge of the Foundation Drainage Pump Station and the Rainwater Harvesting unit shall be pressure tested in compliance to Part 3 of this Specification in accordance with the requirements for water mains. Refer to the applicable specification sections.

1.3 DEFINITIONS

- A. PVC: Polyvinyl chloride plastic.
- B. DIP: Ductile iron pipe

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
- C. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements:

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1. Comply with standards and requirements of utility company supplying water. Include tapping of water mains, backflow prevention, materials, installation, testing, and disinfection.
  2. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
- B. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.
- E. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.
- F. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.
- G. NSF Compliance:
1. Comply with NSF 14 for plastic potable-water-service piping. Include marking "NSF-pw" on piping.
  2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Preparation for Transport: Prepare valves according to the following:
1. Ensure that valves are dry and internally protected against rust and corrosion.
  2. Protect valves against damage to threaded ends and flange faces.
  3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. During Storage: Use precautions for valves according to the following:
1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
  2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
- D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.



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- G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.7 PROJECT CONDITIONS

- A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
  - 1. Notify Engineer/Architect no fewer than two days in advance of proposed interruption of service.
  - 2. Do not proceed with interruption of water-distribution service without Engineer's/ Architect's written permission.
- B. No connection or alteration of existing Greenville Utilities Commission water or sewer mains or appurtenances are permitted without the express written consent of authorized GUC personnel. Operation of Greenville Utilities Commission valves, hydrants or other components is prohibited unless the Contractor has specific written approval for such action.
- C. Connection of new items to the existing Greenville Utilities Commission system requires that any components added by the contractor be thoroughly disinfected prior to installation and use. Excavations must be kept dewatered whenever GUC water main facilities are cut, tapped, depressurized or otherwise open and vulnerable to contamination.
- D. Of any GUC water system components are removed they shall be delivered to the GUC's Operations Center undamaged if requested to do so by Engineer.

1.8 COORDINATION

- A. Coordinate connection to water main with Greenville Utilities Commission.

**PART 2 - PRODUCTS**

2.1 DUCTILE-IRON PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated. The minimum thickness Class of pipe shall be Class 50.
  - 1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
  - 2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

2.2 PVC PIPE AND FITTINGS

- A. 2 inch diameter:
  - 1. Pipe: PVC, Class 200 SDR 21 conforming to ASTM D1784 and ASTM D2241 with "push-on" joints.
  - 2. Fittings: Schedule 80 PVC with solvent weld joints and shall bear NSF seal.
- B. 4 inches and larger diameter:
  - 1. Pipe: PVC, C900 ; pressure rating 200 psi.

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2. Fittings: Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern. Grip rings shall be used on all fittings.
3. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

**2.3 GATE VALVES**

**A. AWWA, Cast-Iron Gate Valves:**

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. American Darling
  - b. Mueller Co.; Water Products Div.
  - c. Clow
  - d. Approved Equal
2. Nonrising-Stem, Resilient-Seated Gate Valves:
  - a. Description: Gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut.
    - 1) Standard: AWWA C509.
    - 2) Minimum Pressure Rating: 200 psig.
    - 3) End Connections: Mechanical joint.
    - 4) Interior Coating: Complying with AWWA C550.

**2.4 GATE VALVE ACCESSORIES AND SPECIALTIES**

**A. Tapping-Sleeve Assemblies:**

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Ford Model FAST
  - b. JCM Model 432
  - c. Meuleer Model H304
  - d. Romac Model SST
  - e. Approved Equal
2. Description: Sleeve and valve compatible with drilling machine.
  - a. Standard: MSS SP-60.
  - b. Tapping Sleeve: Cast- or ductile-iron or stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
  - c. Valve: AWWA, cast-iron, nonrising-stem, resilient-seated gate valve with one raised face flange mating tapping-sleeve flange.

**B. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches in diameter either Tyler 6855 or EJIW #8555 with 06800007 lid.**

1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

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**2.5 BACKFLOW PREVENTERS**

**A. Reduced-Pressure-Principle Backflow Preventers:**

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Ames Fire & Waterworks; a division of Watts Regulator Co.
  - b. Conbraco Industries, Inc.
  - c. FEBCO; SPX Valves & Controls.
  - d. Flomatic Corporation.
  - e. Watts Water Technologies, Inc.
  - f. Zurn Plumbing Products Group; Wilkins Water Control Products Div.
  - g. Watts Water Technologies
2. Standards: AWWA C511.
3. Device must meet Greenville Utilities Standards: Design Manual, Chapter 7 – Material Specifications for Water System Extensions.
4. The device must meet the recommendations of the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California.
5. Operation: Continuous-pressure applications.
6. Maximum Pressure Loss: 12 psig (83 kPa) maximum, through middle 1/3 of flow range.
7. Size: Per Plans
8. Body:
  - a. Bronze for NPS 2 (DN 50) and smaller;
  - b. Cast iron with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 (DN 65) and larger.
9. End Connections: Threaded for NPS 2 (DN 50) and smaller; flanged for NPS 2-1/2 (DN 65) and larger.
10. Configuration: Designed for horizontal, straight through flow.
11. Accessories:
  - a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 (DN 50) and smaller; OS&Y gate type with flanged ends on inlet and outlet of NPS 2-1/2 (DN 65) and larger.
  - b. Air-Gap Fitting: ASME A112.1.2, matching backflow preventer connection.
  - c.

**B. Backflow Preventer Test Kits:**

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Conbraco Industries, Inc.
  - b. FEBCO; SPX Valves & Controls.
  - c. Flomatic Corporation.
  - d. Watts Water Technologies, Inc.
  - e. Zurn Plumbing Products Group; Wilkins Water Control Products Div.
2. Description: Factory calibrated, with gages, fittings, hoses, and carrying case with test-procedure instructions.

**2.6 PROTECTIVE ENCLOSURES**

**A. Freeze-Protection Enclosures:**

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1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Aqua Shield.
  - b. BF Products, Inc.
  - c. DekoRRa Products.
  - d. Dunco Manufacturing, Inc.
  - e. G&C Enclosures.
  - f. Hot Box, Inc.
  - g. HydroCowl, Inc.
  - h. Watts Water Technologies, Inc.
  
2. Description: Insulated enclosure designed to protect aboveground water piping, equipment, or specialties from freezing and damage, with heat source to maintain minimum internal temperature of 40 deg F (4 deg C) when external temperatures reach as low as minus 34 deg F (minus 36 deg C).
  - a. Standard: ASSE 1060.
  - b. Class I: For equipment or devices other than pressure or atmospheric vacuum breakers.
  - c. Class I-V: For pressure or atmospheric vacuum breaker equipment or devices. Include drain opening in housing.
    - 1) Housing: Reinforced fiberglass construction.
      - a) Size: To meet manufacturer's recommendations and approved by Engineer.
      - b) Drain opening for units with drain connection.
      - c) Access doors with locking devices.
      - d) Insulation inside housing.
      - e) Anchoring devices for attaching housing to concrete base.
    - 2) Electric heating cable or heater with self-limiting temperature control.

**B. Enclosure Bases:**

1. Description: 4-inch (100-mm) minimum thickness precast concrete, of dimensions required to extend at least 6 inches (150 mm) beyond edges of enclosure housings. Include openings for piping.

**PART 3 - EXECUTION**

**3.1 EARTHWORK**

- A. Refer to Division 2 Section "Earthwork" for excavating, trenching, and backfilling.

**3.2 PIPING APPLICATIONS**

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.

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- B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.
- C. Do not use flanges or unions for underground piping.
- D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- E. Underground water-service piping NPS 3/4 to NPS 3 shall be the following:
  - 1. PVC, Schedule 40 with socket fittings; and solvent-cemented joints.
- F. Underground water-service piping NPS 4 to NPS 8 shall be the following:
  - 1. Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint, restrained fittings; and mechanical joints.
  - 2. PVC, C900 socket fittings; and solvent-cemented joints.
- G. Aboveground Water-Service Piping NPS 3/4 to NPS 3 shall be the following:
  - 1. PVC, Schedule 80 pipe; PVC, Schedule 80 socket fittings; and solvent-cemented joints.
- H. Underground Fire-Service-Main Piping NPS 4 to NPS 12 shall be the following:
  - 1. Ductile-iron mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
  - 2. PVC, AWWA C900 Class 150 pipe listed for fire-protection service; PVC fabricated or molded fittings of same class as pipe; and gasketed joints.
- I. Aboveground Fire-Service-Main Piping NPS 4 to NPS 12 shall be ductile-iron, grooved-end pipe; ductile-iron-pipe appurtenances; and grooved joints.

**3.3 RELATION OF WATER MAINS TO STORM DRAINAGE**

- A. Crossing a Water Main over a Storm Sewer
  - 1. Whenever it is necessary for a water main to cross over a storm drainage line, the water main shall be laid at such an elevation that the bottom of the water main is at least 12 inches above the top of the storm drainage line.
  - 2. Where local conditions or barriers prevent a 12 inch vertical separation, the Contractor shall provide that the water main be constructed of Ductile Iron Pipe, of a class directed by the Engineer, with joints that are equivalent to water main standards for a distance of ten (10) feet on each side of the point of crossing.
- B. Crossing a Water Main Under a Storm Drainage Line
  - 1. Whenever it is necessary for a water main to cross under a storm drainage line, the Contractor shall provide for the water main to be constructed of Ductile Iron Pipe, of a thickness class 50, with joints equivalent to water main standards for a distance of ten (10) feet on each side of the point of crossing.
  - 2. A section of water main pipe shall be centered at the point of crossing.
  - 3. At the direction of the GUC Engineer, the Contractor shall pour a concrete pad under the storm pipe to inhibit future settlement.

**3.4 RELATION OF WATER MAINS TO SANITARY SEWERS**

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- A. Lateral Separation of Sewer and Water Mains: Water mains shall be least at least 10 feet laterally from existing or proposed sewers, unless local conditions or barriers prevent a 10-foot lateral separation in which case:
1. The water main is laid in a separate trench, with the elevation of the bottom of the water main at least 18 inches above the top of the sewer; or
  2. The Water main is laid in the same trench as the sewer with the water main located at one side of a bench of undisturbed earth, and with the elevation of the bottom of the water mains at least 18 inches above the top of the sewer.
- B. Crossing a Water Main Over a Sewer: Whenever it is necessary for a water main to cross over a sewer, the water main shall be laid at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer, unless local condition or barriers prevent an 18 inch vertical separation – in which case both the water and the sewer shall be constructed of ferrous materials and with joints that are equivalent to water main standards for a distance of 10 feet on each side of the point of crossing.
- C. Crossing a Water Main Under a Sewer; Whenever it is necessary for a water main to cross under a sewer, both the water main and the sewer shall be constructed of ferrous materials and with joints equivalent to water main standards for a distance of 10 feet on each side of the point of crossing. A section of the water main pipe shall be centered at the point of crossing.

**3.5 VALVE APPLICATIONS**

- A. General Application: Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 and smaller installation.
- B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
1. Underground Valves, NPS 3 and Larger: AWWA, cast-iron, nonrising-stem, resilient-seated gate valves with valve box.
  2. Use the following for valves in vaults and aboveground:
    - a. Gate Valves, NPS 2 and Smaller: Bronze, rising stem.
    - b. Gate Valves, NPS 3 and Larger: AWWA, cast iron, OS&Y rising stem, resilient seated.
    - c. Check Valves: AWWA C508 swing type.

**3.6 PIPING INSTALLATION**

- A. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated. Contractor shall notify Greenville Utilities Commission and the Engineer 48 hours prior to making tap to coordinate inspection.
- B. Make connections larger than NPS 2 with tapping machine according to the following:
1. Pressure test tapping sleeve assembly prior to cutting hole.
  2. Install tapping sleeve and tapping valve according to MSS SP-60.
  3. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
  4. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.

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5. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.
- C. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
- D. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.
- E. Deviation from the proposed line and grade shown on the approved plans is not permitted without prior approval by the Engineer.
- F. Longitudinal deflection of PVC pipe shall not exceed the pipe manufacturer and Uni-Bell recommendations for the type of pipe installed. Longitudinal deflection of ductile iron pipe shall not exceed the requirements of AWWA C 600.
- G. When multiple forms of pipe restraint are utilized each method must be capable of resisting the full thrust force.
- H. Bury piping with depth of cover over top at least 36 inches.
- I. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.
- J. Extend water-service piping and connect to water-supply source and building-water-piping systems at 5 feet from outside face of building wall in locations and pipe sizes indicated.
  1. Terminate water-service piping 5 feet from outside of building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
- K. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.
- L. See Division 13 Section "Fire-Suppression Piping" for fire-suppression-water piping inside the building.
- M. See Division 15 Section "Domestic Water Piping" for potable-water piping inside the building.

**3.7 JOINT CONSTRUCTION**

- A. Make pipe joints according to the following:
  1. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
  2. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.
  3. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.
  4. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure. Refer to Division 2 Section "Piped Utilities - Basic Materials and Methods" for joining piping of dissimilar metals.

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**3.8 ANCHORAGE INSTALLATION**

- A. Anchorage, General: Install water-distribution piping with restrained joints. Restrained-joint types used include the following:
1. Use on ductile iron and C-900 PVC “push on” joints.
  2. Use on mechanical joint to C-900 PVC.
  3. Use on mechanical joint ductile iron.
  4. Lock hydrant tees and fittings for fire hydrants.
  5. Bolted Couplings for PVC C-900 pipe and ductile iron pipe.
- B. Restraint devices for use on ductile iron and C-900 PVC “push-on” joints shall be constructed of high strength ductile iron, ASTM A536, Grade 65-45-12 and shall incorporate machined serrations on the inside diameter to provide positive restraint, exact fit, full circle contact and support of the pipe in an even and uniform manner. Bolts and connecting hardware shall be of high strength, low alloy material in accordance with ANSI/AWWA C111/A21.11, latest revision thereof. All devices shall have a safety factor of no less than 2:1 at the full rated pressure of the pipe on which it is installed. They shall be UL listed and Factory Mutual approved. Restraining devices shall be Uni-Flange Block Buster Series 1390-C, Star Pipe Products Allgrip series 3600 and Pipe Restrainers Series 1200S, or approved equal.
- C. Restraint devices for use on mechanical joint to C-900 PVC, shall be constructed of high strength ductile iron, conforming to the requirements of ASTM A536, Grade 65-45-12, and shall incorporate machined serrations on the inside diameter to provide positive restraint, exact fit, full circle contact and support of the pipe in an even and uniform manner. Bolts and connecting hardware shall be of high strength low alloy material in accordance with ANSI/AWWA C111/A21.11, latest revision thereof. All devices shall have a safety factor of no less than 2:1 at the full rated pressure of the pipe on which it is installed. They shall be UL listed and Factory Mutual approved. Restraining devices shall be Uni-Flange Series 1500, Star Pipe Products, Allgrip Series 3600, Romac Industries, Inc GripRing or approved equal.
- D. Restraint devices for use on mechanical joint ductile iron, shall be constructed of high strength ductile iron, conforming to the requirements of ASTM A536, Grade 65-45-12, and shall incorporate machined serrations on the inside diameter to provide positive restraint, exact fit, full circle contact and support of the pipe in an even and uniform manner. Bolts and connecting hardware shall be of high strength low alloy material in accordance with ANSI/AWWA C111/A21.11, latest revision thereof. All devices shall have a safety factor of no less than 2:1 at the full rated pressure of the pipe on which it is installed. They shall be UL listed and Factory Mutual approved. Restraining devices shall be Uni-Flange Series 1300 C, Star Pipe Products, Allgrip Series 3600, Romac Industries, Inc. GripRing or approved equal.
- E. Locked hydrant tees and fittings for fire hydrants shall meet the requirements of AWWA Standard C-111 (ANSI A21-11). Locked tees shall be as manufactured by American Cast Iron Pipe Company, Clow, U.S. Pipe, or approved equal.
- F. Bolted Couplings for PVC C-900 pipe and ductile iron pipe shall be constructed of a center sleeve and end rings of ductile iron in accordance with ASTM A536. Bolts and nuts shall be of high strength, low alloy steel per ASTM A242 and AWWA C-111. Center sleeve and end rings shall have a paint finish coat. Couplings shall be Ford Style FC1, Romac 501 Series, Smith Blair 441, or JCM 201.



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**3.9 VALVE INSTALLATION**

- A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
- B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.

**3.10 BACKFLOW PREVENTER INSTALLATION**

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
- B. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.
- C. Do not install bypass piping around backflow preventers.
- D. Support NPS 2-1/2 (DN 65) and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

**3.11 PROTECTIVE ENCLOSURE INSTALLATION**

- A. Install concrete base level and with top approximately 2 inches (50 mm) above grade.
- B. Install protective enclosure over valves and equipment.
- C. Anchor protective enclosure to concrete base.

**3.12 CONNECTIONS**

- A. Coordinate piping installations and specialty arrangements with schematics on Drawings and with requirements specified in piping systems.
- B. Piping installation requirements are specified in other Division 2 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- C. Connect water-distribution piping to utility water main. Use tapping sleeve and tapping valve.
- D. Pipe cutting, where permitted by the Engineer, shall be done in accordance with the written recommendations of the pipe manufacturer.
- E. Connect water-distribution piping to interior domestic water and fire-suppression piping.
- F. Ground equipment according to Division 16 Section "Grounding and Bonding."
- G. Connect wiring according to Division 16 Section "Conductors and Cables."

**3.14 FIELD QUALITY CONTROL**

- A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

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- B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure but not less than 150 psi for two hours.
  - 1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.
- C. Prepare reports of testing activities.

**3.15 IDENTIFICATION**

- A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Division 2 Section "Earthwork."
- B. Permanently attach equipment nameplate or marker indicating plastic water-service piping, on main electrical meter panel. See Division 2 Section "Piped Utilities - Basic Materials and Methods" for identifying devices.

**3.16 TESTING**

- A. The Contractor will be required to furnish, set up, and service a suitable pump and test equipment (to accurately measure water pressure). The Contractor shall contact Deep Run Water Corporation and the Engineer 48 hours prior to performing test for coordination of inspection.
- B. The Contractor shall test each section between valves of the pipe line to a hydrostatic pressure of one hundred fifty (150) pounds per square inch, making sure that there is no air in the pipe, valves and hydrants. This can be done with corporation cocks being placed at the high spots in the line.
- C. Where water is not readily available the Contractor shall provide a sterilized tank of such capacity to provide sufficient water for the test.
- D. The Contractor shall perform the test for a period of time not less than two (2) hours or for a period considered necessary by the Engineer to insure tightness of the joints and to detect any defective material. Lines shall maintain 150 pounds per square inch after a time period of two hours.
- C. The allowable leakage shall be as specified under each section of applicable pipe used. The leakage of the test section shall be accurately determined and compared to the schedule shown below:

<b>PIPE SIZE</b> (inches)	<b>ALLOWABLE LEAKAGE</b> (Gallons per hour per 1000 feet of pipe)
2	0.16
4	0.33
6	0.50
8	0.66
10	0.83
12	0.99
16	1.47

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- D. If any portion of the pipe line proves to be defective, the Contractor shall correct the defect and re-test the line for compliance. Such action shall be maintained until the line complies to the leakage requirements.

**3.17 CLEANING**

- A. Clean and disinfect water-distribution piping as follows:

1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 for a continuous feed method or do as follows:
  - a. Fill system through dispersion of a chlorine solution in concentrations sufficient to produce a chlorine residual of at least 50 milligrams per liter (or ppm) in the water throughout the distribution system.
  - b. The chlorine solution shall remain in contact with interior surfaces of the water system for a period of 24 hours.
  - c. The water system shall be flushed with fresh water from an approved water source until the chlorine solution is dispelled
  - d. Submit water samples in sterile bottles to authorities having jurisdiction for analysis by a state-approved laboratory. Repeat procedure if biological examination shows evidence of contamination. The Greenville Utilities representative shall be present when samples are taken. The number of samples shall be as required by Greenville Utilities but not less than 2 shall be taken.

- B. Prepare reports of purging and disinfecting activities.

**END OF SECTION 2510**

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**SECTION 2630 – STORM DRAINAGE**

**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**

- B. This Section includes gravity-flow, non-pressure storm drainage outside the building, with the following components:
  - 1. Special fittings for expansion and deflection.
  - 2. Cleanouts.
  - 3. Drains.
  - 4. Corrosion-protection piping encasement.
  - 5. Catch Basins, Drop Inlets and Junction Boxes.

**1.3 DEFINITIONS**

- C. CPP: Corrugated Plastic Pipe.
- D. RCP: Reinforced concrete pipe.
- E. PVC: Polyvinyl chloride

**1.4 PERFORMANCE REQUIREMENTS**

- F. Gravity-Flow, Non-pressure, Drainage-Piping Pressure Rating. Pipe joints shall be at least silt-tight, unless otherwise indicated.

**1.5 SUBMITTALS**

- G. Product Data: For the following:
  - 1. Special pipe fittings.
  - 2. Drains.
  - 3. Piping.
- H. Shop Drawings: For the following:
  - 1. Drop Inlets and Junction Boxes: Include plans, elevations, sections, details, and frames and covers.
  - 2. Catch Basins and Inlets. Include plans, elevations, sections, details, and frames, covers, and grates.

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- I. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.
- J. Field quality-control test reports.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- K. Do not store plastic pipe, and fittings in direct sunlight.
- L. Protect pipe, pipe fittings, and seals from dirt and damage.
- M. Handle catch basins and drop inlets, junction boxes according to manufacturer's written rigging instructions.

**1.7 PROJECT CONDITIONS**

- N. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
  - 1. Notify Engineer no fewer than two days in advance of proposed interruption of service.
  - 2. Do not proceed with interruption of service without Engineer's written permission.

**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. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

**2.3 PIPE AND FITTINGS**

- A. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76, with bell-and-spigot sealant joints with ASTM C 990, bitumen or butyl-rubber sealant.
- B. PVC storm drainage pipe 8" in diameter or smaller shall be ASTM D1785 Schedule 40. Pipe requiring threaded adapters shall be Schedule 80. In lieu of Schedule 40 pipe ASTM D2241 SDR-21 PVC pipe is also acceptable.
- C. Corrugated PE Drainage Pipe and Fittings NPS 3 to NPS 10 (DN 80 to DN 250): AASHTO M 252M, Type S, with smooth waterway for coupling joints.

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1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings.
2. Soiltight Couplings: AASHTO M 252M, corrugated, matching tube and fittings.

**2.4 DROP INLETS, JUNCTION BOXES AND YARD INLETS**

- A. Standard Precast Concrete Basins: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
1. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
  2. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
  3. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
  4. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
  5. Grade Rings: Include 2 or 3 reinforced-concrete risers, of 6- to 9-inch total thickness, that match frame and grate.
  6. Steps: Individual FRP steps, FRP ladder, or ASTM A 615, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches.
  7. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
- B. Designed Precast Concrete Catch Basins: ASTM C 913, precast, reinforced concrete; designed according to ASTM C 890 for A-16 (ASSHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for sealant joints.
1. Joint Sealants: ASTM C 990, bitumen or butyl rubber.
  2. Grade Rings: Include 2 or 3 reinforced-concrete risers, of 6- to 9-inch total thickness, that match frame and grate.
  3. Steps: Individual FRP steps or FRP ladder, Individual FRP steps, FRP ladder, or ASTM A 615, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, ASTM A 615, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches.
  4. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
- C. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include flat grate with small square or short-slotted drainage openings.
1. Size: 24 by 24 inches minimum, unless otherwise indicated.
  2. Grate Free Area: Approximately 50 percent, unless otherwise indicated.
  3. Provide standard asphaltic coating.

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- D. Cast in Place Concrete: Drop inlets or structures shall meet applicable NCDOT specifications. Concrete shall comply with section 1077 of the NCDOT Standard Specification for Roads and Structures.

**PART 3 - EXECUTION**

**3.1 EARTHWORK**

- A. Excavation, trenching, and backfilling are specified in Division 2 Section "Earthwork."

**3.2 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.
- B. Gravity-Flow, Non-pressure Piping: Use any of the following pipe materials for each size range:
1. NPS 12 to NPS 24 : Reinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints. Do not use nonreinforced pipe instead of reinforced concrete pipe.
  2. NPS 8 to NPS 4: PVC Schedule 40
  3. NPS 8 to NPS 4: PE drainage pipe, smooth interior

**3.3 PIPING INSTALLATION**

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. 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. All non-metallic pipe shall have a tracer wire installed along the length of the pipe.
- C. Install inlets for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install gravity-flow, non-pressure 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 per plans.
  3. Install piping below frost line.
  4. Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."
  5. Install PE corrugated sewer piping according to ASTM D 2321



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**3.4 PIPE JOINT CONSTRUCTION**

- E. Basic pipe joint construction is specified in Division 2 Section "Piped Utilities - Basic Materials and Methods." Where specific joint construction is not indicated, follow piping manufacturer's written instructions.
- F. Join gravity-flow, non-pressure drainage piping according to the following:
  - 1. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasket joints.
  - 2. Join dissimilar pipe materials with non-pressure-type flexible couplings.

**3.5 CATCH BASIN, JUNCTION BOX AND DROP INLET INSTALLATION**

- A. Use pre-cast or construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

**3.6 CONCRETE PLACEMENT**

- A. Place cast-in-place concrete according to ACI 318/318R.

**3.6 IDENTIFICATION**

- A. Materials and their installation are specified in division 2 Section "Earthwork." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
  - 1. Use warning tape or detectable warning tape over ferrous piping.
  - 2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

**3.7 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.
  - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
  - 4. Reinspect and repeat procedure until results are satisfactory.

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- 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 soil-tight joints unless required by authorities having jurisdiction.
    - b. Option: Test concrete piping according to ASTM C 924.
- C. Leaks constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

**3.8 CLEANING**

- A. Clean interior of piping of dirt and superfluous materials. Flush with potable water.

**END OF SECTION 02630**

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**SECTION 02730 - WASTEWATER SYSTEM**

**SECTION I - GENERAL**

**1.1 PROJECT DESCRIPTION AND SCOPE OF WORK**

- A. The work to be included in this Section and the following Sections will consist of the installation of: 3000 gallon septic tank, a 2000 gallon pump tank with two pumps, 2" and 4" PVC supply line, 1-1/4" laterals, 4" manifold and all appurtenances as specified herein and/or shown on the project plans as required to install a complete project.

**1.2 REGULATORY COMPLIANCE**

- A. All work described herein and as shown on the plans shall be performed in compliance with the approved plans and specification and the permit requirements issued by the Pitt County Health Department and any other State and Local Regulations as applicable. The Pitt County Health Department shall be notified at least 48 hours prior to initiation of any construction activity. Additional 48 hour notifications shall be provided to the Pitt County Health Department at the completion of construction inspections and start-up.

**SECTION II - EXCAVATION, BACKFILL AND GRADING**

**2.1 EXCAVATION AND BACKFILL**

A. Excavation

1. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of excess materials removed.
2. If unsuitable bearing materials are encountered at the required subgrade elevation, carry the excavation deeper and replace excavated material as directed by the Engineer.
3. Slope sides of excavation, shore and/or brace excavations to comply with local codes and ordinances having jurisdiction. Maintain sides and slopes in a safe condition until completion of backfilling.
4. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding the project and surrounding area. Do not allow water to accumulate in excavation. Remove water to prevent softening of foundation bottoms and soil changes detrimental to stability of subgrades. Provide necessary measures to convey water from excavations.
5. Stockpile satisfactory excavated materials where directed by owner, until required for backfill or fill. Place grade and shape stockpiles for proper drainage. Dispose of excess and unsatisfactory soil materials off site, unless otherwise directed by owner.

B. Stone for Laterals:

1. Stone for laterals shall be size #57 clean washed stone. Stone shall be placed at the location and in quantities as shown on the plans. Contractor shall use care to keep the stone separated from dirt when using stone stockpiled on the ground. Upon completion of the project, the Contractor will be required to remove all remaining stone left on site and fine grade and grass the site to an acceptable condition.

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C. Backfill

1. Acceptable soil material shall be placed in layers to required elevation. Excavations shall be backfilled as promptly as work permits, but not until completion of inspection, testing, and approval of the Pitt County Health Department. Place backfill materials in layers not more than 4-inches in loose depth and compact by hand operated tampers. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

D. Final Clean Up and Grading:

1. After all facilities have been started and checked and properly adjusted, but prior to seeding of the area, an inspection will be required. After the Pitt County Health Department has been assured that all facilities are in proper operating condition, the Contractor will final grade the entire site. The drain field shall be shaped for surface drainage to the extremities of the site. The Contractor shall use such equipment as is necessary to prevent disturbance of the previously installed facilities. The shaping of the site will generally include only those measures necessary to provide surface drainage and to prevent ponding of rain water on the surface. After shaping of the site for proper drainage but prior to seeding of the site, the Contractor will ask the Pitt County Health Department for an inspection of the grading activity.
2. If any trenches settle more than 1-inch, the Contractor shall place additional select fill material, rake smooth, re-seed and re-mulch the settled trench areas to the satisfaction of the Owner.

**SECTION III - SEEDING**

**3.1 GENERAL**

- A. All areas to be protected by a vegetative cover will include any areas here in before outlined and any other areas disturbed during construction. Prior to the commencement of any seeding activities, the Contractor will request and receive, from the Pitt County Health Department, an inspection of the appropriate areas to assure that satisfactory grading and dress-up work has been completed.

**3.2 SEEDING**

- A. The work to be performed to acquire the necessary vegetative cover, will include but is not specifically limited to: appropriate tilling of the area, the application of fertilizer and lime, sowing of seed and placing of a straw mulch to help hold the seed and soil in place until germination and growth occur.
- B. The following are the requirements, for application rates of fertilizers, seed and mulch to the area. The Contractor will assure himself that the actual amount applied will guarantee a sufficient and acceptable stand of grass. The areas to be seeded should be given a full application of agricultural lime at the rate of 1500 pounds per acre and a mixture of 10-10-10 fertilizer at the rate of 800 pounds per acre, all thoroughly mixed with the soil. Following this, a mixture of 20 pounds per acre of Unhulled Common Bermuda and 30 pounds per acre of Lespedeza and 10 pounds per acre of German Millet should be sown and raked in. In the winter months, 20 pounds per acre of rye grass seed shall be substituted for the German Millet. Straw mulch shall be placed over all seeded areas at a rate of 1.5 tons/acre. In cases of extreme slopes, the application of an

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asphalt or other approved binding material will be applied to the mulch cover to help hold it in place.

- C. The Contractor will initially irrigate the entire site with ½ inch of water to aid in preserving the straw mulch from blowing away and to assist in early germination.
- D. Contractor shall guarantee a thriving cover of grass prior to final acceptance/payment. A cover of grass is considered acceptable when the cover is at least 95% and a uniform height of 3-4 inches is obtained. Contractor re-seed areas that do not achieve an acceptable stand of grass.

**SECTION IV - PIPING & VALVES**

**4.1 WASTEWATER SUPPLY LINE**

- A. The wastewater supply line and fittings from the building to the septic tank and for the septic tank to the dosing tank shall be Schedule 40 PVC pipe (ASTM D 1785) of the diameter shown on the drawings. It shall be installed with a minimum of 30 inches of cover or as shown on the drawings. Joints shall be solvent cement (ASTM D 2564) or elastomeric seals (ASTM F 477).

**4.2 PUMP DISCHARGE PIPING**

- A. The pump discharge piping and fittings from the pump tank to the distribution field laterals shall be Schedule 40, 160 psi, PVC pipe (ASTM D 1785) of the diameter shown on the drawings. Joints shall be solvent cement (ASTM D 2564) or elastomeric seals (ASTM F 477).

**4.3 LATERALS**

- A. The lateral piping and fittings shall be Schedule 40, 160 psi, PVC pipe (ASTM D 1785), with solvent cement (ASTM D 2564) or elastomeric seal (ASTM F 477) joint on the diameter indicated on the drawings. The lateral inside the distribution field shall have 5/32" diameter holes, every 5 feet on center, inside a 4-inch diameter corrugated perforated polyethylene (PE) tubing and fittings (ASTM F 405). The corrugated perforated polyethylene (PE) pipe shall have 3 holes, ½ - ¾ inch in diameter, 4-inches on center, spaced equally 120 degrees each around the periphery. All perforations shall be cleaned of all filings and not have any visible burrs. Pressure distribution laterals shall be reamed with a hole reamer prior to being placed in the protective sleeve.
- B. No installation of piping within the drain fields shall be performed during wet or rainy weather. Should the Contractor question whether the water content of the soil is acceptable, he shall immediately contact the Pitt County Health Department for and inspection to determine if construction may continue.
- C. Lateral installation shall be done with a small trencher of size large enough only to provide the trench width and depth necessary for this installation. After lateral lines have been connected, the manifold line will be backfilled and tightly tamped with previously suitable excavated material. Backfilling shall be made in 4-inch lifts and shall contain no gravel as used in the lateral installation.
- D. Lateral lines shall be installed in trenches at a depth as shown on the plans. Lateral lines shall be installed level and shall vary no more than 2-inches in elevation across the field and laterals shall not be allowed to flow away from the manifold. Lateral trenches must not extend more than 12-inches beyond the end of the lateral turn-up. Trenches shall be filled with stone as indicated on the plans. An Engineers level will be utilized to insure proper grades for trench bottom and stone prior to lateral installation.

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- E. Upon leveling of the trench stone, the 4" perforated drain pipe shall be installed. The laterals shall be installed inside the drain pipe with the pre-drilled orifices facing up. The first and last orifice on each lateral line shall be turned down to allow the lateral to drain between doses. The trench shall then be filled to the proper elevation, the synthetic geotextile fabric shall be carefully placed on top of the stone and the trench shall be backfilled.
- F. End turn-ups will be installed and positioned as shown on the plans.

**4.4 GATE VALVES**

- A. Gate valves shall be installed at the locations and of the sizes as shown on the drawings. They shall be MSS SP 80; body and screw bonnet of ASTM B 62 cast bronze; with Class 125 threaded ends, solid wedge, nonrising copper-silicon alloy stem, brass packing gland, polytetrafluoroethylene (PTFE) - impregnated packing, and malleable iron handwheel. When located outside a structure they shall be enclosed in a meter box for easy access. Valve box shall be cast iron or polyvinyl chloride (PVC) of the length to fit over the valve. Base section is open at bottom, and slotted.

**4.5 BALL VALVES**

- A. Ball valves shall be installed at the location and of the size as shown on the drawings. They shall be PVC true union ball valves with two disconnect unions. Ball valves shall be Watts TPBV-D True Union or equal. Valve box shall be cast iron or polyvinyl chloride (PVC) of the length to fit over the valve.

**4.6 TESTING**

- A. All testing shall be done in accordance with local and state authorities having jurisdiction.
- B. Visual Inspection: Gravity sewers shall be visually inspected by use of mirrors, cameras, or other devices. Lines having defects shall be replaced prior to leakage test.
- C. Leakage Test: Leakage test shall be conducted on gravity sewer lines and force mains. After completion of the pipe laying, an air test shall be conducted by the Contractor as his expense to determine the integrity of the pipe line. The length of the line to be tested shall be from manhole to manhole. All air used for testing shall pass through a single, above ground control panel visible to the Architects representative during testing. The internal pressure on the system shall not exceed 9.0 psig. Sewer service lengths shall be ignored for computing required test times for mains.
- D. Test Pressure: The test pressure shall be 4.0 psig. The air pressure shall be maintained for a minimum of two (2) minutes by throttling the air supply. The air supply shall then be disconnected and the pressure allowed to drop. At any convenient point at which internal air pressure is greater than 3.5 psig, shall commence with a stop watch or other timing device that is at least 99.8% accurate. The time required to drop 1.0 psig shall be recorded. The leakage rate shall be considered acceptable if the pressure does not drop over 1 psig in the time prescribed for the test in Table 4-4. Otherwise, the leakage rate shall be considered unacceptable.

**SECTION V - TANKS**

**5.1 SEPTIC TANK**

- A. A 3000 gallon precast concrete septic tank as manufactured by Stay-Right Tank Company or approved equal shall be installed as shown on plans. The precast tank shall consist of 4000 psi

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concrete with 6" x 6" 10/10 WWM reinforcing and be a H-20 traffic bearing tank. The septic tank shall be watertight, structurally sound, and not subject to excessive corrosion or decay.

- B. The septic tank shall have a two-compartment design. The inlet compartment of a two-compartment tank shall hold between two-thirds and three-fourths of the total tank capacity. The partition shall be located at a point not less than two-thirds nor more than three-fourths the length of the tank from the inlet end. The top of the partition shall terminate two inches below the bottom inside of the tank top. The top and bottom halves of the partition shall be cast in such manner as to leave a water passage slot four inches high for the full width of the tank.
- C. The minimum requirement for the liquid depth shall be 36 inches with a minimum of nine inches freeboard. The freeboard being the air space between the top of the liquid and the bottom side of the lid or cap of the tank. The length of the septic tank shall be at least twice as long as the width.
- D. All tank joints shall be waterproofed by using 1-inch (minimum) diameter butyl rubber sealant then all joints inside and outside and tank shall be sealed with non-shrink hydraulic cement
- E. Two 24-inch diameter access openings with covers shall be provided in the tank top as shown on the drawings.
- F. The inlet and the outlet pipes in the tank shall be a straight pipe. The outlet shall be provided with a Zabel Filter Model A-100 or equal.

**5.2 PUMP TANK**

- A. The pump tank shall be a 2000 gallon precast concrete tank as previously specified under the septic tank item, but shall have no interior baffle wall. The tank shall be vented and accessible for routine maintenance. A single access frame and cover shall be provided over the pump as shown on the drawings. The access frame and cover shall extend at least to six inches above finished grade and be designed and maintained to prevent surface water inflow.

**5.4 TANK LEAKAGE TEST**

- A. All tanks shall be subject to a leakage test in the presence of the Pitt County Health Department.
- B. Prior to backfilling and with the sides of the tanks uncovered, each tank shall be filled with water and allowed to stand for a period of 24 hours. The Pitt County Health Department shall take a water level measurement upon filling and after a 24-hour period and visually inspect the tank to assure no leakage occurs. All tanks shall receive watertight approval prior to backfilling. If leakage occurs, the tank shall be pumped out and taken apart, resealed and re-grouted.

**SECTION VI - PUMPS**

**6.1 GENERAL**

- A. The dosing pumps shall be Myers Non-Clog Submersible Wastewater Pump, Model WHR, 1/ 2 HP, 1750 RPM, three phase, 230 Volt, capable of pumping 46 gallons per minute at 31 feet of total dynamic head. Pumps shall be removable without requiring entrance into the tank. The pump discharge lines shall be provided with a check valve and gate valve of the size and location shown on the drawings. The check valve shall be a heavy-duty spring loaded all rubber flapper type; cast iron body; and shall allow for operation when negative heads of up to 5 feet are

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encountered. The check valve shall operate at all pressures in the system created by the pump. A flat set stainless steel spring, integrally molded into the Buna N rubber flapper, shall be furnished in order to prevent collection of debris in the check valve. All fasteners shall be stainless steel. Gate valves shall be installed at the locations and of the sizes as shown on the drawings. They shall be MSS SP 80; body and screw bonnet of ASTM B 62 cast bronze; with Class 125 threaded ends, solid wedge, nonrising copper-silicon alloy stem, brass packing gland, polytetrafluoroethylene (PTFE) - impregnated packing, and malleable iron handwheel. When located outside a structure they shall be enclosed in a meter box for easy access. Meter box shall be cast iron or polyvinyl chloride (PVC) of the length to fit over the valve. Base section is open at bottom, and slotted

**6.2 PUMP**

- A. The pump shall be designed to handle septic tank effluent and be capable of passing 1 inch spherical solids. The pump shall be capable of handling liquids with temperatures up to 140°F intermittent and shall be capable of running dry without damage to seals or bearings.

**6.3 MOTOR**

- A. The pump motor shall be of the submersible type rated 1/2 HP. Motor shall operate at 1750 RPM and shall be three phase. The winding housing will be filled with clean dielectric oil to lubricate bearings, seals, and transfer heat from the winding to the outer shell.

**6.4 POWER AND SWITCH CORDS**

- A. The motor power cord shall be 40 feet 16/3 SJTW/SJTW-A type. The power and switch cords shall be of the positive sealing, quick-disconnect type. The power and switch cable connections shall be sealed at the motor entrance by means of a compression nut which serves to make a positive electrical connection and prevent water from entering the cable jacket and motor housing.

**6.5 SHAFT SEAL**

- A. The motor shall be protected by rotating mechanical shaft seals. The seals shall have carbon and ceramic seal faces lapped to a tolerance of one light band. Metal parts and springs for seals shall be 300 series stainless steel.

**6.6 PUMP IMPELLER**

- A. The pump impeller shall be of the two vane enclosed type. The impeller shall be constructed of engineered thermoplastic. A stainless steel wear ring shall be molded into the neck of the impeller to provide a sealing surface. A replaceable Buna-N sealing cup shall effect a seal between the volute and impeller in order to maintain high efficiency and prevent recirculation.

**6.7 PUMP AND MOTOR CASTINGS**

- A. All castings shall be of high tensile strength Class 30 gray cast iron. Castings shall be treated with phosphate and chromate rinse and painted with a high-quality air day alkyd enamel for corrosion protection.

**6.8 FASTENERS**

- A. All exposed fasteners shall be of 300 series stainless steel

**6.9 CONTROL PANEL**



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- A. The pump manufacturer shall supply a completely self-contained Motor Control Panel for two 230 volt, three phase submersible pump. Contractor shall verify electrical power supply prior to ordering and installing equipment. The control panel shall provide short circuit and overload protection for the pump. The control panel shall conform to NEMA, Joint Industry Council (JIC), and NEC specifications, and shall be Underwriter's Laboratories (UL) listed. Electrical controls shall be secured against unauthorized access.
- B. The motor control shall be housed in a NEMA 4X stainless steel or fiberglass enclosure. There shall be a rolled lip around all four sides of the enclosure opening and around three sides of the door to increase strength and prevent dirt and liquids from dropping into the enclosure when the door is open. The door shall be fastened to the enclosure with a continuous hinge. A neoprene gasket shall be provided fastened with oil resistant adhesive around the entire perimeter of the door. The enclosure shall be provided with a tamper-proof double door system consisting of a blank outer door completely gasketed and weather tight as described above and a second inner door on which all operating controls are located. Located on the inner door shall be operating controls including, but not limited to motor circuit breaker handle, hand-off-auto switch, pump run light, pump run time meter, heat sensor and phase sensor failure light, and overload reset button. A padlock hasp shall be provided.
- C. A hand-off-automatic selector switch shall be provided for the pump. Selector switches shall be of oil-tight construction; toggle switch types shall not be considered equal. Each selector switch shall be identified with an engraved metal legend plate held in place by the switch mounting nut. Selector switch contracts shall be heavy duty, double-break, silver, Furnas Electric, Class 50 or equal. These switches shall be mounted on the inner door.
- D. An elapse time meter shall be provided to accurately record the pump run time in hours and tenths and shall be able to record up to 99,999.9 hours. This hour meter shall be mounted on the inner door.
- E. Heat sensor unit shall be embedded in the motor winding to detect excessive heat. The heat sensor should be set to trip at 105 degrees C. Upon the heat sensor tripping, a signal shall be transmitted to the sensing unit in the control panel causing the activation of the alarm system. The red heat sensor light shall be mounted on the inner door. The sensor shall automatically reset when the motor cools to a safe temperature.
- F. A three pole circuit breaker sized to NEC requirements shall be provided for the pump. A through-door operator interlocked to the enclosure door shall be provided for the circuit breaker so that the door cannot be opened with the circuit breaker on. The operator shall be provided with an interlock defeat device which requires a hand tool to operate and shall be lockable in the off position. Minimum interrupting capacity shall be 10,000 symmetrical amperes. Circuit breakers shall be Westinghouse EB frame or equal.
- G. The pump motor shall be provided with a NEMA rated across the line motor starter. The starter shall employ gravity drop-out armatures without bell cranks or other mechanical linkages which are subject to failure. Starter coils and contacts shall be easily replaceable with standard hand tools and without removing the starter from the panel. Starters shall be equipped with one ambient compensated quick-trip overloading each phase. Overloads shall be capable of either manual or automatic reset and shall have a manual trip button to facilitate testing of the overload mechanism. A reset button shall be provided on the door for each overload. Starters shall be Furnas Electric Class 14 or equal.
- H. A control transformer shall be provided to supply 115 BAC for the control circuit. The transformer shall be sized according to the transformer manufacturer's instructions to supply the total connected load in the panel. Connection to transformer shall be by means of a molded barrier

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terminal block. The terminal block shall be an integral part of a molded Noryl shell which shall contain the transformer windings. The winding shall be potted in the molded shell using a high thermal conductivity epoxy resin. Both legs of the transformer secondary shall be fused according to JIC specifications. A ground lug shall be provided adjacent to one of the fuses so that the load side of the fuse may be grounded if required by local electrical codes. The control transformer shall be Micron Industrials Impervi Tran or equal.

- I. Relays shall be NEMA 300-volt open frame industrial control type, Frunas Electric Class 46 or equal.
- J. Terminal blocks shall be provided for all external connections to the control panel and for all connections between the component mounting plate and enclosure mounted components to allow for easy removal of the component mounting plate if required for service. Terminal blocks shall consist of individual snap together contact sections mounted on a common mounting channel. Terminal block sections shall have tubular screw contacts mounted in a nylon housing to resist breakage; phenolic or other rigid, brittle materials shall not be considered equal. Plain screw contacts requiring lugs to be installed on wires shall not be considered equal. Power terminal block shall meet 600-volt creepage and clearance requirements of NEMA for UL for general industrial control equipment and panel boards. Power terminal block sections shall be Buchanan Catalog Number 0242 or equal. Control Circuit Terminal Block shall be rated 300 volts as NEMA general industrial control devices. Control circuit terminal block shall be Buchanan Catalog Number 0625 or equal.

**6.10 LIQUID LEVEL CONTROLS AND ALARM**

- A. The Contractor will furnish and install three (3) Mercury Float Level Controls. Each level control shall consist of a steel shelled mercury switch encased in a solid polyurethane float and attached to 16/2 SJ0 cable. Float control cables shall extend from wet well to the control panel. Splicing of cables is not permitted. Each level control shall be supplied with a stainless-steel bank clamp to facilitate mounting in the wet well. Level controls employing glass switches or hollow floats shall not be considered equal.
- B. A high-water alarm flashing light and horn shall be provided in a weatherproof enclosure for mounting on the outside of the control panel. Alarm light shall glow dim at all times except under alarm conditions, then light shall glow bright and flash. Alarm horn shall have silencing switch with automatic reset.

**6.11 OPERATION OF SYSTEM**

- A. On sump level rise, lower mercury switch "pump off" shall first be energized, then the upper-level switch "pump on" shall next energize and start the pump. With pump operating, sump level shall lower to low switch "pump off" setting and pump shall stop.
- B. If level continues to rise when the lead pump is operating, the second "pump on" mercury switch should energize and the lag pump should start. With pump operating, sump level shall lower to low switch "pump off" setting and pump shall stop.
- C. If level continues to rise when the pump is operating, the alarm float switch shall energize and signal the alarm. All level switches shall be adjustable, for level setting, from the surface. Initial setting of the level switches shall be as shown on the drawings.
- D. Pumps should alternate in operation to maintain pump starts for each pump stays consistent with each other.

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**SECTION VII - ELECTRICAL EQUIPMENT**

**7.1 GENERAL**

- A. Electrical service to the site will be provided by the Owner. The Contractor will be required to install all wiring for the dosing tank system.
- B. All electrical work shall conform to the latest edition of the National Electrical Code (NEC).

**7.2 CONTROL PANEL SUPPORT**

- A. Control Panel Support shall be constructed of pressure treated 4" x 4" post installed 3 feet in the ground and 2" x 6" lumber shall be used as the back support, unless otherwise stipulated on the drawings or directed by the owner.

**7.3 LUMBER**

- A. Lumber shall conform to REA Specification DT5C and shall be Class 4, Southern Yellow Pine fully pressure treated by the Reuping Process (empty cells) to a minimum net final retention of twelve (12) pounds of Creosote-Pentachlorophenol solution. The solution shall contain not less than 2 percent by weight of Pentachlorophenol. Or, the poles may be salt treated to equal specifications.

**7.4 EXPOSED CONDUIT**

- A. Exposed conduit shall be Schedule 40 PVC and shall conform to NEMA TC-8. Exposed PVC conduit shall be type DB, Schedule 40. PVC conduit shall be in accordance with UL-651 "heavy-wall" for direct burial and "thin-wall" for concrete encasement. All PVC conduit runs shall contain a green TW insulated Copper grounding conductor sized in accordance with the NEC. Fittings, elbows, etc., shall be manufactured in accordance with NEMA TC-9. PVC conduit and fittings shall be manufactured by Carlon, queen city, or equal. All electric conduit must be watertight and gas tight. Each length of conduit shall be stamped with the name and trademark of the manufacturer and shall bear the Underwriter's Label. Joints shall be made completely liquid tight by use of the manufacturer's approved sealant. The sealant shall be applied only in dry conditions and to dry materials.
- B. All conductors shall be installed in accordance with the NEC and shall be copper with type THW insulation. Conductors supplying pump station shall be sized in accordance with pump manufacturers recommendations. Splices shall take place only within accessible, weatherproof junction boxes. All connectors shall be copper and shall have a conductivity not less than that of the conductor to which they are attached.
- C. The Contractor shall provide a fully bonded system of grounding in accordance with the NEC including all systems and equipment requiring grounding in accordance with the NEC and other prevailing code requirements and in compliance with the electrical utility serving the project. Ground connections shall be made to non-current carrying metal parts of structures, accessories, etc. All ground conductors shall be copper, sized in accordance with the NEC and the pump manufacturer's recommendations.

**SECTION VIII - SYSTEM START-UP**

- A. After completion of all installation and testing, the system will be checked for proper operation. Prior to pressure adjustment and system start-up, all lateral lines shall initially be flushed with clean water.

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- B. Upon verification of proper operations of the Dosing Chamber Equipment, the the distribution field laterals will be adjusted to conform to the design requirements. Adjustment of the pressure head in the laterals will be made through operation of the valves on the discharge line in the dosing tanks. The operator in responsible charge shall be present during this determination. Pump dosing rate in addition to the pump pressure, cycle times and pump level float switches will be set at this time in accordance with the design requirements. The entire system shall be operated and monitored in order for the operation to be verified that it meets the design criteria. The operator in responsible charge shall make any adjustments necessary to the system (timer settings, level settings, flow rates, etc.) until the system meets the design criteria.
- C. A section of rigid clear plastic pipe will be connected to the four corner turn-ups or other points as designated by the Pitt County Health Department for each field. The Dosing Chamber then will be manually started to pump fluid through the system. When the liquid level rises in the clear plastic pipe above the end of the lateral, the plug valve will be adjusted until the liquid level equalized at the required height of 3 feet above the lateral invert.

**SECTION IX - OPERATION AND MAINTENANCE PLAN**

**9.1 TANKS**

- A. The septic tank and pump tank shall be inspected bi-annually (twice a year) by the Certified On-Site Wastewater Operator and at other such times that may be deemed appropriate for scum, sludge, and solids buildup. The water level in the tank shall be observed and the sanitary tees and/or filters should also be checked at these times for blockages and deposition of solids. The septic tank should be pumped a minimum of every four years or upon the determination the sludge level has exceeded 25% of the liquid depth, whichever occurs earlier. The dosing tanks should also be checked for solids build-up. If any solids build-up occurs, it shall be removed immediately so as not to clog the drain field, and the septic tank shall also at that time be pumped of its solids. Water tightness of the tanks and piping systems shall be checked.
- B. The collection system also should be inspected periodically for blockages and deposition of solids in the lines from the individual cleanouts to the septic tank.

**9.2 PUMP AND CONTROLS**

- A. The pump tank pumps shall be checked weekly by the owner for proper operation of pumps, timers, controls, float switches and alarm systems. Pump delivery rate to the filter and drain field shall be measured. If any corrective maintenance is necessary the owner shall notify the Certified On-Site Wastewater Operator. The Certified On-Site Wastewater Operator shall observe and monitor the pump and control system (pumps, floats, valves, electric controls, timers and alarms) bi-annually for proper operation. Pumping frequency from pump pulse controls and elapsed run time meters shall be noted. If they are not operating properly they shall be reset, and/or repaired.

**9.3 DRAIN FIELD**

- A. Approximately 30 days after completion of the installation and initial start-up, the laterals shall be checked again by the Certified On-Site Wastewater Operator for any necessary readjustments to head.
- B. All laterals should be checked at approximately 6 month intervals by the Certified On-Site Wastewater Operator at all times thereafter to insure that the flow is reaching the end of the

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lateral and the pressure heads are as specified. Visual inspections at selected spots throughout the field may be made to determine that fluid is reaching the turn up.

- C. Additionally, all laterals should be inspected biannually (twice a year) by the Certified On-Site Wastewater Operator for signs of deposition and collection of solids. If such occurs, then the screw-in plug at the top of the turn-up will be removed and the laterals will be flushed until no sludge is visible. Should sludge become caked or unable to be removed by simple flushing, the line shall be pressure jet flushed or the lateral shall be removed from the 4" perforated tubing, cleaned and repaired. If the lateral is unable to be reused, it shall be replaced with an identical predrilled lateral. Should simple back-flushing not alleviate the sludge build-up problem, and prior to removal and replacement of a portion of the lateral, the gate valve immediately upstream of the field should be operated at full open to provide for any additional pressure which may then expel the sludge through the turn up. Then, and only after this has been attempted, should the lateral be removed and/or replaced.
- D. The Certified On-Site Wastewater Operator shall observe and monitor the vegetative growth over the drain field and check the field for surfacing of effluent. If observed to need maintenance, proper corrective measures will be taken.

**9.4 OPERATOR**

- A. A Certified On-Site Wastewater Operator as licensed by the State of North Carolina Division of Environment, Health and Natural Resources, On-Site Wastewater Section, shall be employed by the owner to properly operate and maintain the system and keep all records and provide reports as required.

**9.5 REPORTS**

- A. The Certified On-Site Wastewater Operator shall at a minimum of twice per year, measure and report to the health department within 30 days the following:
  1. Sludge and scum levels in the septic tank.
  2. Sludge Level in the pump tanks.
  3. Pressure head in the distribution network.
  4. Pump delivery rate at the design head and calculate the pump delivery rate efficiency.
  5. Dosing volume and measure or calculate the average pump run time.
  6. Number of turns the gate valves were opened when the pressure head was set.
  7. Wastewater level in the tanks.
  8. Any clogging of the septic tank outlet filter.
  9. Water tightness of tanks, risers and pipe connections at tanks.
  10. Operations of pumps, floats, valves, electrical controls, timers and alarms.
  11. Any ponding of wastewater in the bio-filter.
  12. Physical integrity of the pipe network.

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13. Vegetative growth condition over the drain field.
14. Any surfacing of the effluent at the drain field area
15. Results clarity of the bio- filter effluent.
16. Results of laboratory analysis of effluent samples,
17. Maintenance activities performed since the last inspection report.
18. An assessment of the overall system performance.
19. Determination of whether the system is malfunction and the specific nature of the malfunction.
20. Corrective measures and/or actions taken to correct any problems.
21. Any other observations, measurements, monitoring and maintenance activities specified in the Operation Permit.

**9.6 EFFLUENT SAMPLING AND ANALYSIS**

- A. Annually or as specified at the frequency specified by the local health department the Certified On-Site Wastewater Operator shall collect effluent samples. Samples shall be collected from the dosing tank. All samples shall be obtained, observe and analyzed in accordance with 40 CFR 136. Analysis shall be performed by a state certified laboratory for the performance standards for Biochemical Oxygen Demand, 5-day (BOD5) <15 mg/l, Total Suspended Solids <15 mg/l, Ammonium-nitrogen <10 mg/l, Fecal Coliform Bacteria densities < 10,000 colonies/100ml.
- B. Any samples not meeting the treatment standards shall be re-sampled two more times within the next 60 day, with samples collected no less than 48 hours apart. The average system performance shall be calculated as the arithmetic mean (geometric mean for fecal coliforms) of the results from the three samples. System maintenance or repair shall be required whenever the average system performance a calculated above does not meet the treatments standards specified.

**9.7 NOTIFICATION AND PERFORMANCE OF MAINTENANCE AND REPAIRS**

- A. The Certified On-Site Wastewater Operator shall alert the system owner in a timely fashion of needed maintenance and/or repair activities including, but not limited to, landscaping, tank sealing, tank pumping, lateral pipe desludging, pipe or control system repairs, peat media replacement, and adjustments to any other system component. The Certified On-Site Wastewater Operator shall notify the system owner and local health department whenever the pump delivery rate efficiency or average pump run time are not within 25% of initial measurements conducted prior to system startup.
- B. The Certified On-Site Wastewater Operator shall keep the septic tank outlet filter cleaned and in proper operating condition.
- C. System maintenance must be provided to maintain the pump delivery rate efficiency and average pump run time within 25% of initial measurements conducted prior to system startup.

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- D. The septic tank or pump tank shall be pumped as need upon recommendation of the Certified On-Site Wastewater Operator. The septic tank will be pumped at a minimum whenever the solids level exceeds 25% of the tank's total liquid working capacity or the scum layer is more than 4 inches thick.
  
- E. The Certified On-Site Wastewater Operator shall notify the local Health Department and system owner in writing whenever repairs are required. All maintenance activities shall be logged and recorded in the Certified On-Site Wastewater Operator's reports provided to the local health department.

**END OF SECTION 02730**

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**SECTION 2751 – CEMENT CONCRETE PAVEMENT**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes exterior cement concrete pavement for the following:
  - 1. Curbs and gutters, valley gutters, and sidewalk.
- B. Related Sections include the following:
  - 1. Division 2 Section "Earthwork" for subgrade preparation, grading, and subbase course.

**1.2 DEFINITIONS**

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, expansive hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

**1.3 SUBMITTALS**

- A. Design Mixes: For each concrete pavement mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
- B. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
  - 1. Cementitious materials and aggregates.
  - 2. Admixtures.
  - 3. Curing compounds.
  - 4. Applied finish materials.
  - 5. Bonding agent or adhesive.
  - 6. Joint fillers.

**1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: An experienced installer who has completed pavement work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
  - 1. Manufacturer must be certified according to the National Ready Mix Concrete Association's Plant Certification Program.

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- C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.
- E. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by the requirements of the Contract Documents.
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixes.

**1.5 PROJECT CONDITIONS**

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

**PART 2 – PRODUCTS**

**2.1 FORMS**

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
  - 1. Use flexible or curved forms for curves of a radius 100 feet (30.5 m) or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

**2.2 CONCRETE MATERIALS**

- A. General: Use the same brand and type of cementitious material from the same manufacturer throughout the Project.
- B. Portland Cement: ASTM C 150, Type I or II.
  - 1. Fly Ash: ASTM C 618, Class F or C.
  - 2. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- C. Aggregate: ASTM C 33, uniformly graded, from a single source, with coarse aggregate as follows:
  - 1. Class: 4S.
  - 2. Maximum Aggregate Size: 3/4 inch (19 mm) nominal.
  - 3. Do not use fine or coarse aggregates containing substances that cause spalling.
- D. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures.

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- E. Air-Entraining Admixture: ASTM C 260.
- F. Water-Reducing Admixture: ASTM C 494, Type A.
- G. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
- H. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
- I. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

**2.3 CURING MATERIALS**

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- E. Clear Solvent-Borne Liquid-Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- F. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- G. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.
- H. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- I. Products: Subject to compliance with requirements, provide one of the following:
  - 1. Evaporation Retarder:
    - a. Cimfilm; Axim Concrete Technologies.
    - b. Finishing Aid Concentrate; Burke Group, LLC (The).
    - c. Spray-Film; ChemMasters.
    - d. Aquafilm; Conspec Marketing & Manufacturing Co., Inc.
    - e. Sure Film; Dayton Superior Corporation.
    - f. Eucobar; Euclid Chemical Co.
    - g. Vapor Aid; Kaufman Products, Inc.
    - h. Lambco Skin; Lambert Corporation.
    - i. E-Con; L&M Construction Chemicals, Inc.
    - j. Confilm; Master Builders, Inc.
    - k. Waterhold; Metalcrete Industries.
    - l. Rich Film; Richmond Screw Anchor Co.
    - m. SikaFilm; Sika Corporation.
    - n. Finishing Aid; Symons Corporation.
    - o. Certi-Vex EnvioAssist; Vexcon Chemicals, Inc.
  - 2. Clear Solvent-Borne Liquid-Membrane-Forming Curing Compound:

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- a. AH Curing Compound #2 DR; Anti-Hydro International, Inc.
  - b. Res-X Cure All Resin; Burke Group, LLC (The).
  - c. RX Cure; Conspec Marketing & Manufacturing Co., Inc.
  - d. Day-Chem Rez Cure; Dayton Superior Corporation.
  - e. Kurez DR; Euclid Chemical Co.
  - f. Nitocure S; Fosroc.
  - g. #64 Resin Cure; Lambert Corporation.
  - h. L&M Cure DR; L&M Construction Chemicals, Inc.
  - i. 3100-Clear; W. R. Meadows, Inc.
  - j. Seal N Kure FDR; Metalcrete Industries.
  - k. Rich Cure; Richmond Screw Anchor Co.
  - l. Resi-Chem C309; Symons Corporation.
  - m. Horncure 30; Tamms Industries Co., Div. of LaPorte Construction Chemicals North America, Inc.
  - n. Uni Res 150; Unitex.
  - o. Certi-Vex RC; Vexcon Chemicals, Inc.
3. Clear Waterborne Membrane-Forming Curing Compound:
- a. AH Curing Compound #2 DR WB; Anti-Hydro International, Inc.
  - b. Aqua Resin Cure; Burke Group, LLC (The).
  - c. Safe-Cure Clear; ChemMasters.
  - d. W.B. Resin Cure; Conspec Marketing & Manufacturing Co., Inc.
  - e. Day Chem Rez Cure (J-11-W); Dayton Superior Corporation.
  - f. Nitocure S; Fosroc.
  - g. Aqua Kure-Clear; Lambert Corporation.
  - h. L&M Cure R; L&M Construction Chemicals, Inc.
  - i. 1100 Clear; W. R. Meadows, Inc.
  - j. Resin Cure E; Nox-Crete Products Group, Kinsman Corporation.
  - k. Rich Cure E; Richmond Screw Anchor Co.
  - l. Resi-Chem Clear Cure; Symons Corporation.
  - m. Horncure 100; Tamms Industries Co., Div. of LaPorte Construction Chemicals North America, Inc.
  - n. Hydro Cure; Unitex.
  - o. Certi-Vex Enviocure; Vexcon Chemicals, Inc.
4. White Waterborne Membrane-Forming Curing Compound:
- a. AH Curing Compound #2 WB WP; Anti-Hydro International, Inc.
  - b. Aqua Resin Cure; Burke Group, LLC (The).
  - c. W.B. Resin Cure; Conspec Marketing & Manufacturing Co., Inc.
  - d. Thinfilm 450; Kaufman Products, Inc.
  - e. Aqua Kure-White; Lambert Corporation.
  - f. L&M Cure R-2; L&M Construction Chemicals, Inc.
  - g. 1200-White; W. R. Meadows, Inc.
  - h. White Pigmented Resin Cure E; Nox-Crete Products Group, Kinsman Corporation.
  - i. Rich Cure White E; Richmond Screw Anchor Co.
  - j. Resi-Chem High Cure; Symons Corporation.
  - k. Horncure 200-W; Tamms Industries Co., Div. of LaPorte Construction Chemicals North America, Inc.
  - l. Hydro White 309; Unitex.

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**2.4 RELATED MATERIALS**

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.
- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:
  - 1. Type II, non-load bearing, for bonding freshly mixed concrete to hardened concrete.
  - 2. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
  - 3. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

**2.5 CONCRETE MIXES**

- A. Prepare design mixes, proportioned according to ACI 211.1 and ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the trial batch method.
  - 1. Do not use Owner's field quality-control testing agency as the independent testing agency.
- C. Proportion mixes to provide concrete with the following properties:
  - 1. Compressive Strength (28 Days): 4500 psi (30.0 MPa) unless otherwise noted on plans.
  - 2. Maximum Water-Cementitious Materials Ratio: 0.4-0.5.
  - 3. Slump Limit: 3-4 inches (75 mm).
    - a. Slump Limit for Concrete Containing High-Range Water-Reducing Admixture: Not more than 8 inches (200 mm) after adding admixture to plant- or site-verified, 2- to 3-inch (50- to 75-mm) slump.
- D. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements for concrete exposed to deicing chemicals.
- E. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 2.5 to 4.5 percent.

**2.6 CONCRETE MIXING**

- A. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94.

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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; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Proof-roll prepared subbase surface to check for unstable areas and verify need for additional compaction. Proceed with pavement only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.
- B. Remove loose material from compacted subbase surface immediately before placing concrete.

**3.2 EDGE FORMS AND SCREED CONSTRUCTION**

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form release agent to ensure separation from concrete without damage.

**3.3 JOINTS**

- A. General: Construct construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
  1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour, unless pavement terminates at isolation joints.
- C. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
  1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to the following radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
    - a. Radius: 1/4 inch (6 mm).
  2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete

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when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

- D. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to the following radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.
1. Radius: 1/4 inch (6 mm).
  2. Radius: 3/8 inch (10 mm).

### **3.4 CONCRETE PLACEMENT**

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcement steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subgrade surface before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subgrade to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment.
- D. Comply with requirements and with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery, at Project site, or during placement.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R.
1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- H. Screed pavement surfaces with a straightedge and strike off. Commence initial floating using bull floats or darbies to form an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading dry-shake surface treatments.
- I. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.
- J. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.

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- K. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 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.
  2. Do not use frozen materials or materials containing ice or snow.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
- L. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F (32 deg C). Chilled mixing water 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 reinforcement steel with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
  3. Fog-spray forms, reinforcement steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

**3.5 CONCRETE FINISHING**

- A. General: Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots, and fill low spots. Refloat surface immediately to uniform granular texture.
1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

**3.6 CONCRETE PROTECTION AND CURING**

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and follow recommendations in ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.



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- D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
  2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
  3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

**3.7 PAVEMENT TOLERANCES**

- A. Comply with tolerances of ACI 117 and as follows:
1. Elevation: 1/4 inch (6 mm).
  2. Thickness: Plus 3/8 inch (9 mm), minus 1/4 inch (6 mm).
  3. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/4 inch (6 mm).
  4. Joint Spacing: 3 inches (75 mm).
  5. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
  6. Joint Width: Plus 1/8 inch (3 mm), no minus.

**3.8 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified testing and inspection agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.
- B. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing agency, concrete type and class, location of concrete batch in pavement, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- C. Additional Tests: Testing agency shall make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, 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.

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**3.9 REPAIRS AND PROTECTION**

- A. Remove and replace concrete pavement that is broken, damaged, or defective, or does not meet requirements in this Section.
- B. Drill test cores where directed by Engineer when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

**END OF SECTION 02751**

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**SECTION 2950 - PLANTING**

**PART I – GENERAL**

**1.1 DESCRIPTION OF WORK**

- A. Provide all exterior planting as shown on the drawings or inferable therefrom and/or as specified in accordance with the requirements of the Contract Documents.
- B. These specifications include standards necessary for and incidental to the execution and completion of planting, including hauling and spreading of topsoil, and finished grading as indicated on the prepared drawings and specified herein.
- C. Protection of existing features. During construction, protect all existing trees, shrubs, and other specified vegetation, site features and improvements, structures, and utilities specified herein and/or on submitted drawings. Removal or destruction of existing plantings is prohibited unless specifically authorized by the owner.

**1.2 APPLICABLE STANDARDS**

- A. *American National Standards for Tree Care Operations, ANSI A300.* American National Standards Institute, 11 West 42<sup>nd</sup> Street, New York, N.Y. 10036.
- B. *American Standard for Nursery Stock, ANSI Z60.1.* American Nursery and Landscape Association, 1250 Eye Street. NW, Suite 500, Washington, D.C. 20005.
- C. *Hortus Third*, The Staff of the L.H. Bailey Hortorium. 1976. MacMillan Publishing Co., New York.
- D. All standards shall include the latest additions and amendments as of the date of advertisement for bids.

**1.3 QUALIFICATIONS**

- A. Landscape planting and related work shall be performed by a firm with a minimum of five years experience specializing in this type of work. All contractors and their sub-contractors who will be performing any landscape work included in this section of the specification shall be approved by the Landscape Architect.
- B. Landscape contractor shall be actively registered with the North Carolina Landscape Contractors registration board.

**1.4 REQUIREMENTS OF REGULATORY AGENCIES**

- A. Certificates of inspection shall accompany the invoice for each shipment of plants as may be required by law for transportation. File certificates with the Landscape Architect prior to acceptance of the material. Inspection by federal or state authorities at place of growth does not preclude rejection of the plants at the site.

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**1.5 SUBMITTALS**

- A. Manufacturer's Data: Submit copies of the manufacturer's and/or source data for all materials specified, including soils, mulch and structural soil.
- B. Samples: Submit samples of all topsoil, soil mixes, mulches, and organic materials. Samples shall weigh 1 kg (2 lb) and be packaged in plastic bags. Samples shall be typical of the lot of material to be delivered to the site and provide an accurate indication of color, texture, and organic makeup of the material.
- C. Plant Photographs: Submit color photographs of representative specimens of each plant on the plant list. Photos shall be a minimum 3 x 5 in. taken from angle that depicts the size and condition of the typical plant to be furnished. A scale rod or other measuring device shall be included in the photograph. Label each photograph with the plant name, plant size, and name of the growing nursery.
- D. Nursery Sources: Submit a list of all nurseries that will supply plants, along with a list of the plants they will provide and the location of the nursery.
- E. Soil Test: Submit soil test analysis report for each sample of topsoil and planting mix from a soil testing laboratory approved by the Landscape Architect.

- 1. Provide a particle size analysis, including the following gradient of mineral content:

<u>USDA Designation</u>	<u>Size in mm</u>
Gravel	+2 mm
Very course sand	1-2 mm
Coarse sand	0.5 -1 mm
Medium sand	0.25-0.5 mm
Fine sand	0.1-0.25 mm
Very fine sand	0.05-0.1 mm
Silt	0.002-0.05 mm
Clay	smaller than 0.002 mm

- 2. Provide a chemical analysis, including the following:
  - a. pH and buffer pH
  - b. Percentage of organic content by oven-dried weight.
  - c. Nutrient levels by parts per million, including phosphorus, potassium magnesium, manganese, iron, zinc, and calcium. Nutrient test shall include the testing laboratory recommendations for supplemental additions to the soil based on the requirements of horticultural plants.
  - d. Soluble salt by electrical conductivity of a 1:2, soil: water, sample measured in millimho per cm.
  - e. Cation exchange capacity (CEC).

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**1.6 PLANTING SEASON**

- A. Planting shall be done between October 01 and April 30.
- B. Variance: If special conditions exist that warrant a variance in the above planting dates, a written request shall be submitted to the Landscape Architect stating the special conditions and the proposed variance. Permission for the variance will be given if warranted in the opinion of the Landscape Architect. Any variance in the planting season will not affect the guarantee period.

**1.7 UTILITY VERIFICATION**

- A. The contractor shall contact the local utility companies for verification of the location of all underground utility lines in the area of the work. The contractor shall be responsible for all damage resulting from neglect or failure to comply with this requirement.

**PART 2 – MATERIALS**

**2.1 TOPSOIL**

- A. All seed and sod areas shall have a minimum 6” of topsoil applied (depth after rolling).
- B. All groundcover and ornamental grasses shall have a minimum 12” of topsoil applied (depth after rolling).
- C. All shrub beds shall have a minimum 18” of topsoil applied (depth after rolling).
- D. It is the Contractor’s responsibility to test the existing topsoil to ensure that it meets the requirements listed below to promote vigorous and healthy establishment and growth of plants.
- E. Imported topsoil may be used in quantities sufficient to complete the specified requirement.
- F. Existing or imported topsoil shall be:
  - 1. Fertile agricultural soil
  - 2. Typical for locality
  - 3. Capable of sustaining vigorous plant growth
  - 4. Taken from drained sites
  - 5. Free of subsoil, rock, stones, clay or impurities, plants, weeds and roots
  - 6. pH value minimum 5.7, maximum 6.5
  - 7. Organic content 5 to 7 percent

**2.2 MATERIALS FOR SOIL AMENDMENT**

- A. Organic Matter
  - 1. Shall be commercially prepared compost consisting of leaf matter and yard waste composted sufficiently to break down all woody fibers, seeds, and leaf structures, and free of toxic and nonorganic matter.
- B. Course Sand

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1. Course concrete sand, ASTM C-33 Fine Aggregate, with a Fines Modulus Index of 2.75 or greater.
2. Sands shall be clean, sharp, natural sands free of limestone, shale and slate particles.
3. Provide the following particle size distribution:

<u>Sieve</u>	<u>Percentage Passing</u>
3/8 in (9.5 mm)	100
No. 4 (4.75 mm)	95-100
No. 8 (2.36 mm)	80-100
No. 16 (1.18 mm)	50-85
No. 30 (0.60 mm)	25-60
No. 50 (0.30 mm)	10-30
No. 100 (0.15 mm)	2-10

- C. Lime
  1. Shall be ground, palletized, or pulverized lime manufactured to meet agricultural standards and contain a maximum of 60 percent oxide (i.e. calcium oxide plus magnesium oxide). Submit manufacturer literature for approval.
- D. Sulfur
  1. Shall be flowers of sulfur, pelletized or granular sulfur, or iron sulfate. Submit manufacturer literature for approval.
- E. Fertilizer
  1. Agricultural fertilizer of a formula indicated by the soil test. Fertilizers shall be organic, slow-release compositions whenever applicable. Submit manufacturer literature for approval.

**2.3 PLANTS**

- A. Plants shall be true to species and variety specified and nursery-grown in accordance with good horticultural practices under climatic conditions similar to those in the locality of the project for at least two years. They shall have been freshly dug during the most recent favorable harvest season.
- B. All plant names and descriptions shall be as defined in *Hortus Third*.
- C. All plants shall be grown and harvested in accordance with the *American Standard for Nursery Stock*.
- D. Unless approved by the Landscape Architect, plants shall have been grown not more than a 200-mile radius of the project unless the provenance of the plant can be documented to be compatible with the latitude and cold hardiness zone of the planting location.
- E. Unless specifically noted, all plants shall be of specimen quality, exceptionally heavy, symmetrical, and so trained or favored in development and appearance as to be unquestionably and outstandingly superior in form, compactness, and symmetry. They shall be sound, healthy, vigorous, well branched, and densely foliated when in leaf; free of disease and insects, eggs, or larvae; and shall have healthy, well-developed root systems. They shall be free from physical damage or other conditions that would prevent vigorous growth.

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- F. Trees with multiple leaders, unless specified, will be rejected. Trees with a damaged or crooked leader, bark abrasions, sunscald, disfiguring knots, insect damage, or cuts of limbs over 3/4 in. in diameter that are not completely closed will be rejected.
- G. Plants shall conform to the measurements specified, except that plants larger than those specified may be used if approved by the Landscape Architect. Use of larger plants shall not increase the contract price. If larger plants are approved, the root ball shall be increased in proportion to the size of the plant.
- H. Caliper measurements shall be taken on the trunk 6 in. above the natural ground line for trees up to and including 4 in. in caliper, and 12 in. above the natural ground line for trees over 4 in. in caliper. Height and spread dimensions specified refer to the main body of the plant and not from branch tip to branch tip. Plants shall be measured when branches are in their normal position. If a range of sizes is given, no plant shall be less than the minimum size, and no less than 50 percent of the plants shall be as large as the maximum size specified. Measurements specified are minimum sizes acceptable after pruning, where pruning is required. Plants that meet measurements but do not possess a standard relationship between height and spread, according to the *American Standards for Nursery Stock*, shall be rejected.
- I. Substitutions of plant materials will not be permitted unless authorized in writing by the Landscape Architect. If proof is submitted in writing that a plant specified is not obtainable, consideration will be given to the nearest available size or similar variety, with a corresponding adjustment of the contract price.
- J. The plant list on the drawing, is for the contractor's information only, and no guarantee is expressed or implied that quantities therein are correct or that the list is complete. The contractor shall ensure that all plant materials shown on the drawings are included in his or her bid.
- K. All plants shall be labeled by plant name. Labels shall be attached securely to all plants, bundles, and containers of plant materials when delivered. Plant labels shall be durable and legible, with information given in weather-resistant ink or embossed process lettering.
- L. Selection and Tagging
1. Plants shall be subject to inspection for conformity to specification requirements and approval by the Landscape Architect at their place of growth and upon delivery. Such approval shall not impair the right of inspection and rejection during progress of the work.
  2. A written request for the inspection of plant material at their place of growth shall be submitted to the Landscape Architect at least ten calendar days prior to digging. This request shall state the place of growth and the quantity of plants to be inspected. The Landscape Architect may refuse inspection at this time if, in his or her judgment, sufficient quantities of plants are not available for inspection.
  3. All plants shall be selected and tagged by the Landscape Architect at their place of growth. For distant material, photographs may be submitted for pre-inspection review.
- M. Anti-Desiccants
1. Anti-desiccants, if specified, are to be applied to plants in full leaf immediately before digging or as required by the Landscape Architect. Anti-desiccants are to be sprayed so that all leaves and branches are covered with a continuous protective film.
- N. Balled and Burlapped (B&B) Plant Materials
1. Trees designated B&B shall be properly dug with firm, natural balls of soil retaining as many fibrous roots as possible, in sizes and shapes as specified in the *American Standard for Nursery Stock*. Balls shall be firmly wrapped with nonsynthetic, rottable burlap and secured with nails and heavy, nonsynthetic, rottable twine. The root collar

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shall be apparent at surface of ball. Trees with loose, broken, processed, or manufactured root balls will not be accepted, except with special written approval before planting.

O. Container Plants

1. Plants grown in containers shall be of appropriate size for the container as specified in the most recent edition of the *American Standard for Nursery Stock* and be free of circling roots on the exterior and interior of the root ball.
2. Container plants shall have been grown in the container long enough to have established roots throughout the growing medium.

P. Bareroot and Collected Plants

1. Plants designated as bareroot or collected plants shall conform to the *American Standard for Nursery Stock*.
2. Bareroot material shall not be dug or installed after bud break or before dormancy.
3. Immediately after harvesting plants, protect from drying and damage until shipped and delivered to the planting site. Rootballs shall be checked regularly and watered sufficiently to maintain root viability.

Q. Transportation and Storage of Plant Material

1. Branches shall be tied with rope or twine only, and in such a manner that no damage will occur to the bark or branches.
2. During transportation of plant material, the contractor shall exercise care to prevent injury and drying out of the trees. Should the roots be dried out, large branches broken, balls of earth broken or loosened, or areas of bark torn, the Landscape Architect may reject the injured tree(s) and order them replaced at no additional cost to the owner. All loads of plants shall be covered at all times with tarpaulin or canvas. Loads that are not protected may be rejected.
3. All bareroot stock sent from the storage facility shall be adequately covered with wet soil, sawdust, woodchips, moss, peat, straw, hay, or other acceptable moisture-holding medium, and shall be covered with a tarpaulin or canvas. Loads that are not protected in the above manner may be rejected.
4. Plants must be protected at all times from sun or drying winds. Those that cannot be planted immediately on delivery shall be kept in the shade, well protected with soil, wet mulch, or other acceptable material, and kept well watered. Plants shall not remain unplanted any longer than three days after delivery. Plants shall not be bound with wire or rope at any time so as to damage the bark or break branches. Plants shall be lifted and handled with suitable support of the soil ball to avoid damaging it.

R. Mechanized Tree Spade Requirements

1. Trees may be moved and planted with an approved mechanical tree spade. The tree spade shall move trees limited to the maximum size allowed for a similar B&B root-ball diameter according to the *American Standard for Nursery Stock* or the manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller. The machine shall be approved by the Landscape Architect prior to use. Trees shall be planted at the designated locations in the manner shown in the plans and in accordance with applicable sections of the specifications.

**2.3 MATERIALS FOR PLANTING**



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- A. Mulch: At all planting areas, mulch shall be triple shredded hardwood bark mulch (non-dyed). Material shall be mulching grade, uniform in size, and free of foreign matter. Submit sample for approval.
- B. Anti-desiccant: shall be an emulsion specifically manufactured for agricultural use, which provides a protective film over plant surfaces. Anti-desiccants shall be delivered in containers of the manufacturer and shall be mixed according to the manufacturer's directions. Submit manufacturer literature for approval.
- C. Steel edging: Commercial steel edging with loops pressed from or welded to face of sections at 2'-06" o.c. to receive steel staples 16 inches long for each loop. 1/8 inch thick by 4 inches high by 16 feet long. Border Guard landscape divider by Border Concepts, Inc. or equal. Custom finish shall be powder coated paint. Color: Brown.

**PART 3 – EXECUTION**

**3.1 EXCAVATION OF PLANTED AREAS**

- A. Locations for plants and/or outlines of areas to be planted are to be staked out at the site. Locate and mark all subsurface utility lines. Approval of the stakeout by the Landscape Architect is required before excavation begins.
- B. Tree, shrub, and groundcover beds are to be excavated to the depth and widths indicated on the drawings. If the planting area under any tree is initially dug too deep, the soil added to bring it up to the correct level should be thoroughly tamped.
- C. The sides of the excavation of all planting areas shall be sloped at 45 degrees. The bottom of all beds shall slope parallel to the proposed grades or toward any subsurface drain lines within the planting bed. The bottom of the planting bed directly under any tree shall be horizontal such that the tree sits plumb.
- D. Maintain all required angles of repose of the adjacent materials as shown on the drawings. Do not excavate compacted subgrades of adjacent pavement or structures.
- E. Subgrade soils shall be separated from the topsoil, removed from the area, and not used as backfill in any planted or lawn area. Excavations shall not be left uncovered or unprotected overnight.
- F. For trees and shrubs planted in individual holes in areas of good soil that is to remain in place and/or to receive amendment in the top 6 in. layer, excavate the hole to the depth of the root ball and to widths shown on the drawing. Slope the sides of the excavation at a 45 degree angle up and away from the bottom of the excavation.
- G. In areas of slowly draining soils, the root ball may be set up to 3 in. or 1/8 of the depth of the root ball above the adjacent soil level.
- H. Save the existing soil to be used as backfill around the tree.
- I. On steep slopes, the depth of the excavation shall be measured at the center of the hole and the excavation dug as shown on the drawings.

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- J. Detrimental soil conditions: The Landscape Architect is to be notified, in writing, of soil conditions encountered, including poor drainage that the contractor considers detrimental to the growth of plant material. When detrimental conditions are uncovered, planting shall be discontinued until instructions to resolve the conditions are received from the Landscape Architect.
- K. Obstructions: If rock, underground construction work, utilities, tree roots, or other obstructions are encountered in the excavation of planting areas, alternate locations for any planting shall be determined by the Landscape Architect.

**3.2 INSTALLATION OF TOPSOIL**

- A. Prior to the installation of topsoil, install subsurface drains, irrigation main lines, lateral lines, and irrigation risers shown on the drawings.
- B. The Landscape Architect shall review the preparation of subgrades prior to the installation or modification of topsoil.
- C. Do not proceed with the installation of topsoil until all utility work in the area has been installed.
- D. Protect adjacent walls, walks, and utilities from damage or staining by the soil. Use 1/2 in. plywood and/or plastic sheeting as directed to cover existing concrete, metal, masonry work, and other items as directed during the progress of the work.
- E. Clean up any soil or dirt spilled on any paved surface at the end of each working day.
- F. Any damage to the paving or architectural work caused by the soils installation contractor shall be repaired by the general contractor at the soils installation contractors expense.
- G. Till the subsoil into the bottom layer of topsoil or planting mix.
- H. Loosen the soil of the subgrade to a depth of 2 to 3 in. with a rototiller or other suitable device. Spread a layer of the specified topsoil 2 in. deep over the subgrade. Thoroughly till the topsoil and the subgrade together.
- I. Immediately install the remaining topsoil in accordance with the following specifications:
  - 1. Shrub and Groundcover Beds: Prepare specified depth of the approved topsoil graded to meet elevations indicated on engineering plans. Thoroughly roto-till and break up subsoil to a minimum of 6" depth. Remove debris, gravel, rocks and other deleterious material over 1" in diameter, within 12" of surface shrub beds and tree pits, from the project site.
  - 2. Trees: For trees which are not located within topsoil shrub beds, prepare 2" of the approved topsoil in the future root zone area or each tree (minimum 8' radius of trunk in all directions) and thoroughly till in to a depth of 6" – 8".
- J. Do not compact topsoil but do wet-soak planting areas to assure proper settlement. Replace topsoil to specified grade after watering, where necessary.
- K. Protect the tilled area from traffic. Do not allow the tilled subgrade to become compacted.
- L. In the event that the tilled area becomes compacted, till the area again prior to installing the planting mix.

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- M. Soils shall be thoroughly mixed and tilled with tractor driven PTO tiller unless impossible due to space constraints. In confined areas, heavy duty manual tiller will be used.
- N. Topsoil shall not be stripped, transported, or graded if moisture content exceeds field capacity or if the soil is frozen.
- O. Topsoil stockpiles shall be protected from erosion and contamination.
- P. Subsoiling: When subsoiling is indicated on the drawings, use a chisel plow subsoil ripping tool mounted on a machine of sufficient power to make vertical trenches 18 in. deep into the subsoil 24 in. apart. Run the ripping tool over each area in opposite directions so that each area is ripped twice to thoroughly break up the compacted subgrade material prior to the installation of topsoil. Install the remaining topsoil in 8- to 10-in. lifts to the depths and grades shown on the drawing. The depths and grades shown on the drawings are the final grades after soil settlement and shrinkage of the organic material. The contractor shall install the soil at a higher level to anticipate this reduction of soil volume, depending on predicted settling properties for each type of soil.
- Q. Phase the installation of the soil such that equipment does not have to travel over already-installed topsoil or planting mixes.
- R. Compact each lift sufficiently to reduce settling but not enough to prevent the movement of water and feeder roots through the soil. The soil in each lift should feel firm to the foot in all areas and make only slight heel prints. Over compaction shall be determined by the following field percolation test.
  - 1. Dig a hole 10 in. in diameter and 10 in. deep.
  - 2. Fill the hole with water and let it drain completely. Immediately refill the hole with water, and measure the rate of fall in the water level.
  - 3. In the event that the water drains at a rate less than 1 in. per hour, till the soil to a depth required to break the over compaction.
  - 4. The Landscape Architect shall determine the need for, and the number and location of percolation tests based on observed field conditions of the soil.
  - 5. Maintain moisture conditions within the soils during installation to allow for satisfactory compaction. Suspend installation operations if the soil becomes wet. Do not place soils on wet or frozen subgrade.
  - 6. Provide adequate equipment to achieve consistent and uniform compaction of the soils. Use the smallest equipment that can reasonably perform the task of spreading and compaction.
  - 7. Add lime, sulfur, fertilizer, and other amendments during soil installation. Spread the amendments over the top layer of soil and till into the top 4 in. of soil. Soil amendments may be added at the same time that organic matter, when required, is added to the top layer of soil.
  - 8. Protect soil from over compaction after placement. An area that becomes over compacted shall be tilled to a depth of 6 in.. Uneven or settled areas shall be filled and regraded.

### **3.3 FINE GRADING**

- A. Grade the surface of all planted or lawn areas to meet the grades shown on the drawings or to be flush with the adjacent surface after the 12-month settling period. Set grades at time of installation high enough relative to the type of soil mix and settlement anticipated so that the soil will be at the correct grades after the settlement period. Adjust the finish grades to meet field conditions as directed.

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- B. Provide for positive drainage from all areas toward the existing inlets and drainage structures.
- C. Provide smooth transitions between slopes of different gradients and direction. Modify the grade so that the finish grade is flush with all paving surfaces or as directed by the drawings.
- D. Fill all dips and remove any bumps in the overall plane of the slope.
- E. The tolerance for dips and bumps in lawn areas shall be a 1/2 in. deviation from the plane in 10 ft.
- F. The tolerance for dips and bumps in shrub planting areas shall be a 1 in. deviation from the plane in 10 ft.
- G. All fine grading shall be inspected and approved by the Landscape Architect prior to planting, mulching, sodding, or seeding.

**3.4 PLANTING OPERATIONS**

- A. Plants shall be set on flat-tamped or unexcavated pads at the same relationship to finished grade as they were to the ground from which they were dug, unless otherwise noted on the drawings. Plants must be set plumb and braced in position until topsoil has been placed and tamped around the base of the root ball. Improper compacting of the soil around the root ball may result in the tree settling or leaning. Plants shall be set so that they will be at the same depth and so that the root ball does not shift or move laterally one year later.
- B. Determine the elevation of the root flare and ensure that it is planted at grade. This may require that the tree be set higher than the grade in the nursery.
- C. If the root flare is less than 2 in. below the soil level of the root ball, plant at the tree the appropriate level above the grade to set the flare even with the grade. If the flare is more than 2 in at the center of the root ball the tree shall be rejected.
- D. Lift plants only from the bottom of the root balls or with belts or lifting harnesses of sufficient width not to damage the root balls. Do not lift trees by their trunk or use the trunk as a lever in positioning or moving the tree in the planting area.
- E. Remove plastic, paper, or fiber pots from containerized plant material. Pull roots out of the root mat, and cut circling roots with a sharp knife. Loosen the potting medium and shake away from the root mat. Immediately after removing the container, install the plant such that the roots do not dry out. Pack planting mix around the exposed roots while planting.
- F. The roots of bare-root trees shall be pruned at the time of planting to remove damaged or undesirable roots (those likely to become a detriment to future growth of the root system). Bare-root trees shall have the roots spread to approximate the natural position of the roots and shall be centered in the planting pit. The planting-soil backfill shall be worked firmly into and around the roots, with care taken to fill in completely with no air pockets.
- G. Cut ropes or strings from the top of shrub root balls and trees smaller than 3 in. caliper after plant has been set. Remove burlap or cloth wrapping and any wire baskets from around top half of balls. Do not turn under and bury portions of burlap at top of ball.
- H. Completely remove any waterproof or water-repellant strings or wrappings from the root ball and trunk before backfilling.

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- I. Place existing topsoil and/or topsoil into the area around the tree, tamping lightly to reduce settlement.
- J. For plants planted in individual holes in existing soil, add any required soil amendments to the soils, as the material is being backfilled around the plant. Ensure that the amendments are thoroughly mixed into the backfill.
- K. For plants planted in large beds of prepared soil, add soil amendments during the soil installation process.
- L. Ensure that the backfill immediately around the base of the root ball is tamped with foot pressure sufficient to prevent the root ball from shifting or leaning.
- M. Thoroughly water all plants immediately after planting. Apply water by hose directly to the root ball and the adjacent soil.
- N. Remove all tags, labels, strings, etc. from all plants.
- O. Remove any excess soil, debris, and planting material from the job site at the end of each workday.
- P. Form watering saucers 4 in. high immediately outside the area of the root ball of each tree as indicated on the drawings.

**3.5 STAKING AND GUYING**

- A. Stake or guy a tree only when necessary for the specific conditions encountered and with the approval of the Landscape Architect or as noted on the drawings. Staking may be required in unusual circumstances such as sandy soils in either the root ball or adjacent soils or in extremely windy locations. Poor-quality trees with cracked, wet, or loose root balls, poorly developed trunk-to-crown ratios, or undersized root balls shall be rejected if they require staking, unless written approval to permit staking or guying as a remedial treatment is obtained from the Landscape Architect. Trees that settle out of plumb due to inadequate soil compaction either under or adjacent to the root ball shall be excavated and reset. In no case shall trees that have settled out of plumb be pulled upright using guy wires.
- B. When required, staking and guying methods shall be approved by the Landscape Architect. If no staking or guying requirements appear on the drawings, submit for approval a drawing of the staking or guying method to be used. Stakes, anchors, and wires shall be of sufficient strength to maintain the tree in an upright position that overcomes the particular circumstances that initiated the need for staking or guying. Guy wires shall be galvanized, multistrand, twisted wire.
- C. Where guy wires are attached around the tree, the trunk shall be protected with 3/4 in. diameter rubber hose, black in color, and of sufficient length to extend past the trunk by more than 6 in.
- D. Stakes and guys shall be installed immediately upon approval or planting, and shall be removed at the end of the first growing season. Any tree that is not stable at the end of this time shall be rejected.
- E. One tree shall be staked as a sample of the standard of work. The Landscape Architect shall approve the sample staking before the Contractor proceeds with the remaining trees to be staked.

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**3.6 WRAPPING**

- A. Wrap the trunk of any tree only when necessary for the specific conditions encountered and with the approval of the Landscape Architect. Wrapping may be required for thin-barked species in unusual circumstances such as trees planted adjacent to South- or West-facing reflective surfaces, or when it is impossible to plant the tree with the trunk oriented to the same north orientation that it held in the growing nursery.
- B. When required, wrapping methods shall be approved by the Landscape Architect. If no wrapping requirements appear on the drawings, submit for approval a drawing of the wrapping method to be used. Wrapping material shall be as specified in this specification. Wrapping material shall be fastened using a biodegradable tape. All tape shall be loosely wrapped around the wrapping material in single layer to permit its breakdown in sunlight and permit a minimum of 1 in. of unrestricted trunk growth. Stapling or tying the wrap with non- or slowly biodegradable tape or any synthetic or natural fiber string shall be prohibited.
- C. Wrapping material shall be applied from the base of the tree to the first branch.
- D. All wrapping material shall be removed no later than at the end of the year after planting or as specified by the Landscape Architect.

**3.7 PRUNING**

- A. Plants shall not be heavily pruned at the time of planting. Pruning is required at planting time to correct defects in the tree structure, including removal of injured branches, double leaders, waterspouts, suckers, and interfering branches. Healthy lower branches and interior small twigs should not be removed except as necessary to clear walks and roads. In no case should more than one-quarter of the branching structure be removed. Retain the normal or natural shape of the plant.
- B. All pruning shall be completed using clean, sharp tools. All cuts shall be clean and smooth, with the bark intact with no rough edges or tears.
- C. Except in circumstances dictated by the needs of specific pruning practices, tree paint shall not be used. The use of tree paint shall be only upon approval of the Landscape Architect. Tree paint, when required, shall be paint specifically formulated and manufacturing for horticultural use.
- D. Pruning of large trees shall be done from a hydraulic man-lift such that it is not necessary to climb the tree.

**3.8 MULCHING**

- A. All trees, shrubs, and other plantings will be mulched with mulch previously approved by the Landscape Architect. The mulch on trees and shrubs shall be to the depths shown on the drawing. Mulch must not be placed within 3 in. of the trunks of trees or shrubs.
- B. Final grade of mulch shall be ½" below adjacent surface or steel edging to prohibit washout or migration of mulch to adjacent surface.

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**3.9 MAINTENANCE OF TREES, SHRUBS, AND VINES**

- A. Maintenance shall begin immediately after each plant is planted and continue until its acceptance has been confirmed by the Landscape Architect.
- B. Maintenance shall consist of pruning, watering, cultivating, weeding, mulching, tightening and repairing guys and stakes, resetting plants to proper grades or upright position, restoring of the planting saucer, and furnishing and applying such sprays or other materials as necessary to keep plantings free of insects and diseases and in vigorous condition.
- C. Planting areas and plants shall be protected at all times against trespassing and damage of all kinds for the duration of the maintenance period. If a plant becomes damaged or injured, it shall be treated or replaced as directed by the Landscape Architect at no additional cost.
- D. Watering: Contractor shall irrigate as required to maintain vigorous and healthy tree growth. Overwatering or flooding shall not be allowed. The contractor shall monitor, adjust, and use existing irrigation facilities, if available, and furnish any additional material, equipment, or water to ensure adequate irrigation. Root balls of all trees and large shrubs shall be spot watered using handheld hoses during the first four months after planting, as required to ensure adequate water within the root ball.
- E. During periods of restricted water usage, all governmental regulations (permanent and temporary) shall be followed. The contractor may have to transport water from ponds or other sources, at no additional expense to the owner when irrigation systems are unavailable.

**3.10 "AS-BUILT" DRAWINGS**

- A. Prepare an "As-Built" draw to show deviations from the bid documents made during construction. The drawings shall be delivered to the Landscape Architect before final acceptance of work. Upon approval of the "As-Built" drawings, the Prime Contractor shall be responsible for submittal of two (2) reproducible set of plans to the Owner.

**3.11 FINAL ACCEPTANCE**

- A. The Landscape Architect shall inspect all work for acceptance upon written request of the contractor at the point of substantial completion. The request shall be received at least ten calendar days before the anticipated date of inspection.
- B. Acceptance of plant material shall be for general conformance to specified size, character, and quality and shall not relieve the contractor of responsibility for full conformance to the contract documents, including correct species.
- C. Upon completion and re-inspection of all repairs or renewals necessary in the judgment of the Landscape Architect, the Landscape Architect shall certify in writing that the work has been accepted.

**3.12 ACCEPTANCE IN PART**

- A. Work may be accepted in parts when the Landscape Architect and contractor deem that practice to be in their mutual interest. Approval must be given in writing by the Landscape Architect to the contractor verifying that the work is to be completed in parts. Acceptance of work in parts shall not waive any other provision of this contract.

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**3.13 GUARANTEE PERIOD AND REPLACEMENTS**

- A. The guarantee period for trees and shrubs shall begin at the date of final acceptance.
- B. The contractor shall guarantee all plant material to be in healthy and flourishing condition for a period of one year from the date of final acceptance.
- C. When work is accepted in parts, the guarantee periods extend from each of the partial acceptances to the terminal date of the guarantee of the last acceptance. Thus, all guarantee periods terminate at one time.
- D. The contractor shall replace, without cost, as soon as weather conditions permit, and within a specified planting period, all plants determined by the Landscape Architect to be dead or in an unacceptable condition during and at the end of the guarantee period. To be considered acceptable, plants shall be free of dead or dying branches and branch tips and shall bear foliage of normal density, size, and color. Replacements shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in this specification.
- E. The guarantee of all replacement plants shall extend for an additional period of one year from the date of the accepted replacement. In the event that a replacement plant is not acceptable during or at the end of said extended guarantee period, the Landscape Architect may elect subsequent replacement or credit for that item.
- F. At the end of the guarantee, the contractor shall reset grades that have settled below the proposed grades on the drawings.
- G. The contractor shall make periodic inspections, at no extra cost, during the guarantee period to determine what changes, if any, should be made in the maintenance program. If changes are recommended, they shall be submitted in writing to the Landscape Architect. Claims by the contractor that the Owners maintenance practices or lack of maintenance resulted in dead or dying plants will not be considered if such claims have not been documented by the Contractor during the guarantee period.
- H. In the event of a necessary repair or replacement during the guarantee period, the Contractor is expected to respond in a timely manner.
- I. At the end of the guarantee period and upon written request of the contractor, the Landscape Architect can inspect all guaranteed work. The request shall be received at least ten calendar days before the anticipated date of inspection. Upon completion and re-inspection of all repairs or renewals necessary in the judgment of the Landscape Architect at that time, the Landscape Architect shall certify, in writing, that the guarantee period is complete.

**END OF SECTION 02950**



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**RELATED DOCUMENTS:**

The general conditions of the Contract, including General and Supplementary Conditions, Section 03200 - Concrete Reinforcement, Section 03300 - Cast-in-Place Concrete, apply to the work specified in this Section.

**PART 1: GENERAL**

**1.1 SECTION INCLUDES**

- A. Formwork for cast—in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

**1.2 REFERENCES**

- A. ACI 301 — Structural Concrete for Buildings.
- B. ACI 318 — Building Code Requirements for Reinforced Concrete.
- C. PS 1 — Construction and Industrial Plywood.

**1.3 DESIGN REQUIREMENTS**

- A. Design and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

**1.4 QUALITY ASSURANCE**

- A. Perform Work in accordance with ACI 301 and 318.
- B. Maintain one copy of each document on site.

**1.5 REGULATORY REQUIREMENTS**

- A. Conform to ACI 301 and ACI 318 code for design, fabrication, erection and removal of formwork.

**1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, protect and handle products to site to prevent damage.
- B. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

**1.9 COORDINATION**

- A. Coordinate this Section with other Sections of work which require attachment of components to formwork.
- B. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

**PART 2: PRODUCTS**

**2.1 WOOD FORM MATERIALS**

- A. Plywood: Douglas Fir; solid one side, tight faced undamaged sheets with clean, true edges.

**2.2 MANUFACTURERS — PREFABRICATED FORMS**

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- A. Symons or equal.

**2.3 PREFABRICATED FORMS**

- A. Preformed Steel Forms: Minimum 16 gage, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- B. Tubular Column Type: Round, glass fiber material, surface treated with release agent, non-reusable, of sizes required.

**2.4 FORMWORK ACCESSORIES**

- A. Form Ties: Snap—off type, galvanized metal, cone type, with waterproofing washer.
- B. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture.
- C. Dovetail Anchor Slot: Galvanized steel, 22 gage, foam filled.
- D. Flashing Reglets: Galvanized steel, 22 gage, longest possible lengths, with alignment splines for joints, foam filled,
- E. Nails, Spikes, Lag Bolts, Through Bolts, Anchors: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- F. Waterstops: Hydrophylic type as manufactured by American Colloid or approved equal.

**PART 3: EXECUTION**

**3.1 EXAMINATION**

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

**3.2 EARTH FORMS**

- A. Hand trim sides and bottom of earth forms. Remove loose soil, mud, and debris prior to placing concrete.

**3.3 ERECTION — FORMWORK**

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to over stressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.
- E. Obtain approval before framing openings in structural members which are not indicated on Drawings.
- F. Provide chamfer strips on exposed external corners.

**3.4 APPLICATION — FORM RELEASE AGENT**

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

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**3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS**

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items which will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- D. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Install waterstops in accordance with manufacturer's instruction continuous without displacing reinforcement.
- F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

**3.6 FORM CLEANING**

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean—out ports.
- D. During cold weather, remove ice and snow from within forms. Do not use de—icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

**3.7 FORMWORK TOLERANCES**

- A. Construct formwork to maintain tolerances required by ACI 301.

**3.8 FIELD QUALITY CONTROL**

- A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

**3.9 FORM REMOVAL**

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

**END OF SECTION 03100**

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**RELATED DOCUMENTS:**

- A. The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this Section.

**PART 1: GENERAL**

**DESCRIPTION OF WORK:**

- A. Work of this Section shall include furnishing all labor and materials required to provide all cast-in-place concrete scheduled on Drawings and as specified in this Section.

Related Work Specified Elsewhere:

- A. Concrete Formwork (Section 03100)
- B. Concrete Reinforcement (Section 03300)
- C. Concrete Stain (Section 03350)

**INDUSTRY STANDARDS:**

- A. For listing of names of industry standard agencies mentioned by abbreviation in this section refer to Industry Standards Index in Division 1.

**DELIVERY AND PROTECTION OF MATERIALS:**

- A. Store cement in weather tight structure with floor at least 12 inches off ground, and accessible for inspection in original packages.
- B. Store fine and coarse aggregate separately. Segregate sizes and avoid getting dirt and foreign materials in concrete.
- C. Deliver ready-mixed concrete in compliance with requirements set forth in ASTM C 94.

**SEVERE-WEATHER PROVISIONS:**

- A. Cold-Weather Concreting: (In accordance with ACI 306 and as follows):
  - 1. Provide adequate equipment for heating concrete materials and protecting concrete during freezing or near-freezing weather. Do not use frozen materials, or materials containing ice.
  - 2. All concrete materials and all reinforcement, forms, fillers, and around which concrete is in contact shall be free from frost.
  - 3. Whenever temperature of surrounding air is below 40 degrees F., all concrete shall have temperature between 70 degrees and 80 degrees F. Provide adequate means for maintaining temperature not less than 70 degrees F. for three days, or 50 degrees F. for five days, or for as much more time as is necessary to insure curing of concrete.
  - 4. Use no salt or other chemicals to prevent freezing.
  - 5. Housing, covering, or other protection used in connection with curing shall remain in place, intact, at least 24 hours after artificial heat is discontinued.
- B. Hot Weather Concreting: (In accordance with ACI 305 and as follows):
  - 1. Provide adequate methods of lowering temperature of concrete ingredients so that temperature of concrete when placed does not exceed 90 degrees F.
  - 2. When weather is such as to raise concrete temperature, as placed, consistently above 80 degrees F., use approved retarder.

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3. Sprinkle all subgrade and forms with water before placing concrete. Remove all excess water before placing concrete.
4. Start curing as soon as practicable to prevent evaporation of water and keep forms wet. Protect flat work from dry wind, direct sun, and high temperatures.

**PART 2: PRODUCTS**

**CEMENT:**

- A. Cement shall be standard portland cement of United States manufacture, conforming to ASTM C 150, Type I or Type III. Only one brand of commercial portland cement shall be used. Each bag shall weigh approximately 94 pounds and contain one cubic foot.

**CONCRETE AGGREGATES:**

- A. Fine Aggregate: Sand having clean, hard, durable, uncoated grains, free from harmful substances conforming to ASTM C 33.
- B. Coarse Aggregate for standard-weight concrete: crushed stone, gravel, or other approved inert material having clean, hard, durable uncoated particles conforming to ASTM C 33. Maximum size, in accordance with ACI 318.
- C. Lightweight Coarse Aggregate shall conform to ASTM C 330. Lightweight aggregate shall be expanded shale or slate. Maximum size of aggregate shall be of 3/4".

**WATER:** Clean and free from harmful amounts of acids, alkalies, or organic materials.

**VAPOR BARRIER:**

- A. Vapor barrier under floor slabs on earth shall be puncture resistant polyethylene sheet not less than 15 mils thick, with permeance of less than 0.01 perms per ASTM F 1249 or ASTM E 96, and in compliance with ASTM E 1745 Class A and ACI 302. Accessories would include seam tape and vapor proofing mastic with permeance less than 0.03 perms. Provide pipe boots constructed from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instructions.

**EXPANSION JOINT MATERIALS:**

- A. Expansion joint material shall be asphalt-impregnated fiber strips, 1/2" thick, unless otherwise shown or noted: Flexcell by Celotex Corporation, Sealtight by W. R. Meadows, Inc., Joint Filler by Serviced Products Corporation, or approved equal.

**ADMIXTURES:**

- A. Water Reducing Admixture: ASTM C 494, Type A, and contain no chloride ions.
- B. Air Entraining Admixture: ASTM C 60 for slabs permanently exposed to weather. No air entraining admixture is to be used for concrete not exposed to weather. Air content is to be confirmed by lab tests for both air entrained and non-air entrained mixes.

**CLASS OF CONCRETE:**

- A. f'c minimum 3000 psi, maximum 150 pcf (regular weight).
- B. f'c minimum 3000 psi, maximum 150 pcf (fine aggregate concrete masonry grout conforming to ASTM C476) high slump mix for concrete masonry fill.

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**MIX DESIGNS:**

- A. Contractor shall select a testing laboratory acceptable to Architect to verify mixes of all classes of concrete.
- B. Contractor shall submit samples in adequate quantities for each mix verification, of all concrete materials to be used on project to designated testing laboratory.
- C. Laboratory shall be engaged by and paid by the contractor out of the material testing allowance.
- D. Submit four (4) copies of all mix design, aggregate test results, and compression test results to Architect prior to use on the job.

**PLANT MIXING:**

A. Proportioning Concrete:

- 1. Stresses for design of this structure are based on specified minimum 28-day compressive strength of concrete. Proportions shall be in compliance with approved design mix for each class of concrete.
- 2. Regular weight 4000 psi concrete shall be proportioned for a slump of 4" + or - 1".
- 3. Lightweight 3000 psi concrete shall be proportioned for a slump of 6" + or - 1".
- 4. Fine aggregate 3000 psi concrete masonry grout shall be proportioned for a slump of 8" (+/- 1").
- 5. All concrete shall be proportioned for a maximum water to cement ratio 0.5.
- 6. Concrete not permanently exposed to weather such as concrete for foundations, interior slabs on grade, concrete unit masonry grout, and elevated slabs on composite metal deck shall not have air added by entrainment admixtures. This requirement shall be verified by the testing laboratory.
- 7. Concrete to be permanently exposed to weather shall have air added by entrainment admixtures. Air content shall be 5% + or - 1%. This requirement shall be verified by the testing laboratory.

B. Batching:

- 1. Ready-mixed concrete shall be mixed and delivered in accordance with requirements of ASTM C 94.
- 2. Producer shall furnish delivery ticket with each load of concrete delivered under this Specification. Delivery ticket shall show clearly class and strength of concrete, size of coarse aggregate, slump ordered, and date and time of departure from batching plant.

**CONVEYING EQUIPMENT:**

- A. Carts or buggies transporting concrete more than 50 feet shall be equipped with pneumatic tires.
- B. Equipment for chuting or conveying concrete shall be of sufficient size to insure continuous flow of concrete at delivery and without separation of materials.

**PART 3: EXECUTION**

**EVALUATION OF COMPRESSION TESTS:**

- A. Evaluation of results of tests for ultimate-strength design concrete shall be according to ACI 318-05.

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- B. Neither results of laboratory verification tests nor any provision in Contract Documents shall relieve Contractor of obligation to furnish concrete of class and strength specified.

**INSPECTION OF WORK BEFORE PLACING:**

- A. Inspect work to receive concrete for deficiencies which would prevent proper execution of finished work. Do not proceed with placing until such deficiencies are corrected.
- B. Do not place concrete on earth until fill or excavation has been prepared as set forth under applicable sections of specifications for that work as verified by the testing lab.
- C. Before any concrete is placed in form, all pipes or sleeves, openings, or embedded items shall be in place and shall receive all tests specified for them.
- D. Remove all grease, oil, mud or other foreign matter from forms and have reinforcing steel in proper condition and position before placement of concrete. Dowels shall be in place and tied off prior to placing concrete.
- E. Remove hardened, or partially hardened, concrete on forms or reinforcement before placing concrete.

**CONVEYING:**

- A. Convey concrete from mixer to placement by methods in accordance with ASTM C94 which will prevent separation or loss of material.
- B. No water shall be added at the site to aid placement of concrete. Concrete too stiff to be properly placed shall be rejected and removed from the site and legally disposed of at no additional cost to the owner.
- C. Runway supports shall not bear upon reinforcing steel or fresh concrete.
- D. If pump(s) are used for conveying concrete, there shall be no aluminum in contact with the concrete, either in pump or in conveying pipes.
- E. Clean and maintain conveying equipment thoroughly before run of concrete at frequent intervals.

**CONSTRUCTION AND EXPANSION JOINTS:**

- A. Construction Joints:
  - 1. Early in construction program, contractor shall review with Architect construction joints he proposes to use, not indicated on the Drawings. Contractor shall not use any construction joints not approved by Architect.
- B. Expansion Joints:
  - 1. Install as indicated.

**PLACING:**

- 1. Deposit concrete as nearly as practicable in its final position to avoid re-handling. Do not deposit concrete on work partially hardened or contaminated by foreign material. Do not use re-tempered concrete. In no case use concrete when elapsed time, after addition of water and cement to batch, exceeds one hour.
- 2. Concrete shall not be dropped more than four feet. For dropping greater distances use metal chutes or tremie pipes.



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3. Once concreting is started carry on as continuous operation until placing of section is completed. Finish top surface to true plane. When construction joints are necessary, they shall be made in accordance with article above. Do not allow cold joints to occur within pours.
4. Compact all concrete thoroughly by suitable means during placing, and work thoroughly around reinforcement, embedded fixtures, and into corners of forms. When vibrator is used, apply directly to concrete. Do not over vibrate.

**PROTECTION**

1. During curing period protect concrete from damaging mechanical disturbances, particularly load stresses, heavy stock, and excessive vibration. Protect all finished concrete surfaces from damage by construction equipment, materials, or methods, and by rain, running water, hot sun, or windy conditions. Do not load self supporting structures in such a way as to overstress concrete.

**TESTING:**

1. Conduct slump, air, and strength tests of concrete in accordance with following procedures:
2. Secure samples in accordance with "Method of Sampling Fresh Concrete" (ASTM C 172).
3. Mold and cure five specimens from each sample in accordance with "Method of Making and Curing Concrete Compression and Flexure Specimens in the Field" (ASTM C 31). Five specimen comprise one test.
4. Test Two Specimens at 7 days (ASTM C 39). Test two specimens at 28 days in accordance with "Method of Test for Compressive Strength of Molded Concrete Cylinders" (ASTM C 39). Test evaluation shall be conducted in accordance with provisions of ACI 318-05. Keep one Specimen in reserve.
5. Make one strength test for each 100 cubic yards. or fraction thereof for each mix design of concrete placed in any one day, except that in no case shall a given mix design be represented by less than three tests.
6. Testing Laboratory shall be selected and paid by the Contractor out of the material testing allowance.
7. Report all test results to Architect, Structural Engineer, and Contractor on same day that tests are made.
8. Testing laboratory shall make and handle all test cylinders.

**NON-CONFORMING MATERIAL**

1. Any tested concrete material that fails to meet design strength at 28 days shall be removed and replaced at no cost to the owner. Substandard concrete may be allowed to remain if certified structurally adequate by a qualified independent engineer and approved by the Owner and Architect, however, the cost of the substandard material shall be deducted from the contract sum.

**END OF SECTION 03200**

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**PART 1: GENERAL**

**1.1 SECTION INCLUDES**

- A. Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete.

**1.2 REFERENCES**

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 318 - Building Code Requirements For Reinforced Concrete.
- C. ACI SP-66 - American Concrete Institute - Detailing Manual.
- D. ANSI/ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.
- E. ANSI/ASTM A184 - Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
- F. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- G. ANSI/ASTM A496 - Deformed Steel Wire Fabric for Concrete Reinforcement.
- H. ANSI/ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
- I. ANSI/AWS D1.4 - Structural Welding Code for Reinforcing Steel.
- J. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- K. ASTM A616 - Rail Steel Deformed and Plain Bars for Concrete Reinforcement.
- L. ASTM A617 - Axle Steel Deformed and Plain Bars for Concrete Reinforcement.
- M. ASTM A704 - Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
- N. ASTM A706 - Low-Alloy Steel Deformed Bars for Concrete Reinforcement.
- O. ASTM A767 - Zinc-Coated (Galvanized) Bars for Concrete Reinforcement.
- P. ASTM A775 - Epoxy-Coated Reinforcing Steel Bars.
- Q. ASTM D3963 - Epoxy-Coated Reinforcing Steel.
- R. ASTM C1116 – Standard Specification for Fiber-Reinforced Concrete and Shotcrete
- S. AWS D12.1 - Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.
- T. CRSI - Concrete Reinforcing Steel Institute - Manual of Practice.
- U. CRSI 63 - Recommended Practice For Placing Reinforcing Bars.
- V. CRSI 65 - Recommended Practice For Placing Bar Supports, Specifications and Nomenclature.

**1.3 SUBMITTALS**

- A. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and wire fabric, bending and cutting schedules, and supporting and spacing devices.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- C. Submit in writing any request for deviation from the design drawings and specifications.

**1.4 QUALITY ASSURANCE**

- A. Perform Work in accordance with CRSI 63, 65 and Manual of Practice, ACI 301, ACI SP-66, ACI 318, ANSI/ASTM A184.
- B. Submit certified copies of mill test report of reinforcement materials analysis.

**1.5 COORDINATION**

- A. Coordinate with placement of formwork, formed openings and other Work.

**PART 2: PRODUCTS**

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**2.1 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615, 60 ksi yield grade; deformed billet steel bars, unfinished.
- B. Welded Steel Wire Fabric: ASTM A185 Plain Type; in flat sheets; unfinished. Rolled WWF shall not be acceptable for use on this job.
- C. Polypropylene Fibers: ASTM C1116.

**2.2 ACCESSORY MATERIALS**

- A. Tie Wire: Minimum 16 gage annealed type.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.
- C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Stainless steel type; size and shape as required.

**2.3 FABRICATION**

- A. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice ACI SP-66, ACI 318 ANSI/ASTM A184.
- B. Locate reinforcing splices not indicated on drawings, at point of minimum stress. Indicate location of splices on shop drawings for approval by the Architect/Engineer.

**PART 3: EXECUTION**

**3.1 HANDLING AND STORAGE**

- A. Provide proper equipment for safe off loading and handling of material.
- B. Provide proper clean level storage area with proper skids to keep material clear of mud and water.
- C. Keep material free from mud and other deleterious materials that will reduce bond and do not place any reinforcing bars that are bent, twisted, broken, pitted, or otherwise unsuitable for use on the project as determined by the architect.
- D. All necessary field bending and straightening shall be accomplished without heating the material.
- E. Cutting torch shall be used only for cut off of material but not for bending. All heat bent material will be rejected by the inspector and shall be promptly removed and replaced at no additional cost. Do not weld reinforcing bars.

**3.2 PLACEMENT**

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position. WWF laying on the vapor barrier and being manually pulled up into the fresh concrete during concrete placement operations shall not be acceptable.
- B. Do not displace or damage vapor barrier. Damaged vapor barrier shall be removed and replaced at the direction of the architect.
- C. Accommodate placement of formed openings.
- D. Maintain concrete cover around reinforcing as indicated on drawings.
- E. Provide proper and adequate supports at maximum 3 ft x 3 ft spacing each way for support of wwf in the designated position. Tie off wwf sheets so that placement of the fresh concrete will not cause the wwf to be displaced. Pulling up of the wwf sheets into freshly placed concrete will not be an acceptable means of placing the wwf.

**END OF SECTION 03300**

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**RELATED DOCUMENTS**

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this Section.

**PART 1: GENERAL**

**DESCRIPTION OF WORK:**

Work shall consist of providing specified decorative finishes to all cast-in-place concrete shown on drawings.

**INDUSTRY STANDARDS:**

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Industry Standards Index in Division 1.

**SUBMITTALS:**

Submit (in duplicate) Manufacturer's printed instructions for application of curing compound and floor hardener.

**PART 2: PRODUCTS**

**MANUFACTURERS:**

Permanent concrete acid stain for interior or exterior concrete by EPMAR Corporation, SurfKoat Surface Coatings, Eagle Stains or equal.

**PRODUCT:**

Kemiko Stone Tone Acid Stain as manufactured by EPMAR Corporation or equal by Surfkoat Surface Coatings or Eagle Stains (per manufacturer recommendations).

Combination of acid solution, wetting agents, and metallic ions. When mixed with water, chemically combines with Portland cement to form permanent colors.

Color as selected by owner from manufacturer's full line.

**CURING COMPOUND AND SEALER:**

Kemiko Stone Tone Sealer II as manufactured by EPMAR Corporation or equal by Surfkoat Surface Coatings or Eagle Stains (per manufacturer recommendations). Sealer to be transparent, water based sealer with 30% solids content, VOC compliant and conforming to ASTM C 309. Sealer shall be non-yellowing and quick drying.

**CLEANER:**

Water Base Cleaner (alkaline concentrate in water): Kemiko Neutra Clean as manufactured by Epmar Corporation or equal by Surfkoat Surface Coatings or Eagle Stains (per manufacturer recommendations).

1. Type: Industrial strength, low VOC, high performance water base sodium metasilicate cleaner for the preparation of bare concrete and coated substrates, staining, sealing, and recoating.
2. Biodegradable with low odor.
3. Used to neutralize Kemiko Concrete Acid Stains.

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Do not begin installation until substrates have been properly prepared.

- A. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

**PREPARATION FOR CONCRETE SUBSTRATES:**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Protection: Protect walls and surrounding surfaces not to receive finish.
- D. Concrete shall be as specified in Section 03 30 00 - Cast-in-Place Concrete. Verify concrete is a minimum of 28 days old.
- E. Confirm that concrete surface is clean, dry, structurally sound, and free from dirt, dust, oil, grease, solvents, paint, wax, asphalt, concrete curing compounds, sealing compounds, surface hardeners, bond breakers, adhesive residue, and other surface contaminants.
- F. Do not acid wash or use heavy alkali cleaners.

**CLEANING OF CONCRETE SUBSTRATES:**

- A. Bare Concrete: Apply water base cleaner to substrate and let stand for 2 to 3 minutes. Work into surface with brooms, brushes or floor scrubbing machines. Do not allow cleaner to dry on floor. Rinse with clean water and repeat cleaning operation until substrate is free of contaminants. Substrate shall be allowed to dry thoroughly prior to coating application.
- B. Existing Coatings/Sealers: Apply water base cleaner to substrate and let stand for 5 to 10 minutes. Do not allow cleaner to dry on floor. Rinse with clean water and repeat cleaning operation until substrate is free of contaminants. Substrate shall be allowed to dry thoroughly prior to coating application. Stripping of acrylic sealers may result from cleaning operation. Test compatibility with existing sealers if scheduled to remain.
- C. Reduction:
  - 1. Light Duty: 1 part Kemiko Neutra Clean to 10 part water.
  - 2. Medium Duty: 1 part Kemiko Neutra Clean to 5 part water.
  - 3. Heavy Duty: 1 part Kemiko Neutra Clean to 2 part water.

**STAIN APPLICATION TO CONCRETE SUBSTRATES:**

- A. Apply concrete floor stain in accordance with manufacturer's instructions at locations indicated on the drawings.
- B. Control depth of color by adjusting volume of stain applied to floor.
- C. Apply 2 applications of concrete floor stain. Allow floor to completely dry after each application. Do not scrub clean between applications.
- D. After floor has completely dried, scrub off stain residue in accordance with manufacturer's instructions. Allow floor to completely dry.

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- E. Keep material containers closed when not in use to avoid contamination

**FLOOR SEALER APPLICATION FOR CONCRETE SUBSTRATES**

- A. Apply sealer in accordance with manufacturer's instructions at locations indicated on the drawings.
- B. Do not dilute sealer.
- C. Apply sealer in a thin uniform film.
- D. Apply second coat of sealer if required by manufacturer's instructions. Apply second coat after first coat is dry.
- E. Keep sealer film build-up to a minimum.
- F. Keep material containers closed when not in use to avoid contamination.

**PROTECTION:**

- A. Protect finishes from damage during construction.
- B. Protect concrete surfaces from foot traffic for a minimum of 24 hours. Avoid washing concrete surfaces for a minimum of 48 hours.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

**FLATNESS AND LEVELNESS:**

Comply with ACI Standard No. 117 and provide floors with a flatness of F50 minimum and a levelness of F35 minimum. Use laser guided equipment to set all forms. Use laser guided highway screed to achieve specified levelness and flatness. Use of BULLFLOATS is prohibited.

**TESTING:**

Floors shall be tested for levelness and flatness by an independent testing agency, using a "Dipstick Floor Profiler". Floors that do not meet specification will be removed and re-constructed.

**END OF SECTION 03350**

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**PART 1: GENERAL**

**A. DESCRIPTION OF WORK:**

Work of this Section shall consist of all labor and materials required to provide all rough carpentry work illustrated on Drawings and specified herein including, but not limited to: wood blocking, framing, dimensional lumber, sheathing, furring, nailers, sub-flooring, rough hardware, accessories, fasteners and light wood construction.

**B. RELATED DOCUMENTS:**

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this Section.

**C. REFERENCES / INDUSTRY STANDARDS:**

1. ALSC - American Lumber Standard Committee; [www.alsc.org](http://www.alsc.org)
2. ANSI - American National Standards Institute; [www.ansi.org](http://www.ansi.org)
3. ASTM - ASTM International; [www.astm.org](http://www.astm.org)
  - a. ASTM D245, Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber
  - b. ASTM D1990, Establishing Allowable Properties for Visually Graded Dimension Lumber from In-Grade Tests of Full-Sized Specimens
  - c. ASTM D6570, Standard Practice for Assigning Allowable Properties for Mechanically Graded Lumber
4. AWI - Architectural Woodwork Institute
  - a. AWI - Quality Standards, 8<sup>th</sup> Edition, Version 1.0, 2003
5. AWI / AWMAC / WI – Architectural Woodwork Standards – 2009, 1<sup>st</sup> Edition
6. AWWPA - American Wood Preservers Association; [www.awpa.com](http://www.awpa.com)
  - a. AWWPA Standard U1
7. EPA - U.S. Environmental Protection Agency; [www.epa.gov](http://www.epa.gov)
8. FSC- Forest Stewardship Council; Certified Sustainably Managed Lumber;
  - a. [www.fsc.org/pc.html](http://www.fsc.org/pc.html); <http://www.fscus.org/>
9. HMA - Hardwood Manufacturers Association; [www.hardwoodinfo.com](http://www.hardwoodinfo.com)
10. NHLA - National Hardwood Lumber Association; [www.natlhardwood.org](http://www.natlhardwood.org)
11. SPIB - Southern Pine Inspection Bureau; [www.spib.org](http://www.spib.org)
12. UL -Underwriters Laboratories Inc.; [www.ul.org](http://www.ul.org)
13. WI-Woodworking Institute; <http://www.wicnet.org/publications/2003manual.asp>
14. **All framing to be in compliance with the current edition of the Building Code having jurisdiction in North Carolina.**

**D. QUALITY ASSURANCE:**

**STANDARD:** For purposes of designating type and quality of work under this Section, drawings and Specifications are based on products manufactured or furnished by Manufacturer listed for each product.

**FIRE RETARDANT MATERIALS:** Provide fire retardant treatment which complies with the following regulatory requirements:

1. FHA Minimum Property Standard #2600.
2. HUD Materials Release 1261.

**COORDINATION WITH OTHER TRADES:** Coordinate locating of nailers, furring, blocking, and similar supports for other trades so that installation of finish work may be properly executed to fulfill design requirements.

1. Coordinate location of electrical fixtures with rough framing.
2. Coordinate location of plumbing work with rough framing.
3. Coordinate location of HVAC work with rough framing.

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4. Supply and install rough framing members for in wall fixture and equipment supports such as blocking, anchors, brackets, and frames.
5. Provide and install in wall blocking, anchors, brackets, and frames for plumbing fixtures, electrical fixtures, HVAC equipment, bathroom accessories, handrails, guardrails, shelves, closet shelving, etc.

**MOISTURE CONTENT OF LUMBER:** Maximum moisture content at the time of delivery and as maintained on site for lumber products shall be 19 percent on air dried stock, and 15 percent maximum on kiln-dried (KD) stock.

**DRESSED LUMBER:** Surface lumber four sides (S4S) unless specified otherwise for particular products.

**DELIVERY AND STORAGE:** Delivery, Storage and Handling per industry and fabricator guidelines, SECTION 016000, and as follows:

1. Delivery and Acceptance Requirements:
  - a. Deliver materials to Project site in an undamaged condition, in original bundles and bearing intact labels.
  - b. Inspect shipped materials on delivery to ensure compliance with requirements of Contract Documents and to ensure that products are undamaged and properly protected.
  - c. Reject damaged goods, and accept properly ordered, protected and undamaged goods.
2. Storage and Handling Requirements:
  - a. As soon as materials are delivered to site, place under cover and protect properly from weather. Do not store or erect material in wet or damp portions of buildings or in areas where plastering or similar work is to be executed until such work has been completed and has become reasonably dry.
  - b. Protect wood materials and accessories from soiling, damage, and deterioration, handling with proper care in proportion to the fragility and hazard of each product and its finished surfaces.
  - c. Protect materials during shipping, handling, storage and installation from exposure to harmful conditions including, but not limited to, weather, vandalism, extreme changes in temperature, dryness or humidity, denting, chipping, gouging, warping, peeling, moisture, construction operations, and other damage.
  - d. Store product materials away from exposure to harmful conditions including, but not limited to, weather, vandalism, extreme changes in temperature, direct sunlight, dryness or humidity, water, construction operations, and other damage.
  - e. Store on a flat and level surface to prevent warping. Provide spacers or separators for air circulation as needed.

**DISCREPANCIES:** In the event of discrepancy, immediately notify the Architect or Owner's Representative. Do not proceed with installation in any area of discrepancy until such discrepancies have been fully resolved.

1. Lumber may be rejected by the Architect or Owners Representative, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.

**WARRANTY:** Contractor shall provide Wood Treatment manufacturer's twenty (20) year limited warranty against structural damage due to termites, carpenter ants and fungal decay.

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**PART 2: PRODUCTS**

- A. **FRAMING LUMBER:** Various materials for framing shall be of sizes shown and shall conform to Grading Standards of SPIB (SOUTHERN PINE INSPECTION BUREAU). Unless otherwise indicated, all framing material shall be #2 SYP.

All material to be factory marked with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by inspection agency.

- B. **PLYWOOD or ORIENTED STRAND BOARD MATERIALS:** Softwood plywood or OSB sheathing shall conform to requirements of U. S. Product Standard PS 1-66, Construction and Industrial. All plywood or OSB sheathing which has any edge or surface permanently exposed to weather shall be "EXTERIOR" type. All plywood and OSB shall bear the mark of a recognized association or independent inspection agency that maintains continuing control over quality of plywood which identifies compliance by veneer grade, group number, span rating where applicable, and glue type.

All plywood and OSB used for structural sheathing or subflooring shall be APA rated Exposure 1 or Exterior; panel grade CD or better.

Where indicated on the Drawings, provide FRT Fire Retardant Treated plywood.

Where indicated on the Drawings, provide PT Preservative Treated plywood.

- C. **PRESERVATIVE TREATED WOOD PRODUCTS:** Where wood is immersed or exposed to salt water contact protective pressure treatment of lumber or products shall be of chromated copper arsenate (CCA). Protective pressure treatment of lumber or products in non salt water applications shall be Alkaline Copper Quaternary (ACQ) and Copper Azole (CA) treated wood. All wood material in contact with the ground, roofing, flashing, vapor barriers and waterproofing must be preservative treated and kiln dried not to exceed 19%, and all cut ends shall be coated with the same preservative, at job site during construction.

All wood material in contact or fastened to concrete, concrete masonry or brick masonry to be preservative treated wood products.

- E. **ENGINEERED WOOD PRODUCTS:**

1. Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
2. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
3. Laminated-Veneer Lumber: Manufactured with exterior-type adhesive complying with ASTM D 2559. Allowable design values determined according to ASTM D 5456.
4. Wood I-Joists: Prefabricated units, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Provide units complying with material requirements of and with structural capacities established and monitored according to ASTM D 5055.
  - a. Web Material: Either oriented strand board or plywood, Exposure 1.
  - b. Structural Properties: Provide units with depths and design values not less than those indicated.

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- c. Provide units complying with APA PRI-400, factory marked with nominal joist depth, joist class, span ratings, mill identification, and compliance with APA standard.
- 5. Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research/evaluation report for I-joists.
  - a. Material: glued-laminated wood or product made from any combination solid lumber, wood strands, and veneers.
- F. FASTENING DEVICES: Anchors and fasteners for securing wood items, unless noted otherwise, shall be of appropriate size, type, length, durability and material to securely fasten to the substrate or other wood structure for the intended life, exposure and use and shall meet following requirements:
  - 1. Provide products acceptable to the State for which code research/evaluation reports exist that show compliance of fastening device for application indicated with codes in effect for project.
  - 2. Meet or exceed allowable design loads required by effective Code.
  - 3. Nails, Brads and Staples: ASTM F1667
  - 4. Power Driven Fasteners: NES NER-272
  - 5. Lag Bolts: ASME B18.2.1
  - 6. Bolts, nuts and washers: Steel bolts complying with ASTM A 307 Grade A
  - 7. Wood Screws: ASME B18.6.1

All fastening devices and fastening device components including but not limited to washers, nuts, screws, nails and bolts used in exterior or concrete construction shall be hot-dip galvanized in accordance with ASTM A 153/A 153M or of Type 304 stainless steel.

All fastening devices used in Fire Retardant Treated or Preservative Treated lumber and plywood to be corrosion resistant per manufacturer's recommendations.

Ground Anchorage: Wood plugs or nailing blocks are not acceptable for fastening, furring, or blocking to concrete or masonry. Hardened steel nails, expansion screws, toggle-bolts, metal plugs, or metal inserts, as most appropriate for each type of masonry or concrete construction shall be used.

Explosive-Driven Fastenings: Explosive or powder-driven fastenings may be used only when approved by Architect.

Metal Framing Anchors: Made from hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

- 1. Available Manufacturers:
  - a. KC Metals Products, Inc.
  - b. Silver Metal Products, Inc.
  - c. Simpson Strong-Tie Company, Inc.
  - d. United Steel Products Company, Inc.

Adhesives:

- 1. For field-gluing plywood to lumber framing floor or roof systems: ASTM D3498.
- 2. For structural laminated Wood: ASTM D2559

**PART 3: EXECUTION**

**A. GENERAL REQUIREMENTS FOR FRAMING AND BRACING:**

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Finish: Unless otherwise indicated, use S4S lumber for all framing members.

Size: Unless otherwise indicated, framing shall conform to nominal size requirements shown on Drawings.

Framing shall be spaced at 16 inches on center, unless shown otherwise on Drawings.

Install required blocking, bracing, or other framing required for support of built-in equipment, including casework.

**B. INSTALLATION OF WOOD BLOCKING:**

Location: Install all wood blocking required to provide anchorage for other materials. Form to shapes and sizes as indicated or as may be required to accomplish particular installation. Form blocking of sizes shown or of minimum 2 inch thick nominal material.

At location of wall mounted equipment install 2"x 8" blocking unit between properly located studs at height indicated in Finish Hardware Schedule, or where indicated for wall mounted equipment. Install wood blocking behind all cabinets and toilet accessories as required.

Steel: Blocking in conjunction with steel work shall be bolted to steel with bolts, washers and nuts, countersunk where required.

Roofing: Form blocking in conjunction with gravel stops and built-up roofs to shapes as detailed. Anchor with countersunk bolts, washers and nuts.

Anchorage: Wedge, anchor and align blocking to provide rigid and secure installation of both blocking and other related work.

**C. INSTALLATION OF WOOD FURRING:**

Location: Provide all free-standing, suspended, solid-anchored, and other types of wood furring as required for receipt, alignment and complete installation of various types of finishing materials.

Spacing: Space furring members as required. Provide headers and other nailing members within furring framework. Install with faces true to line and plumb, using wood shims as necessary.

Fastening: Install furring into position by whatever means required to provide secure, rigid, and correct installation. When necessary, use nailing plugs, power-actuated anchors, toggle bolts, anchor bolts, washers and nuts, nails, and similar fastenings.

**D. CLEANING UP:**

At the end of each workday and upon completion, remove all excess materials and all debris resultant from operations of work of this Section. Leave entire work area in neat, clean condition, satisfactory for receipt of other related items of work to be installed as part of work of other Sections. Clean exterior finish carpentry on exposed and semi-exposed surfaces.

**END OF SECTION 06100**

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**RELATED DOCUMENTS:**

The general conditions of the Contract, including General and Supplementary Conditions, Rough Carpentry 06100 and General Requirements, apply to the work specified in this Section.

**PART 1: GENERAL**

**1.01 SUMMARY:**

Work of this Section shall include furnishings and all labor and materials required to provide the following:

1. All finish carpentry, including standing and running interior wood trim and wall paneling
2. Plastic laminate countertops, solid surface countertops and wood countertops.
3. Casework hardware
4. Shelving and shelving systems
5. Wood casework (aka millwork) and cabinetwork as scheduled on Drawings and as specified herein
6. Hanging of wood doors as scheduled

Furnish all millwork and cabinet work, deliver to building, assemble, level, secure to floors and/or walls, as shown on Drawings, equipment schedule, Specifications, and processed Shop Drawings.

**1.02 REFERENCES AND INDUSTRY STANDARDS:**

AWI Quality Standard: Comply with applicable requirements of "Architectural Woodwork Quality Standards" published by the Architectural Woodwork Institute (AWI), except as otherwise indicated.

**1.03 SUBMITTALS:**

- A. Product Data: Manufacturer's specifications, data, and installation instructions for each manufactured product specified.
- B. Shop Drawings:
  1. Submit shop drawings in conforming to the requirements of the *Architectural Woodwork Standards* and in accordance with the GENERAL CONDITIONS.
  2. On casework and countertop elevations show the location of backing, grounds, blocking, and other anchoring devices required for attachment to and within walls to properly secure the work.
  3. Submit samples of each species and cut of wood to be used. Samples shall represent the range of color and grain expected to be provided.
  4. Submit a sample in the specified finish of each hardware item that will be visible at exposed surfaces when the job is complete as well as drawer hardware.
  5. Submit plastic laminate and solid surface samples (manufacturer's full line)

Do not fabricate millwork until final Shop Drawings have been processed by Architect. Reviewing and processing shop drawings by Architect does not relieve Contractor of checking and verifying job dimensions and conditions required by details on processed Shop Drawings and Contract Drawings.

Reviewing and processing shop drawings by Architect does authorize changes. No changes will be made without explicit written authorization.

**1.04 QUALITY CONTROL:**

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Work shall be in accordance with the Grade or Grades specified of the *Architectural Woodwork Standards*.

- A. Firm (woodwork manufacturer) with no less than 5 years of production experience similar to this project, whose qualifications indicate the ability to comply with the requirements of this Section.
- B. The woodwork manufacturer must have at least one project in the past 5 years where the value of the woodwork was within 20 percent of the cost of woodwork for this Project.
- C. Single Source Responsibility: A single manufacturer shall provide and install the work of described in this Section.

**PRE-INSTALLATION MEETING**

- A. Before framing is completed hold a meeting of the contractor, the casework manufacturer, casework installer, and the framing contractor.
  1. Review the locations of backing required for casework installation as shown on the casework shop drawings.
  2. Review the method of attachment of the backing to the wall system as shown on the architectural drawings.

**DELIVERY STORAGE AND HANDLING**

- A. Deliver materials only when the project is ready for installation and the general contractor has provided a clean storage area.
  1. Delivery of architectural millwork shall be made only when the area of operation is enclosed, all gypboard, plaster and concrete work is dry and the area broom clean. Glazing shall be in place, and all exterior openings closed.
  2. Maintain indoor temperature and humidity within the range recommended by the *Architectural Woodwork Standards* for the location of the project during and after installation.
  3. Remove all items damaged due to improper handling or storage from the site.

**SCHEDULING**

- A. Coordinate fabrication, delivery, and installation with the general contractor and other applicable trades.

**PART 2: PRODUCTS**

**2.01 COMPONENTS AND MATERIALS:**

- A. Lumber: In accordance with the *Architectural Woodwork Standards* Grade specified for the product being fabricated.
  1. Moisture Content: 6% to 12% for boards up to 2" nominal thickness, and not to exceed 19% for thicker pieces.
- B. Veneers: As required by *Architectural Woodwork Standards* requirements for its use and the Grade specified.
- C. Core: **MDF and Particleboard** meeting the requirements of *Architectural Woodwork Standards*.
- D. Veneer core plywood: hardwood with a non-telegraphing grain manufactured with exterior glue.
- E. Plastic Laminate:
  1. Of the NEMA LD-3 Grade required by *Architectural Woodwork Standards* for its use (vertical and horizontal grades), thickness, color, pattern and finish indicated for each application, or if not indicated, as selected by Architect from manufacturer's standard products.



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2. See Chemical Resistant Countertops below for additional requirements.
- F. Metal Laminate:
1. Provide Formica brand "DecoMetal" accent aluminum foil laminated to a phenolic core where indicated in the drawings.
- G. Edgeband:
1. For wood veneer casework: Veneer of the same species and cut as the exposed surfaces.
  2. For Laminated Plastic Casework: 3 mm PVC or High Pressure Decorative Laminate as indicated in the drawings. Unless otherwise noted, all edges shall be banded with 3mm PVC.
- H. Shelving Edge Band: Provide 3mm PVC edgebanding of shelves on front and rear edges only, with 1mm PVC edgebanding on remaining two side edges.
- I. Solid Surface Countertops: Where Corian Solid Surface tops are indicated, provide ½" Corian or equal solid surfacing material. Architect to select from manufacturer's full range of colors and patterns.
- J. Chemical Resistant Countertops: Where Chemical Resistant Countertops are indicated, provide Chemtop 2 Chemical Resistant laminate by the Formica Group or equal by Wilsonart.
- K. Hardware:
1. Except as otherwise indicated, comply with AWS and ANSI A 156.9 "American National Standard for Cabinet Hardware". Millwork Contractor to provide slides, dual hinges, catches, standards, brackets, locks, and pulls as shown and required for a complete assembly.
  2. Finish:
    - i. Exposed hardware: brushed aluminum
    - ii. Semi exposed hardware: Manufacturer's standard finish.
  3. Drawer and Door Pulls: Hafele No. 132202 (3 3/4" centers), cast aluminum, brushed finish.
  4. Drawer Guides: **full extension** meeting the requirements of the AWS for the type and size of drawer.
  5. Hinges: Reveal overlay, 5-knuckle, Grade 1, non-removable pin, hospital type, US32D stainless steel finish, Stanley HT1592 or equivalent.
  6. Door Catches: Roller ball catches.
  7. Shelf Supports: Bored hole system
  8. Sliding glass doors: Glass shall be Grade A double strength where specified. Sliding glass doors that are more than 1 ½ times as tall as they are wide should be installed using top hung hardware.
  9. Provide grommets in locations and sizes as indicated in the drawings.

**2.02 FABRICATION:**

- A. General:
1. All materials and methods of construction are to meet the requirements of Architectural Woodwork Standards for the grade or grades specified.
    - i. If there is a conflict between plans and/or specifications and the AWS, plans and specifications shall govern.
    - ii. Provide dust panels above and below all locking drawers.
- B. Wood Casework
1. Grade: Custom Grade
  2. Construction Type: face frame
  3. Cabinet and door interface: reveal overlay

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4. Exposed Surfaces shall be book matched, flat sawn or plain sliced Oak meeting the requirements of the AWS for the Grade specified.
    - i. Casework, paneling, doors and wood trim shall be provided by the same manufacturer.
    - ii. Veneers shall be taken from the same flitch.
    - iii. Faces at cabinet doors, drawer fronts and false fronts shall be sequence matched, shall run and match vertically, and shall be sequence matched with adjacent wall paneling and/or doors.
    - iv. Faces at exposed ends of cabinets shall be selected from the same flitch, and shall be well matched to the adjacent paneling and to the cabinet fronts.
    - v. All components including casework, paneling, doors, and trim shall be factory finished at the same time in the same facility.
  5. Exposed interior surfaces: Veneer of the same species and cut as the exposed exterior surfaces.
  6. Semi-exposed surfaces: **per the AWS**
- C. Plastic Laminate Casework:
1. Grade: *Custom*
  2. Construction Type: *Architectural Woodwork Standards* construction type A, Frameless.
  3. Cabinet and door interface: reveal overlay
  4. Exposed interior surfaces: low pressure melamine overlay of a color and pattern as selected by Architect
  5. Semi-exposed surfaces: low-pressure melamine overlay
  6. Edgeband: Edgeband at doors, drawer fronts, and false fronts: 3mm thick. Unless otherwise noted, all edges shall be banded with 3mm PVC.
- D. Drawers:
1. Sides and Bottom: Particle board with melamine surfaces
- E. Laminated Plastic Countertops:
1. Laminate: Provide Chemtop 2 Chemical Resistant laminate by Formica Group or equivalent Laboratory Grade Laminate 840/LGP over 45 lb. density industrial grade particleboard (CS 236-66: Type 1, Grade B, Class 2) where chemical resistant countertops are indicated, or in all science or vocational areas.
  2. Core material: particleboard
    - i. Provide exterior grade plywood or water resistant resin impregnated composition board countertops at all locations with a sink. Use CD exterior grade veneer plywood, fabricated with water resistant glues and adhesives.
  3. Back splashes: butt joint 4" high or as indicated in drawings.
  4. Front edges: self edge
- F. Solid Surface Countertops:
1. Solid surface: Provide ½" Corian or equal solid surfacing material. Architect to select from manufacturer's full range of colors and patterns.
  2. Back splashes: butt joint 4" high or as indicated in drawings.
  3. Front edges: self edge

**PART 3: EXECUTION**

**3.01 EXAMINATION**

- A. Verification of conditions: Verify that mechanical, electrical, plumbing and other building components affecting work in this section are in place and ready.

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- B. Inspect all surfaces for any deficiency which might prevent satisfactory installation of cabinetwork, millwork, or hanging wood doors.
- C. Acceptance of Surfaces: Do not start work until deficiencies of surfaces to receive work have been corrected. Beginning of installation in any area shall constitute acceptance of that area as satisfactory to receive this work. Contractor shall be fully accountable for final results and workmanship specified herein.

**3.02 INSTALLATION**

- A. Install all work in conformance with the *Architectural Woodwork Standards*, latest edition.
  - 1. Installation shall conform to the *AWS* Grade of the items being installed.
- B. Secure all work in place, square, plumb, and level.
- C. Secure all cabinetwork to wall and or floor as shown in the shop drawings.
  - 1. If not otherwise noted or specified in the shop drawings, wall cabinets shall be fastened using ¼" diameter lag bolts in lead shields @ 24" maximum spacing, minimum of 4 anchors per wall hung cabinet section, 2 anchors across top and 2 anchors across bottom.
  - 2. If not otherwise noted or specified in the shop drawings, base cabinets shall be fastened using ¼" diameter lag bolts in lead shields @ 24" maximum spacing, minimum of 4 anchors per cabinet section.
- D. Installation shall be complete, including all trim and fillers required.
- E. Fit and scribe all work abutting other building components.
- F. Mechanical fasteners used at exposed and semi-exposed surfaces, excluding installation attachment screws and those securing cabinets end to end, shall be countersunk.
- G. Cut equipment cutouts shown on plans using templates provided by the general contractor.
- H. Hang all wood doors according to Door Schedule and Shop Drawings approved by Architect.
  - 1. Leave each door neatly hung, swinging easily, and performing all functions intended by finish hardware schedule.

**3.02 ADJUSTING & TOUCH UP**

- A. Adjust all moving and operating parts to function smoothly and correctly.
- B. Fill and retouch all nicks, chips and scratches. Replace damaged items that cannot be repaired.

**3.03 CLEANUP**

Upon completion of installation, clean all installed items of pencil and ink marks and broom clean the area of operation, depositing debris in containers provided by the general contractor.

**END OF SECTION 06400**

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**PART 1: GENERAL**

**RELATED DOCUMENTS:**

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this Section.

**DESCRIPTION OF WORK:**

Work of this Section shall consist of furnishing all labor, materials, equipment and testing required to insulate exterior stud and cavity walls, interior stud walls, foundations, and interior ceilings in complete assemblies, as shown in the accompanying drawings and as specified herein. Insulation systems include but are not limited to:

- Cavity wall insulation
- Ceiling fiberglass blanket Insulation
- Retrofit Roof Insulation
- Sound Attenuation Batt Insulation

**QUALITY ASSURANCE:**

Thermal Conductivity: Thicknesses indicated are for thermal conductivity (k-value at 75 degrees F or 24 degrees C) specified for each material. Provide adjusted thicknesses as directed for equivalent use of material having a different thermal conductivity. Where insulation is identified by "R" value, provide thickness required to achieve indicated value.

**SUBMITTALS:**

Product Data: Submit manufacturer's product specifications and installation instructions for each type of insulation and vapor barrier material required for the project.

**PRODUCT HANDLING:**

Protect all insulation from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, shipping, storage and protection during installation.

**PART 2: PRODUCTS**

**CAVITY WALL AND ROOF INSULATION:**

Kraft-faced Blanket-type, Glass Fiber Wall Insulation: **(for all locations of concealed insulation within exterior wall construction)** Inorganic non-asbestos fibers formed into 8" thick semi-rigid blankets, R-Value of R-19 (walls), or R-38 (ceiling) or as indicated on drawings with batt sizes manufactured specifically for fitting between steel or wood studs (provide 12", 16" or 24" depending on stud spacing indicated in plans). Provide with kraft facing vapor barrier, with overlapping tabs. Friction fit in between wall framing members. Overlap tabs at each adjoining piece and tape for continuous vapor barrier construction. Install in strict accordance with manufacturer's printed instructions.

Protection: Do not leave installed insulation exposed to weather. Cover as required during storage and installation. Remove and replace installed insulation that has become damaged, with new insulation. Allow wet insulation to air dry prior to installation.

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**CONTINUOUS WALL INSULATION SYSTEM:**

Foil Faced Polyisocyanurate Foam Sheathing: Rigid, closed-cell foam, polyisocyanurate insulation board with one foil faced side; complying with ASTM C1289, Type I, Class 1, ASTM E 96 Moisture Vapor Transmission, R-value of 7.2, compressive strength of 20 psi; manufacturer's standard lengths and widths.

Application: Examine framing for suitability to receive insulation. Verify that substrate is dry, straight, clean and free of foreign material that will damage insulation or impede installation. Install specified wall insulation panels using approved mechanical fasteners in accordance with manufacturer's latest written instructions and as required by governing codes and Owner's Design Professional. Install with tight board to board joints to assure proper edge contact and thermal performance. Tape all joints with manufacturer approved foil faced tape.

Protection: Do not leave installed insulation exposed to weather, long term. Cover within 60 days after installation. Remove and replace installed insulation that has become damaged, with new insulation. Allow wet insulation to air dry prior to installation.

**SOUND ATTENUATION BATT INSULATION:**

Sound attenuation batts shall be installed at all interior metal stud and gypboard walls and partitions.

Sound Attenuation Batt Insulation: Mineral wool blankets, 3 1/2" thick, manufactured by USG, USM, Owens-Corning or equal providing STC ratings scheduled. Install in strict accordance with manufacturer's instructions.

**PROTECTION:**

Do not leave installed insulation exposed to weather. Cover as required during storage and installation. Remove and replace installed insulation that has become damaged, with new insulation. Allow wet insulation to air dry prior to installation.

**PART 3: EXECUTION**

**INSPECTION AND PREPARATION:**

Installer must examine substrates and existing conditions under which insulation work is to be performed, and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with insulation work until unsatisfactory conditions have been corrected in manner acceptable to Installer. Proceeding with installation will indicate acceptance of work.

Clean all substrates of substances harmful to insulations or vapor barriers. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

**INSTALLATION:**

Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.

Extend insulation full thickness as shown over entire area to be insulated. Spray, or cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.

**END OF SECTION 07200**

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RELATED DOCUMENTS

- A. Division 07 Section "Thermal Insulation" for thermal insulation installed under metal panels.
- B. Division 07 Section "[Joint Sealants](#)" for field-applied [Joint Sealants](#).

**PART 1: GENERAL**

**1.01 DESCRIPTION**

- A. General
  - 1. Furnish all labor, material, tools, equipment, and services for a complete roofing panel system to include all flashing, curbs, gutters and downspouts as indicated, in accordance with provisions of Contract Documents.
  - 2. Completely coordinate with work of all other trades.
  - 3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.
  - 4. See Division 1 for General Requirements.

**1.02 QUALITY ASSURANCE**

- A. Applicable standards:
  - 1. American Architectural Manufacturer's Association (AAMA): AAMA 621 - Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) & Zinc-Aluminum Coated Steel Substrates.
  - 2. AAMA 809.2 - Voluntary Specification Non-Drying Sealants.
  - 3. SMACNA: "Architectural Sheet Metal Manual" Sheet Metal and Air Conditioning Contractors National Association, Inc.
  - 4. American Society of Civil Engineers (ASCE): ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
  - 5. AISC: "Steel Construction Manual" American Institute of Steel Construction.
  - 6. AISI: "Cold Form Steel Design Manual," American Iron and Steel Institute.
  - 7. ASTM A792-AZ50: Specifications for steel sheet, aluminum-zinc alloy coated (galvanized) by the hot dip process, general requirements (galvalume).
  - 8. Underwriters Laboratories Inc. wind uplift classification UL 90
  - 9. 2000 International Building Code, Table 1604.5, Classification Of Buildings And Other Structures For Importance Factors, Category II Seismic, Snow and Wind Factors.
  - 10. 2000 International Building Code, Table 1604.5, Classification Of Buildings And Other Structures For Importance Factors, Category III Seismic, Snow and Wind Factors.
  - 11. Energy Star Roof Rating
  - 12. Cool Metal Roof Coalition
  - 13. Cool Roof Rating Council
- B. Manufacturer's qualifications:
  - 1. Manufacturer has a minimum of three years experience in manufacturing panels of this nature.

- C. Installer's qualifications:

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1. Experienced Installer with minimum of five years experience with successfully completed projects of a similar nature and scope.
- D. Provide metal roof panel assembly and accessories from a single manufacturer providing fixed-base roll forming, and accredited under IAS AC 472 Part B.

**1.03 SUBMITTALS**

- A. Submittals: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, and special details. Make distinctions between factory and field assembled work.
1. Indicate points of supporting structure that must coordinate with metal panel system installation.
  2. Include data indicating compliance with performance requirements.
- B. Include structural data indicating compliance with requirements of authorities having jurisdiction. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated:
1. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings.
  2. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code maximum allowed deflection (or deflection indicated by structural specifications or drawings) of the span with no evidence of failure.
  3. Seismic Performance: Comply with ASCE 7, Section 9, "Earthquake Loads."
- C. Samples:
1. Submit samples and color chips for all proposed finishes.
    - a. Submit one sample of roof panel, including clips.
    - b. Submit color chip samples in all standard colors.
- E. Warranty
2. Provide manufacturer's written weather tightness warranty twenty (20) years, against leaks in roof panels arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions. Warranty coverage shall include all curbs, flashing and miscellaneous trim and accessories. Warranty shall be non-pro-rated, signed by the metal roofing system contractor and shall provide for both labor and materials.
  3. Provide manufacturer's standard written warranty for twenty (20) years against perforation of metal roof panels due to corrosion under normal weather and atmospheric conditions. Warranty shall be signed by metal roofing system manufacturer and shall provide for complete replacement of panels and associated trim.
  4. Provide manufacturer's standard written paint film (finish warranty) warranty for twenty (20) years on finish film integrity and color retention. The finish will not crack, check, peel, flake, or blister, or chalk in excess of ASTM 4214, number 8 rating, or fade in excess of 5 units per ASTM D 2244, under normal atmospheric conditions. Warranty shall be signed by metal roof system manufacturer.



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5. The Roofing Contractor shall warrant the materials and workmanship of the roofing system against leakage and defects due to faulty materials, workmanship and contract negligence for a period of two (2) years following acceptance of the project by the Owner.
6. Inspection and Report Services: Contractor shall retain independent third party agent who shall perform an inspection of the entire roof system and shall submit a written report to the Owner detailing all conditions requiring maintenance and repair by parties under the above warranties. Third party agent shall be a registered roof consultant (RRC) with minimum of 5 years as a registered roof consultant and 5 years of active project experience. Provide written certification of qualifications.

**1.04 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping.
  1. Deliver, unload, store, and erect metal panel system and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
  2. Store in accordance with Manufacturer's written instructions. Provide wood collars for stacking and handling in the field.

**PART 2: PRODUCTS**

**2.01 MANUFACTURER**

- A. Basis of Design Manufacturer: **MBCI Metal Roof and Wall Systems, Division of NCI Group, Inc.**; Houston TX. Tel: (877)713-6224; Email: [info@mbci.com](mailto:info@mbci.com); Web: [www.mbci.com](http://www.mbci.com).
- B. Acceptable optional manufacturers:
  1. Equivalent products by:
    - a. AEP Span
    - b. American Building Company
    - c. Butler Manufacturing Company
    - d. McElroy Metal, Maxima 216
    - e. Metl-Span
    - f. Peterson Aluminum Corporation, Tite-Loc
- C. All roofing panels and associated materials shall be provided from one manufacturer only (single source).

**2.02 ROOF PANEL MATERIALS**

- A. **Standing Seam Roof Panel:** 2 in. high x 3/4 in. wide rib x 16 in. wide striated panel. Panel shall be large batten, vertical leg, concealed fastener, standing seam, utilizing male and female rib configurations, with factory applied hot melt mastic in female rib, continuously locked together by an electrically powered mechanical seaming device during installation.
  1. Basis of Design: **MBCI, Battenlok Panel**, [www.mbci.com/pbr.html](http://www.mbci.com/pbr.html).
  2. Width: 16 inches (914 mm).
  3. Rib Height: 2 inch (31.8 mm).
  4. Nominal Coated Thickness: 24 gauge

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5. Panel Surface: Smooth texture, Striated panel
  6. Exterior Finish: signature 200 or 300 series
  7. Color: Selected from manufacturer's standard Energy Star Rated roof colors, with Solar Reflectance Index (SRI) value equal to or greater than SRI 29.
  8. Clip: Floating clip, low, 22 gauge, with factory applied mastic (# UL-90 rated-Underwriters Laboratories).
  9. Finish: Premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin (20 year warranty).
  10. Reflectivity and Emissivity: Metal roof Panels shall be high reflectance and high remittance in accordance with Energy Star. Initial Reflectance (Galvalume Only) shall be at least 0.68 when tested with ASTM E-903. The three year aged reflectance shall be at least 0.57, when tested in accordance with ASTM E-1918 (Measured AS Solar Reflectivity, Not Visible Reflectance).
  11. Equivalent products by the following manufacturers will also be accepted:
    - i. AEP Span
    - ii. American Building Company
    - iii. Butler Manufacturing Company
    - iv. McElroy Metal, Maxima 216
    - v. Peterson Aluminum Corporation, Tite-Loc
- B. Pipe flashing shall be Dektite, or equivalent by Master Flash, Westform Metals or IPS Roofing Products.
- C. All roof curbs are by metal roof contractor. Refer to mechanical drawings and coordinate curbs required with HVAC Contractor.
- D. Metal soffit panels and trim where indicated to be .019" aluminum, smooth finish, factory finish, custom color. Provide ventilated panels where detailed. Soffit system to be Revere Hi-Tensile or equivalent by Alcoa or Owens Corning
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings. Form from materials matching metal panel substrate and finish.
- F. Self-adhering polymer modified bituminous membrane, Vycor Ice and Water Shield by W.R. Grace or equivalent products by GAF Materials Corp. or Calisle Coatings and Waterproofing.
- G. Roofing system shall meet UL 90 Uplift rating and Class A.

**2.04 FABRICATION**

- A. Material shall be in-line tension leveled prior to roll forming finished panel profile.
- B. Factory roll form panels in continuous lengths, full length of detailed runs. Field formed panels will not be accepted.
- C. Standard panel length shall be no more than 45 feet.
- D. Panel laps shall be 5" minimum.
- E. Fabricate trim, flashing and accessories to detailed profiles.
- F. Fabricate trim and flashing from same material as panel.

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**PART 3: EXECUTION**

**3.01 SURFACE CONDITIONS**

- A. Examination and Preparation.
  - 1. Inspect installed work of other trades and verify that such work is complete to a point where this work may continue.
  - 2. Verify that installation may be made in accordance with approved shop drawings and manufacturer's instructions.
  - 3. Miscellaneous Supports: Install subframing, girts, furring, and other miscellaneous panel support members according to ASTM C 754 and manufacturer's written instructions.
  
- B. Discrepancies:
  - 1. In event of discrepancy, notify Architect. Do not proceed with installation until discrepancies have been resolved.

**3.02 INSTALLATION**

- A. Exposed Fastener Metal Roof Panels: Install weathertight metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal roof panels in orientation, sizes, and locations indicated, free of waves, warps, buckles, fastening stresses, and distortions. Anchor panels and other components securely in place. Provide for thermal and structural movement.
  
- B. Provide concealed anchors at all panel attachment locations.
  
- C. Install panels plumb, level, and straight with seams and ribs/battens parallel, conforming to design as indicated.
  
- D. Fastening: Attach panels to supports using screws, fasteners, and sealants recommended by manufacturer and indicated on approved shop drawings.
  - a. Fasten metal panels to supports at each location indicated on approved shop drawings, with spacing and fasteners recommended by manufacturer.
  - b. Provide weatherproof jacks for pipe and conduit penetrating metal panels of types recommended by manufacturer.
  - c. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.
  
- E. Do not place scratched panels or material in the work.
  
- F. Metal roofing contractor is responsible for cutting and sealing all roof penetrations and installations of all curbs. Refer to plumbing and mechanical drawings. Coordinate roof penetrations and curbs required with Plumbing and HVAC Contractors.
  
- G. Install self-adhering polymer modified bituminous membrane ice and watershield over entire roof.
  
- H. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and

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contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.

I. ACCESSORY INSTALLATION

- a. General: Install metal panel trim, flashing, and accessories using recommended fasteners and joint sealers, with positive anchorage to building, and with weather tight mounting. Coordinate installation with flashings and other components.
- b. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
- c. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
- d. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.
- e. Joint Sealers: Install joint sealers where indicated and where required for weathertight performance of metal panel assemblies, in accordance with manufacturer's written instructions.
- f. Prepare joints and apply sealants per requirements of Division 07 Section "[Joint Sealants](#)."

**3.03 CLEANING, PROTECTION**

- A. Remove temporary protective films immediately in accordance with metal roof panel manufacturer's instructions. Clean finished surfaces as recommended by metal roof panel manufacturer.
- B. Dispose of excess materials and remove debris from site.
- A. Clean work in accordance with manufacturer's recommendations.
- B. Protect work against damage until final acceptance. Replace or repair to the satisfaction of the Architect, any work that becomes damaged prior to final acceptance.
- C. Scratched panels or scratched flat surfaces will not be accepted. Scratched materials shall be replaced with new matching material at contractor's expense. Repainting to conceal surface scratches will not be accepted.

**END OF SECTION 07610**

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**RELATED DOCUMENTS**

- A. Division 07 Section "Thermal Insulation" for thermal insulation installed under metal panels.

**PART 1: GENERAL**

**1.01 DESCRIPTION**

- A. Exterior, panelized fiber cement cladding system and accessories to complete a drained and back-ventilated rainscreen.
- B. Interior fiber cement panelized cladding system and accessories.

**1.02 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 509-09 – Voluntary Test and Classification Method of Drained and Back Ventilated Rain Screen Wall Cladding Systems
- B. ASTM International (ASTM):
  - 2. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  - 3. ASTM C 1185 - Standard Test Methods for Sampling and Testing Non-Asbestos Fiber Cement.
    - a. ASTM C 1186 – Standard Specification for Flat Fiber-Cement Sheets.
  - 4. ASTM E-84 - Standard Test for Surface Burning Characteristics of Building Materials.
  - 5. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
  - 6. ASTM E 228 - Standard Test Method for Linear Thermal Expansion of Solid Materials with a Vitreous Silica Dilatometer.
  - 7. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  - 8. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  - 9. ASTM G 23 - Standard Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) with and without Water for Exposure of Nonmetallic Materials, Replaced by G152 and G153.
- B. Florida Building Code - Test Protocol HVHZ
  - 1. Testing Application Standard (TAS) 201, 202, 203 – Impact Test Procedures
- C. National Fire Protection Association (NFPA):
  - 1. NFPA 285 - Fire Test Method for Exterior Wall Assemblies Containing Combustible Material.
  - 2. NFPA 268 – Ignition Resistance of Exterior Wall Assemblies.
- D. Standards Council of Canada & Underwriters Laboratories Canada (ULC):
  - 1. CAN/ULC S-102 – Standard Method of Test for Surface Burning Characteristics.
  - 2. CAN/ULC S-134 – Standard Method of Fire Test of Exterior Wall Assembly.

**1.03 QUALITY ASSURANCE**

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A. Manufacturer Qualifications:

1. All fiber cement panels specified in this section must be supplied by a manufacturer with a minimum of 10 years of experience in fabricating and supplying fiber cement cladding systems.
  - a. Products covered under this section are to be manufactured in an ISO 9001 certified facility.
2. Provide technical and design support as needed regarding installation requirements and warranty compliance provisions.

B. Installer Qualifications: All products listed in this section are to be installed by a single installer trained by manufacturer or representative.

C. Mock-Up Wall: Provide a mock-up wall as evaluation tool for product and installation workmanship.

D. Pre-Installation Meetings: Prior to beginning installation, conduct conference to verify and discuss substrate conditions, manufacturer's installation instructions and warranty requirements, and project requirements.

#### **1.04 SUBMITTALS**

- A. Product Data: Submit manufacturer's product description, storage and handling requirements, and installation instructions.
- B. Product Test Reports and Code Compliance: Documents demonstrating product compliance with local building code, such as test reports or Evaluation Reports from qualified, independent testing agencies.
- C. Manufacturer's Details: Submit drawings including plans, sections, showing installation details that demonstrate product dimensions, edge/termination conditions/treatments, compression and control joints, corners, openings, and penetrations.
- D. Samples: Submit samples of each product type proposed for use.

#### **1.05 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Panels must be stored flat and kept dry before installation. A waterproof cover over panels and accessories should be used at all times prior to installation.
- B. If panels are exposed to water or water vapor prior to installation, allow to completely dry before installing. Failure to do so may result in panel shrinkage at ship lap joints, and such action may void warranty.
- C. Panels MUST be carried on edge. Do not carry or lift panels flat. Improper handling may cause cracking or panel damage.
- D. Direct contact between the panels and the ground should be avoided at all times. It is necessary to keep panels clean during installation process.

#### **1.06 WARRANTY**

- A. Provide manufacturer's 15-year warranty against manufactured defects in fiber cement panels. Additional 5-year extension available when refinished in year 14-15.
- B. Provide manufacturer's 15-year warranty against manufactured defects in panel finish.
- C. Warranty provides for the original purchaser. See warranty for detailed information on terms, conditions and limitations.

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**PART 2: PRODUCTS**

**2.01 MANUFACTURER**

- A. Acceptable Manufacturer: Nichiha Corporation, 18-19 Nishiki 2-chome Naka-ku, Nagoya, Aichi 460-8610, Japan.
- B. Acceptable Manufacturer's Representative: Nichiha USA, Inc., 6465 E. Johns Crossing, Suite 250, Johns Creek, GA 30097. Toll free: 1.866.424.4421, Office: 770.805.9466, Fax: 770.805.9467, [www.nichiha.com](http://www.nichiha.com).
- 3. Basis of Design Product: Nichiha Riftsawn (horizontal rainscreen panel where noted in the drawings)
  - a. Profile colors: Bark, Cedar, Redwood, Ash.
  - b. Profiles: Wood plank texture with three, 3/8" grooves running lengthwise, spaced 5-5/8" apart.
  - c. Accessory/Component Options:
    - i. Manufactured Corners with 3-1/2" returns for each profile color.
    - ii. Aluminum trim to be painted per finish schedule: Outside corners (Corner Key, Open Outside Corner), vertical joints (H-Mold), terminations (J-Mold)
    - iii. Essential Flashing System: Starter, Compression Joint, Overhang.
      - d. Dimensions - AWP-3030: 455mm (17-7/8") (h) x 3,030 mm (119-5/16") (l).
      - e. Panel Thickness: 16 mm (5/8").
      - f. Weight: 57.32 lbs. per panel.
      - g. Coverage: 14.81 sq. ft. per panel.
      - h. Factory sealed on six [6] sides.
- D. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

**2.02 MATERIALS**

- A. Fiber cement panels manufactured from a pressed, stamped, and autoclaved mix of Portland cement, fly ash, silica, recycled rejects, and wood fiber bundles.
- B. Panel surface pre-finished and machine applied.
- C. Panels profiled along 3030mm edges so that the long joints between the installed panels are ship-lapped.
- D. Factory-applied sealant gasket added to top panel edge; all 3030mm edge joints contain a factory sealant.

**2.03 PERFORMANCE REQUIREMENTS**

- A. Fiber Cement Cladding – Must comply with ASTM C-1186, Type A, Grade II requirements:
  - 4. Wet Flexural Strength, lower limit: 1015 psi.
  - 5. Water Tightness: No water droplets observed on any specimen.
  - 6. Freeze-thaw: No damage or defects observed.
  - 7. Warm Water: No evidence of cracking, delamination, swelling, or other defects observed.
  - 8. Heat-Rain: No crazing, cracking, or other deleterious effects, surface or joint changes observed in any specimen.
- E. Mean Coefficient of Linear Thermal Expansion (ASTM E-228): Max  $1.0 \times 10^{-5}$  in./in. F.
- F. Surface Burning (CAN-ULC S102/ASTM E-84): Flame Spread: 0, Smoke Developed: 5.

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- G. Wind Load (ASTM E-330): Contact manufacturer for ultimate test pressure data corresponding to framing type, dimensions, fastener type, and attachment clips. Project engineer(s) must determine Zone 4 and 5 design pressures based on project specifics.
  - 1. Minimum lateral deflection: L/120.
- H. Water Penetration (ASTM E-331): No water leakage observed into wall cavity.
- I. Weather Resistant (ASTM G-23): No cracking, checking, crazing, erosion, or other detrimental effects observed.
- J. Steady-State Heat Flux and Thermal Transmission Properties Test (ASTM C-518): thermal resistance R Value of 1.23.
- K. Fire Resistant (ASTM E-119): The wall assembly must successfully endure 60-minute fire exposure without developing excessive unexposed surface temperature or allowing flaming on the unexposed side of the assembly.
- L. Ignition Resistance (NFPA 268): No sustained flaming of panels, assembly when subjected to a minimum radiant heat flux of 12.5 kW/m<sup>2</sup> ± 5% in the presence of a pilot ignition source for a 20-minute period.
- M. Fire Propagation (NFPA 285): Wall assembly of Nichiha AWP, Ultimate Clips and Starter Track, Tyvek Commercial Wrap, ½" Densglass Gold Sheathing, 16" o.c. 18 gauge steel studs, mineral wool in-cavity insulation, and interior 5/8" Type X gypsum met the acceptance criteria of NFPA 285.
- N. Fire Propagation (CAN/ULC S-134): Wall assembly of Nichiha AWP, Ultimate Clips and Starter Track, Tyvek Housewrap, 5/8" FRT plywood, 16" o.c. 2x wood studs, fiberglass in-cavity insulation, and interior 5/8" Type X gypsum met the acceptance criteria of CAN/ULC S-134.
- O. Drained and Back Ventilated Rainscreen (AAMA 509-09): System must pass all component tests.
- P. Florida Building Code - Test Protocol HVHZ (TAS 201, 202, 203): Passed.

**2.04 INSTALLATION COMPONENTS**

- A. Ultimate Clip System:
  - 1. Starter Track:
    - a. Horizontal Panel Installations - FA 700 – 3,030mm (I) galvalume coated steel.
    - b. Vertical Panel Installations (AWP-3030 only) – FA 710T – 3,030mm (I) galvalume coated steel.
  - 2. Panel Clips: JEL 777 "Ultimate Clip" (10mm rainscreen for 16mm AWP) – Zinc-Aluminum-Magnesium alloy coated steel.
    - a. Joint Tab Attachments (included) – used at all AWP-1818 panel to panel vertical joints – NOT used with AWP-3030 installations.
  - 3. Single Flange Sealant Backer – FHK 1017 (10mm) – 6.5' (I) fluorine coated galvalume.
  - 4. Double Flange Sealant Backer – FH 1020 (10mm) – 10' (I) fluorine coated galvalume.
  - 5. Corrugated Spacer – FS 1005 (5mm), FS 1010 (10mm) – 4' (I).
  - 6. Finish Clip (optional) – JE310 (5mm)
- B. Aluminum Trim (optional): Paint as specified in finish schedule.
- C. Essential Flashing System (optional):
  - 1. Starter – main segments (3,030mm), inside corners, outside corners



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2. Compression Joint – main segments (3,030mm)
  3. Overhang – main segments (3,030mm), inside corners, outside corners, joint clips
- D. Fasteners: Corrosion resistant fasteners, such as hot-dipped galvanized screws appropriate to local building codes and practices must be used. Use Stainless Steel fasteners in high humidity and high-moisture regions. Panel manufacturer is not liable for corrosion resistance of fasteners. Do not use aluminum fasteners, staples or fasteners that are not rated or designed for intended use. See manufacturer's instructions for appropriate fasteners for construction method used.
- E. Flashing: Flash all areas specified in manufacturer's instructions. Do not use raw aluminum flashing. Flashing must be galvanized, anodized, or PVC coated.
- F. Sealant: Sealant shall comply with ASTM C920, Class 35.

**PART 3: EXECUTION**

**3.01 EXAMINATION**

- A. Verification of Conditions:
1. Fiber cement panels can be installed over braced wood, steel studs and sheathing including plywood, OSB, plastic foam or fiberboard sheathing. Fiber cement panels can also be installed over Structural Insulated Panels (SIP's), Concrete Masonry Units (CMU's) and Concrete Block Structures (CBS's) with furring strips, and Pre-Engineered Metal Construction. Insulated Concrete Forms (ICFs) are **NOT** an approved substrate under any condition.
  2. Allowable stud spacing: 16" o.c. maximum.
  3. A weather resistive barrier is required when installing fiber cement panels. Use an approved weather resistive barrier (WRB) as defined by the 2015 IBC or IRC. Refer to local building codes.
  4. Appropriate metal flashing should be used to prevent moisture penetration around all doors, windows, wall bottoms, material transitions and penetrations. Refer to local building codes for best practices.
- B. Examine site to ensure substrate conditions are within alignment tolerances for proper installation.
- C. Do not begin installation until unacceptable conditions have been corrected.
- D. Do not install panels or components that appear to be damaged or defective. Do not install wet panels.

**3.02 TOLERANCE**

- A. Wall surface plane must be plumb and level within +/- ¼ inch in 20 feet in any direction.
1. One layer of Nichiha 5mm (~3/16") Spacer may be used as shim.

**3.03 INSTALLATION**

A. General: Install products in accordance with the latest installation guidelines of the manufacturer and all applicable building codes and other laws, rules, regulations and ordinances. Review all manufacturer installation, maintenance instructions, and other applicable documents before installation.

1. Consult with your local dealer or Nichiha Technical Department before installing any Nichiha fiber cement product on a building higher than 45 feet or three stories or for conditions not matching prescribed standard installation guide requirements and methods. Special installation

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conditions may be required via a **Technical Review and Special Applications Form (SAF)** process.

2. **Vertical Control/Expansion Joints** are required within 2-10 feet of outside corners finished with metal trim *and* approximately every 30 feet thereafter.

3. **Horizontal/Compression Joints** are required for multi-story installations of AWP. Locate joints at floor lines. Joints are flashed minimum ½" breaks. Do not caulk. Refer to installation guide(s).

A. Wood framed buildings of three or more floors require a compression joint at each floor.

B. Steel framed buildings (including reinforced concrete core with LGMF exterior walls) of more than three floors (or 45 feet) require a compression joint every 25 feet at a floor line.

**B. Panel Cutting**

1. Always cut fiber cement panels outside or in a well ventilated area. Do not cut the products in an enclosed area.

2. Always wear safety glasses and NIOSH/OSHA approved respirator whenever cutting, drilling, sawing, sanding or abrading the products. Refer to manufacturer SDS for more information.

3. Use a dust-reducing circular saw with a diamond-tipped or carbide-tipped blade.

a. Recommended circular saw: Makita 7-1/4" Circular Saw with Dust Collector (#5057KB).

b. Recommended blade: Tenryu Board-Pro Plus PCD Blade (#BP-18505).

c. Shears (electric or pneumatic) or jig saw can be used for complicated cuttings, such as service openings, curves, radii and scrollwork.

4. **Silica Dust Warning:** Fiber cement products may contain some amounts of crystalline silica, a naturally occurring, potentially hazardous mineral when airborne in dust form. Consult product SDS or visit <https://www.osha.gov/dsg/topics/silicacrystalline/>.

**3.03 CLEANING, PROTECTION**

A. Review manufacturer guidelines for detailed care instructions.

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**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Polyurethane Sealants
- B. Tape Mastic Sealants
- C. Non-skinning Sealants
- D. Silicone Sealants
- E. Acrylic Sealants

**1.2 REFERENCES**

- A. American Architectural Manufacturer's Association (AAMA)
  - 1. AAMA 800-10 - Voluntary Specifications and Test Methods for Sealants
- B. ASTM International (ASTM)
  - 1. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 2. ASTM A 792 - Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy Coated by the Hot-Dip Process.
  - 3. ASTM C 639 - Standard Test Method for Rheological (Flow) Properties of Elastomeric Sealants
  - 4. ASTM C 661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer
  - 5. ASTM C 681 - Standard Test Method for Volatility of Oil- and Resin-Based, Knife Grade, Channel Glazing Compounds
  - 6. ASTM C 711 - Standard Test Method for Low-Temperature Flexibility and Tenacity of One-Part, Elastomeric, Solvent-Release Type Sealants
  - 7. ASTM C 794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
  - 8. ASTM C 908 - Standard Test Method for Yield Strength of Preformed Tape Sealants
  - 9. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants
  - 10. ASTM D 56 - Standard Test Method for Flash Point by Tag Closed Cup Tester
  - 11. ASTM D 217 - Standard Test Methods for Cone Penetration of Lubricating Grease
  - 12. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension
  - 13. ASTM D 792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
  - 14. ASTM D 925 - Standard Test Methods for Rubber Property—Staining of Surfaces (Contact, Migration, and Diffusion)
  - 15. ASTM D 2452 - Standard Test Method for Extrudability of Oil- and Resin-Base Caulking Compounds
  - 16. ASTM D 2453 - Standard Test Method for Shrinkage and Tenacity of Oil- and Resin-Base Caulking Compounds
  - 17. ASTM D 1475 - Standard Test Method For Density of Liquid Coatings, Inks, and Related Products
  - 18. ASTM D 2202 - Standard Test Method for Slump of Sealants
  - 19. ASTM D 2203 - Standard Test Method for Staining from Sealants
  - 20. ASTM G 154 - Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials
- C. Interim Federal Specifications (FS)
  - 1. FS TT-S-00230C - Sealing Compound: Elastomeric Type, Single Component
  - 2. FS TT-C-1796A – Caulking Compounds, Metal Seam and Wood Seam
  - 3. FS TT-S-001543A – Sealing Compounds: Silicone Rubber Base (For Caulking, Sealing, and Glazing in Buildings and Other Structures)
- D. South Coast Air Quality Management District (SCAQMD)
  - 1. Rule 1168 – Adhesive and Sealant Applications
- E. Underwriter's Laboratories

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1. UL 580 - Tests for Uplift Resistance of Roof Assemblies

**1.3 SUBMITTALS**

- A. Material Safety Data Sheets (MSDS): Provide in accordance with 29 CFR 1910.1200, Hazard Communication
- B. Product Test Reports: Reports of tests required by this section performed by a qualified testing agency, indicating that the sealants comply with the requirements.
- C. Buy American Compliance: Provide documentation that the products provided in this section comply with the following requirements:
  - 1. Buy American provisions of Section 1605 of the American Recovery and Reinvestment Act of 2009 (ARRA).
- D. VOC Content: Provide documentation of the Volatile Organic Content (VOC) in accordance with SCAQMD Rule 1168
- E. USDA Approval: Provide documentation that the product is approved for use in meat and poultry processing areas by the USDA for the following types of sealants:

**1.4 WARRANTY**

- A. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within 5 years of installation.

**PART 2 - PRODUCTS**

**2.1 GENERAL MATERIAL REQUIREMENTS**

- A. Substrate Requirements: When testing is required on a substrate, the material used shall be either ASTM A653 G-90 or ASTM A792 AZ50 and tests shall be conducted with each of the following coatings:
  - 1. Bare (No coating)
  - 2. Acrylic (Galvalume Plus)
  - 3. Polyester
  - 4. Siliconized Polyester
  - 5. Polyvinylidene Fluoride Resin (PVDF)

**2.2 POLYURETHANE SEALANT**

- A. General: Provide Sealants that meet the following specifications:
  - 1. ASTM C 920, Type S, Grade NS, Class 25, Use: NT, A, M, G and O paintable sealant
  - 2. AAMA 808.3
  - 3. FS TT-S-00230C, Type II, Class A
- B. Color: The sealant shall be in the following colors:
  - 1. White
  - 2. Gray
  - 3. Bronze
  - 4. Almond
- C. Physical Properties: The sealant shall have the following additional physical properties:
  - 1. Peel Adhesion: All panels shall have at least a 90% cohesive failure of at least 15 lb/in when tested in accordance with ASTM C 794.
  - 2. Tensile Strength: Sealant shall have a tensile maximum of 300 psi and an elongation of 500-600% when tested in accordance with ASTM D 412.
  - 3. Sag: There shall be no sag when tested in accordance with ASTM C 639.
  - 4. Hardness: Shore "A" hardness on all three samples shall not exceed 40 when tested in accordance with ASTM C 661
  - 5. Service Temperature Range: -40 degrees Fahrenheit to 200 degrees Fahrenheit.
  - 6. Water Resistance: There shall be no presence of voids, cracks, separation or

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breakdown of the compound when tested in accordance with AAMA 800-10, Section 2.11.1.

7. Flash Point: No less than 145 degrees Fahrenheit when tested in accordance with ASTM D 56.
8. Shelf Life: The compound shall have a shelf life of 9 months or more when stored at or below 80 degrees.
9. Skin Time: The compound shall have a skin time of 2-4 hours
10. Cure Time: The compound shall have a cure time of 24-48 hours
11. VOC Content: The Volatile Organic Compound (VOC) content shall be less than 250 g/L when calculated SCAQMD Rule 1168.

### **2.3 TAPE MASTIC SEALANT**

A. General: Provide Sealants that meet the following specifications:

1. AAMA 804.3
2. AAMA 807.3
3. FS TT-C-1796A, Type II, Class B
4. Approved by Underwriters Laboratories for use in roof deck constructions classified under UL-518 Class 90

B. Color: Gray

C. Physical Properties: The sealant shall have the following additional physical properties:

1. Specific Gravity: 1.4 or higher when tested in accordance with ASTM D 7922. Tensile Adhesive Strength: 20 psi or higher when tested in accordance with ASTM C908
3. Elongation: 1000% or higher when tested in accordance with ASTM C 908
4. VOC Content: The Volatile Organic Compound (VOC) content shall be less than 250 g/L when calculated SCAQMD Rule 1168.

### **2.4 NON-SKINNING SEALANT**

A. General: Provide sealants that meet the following specifications:

1. AAMA 809,2
2. FS TT-C-1796A, Type 1, Class A

B. Color: White

C. Physical Properties: The sealant shall have the following additional physical properties:

1. Extrudability: The sealant shall deposit in 30 to 50 seconds through a 0.104" orifice at 50 psi pressure in accordance with ASTM D 2452
2. Total Solids: At least 85% by weight when determined in accordance with ASTM C 681
3. Volume Shrinkage: Less than 15% when determined in accordance with ASTM D 2453
4. Weight per U.S. Gallon: 10.75 lbs. +/- 0.25 lbs. when determined in accordance with ASTM D 1475
5. Vehicle Bleed out: There shall be no visible exudation of vehicle from sealant after 21 days at 158 degrees Fahrenheit on the test panel
6. Flexibility: There shall be no loss of adhesion at -60 degrees Fahrenheit when tested in accordance with ASTM C 711
7. Sag: 0.20 in max, full button when tested in accordance with ASTM D 2202
8. Staining: Sealant will not stain a painted test panel when tested in accordance with ASTM D 925, Method A
9. UV Resistance: There shall be no cracking, bleeding, or loss of elasticity after 1,000 hours of QUV exposure in accordance with ASTM G 154.
10. Wet Flammability: No less than 110 degree Fahrenheit flash point when determined in accordance with ASTM D 56
11. Coverage: Each gallon of sealant shall provide the following minimum coverage:
  - a. 1,500 lineal feet with 1/8 in bead
  - b. 690 lineal feet with 3/16 in bead

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- c. 390 lineal feet with 1/4 in bead.
- 12. Shelf Life: 18 months minimum in unopened container when stored at or below 90 degrees Fahrenheit.
- 13. Drying time: Non-skinning, remains permanently soft and tacky
- 14. Engageability: Sealant will easily engage and transfer to male joint at 10 degrees Fahrenheit
- 15. Service Temperature Range: -60 degrees Fahrenheit to 200 degrees Fahrenheit
- 16. Application Temperature Range: 10 degrees Fahrenheit to 120 degrees Fahrenheit
- 17. Non-Reactive: Will not darken, etch, or leave salt deposits on the test panel after two years
- 18. VOC Content: The Volatile Organic Compound (VOC) content shall be less than 250 g/L when calculated SCAQMD Rule 1168.

**2.5 SILICONE SEALANT**

- A. General: Provide sealants that meet the following specifications:
  - 1. ASTM C 920, Type S, Grade NS, Class 25
  - 2. AAMA 802.3, Type I and II
  - 3. AAMA 805.2 Group C
  - 4. AAMA 808.3
  - 5. FS TT-S-001543A, Class A
  - 6. FS TT-S-00230C, Class A
- B. Color: Clear
- C. Physical Properties: The sealant shall have the following additional physical properties:
  - 1. Mechanical Properties: The sealant shall have the following mechanical properties as determined by ASTM D 412:
    - a. Tensile Strength: 150 psi minimum (Method A)
    - b. Modulus at 100% Elongation: 35 psi minimum
    - c. Elongation: 400% minimum
    - d. Recovery: 100%
  - 2. Hardness: Maximum Shore A hardness of 15 when determined in accordance with ASTM C 661
  - 3. Tack-free Time: 1/4 in dia. bead at 77 degrees Fahrenheit, 50% relative humidity, 1015 minutes
  - 4. Cure Time: 1/4 in dia. bead at 77 degrees Fahrenheit, 50% relative humidity, 10-12 hours
  - 5. Service Temperature: -60 degrees Fahrenheit to 300 degrees Fahrenheit
  - 6. Shelf Life: 9 months when stored in unopened original containers at 80 degrees Fahrenheit or less
  - 7. VOC Content: The Volatile Organic Compound (VOC) content shall be less than 250 g/L when calculated SCAQMD Rule 1168.

**2.6 ACRYLIC SEALANT**

- A. Color:
  - 1. Clear
  - 2. White
  - 3. Gray
- B. Physical Properties:
  - 1. Percent Solids:
    - a. Colors: 75% minimum determined in accordance with ASTM D 1475
    - b. Clear: 70% minimum determined in accordance with ASTM D 1475
  - 2. Peel Adhesion: All panels shall have at least a 90% cohesive failure of at least 5 lb./in when tested in accordance with ASTM C 794
  - 3. Weight per U.S. Gallon: 8.7 lbs. +/- 0.25 lbs. when determined in accordance with ASTM D 1475

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4. Viscosity: The sealant shall meet the following conditions when tested in accordance with ASTM D 2452 with a 20g cone with a 0.104 in orifice at 60 psi at 77 degrees Fahrenheit in the indicated time:
  - a. Colors: 40-60 seconds
  - b. Clear: 35-45 seconds
5. Elongation: 200% minimum when tested in accordance with ASTM D 412
6. Hardness: Maximum Shore A hardness of 55 when determined in accordance with ASTM C 661
7. Flash Point: No less than the following when tested in accordance with ASTM D 56
  - a. Colors: 52 degrees Fahrenheit
  - b. Clear: 40 degrees Fahrenheit
8. Slump: 0.10" maximum when tested in accordance with ASTM D 2202
9. Vehicle Migration: No vehicle migration from the sealant edge when tested in accordance with ASTM D 2203 as modified by Section 2.8.1 of AAMA 800-10
10. Paintability: Compatible with Alkyds, enamels and lacquers post-solvent release
11. Service Temperature Range: Zero degrees Fahrenheit to 180 degrees Fahrenheit
12. Shelf Life: 18 months when stored in original, unopened containers at or below 80 degrees Fahrenheit

**END OF SECTION 07920**

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**RELATED DOCUMENTS:**

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this Section.

**INDUSTRY STANDARDS:**

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Section 01068.

**PART 1: GENERAL**

**DESCRIPTION OF WORK:**

Work required under this Section consists of providing galvanized hollow metal doors and associated frames, transoms, mullions, view window frames, and all related items necessary to complete work indicated on drawings and as described here. Provide galvanized steel doors and frames for all openings where reasonably inferable from plan drawings, whether specifically scheduled and detailed or not.

**QUALITY ASSURANCE:**

Manufacturers: Except as otherwise specified herein, all hollow metal doors and frames shall be products of one of following manufacturers, or an equal approved by Architect. Manufacturers shall be certified members of the Hollow Metal Manufacturers Association, HMMA.

All doors and frames shall be from the same manufacturer.

- Ceco Door Products (Assa Abloy)
- Curries Company
- Acme Steel Door Corporation
- Pioneer
- Steelcraft by Allegion

Each door shall bear an identifying fire rating label where applicable.

**SUBMITTALS:**

Shop Drawings: Submit shop drawings, in accordance with GENERAL CONDITIONS, of all items specified herein to Architect for approval.

Shop drawings shall indicate (at a min.) the following:

- Elevations and details of each door type
- location in the building for each item
- conditions at openings with various wall thicknesses and materials
- typical and special details of construction
- methods of assembling sections
- location and installation requirements for hardware
- size, shape and thickness of materials; anchorage; joints and connections

General Contractor shall field verify all door and frame sizes, door and frame prep requirements, and hardware prep requirements prior to fabrication. General Contractor shall also obtain approval of Drawings prior to proceeding with manufacturing.

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Samples: Sample of door section indicating edge, top and/or bottom construction, insulation, hinge reinforcement and face stiffening. Sample of frame section showing welded corner joints, welded hinge reinforcements, dust covers and face finish.

**PART 2: PRODUCTS**

Galvanized Metal Frames: Except where otherwise scheduled, all frames for doors, shall be formed of galvanized steel to sizes and shapes indicated, to include but not limited to double and single rabbett frame profiles where indicated. Frames shall be combination type with integral trim and fabricated with full welded unit type construction at joints.

Type and Gauges of Metal: Metal for frames shall be commercial quality, cold-rolled, galvanized steel sheets, with clean smooth surfaces conforming to ASTM A 366. Except where other gauges are indicated or specified, frames shall be fabricated from steel, not lighter than following U.S. Standard gauges:

- Exterior frames - 14 gauge
- Interior frames to 3-0 in width - 16 gauge
- Interior frames over 3-0 in width - 14 gauge

Metal Reinforcements: Provide concealed metal reinforcements for hardware as required. Gauge of metal for reinforcement shall be in accordance with manufacturer's recommendations for type of hardware and the thickness and width of doors to be hung in frame, provided gauges used are not lighter than following:

- Hinge and pivot reinforcements - 7 gauge, 1-1/4"x 10" min. size.
- Strike reinforcements - 12 gauge.
- Flush bolt reinforcements - 12 gauge.
- Closer reinforcements - 12 gauge.
- Surface-mounted hardware reinforcements - 12 gauge.

Workmanship and Design: Finished work shall be strong and rigid, neat in appearance, and free from defects. Fabricate molded members straight and true, with corner joints well formed and in true alignment, and with fastenings concealed where practicable.

Forming Corner Joints: Joints for welded type frames shall be mitered and continuously arc-welded for full depth and width of frame and trim. All contact edges shall be closed tight and all welds on exposed surfaces dressed smooth and flush.

Provisions for Hardware: Wood doors shall be solid core, prefitted. Prepare frames at factory for installation of hardware. Frames shall be mortised, reinforced, drilled and tapped to templates to receive all mortised hardware; frames to receive surface-applied hardware shall be provided with reinforcing plates only. Where concealed overhead door closers are required in frame members, provide necessary additional space, cutouts, reinforcement and provisions for fastenings in heads of frames to receive closers. Provide cover boxes in back of all hardware cutouts. Punch doorframes to receive rubber door silencers; provide three (3) silencers on lock side of single doorframes and one silencer for each leaf in heads of double doorframes.

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Wall Anchors: Provide metal anchors of shapes and sizes required for adjoining type of wall construction. Fabricate jamb anchors of steel, not lighter than gauge used for frame. Locate anchors on jambs near top and bottom of each frame and at intermediate points not over 24" apart.

For frames set in masonry provide 10" long, corrugated or other deformed type adjustable anchors at jambs, 4 per jamb.

For frames set in metal stud partitions weld jamb anchor clips to back of frames at jamb. Make provision for securing anchors to steel studs with 1/4" round-head machine screws, nuts and washers, or by welding. Furnish 4 anchors per jamb.

Floor Anchors: Provide floor clips of not less than 16-gauge steel and fasten to bottom of each jamb member for anchoring frame to floor construction. Clips shall be fixed and drilled for 3/8" diameter anchor bolts.

Shipment: Provide temporary steel spreaders fastened across bottom of frames; where construction will permit concealment, leave spreader in place after installation; otherwise remove spreaders after frames are set and anchored.

**GENERAL REQUIREMENTS FOR GALVANIZED METAL DOORS:**

Type and Gauges of Metal: Metal for doors shall be commercial quality, leveled, cold-rolled, galvanized steel sheets with clean, smooth surfaces, conforming to ASTM A 366-68. All units shall be galvanized. Gauges of face sheets shall be as specified for door types.

Hardware Reinforcements: Doors shall be mortised, reinforced, drilled and tapped at factory for fully templated hardware only, in accordance with approved hardware schedule and templates provided by Hardware Contractor. Where surface-mounted hardware is to be applied, doors shall have reinforcing plates only; all drilling and tapping shall be done by others. Steel doors for locksets shall have welded box reinforcements.

All hardware furnished by Hardware Supplier for single-acting doors shall be designed for beveled edges as specified.

Edge Profiles shall be provided on lock stiles of doors as follows:

- Single-acting swing doors - beveled 1/8" in 2"
- Opposite swing double doors - beveled 1/8" in 2"

Provide clearances as follows:

- Between doors and frames; at head and jambs - 1/8"
- At doorsills; where no threshold is scheduled - 3/8" maximum. Allow for carpet height where required.
- At doorsills; where threshold is scheduled - 1/4" maximum between door bottom and threshold.
- Between meeting stiles of pair of doors - 1/8".

Workmanship: Finish work shall rigid, neat in appearance, and free from defects. Form molded members straight and true, with joints coped or mitered, well formed, and in true alignment. All welded joints on exposed surfaces shall be dressed smooth so that they are invisible after finishing.

**GALVANIZED FLUSH DOORS:**

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Construction: All galvanized flush doors shall be 1 ¾" thick unless otherwise noted in the drawings. Construct doors of two outer steel sheets not lighter than 18 gauge, with edges welded and finished flush. There shall be no seams on the faces or edges of the doors. Reinforce the outer face sheets with 20-gauge interlocking vertical channels of Z-shaped members spaced not over 6" apart. Stiffeners shall be spot-welded 4" o.c. to both faces of doors and arc welded to each other at top and bottom. All doors shall have galvanized steel faces and rails.

All exterior doors shall be capped to retard moisture from penetrating the door.

Reinforcement: Provide continuous reinforcing channels welded to face sheets at top and bottom of door. Voids between stiffeners shall be filled complete with fiberglass or mineral wool insulation.

Moldings shall be not lighter than 18-gauge steel. Doors shall be prepared to receive hardware specified under HARDWARE Section.

Optional Construction: Continuous truss-formed inner core of sheet metal, not lighter than 28-gauge, may be substituted for reinforcing specified, provided it is spot-welded to face sheets every 2-3/4" horizontally and vertically over entire surface of both sides.

**APPROVED FIRE DOORS AND FRAMES:**

Provide approved hollow metal fire doors and frames at all locations indicated in Door Schedule. Fire doors and frames where indicated shall be manufactured in accordance with the Underwriter's Laboratories and shall bear Underwriter's label (UL label) for the appropriate class of opening indicated.

**SHOP PAINTING / GALVANIZING:**

All interior and exterior doors and all interior and exterior frames shall be galvanized.

Apply primed finish to all galvanized metal surfaces furnished in this Section.

Clean and chemically treat metal surfaces to assure maximum paint adherence; follow with dip or spray coat of rust-inhibitive metallic oxide, zinc chromate, or synthetic resin primer on all exposed surfaces.

Finish surfaces shall be smooth and free from irregularities and rough spots.

Approved primer shall be compatible with finish coats specified in Section 09900.

Location of Hardware: Location of hardware for hollow metal doors and frames shall be as specified in Section 08700.

**PART 3: EXECUTION**

**DOOR INSTALLATION:**

Hollow metal shall be erected by skilled workers. Frames shall be carefully plumbed and aligned. Trim and glazing stops shall be coped or mitered with hairline fit. Brace frames until permanent anchors are set. Anchor bottoms of frames to floor with expansion bolts or with power fasteners.

In application of glazing beads, or other trim parts, exercise care to avoid running screws or other fasteners tightly enough to dimple metal.

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Minor damage to metal, incurred during erection, may be repaired by filling with lead or lead alloy ground smooth and flush, if strength and appearance of finish work are not impaired, and if Architect approved. Otherwise, furnish new material.

- Install doors in accordance with manufacturer's instructions.
- Install fire doors in accordance with the NFPA 80, "Standard for Fire Doors and Fire Windows". Machined fire doors shall be provided with detailed installation instructions when doors bear a label indicating compliance to UBC 7-2-1997 or UL 10C.
- Install doors at locations indicated on the Door Schedule.
- Install doors plumb, level, and square.
- Install door hardware as specified in Section 08710

Adjusting:

- Adjust doors to swing freely, without binding in frame.
- Adjust hardware to operate properly.

**PROTECTION AND CLEANING:**

Protect doors and frames from damage during transportation and at job site. Store at site under cover on wood blocking or on suitable floors.

After installation, protect doors and frames from damage during subsequent construction activities.

Damaged work will be rejected and shall be replaced with new work.

Upon completion, metal surfaces of doors and frames shall be thoroughly cleaned, ready for paint finish by others.

**END OF SECTION 08100**

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**RELATED DOCUMENTS:**

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements apply to the work specified in this Section.

**INDUSTRY STANDARDS:**

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Section 01068.

**PART 1 - GENERAL**

**DESCRIPTION OF WORK:**

Work required under this section shall include furnishing, delivering, and storing where directed at site, Heavy Duty Sectional Overhead Doors, with view glass panels, as shown on drawings and specified herein.

**SUBMITTALS:**

Product Data: Submit manufacturer's product data, including door construction description, including door dimensions, finish, and hardware.

Samples: Provide Sample corner section of door indicating edge, top/and/or bottom construction.

**QUALITY ASSURANCE:**

Provide manufacturers standard 1 year hardware and spring warranty.  
Provide 10 year rust through and delamination warranty.

**MANUFACTURERS:**

Standards: For purposes of designating type and quality for work under this Section, Drawings and Specifications are based on products manufactured or furnished by Raynor Manufacturing Company.

Acceptable Manufacturers:

- Raynor Manufacturing Company
- Overhead Door Company
- The Cookson Company, Inc.

Certificates: Provide certificate from manufacturer stating compliance with these specifications.

Guarantee shall be provided by Door Manufacturer for a period of one year against defects in workmanship, materials, and installation.

**PRODUCT HANDLING:**

Storage: Store in enclosed area free from excessive heat, cold and humidity. Do not install scratched, dented or otherwise damaged doors in work.

Packaging: Door Manufacturer shall package doors in a manner to provide protection until they are installed.

Coordination: Provide Door Manufacturer with following:

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Two (2) copies of approved door schedule and Shop Drawings.  
One (1) copy of floor plan of building, showing Architect's marks and opening identification.  
Two (2) of templates for applicable locks, hinges and other finish hardware.

**PART 2 - PRODUCTS**

**HEAVY DUTY UPWARD ACTING SECTIONAL DOORS**

Doors shall be heavy-duty steel sectional overhead type TC 200 Thermal Series as manufactured by Raynor Manufacturing Company or equal. Complete assembly manufactured for high cycle usage.

Door Sections TC 200 Thermal Series - Sections shall be 3 layer sandwich construction, roll formed commercial quality hot-dipped galvanized (G-90) steel in accordance with ASTM A 924 and ASTM a 653. Exterior of door to have flush outside face and roll-formed tongue and groove joints for weathertight closure. Exterior and interior section skins to be constructed of 25 gauge (.015" minimum steel thickness). End stiles to be minimum 18 gauge thickness. Center stiles to be minimum 16 gauge thickness. End stiles and center stiles to be riveted to outside face with stainless steel rivets and resistance welded to interior rail.

Mounting – Sections mounted in door opening using Lap Jamb Angle Mounting, section overlap door jambs by 1" on each side of door opening.

Insulation – Sections to be furnished with insulation and back covers, expanded polystyrene with R-value of 10.25 and U-value of 0.97.

Seals – Sections must be sealed at end stiles with ¼" thick polyethylene foam. Bottom of door to have flexible U-shaped vinyl seal in aluminum retainer.

Finish - All extrusions and panels to be finished with one factory applied primer coat and one factory applied white topcoat.

Tracks - 3" tracks. Hot dip galvanized finish per ASTM A-653. Tracks to have graduated seal for weathertight closing. Vertical tracks to be continuous angle mounted and fully adjustable for sealing door to jamb. Continuous angle size to be not less than 3 ½" x 5" x 1/8". Horizontal track to be adequately reinforced with continuous angle.

Provide lift clearance tracks at all bay doors. See drawings for more information.

Hardware - All hinges and brackets shall be made from galvanized steel. Track rollers shall have ten 5/16" diameter hardened steel balls per roller for 3" track.

Weight Counter Balance - Provide weight counterbalance system. Galvanized lifting cables with minimum safety factor 5 to 1. Life cycle of 100,000.

Lock Options - Exterior and Interior: - Exterior Locking - Provide five pin tumber cylinder with night latch and steel bar engaging track. Interior locking - Interior dead bolt shall be provided with hole to receive padlock.

Weatherstripping - Provide adjustable aluminum channel and vinyl weatherseal on bottom of door. Provide continuous aluminum and vinyl jamb and header perimeter seal molding for tops and sides of doors.

Windload Design: All doors shall be rated by the manufacturer to withstand the wind positive and negative pressures as Components and Cladding all calculated in accordance with the North Carolina State Building Code. Rated wind pressure shall be stated on the shop drawings along with the



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calculations thereof submitted under the seal of a Professional Engineer duly registered in the state of North Carolina.

Framing - Door jambs, mounting pads and brackets shall be furnished as required for proper installation.

**OPERATOR**

Provide Electric Door Operator as recommended by Manufacturer for selected and specified door.

**PART 3 - EXECUTION**

**CONDITION OF SURFACES:**

Frames, brackets, and necessary blocking shall be set plumb and secure before installation of doors, openers, and control systems.

Responsibility: Contractor will be held responsible for correct door frame installation. Frames out of square, cocked at bottom or bowed in or out along vertical jambs more than 1/4" shall be corrected.

**DOOR INSTALLATION:**

Installation of doors, openers, and control systems shall be in accordance with manufacturer's recommendations and approved shop drawings. Contractor shall provide all miscellaneous framing and blocking required or recommended by door manufacturer for proper installation of doors, door tracks, openers and controls.

Door installer and manufacturer's representative to provide a complete operation demonstration and Owner training. Acceptance of door by Owner is dependent on a successful demonstration of operation and completion of all necessary training.

**END OF SECTION 08300**

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**RELATED DOCUMENTS:**

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this section.

**PART 1: GENERAL**

**SUMMARY:**

Section Includes: Aluminum Storefront Systems

Related Sections:

- Refer to Division 07900 Joint Treatment Section for sealant requirements.
- Refer to Division 08800 Glass and Glazing Section for glass and glazing requirements.

**INDUSTRY STANDARDS:**

See section 01068 for a complete listing of names of industry standard agencies mentioned by abbreviation in this section.

**SYSTEM PERFORMANCE DESCRIPTION:**

Provide aluminum storefront systems that comply with performance requirements indicated, as demonstrated by testing manufacturer's assemblies in accordance with test method indicated.

- A. Wind Loads: Completed storefront system shall withstand wind pressure loads normal to wall plane indicated:
  - a. Exterior Walls:
    1. Positive Pressure:
    2. Negative Pressure:
  - b. Interior Walls (Pressure Acting in Either Direction):
- B. Deflection: Maximum allowable deflection in any member when tested in accordance with ASTM E 330-84 with allowable stress in accordance with AA Specifications for Aluminum Structures.
  - a. Without Horizontals: L/175 or 3/4" (19.1mm) maximum.
  - b. With Horizontals: L/175 or L/240 + 1/4" (6.4mm) for spans greater than 13'-6" (4.1m) but less than 40'-0" (12.2m).
- C. Thermal Movement: Provide for thermal movement caused by 180 degrees F. (82.2 degrees C.) surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.
- D. Air Infiltration: Completed storefront systems shall have 0.00 CFM/FT<sup>2</sup> (0.00 m<sup>3</sup>/h·m<sup>2</sup>) maximum allowable infiltration when tested in accordance with ASTM E 283-84 at differential static pressure of 6.24 PSF (299 Pa).

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- E. Water Infiltration: No uncontrolled water on indoor face of any component when tested in accordance with ASTM E 331-86 at a static pressure of 15 PSF (718 Pa).
- F. Thermal Performance: When tested in accordance with AAMA 1503.1-88 Condensation Resistance Factor (CRF), and ASTM C 236-89 Thermal Transmittance (U Value) as follows:
  - a. CRF: A minimum of 59.
  - b. U Value: 0.58 BTU/HR/FT<sup>2</sup>/°F or less.

**PROJECT CONDITIONS / SITE CONDITIONS:**

- A. Field Measurements: Verify actual measurements/openings by field measurements before fabrication: show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

**SUBMITTALS:**

- A. General: Prepare, review, approve, and submit specified submittals in accordance with "Conditions of the Contract" and Division 1 Submittals Sections. Product data, shop drawings, samples, and similar submittals are defined in "Conditions of the Contract."
- B. Product Data: Submit product data for each type storefront series specified and indicated in the drawings.
- C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, accessories, finish colors and textures. Shop Drawings shall be provided with the signature and seal of a professional engineer licensed to practice in the State of North Carolina.
- D. Samples: Submit verification samples for colors on actual aluminum substrates indicating full color range expected in installed system. Submit typical framing member and sill pan sample.
- E. Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.
- F. Installer Qualification Data: Submit installer qualification data.
- G. Closeout Submittals
- H. Warranty: Submit warranty documents specified herein.

**QUALITY ASSURANCE:**

- A. Qualifications:
  - 1. Installer Qualifications: Manufacturer certified Installer. Installer experienced to perform work of this section who has specialized in the installation of work similar to that required for this project. If requested by Owner, submit reference list of completed projects.
  - 2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.

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**PROJECT CONDITIONS / SITE CONDITIONS:**

A. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

**WARRANTY:**

A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under the Contract Documents.

1. Beneficiary: Issue warranty in the legal name of the project Owner.
2. Warranty Period: 5 years commencing on Date of Substantial Completion

**PART: 2 PRODUCTS**

**MANUFACTURERS:**

A. Acceptable Manufacturers include the following:

- YKK AP America Inc.  
5630 Gwaltney Drive  
Atlanta, GA 30336  
Telephone: (404) 629-3800; Fax: (404) 629-3838
- Vistawall Series 3000-S
- US Aluminum Series IT 451

B. Specified Products:

1. Storefront System: YKK AP YES 45F-T MegaTherm™ Storefront System.

C. Storefront Framing System:

1. Description: Center rabbet, exterior flush glazed; jambs and vertical mullions continuous; head, sill, intermediate horizontal attached by screw spline joinery.
2. Components: Manufacturer's standard extruded aluminum mullions, 0-15 degree hinged mullions, 90 degree corner posts, flexible corner posts, three-way corner posts, entrance door framing, and indicated shapes.
3. Thermal Barrier: Provide continuous thermal barrier by means of 6/6 nylon polyamide glass fiber reinforced pressure extruded bars. Systems employing non-structural thermal barriers are not acceptable.
4. Provide .125" thick aluminum bent plate sill pan at exterior storefront systems, finish matching storefront framing. Profiles, sizes and shape as indicated on Drawings. Sill pan shall include integrally formed end dams at wall opening jambs.

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5. Doorstops to be integral fin type, snap-in type not acceptable.
6. Provide internal frame reinforcements all closer locations.

**MATERIALS:**

- A. Extrusions: ASTM B 221 (ASTM B 221M), 6063-T5 Aluminum Alloy.
- B. Aluminum Sheet:
  1. Anodized Finish: ASTM B 209 (ASTM B 209M), 5005-H14 Aluminum Alloy, 0.050 inch (1.27 mm) minimum thickness.
  2. Painted Finish: ASTM B 209 (ASTM B 209M), 3003-H14 Aluminum Alloy, 0.080 inch (1.95 mm) minimum thickness.

**ACCESSORIES:**

- A. Manufacturer's Standard Accessories:
  1. Fasteners: Zinc plated steel concealed fasteners; Hardened aluminum alloys or AISI 300 series stainless steel exposed fasteners, countersunk, finish to match aluminum color.
  2. Sealant: Non-skinning type, AAMA 803.3
  3. Glazing: Setting blocks, edge blocks, and spacers in accordance with ASTM C 864, shore durometer hardness as recommended by manufacturer; Glazing gaskets in accordance with ASTM C 864.

**RELATED MATERIALS (Specified In Other Sections):**

- A. Glass: Refer to Division 8 Glass and Glazing Section for glass materials.

**FABRICATION:**

- A. Shop Assembly: Fabricate and assemble units with joints only at intersection of aluminum members with hairline joints; rigidly secure, and sealed in accordance with manufacturer's recommendations.
- B. Fabrication Tolerance:
  1. Material Cuts: Square to 1/32 inch (0.8 mm) off square, over largest dimension; proportionate amount of 1/32 inch (0.8 mm) on the two dimensions.
  2. Maximum Offset: 1/64 inch (0.4 mm) in alignment between two consecutive members in line, end to end.
  3. Maximum Offset: 1/64 inch (0.4 mm) between framing members at glazing pocket corners.
  4. Joints (Between adjacent members in same assembly): Hairline and square to adjacent member.

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5. Variation (In squaring diagonals for doors and fabricated assemblies): 1/16 inch (1.6 mm).
6. Flatness (For doors and fabricated assemblies): +/- 1/16 inch (1.8 mm) off neutral plane.

**FINISHES AND COLORS:**

A. Anodized Finish:

1. Black, Dark Bronze, or Clear anodized finish (color to be selected by owner Architect), with clear protective composite coating.

B. Finishing: Prepare aluminum surfaces for specified finish; apply finish in accordance with the following:

1. Anodized Coating: Electrolytic color coating followed by an organic top coating applied to aluminum extrusions produced from quality-controlled billets meeting AA-6063-T5.
  - a. Exposed surfaces shall be free of scratches and other serious blemishes.
  - b. Extrusion shall be given a caustic etch followed by an anodic oxide treatment and sealed with an organic electrodeposition applied protective top coating.
  - c. Overall coating thickness for finishes shall be a minimum of 0.7 mils.
  - d. Coating shall conform to Aluminum Association Standard AAM12C22A4X. A4X designation shall signify an anodic coating of 0.4 mils minimum followed by an organic top coating of a minimum 0.3 mils.
  - e. In addition to the Aluminum Association Standard above, finish shall conform to the following:
    - i. AAMA 605.2 Mortar Resistance Test Specification; Test Method per ASTM C207, 24 Hour Pat Test.
    - ii. CASS Corrosion Resistance Test. CASS 240/ASTM B368 Test Method.
    - iii. Other AAMA 605.2 Performance Tests specified in these specifications, such as: 7.3 Dry Film; 7.8.2 Salt Spray Resistance; 7.9.1.2 Color Retention, South Florida; 7.9.1.4 Gloss Retention, South Florida.

C. Finishes Testing:

1. Apply 0.5% solution NaOH, sodium hydroxide, to small area of finished sample area; leave in place for sixty minutes; lightly wipe off NaOH; Do not clean area further.
2. Submit samples with test area noted on each sample.

**PART 3: EXECUTION**

**MANUFACTURER'S INSTRUCTIONS / RECOMMENDATIONS:**

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Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions.

**EXAMINATION:**

Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.

**PREPARATION:**

Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

**INSTALLATION:**

General: Install manufacturer's system in accordance with shop drawings, and within specified tolerances.

- A. Protect aluminum members in contact with masonry, steel, concrete, or dissimilar materials using nylon pads or bituminous coating.
- B. Shim and brace aluminum system before anchoring to structure.
- C. Provide .125" bent plate aluminum sill pans with end dams at exterior storefront systems. Provide profiles, sizes and shape as indicated on Drawings. Extend sill pans continuous with spliced joints; set in continuous beds of waterproofing sealant.
- D. Verify storefront system allows water entering system to be collected in gutters and weeped to exterior. Verify weep holes are open, and metal joints are sealed in accordance with manufacturer's installation instructions.
- E. Seal metal-to-metal storefront system joints using sealant recommended by system manufacturer.
- F. All installation hardware and accessories required for a secure installation into rough openings, including shims, plates and anchors as necessary.

**FIELD QUALITY CONTROL:**

Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

**ADJUSTING AND CLEANING:**

Adjust all operational systems for operation in accordance with manufacturer's recommendations.

Clean aluminum surfaces immediately after installing aluminum-framed door and storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.



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Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

GC shall protect installed product's finish surfaces from damage during construction.

**END OF SECTION 08418**

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**RELATED DOCUMENTS:**

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this Section.

**PART 1 – GENERAL**

**DESCRIPTION OF WORK:**

- A. Work of this section includes furnishing and installation of door hardware for doors specified in "Hardware Sets" and required by actual conditions. Including screws, bolts, expansion shields, electrified door hardware, and other devices for proper application of hardware.
- B. Where items of hardware are not specified and are required for intended service, such omission, error or other discrepancy shall be submitted to Architect fourteen calendar days prior to bid date for clarification by addendum. The intent of this specification is to provide complete and operational hardware throughout the entire building and project.
- C. Products supplied but not installed under this Section:
  - 1. Hardware, ***except gasketing as supplied with aluminum frames***, for aluminum doors will be furnished under this Section, but installed under Division 08 Openings. **Aluminum door supplier shall receive hardware from hardware supplier and accept responsibility for that hardware until accepted by general contractor or owner.**

**REFERENCES**

The following organizations have standards, which are referenced in this section:

- ANSI – American National Standards Institute
- ASTM – American Standard Testing Materials
- BHMA – Builders Hardware Manufacturers Association
- DHI – Door and Hardware Institute
- UL – Underwriters Laboratories
- NFPA-70 – National Electrical Code
- NFPA-80 – Fire Doors, Windows
- NFPA-101 – Life Safety Code

All applicable current edition of North Carolina Building Codes and ICC/ANSI A117.1 Standards for Accessible and Usable Buildings and Facilities

**SUBMITTALS**

- A. Submit in accordance with Conditions of the Contract.
- B. Shop Drawings:
  - 1. Hardware schedule shall be prepared by an Architectural Hardware Consultant (AHC), as certified by DHI, who shall affix seal attesting to completeness and correctness, shall review hardware schedule prior to submittal.
  - 2. 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.

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3. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of hardware.
  4. Architectural Hardware Consultant (AHC), as certified by DHI, who shall affix seal attesting to completeness and correctness, shall review hardware schedule prior to submittal.
- 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. Closeout Submittals: Submit to Owner in a three ringed binder or CD if requested.
1. Warranties.
  2. Maintenance and operating manual.
  3. Maintenance service agreement.
  4. Copy of approved hardware schedule.
  5. Copy of approved keying schedule with bitting list.
  6. Door hardware supplier name, phone number and fax number.

**QUALITY ASSURANCE**

- A. Contractor shall utilize a hardware supplier shall employ an Architectural Hardware Consultant (AHC) as certified by DHI and a member of the seal program and whom shall be available to visit the project to troubleshoot, solve and or correct conditions that affect hardware installation and keying.
- B. 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.
- C. Fire Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL 10C, unless otherwise indicated.
- D. Fire Door Inspection: Prior to receiving certificate of occupancy have fire rated doors inspected by an independent certified Fire and Egress Door Assembly Inspector (FDAI), as certified by Intertek (ITS), a written report shall be submitted to Owner and Contractor. Doors failing inspection shall be adjusted, replaced or modified to be within appropriate code requirements.
- E. Smoke and Draft Control Door Assemblies: Where smoke and draft control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
- F. Door hardware shall be certified to ANSI/BHMA standards as noted, participate and be listed in BHMA Certified Products Directory.
- G. Pre-installation Meeting:
1. Hold a pre-installation meeting prior to installation. Participants required to attend: Contractor, installer, material supplier, manufacturer representatives. Include in conference decisions regarding proper installation methods and procedures for receiving and handling hardware.
  2. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.

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- H. Within fourteen days of receipt of approved door hardware submittals contact Owner with representative from hardware supplier to establish a keying conference. Verify keyway, visual key identification, number of master keys and keys per lock. Provide keying system per Owners instructions.
- I. Installer Qualifications: Specialized in performing installation of this Section and shall have five years minimum documented experience.

**DELIVERY, STORAGE AND HANDLING**

Packing, Marking and Labeling: Deliver hardware to Owner and project site in manufacturer's original packages. Each article of hardware shall be neatly wrapped and individually packed in substantial carton or other container, properly marked or labeled to be readily identifiable with Hardware Schedule.

Storage: General Contractor shall furnish secure storage area for delivery by Hardware Supplier of finish hardware and storage of same. General Contractor shall be responsible for shortages due to theft and pilferage.

Deliver permanent keys and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to Owner shall be established at "Keying Conference."

**WARRANTY**

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.
- 4. Two years for electromechanical door hardware.

**PART 2 – PRODUCTS**

**HINGES**

- A. Hinges shall be of one manufacturer as listed for continuity of design and consideration of warranty.
- B. Butt Hinges:
  - 1. Hinge weight and size unless otherwise indicated in hardware sets:
    - a. Doors up to 36" wide and up to 1-3/4" thick provide hinges with a minimum thickness of .134" and a minimum of 4-1/2" in height.
    - b. Doors from 36" wide up to 42" wide and up to 1-3/4" thick provide hinges with a minimum thickness of .145" and a minimum of 4-1/2" in height.
    - c. For doors from 42" wide up to 48" wide and up to 1-3/4" thick provide hinges with a minimum thickness of .180" and a minimum of 5" in height.
    - d. Doors greater than 1-3/4" thick provide hinges with a minimum thickness of .180" and a minimum of 5" in height.
    - e. Width of hinge is to be minimum required to clear surrounding trim.
  - 2. Base material unless otherwise indicated in hardware sets:

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- a. Exterior Doors: 304 Stainless Steel, Brass or Bronze material.
  - b. Interior Doors: Steel material.
  - c. Fire Rated Doors: Steel or 304 Stainless Steel materials.
  - d. 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 up to 60" in height provide 2 hinges.
  - b. Doors 60" up to 90" in height provide 3 hinges.
  - c. Doors 90" up to 120" in height provide 4 hinges.
  - d. Doors over 120" in height add 1 additional hinge per each additional 30" in height.
  - e. Dutch doors provide 4 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 full width of opening is required, use hinges that are designed to swing door completely from opening when door is opened to 95 degrees.
  - d. Provide mortar boxes for frames that require any electrically modified hinges if not an integral part of frame **or frames requiring grout**.
  - e. When shims are necessary to correct frame or door irregularities, provide metal shims only.
5. Acceptable Manufactures:
- |                    |                  |              |
|--------------------|------------------|--------------|
|                    | Standard Weight  | Heavy Weight |
| a. Hager Companies | BB1279/BB1191    | BB1168       |
| b. <b>PBB</b>      | <b>BB81/BB51</b> | <b>4B81</b>  |
| c. McKinney        | TA2714/TA2314    | T4A3786      |

**LOCKS AND LATCHES**

- A. Locks and latches shall be of one manufacturer as listed for continuity of design and consideration of warranty.
- B. 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 resist 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" throw and deadlocking for keyed and exterior functions. Provide 3/4" latchbolt for pairs of fire rated doors where required by door manufacture. Standard backset to be 2-3/4" and faceplate shall be adjustable to accommodate a square edge door or a standard 1/8" beveled edge door.
  2. Strike is to fit a standard ANSI A115 prep measuring 1-1/4" x 4-7/8" with proper lip length to protect surrounding trim.
- D. Acceptable Manufactures:

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1. Hager Companies: 3400 Series.
2. **Dorma: C800 Series.**
3. **Yale: 4700LN Series**

**CYLINDERS AND KEYING**

- A. Cylinders shall be of one manufacturer (**same as locks**) as listed for continuity of design and consideration of warranty.
- B. Cylinders:
1. Manufacturer's standard tumbler type, match existing **keyway if required.**
  2. Cylinders shall be from same manufacturer as locks. **Aftermarket cylinder manufacturers may not be used.**
  3. Shall be furnished with cams/tailpieces as required for locking device that is being furnished for project.
- C. Keying:
1. All locks and cylinders shall be initially shipped with temporary construction cores and construction keyed cylinders.
  2. The distributor will assist the Owner's facility locksmith in the removal of the construction cores and keys and setting up the key cabinet prior to building turn over from the contractor to the Owner.
  3. Copy of Owners approved keying schedule shall be submitted to Owner and Architect along with documentation of keying conference and Owners sign-off.
  4. Provide a bitting list to Owner of combinations as established, and expand to twenty five percent for future use or as directed by Owner.
  5. Key into Owner's existing keying system **if required.**
  6. Keys to be shipped to Owner's representative, individually tag per keying conference.
- D. Acceptable manufactures:
1. Match Existing keyway **or use cylinders of same manufacturer of locks.**

**PUSH/PULL PLATES**

- A. Push and pull plates shall be of one manufacturer as listed for continuity of design and consideration of warranty.
- C. Push plates: .050" thick, square corner and beveled edges with counter sunk screw holes. Width and height as stated in hardware sets.
- D. Acceptable Manufactures:
1. Hager Companies: 30S
  2. Rockwood: 70
  3. **Burns: 54**
- E. Pull plates: .050" thick, square corner and beveled edges. Width and height as stated in hardware sets, 3/4" diameter pull, with clearance of 2-1/2" from face of door.
- F. Acceptable Manufactures:
1. Hager Companies: H33J
  2. Rockwood
  3. **Burns: 5425**

**CLOSERS**

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- A. Shall be product of one manufacturer. Unless otherwise indicated on hardware schedule, comply with manufacturer's recommendations for size of closer, depending on width of door, frequency of use, atmospheric pressure, ADAAG requirements, and fire rating.
- B. Material and Design:
  - 1. Provide aluminum non-handed bodies with full plastic covers.
  - 2. Closer 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. Double heat-treated steel, tempered springs.
  - 5. Precision machined, heat-treated steel piston.
  - 6. Triple heat-treated steel spindle.
  - 7. 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.
  - 3. Provide brackets and shoe supports for aluminum doors and frames to mount fifth screw.
  - 4. Furnish drop plates where top rail conditions on door do not allow for mounting of closer and where backside of closer is exposed through glass.
- D. Size closers in compliance with requirements for accessibility (ADDAG). Comply with following maximum opening force requirements.
  - 1. Interior hinged openings: 5.0 lbs.
  - 2. Fire rated and exterior openings shall have minimum opening force allowable by authority having jurisdiction.
- E. Fasteners: Provide self-drilling and tapping wood screws, machine screws and sex nuts and bolts for each closer.
- F. Acceptable manufactures:
  - 1. Hager Companies: 5200 Series
  - 2. Dorma: 8600 Series
  - 3. Yale: 4400 Series

**PROTECTIVE TRIM**

- A. Size of protection plate: Single doors, size two inches less door width (LDW) on push side of door, and one inch less on pull side of door. For pairs of doors, size one inch less door width (LDW) on push side of door, and ½ inch on pull side of door.
  - 1. Kickplates 8" high or sized to door bottom rail height
  - 2. Mop Plates 4" high.
- B. Material and Design:
  - 1. 0.050" gage stainless steel
  - 2. Corners shall be square. Polishing lines or dominant direction of surface pattern shall run across the door width of plate.
- C. Acceptable Manufactures:



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1. Hager Companies: 190S
2. **Rockwood**
3. **Burns KP50**

**STOPS AND HOLDERS**

- A. Wall Stops: Provide all doors with stops wherever necessary to prevent door or hardware from striking an adjacent partition or obstruction. Provide wall stops when possible. Where wall stops are not possible, provide overhead stops. Door stops and holders mounted in concrete floor or masonry walls shall have stainless steel machine screws and lead expansion shields. Provide solid wood blocking to be installed at all gypsum wall stop locations.
- B. Acceptable Manufactures:
- |                    | Convex     | Concave    |
|--------------------|------------|------------|
| 1. Hager Companies | 232W       | 236W       |
| 2. Rockwood        |            |            |
| 3. <b>Burns</b>    | <b>570</b> | <b>575</b> |
- C. Overhead Stops and Holders: Provide overhead stop and holders for doors that open against equipment, casework sidelights and other objects that would make wall stops/holders and floor stops/holders inappropriate. Provide sex bolt attachments for mineral core wood door applications.
- D. Acceptable Manufactures:
- |                    | Heavy Duty Surface |
|--------------------|--------------------|
| 1. Hager Companies | 7000 SRF Series    |
| 2. <b>Dorma</b>    | <b>700 Series</b>  |
| 3. <b>ABH</b>      | <b>4400 Series</b> |

**DOOR GASKETING AND WEATHERSTRIP**

- A. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing where indicated on hardware schedule. 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. Sound Gasketing: Cutting or notching for stop mounted hardware not permitted.
  5. Drip Guard: Apply to exterior face of frame header. Lip length to extend 4" beyond width of door.
- B. Smoke-Labeled Gasketing: Comply with NFPA 105 listed, labeled, and acceptable to authorities having jurisdiction, for smoke control indicated.
1. Provide smoke labeled gasketing on 20 minute rated doors and on smoke rated doors.
- C. Fire-Rated Gasketing: Comply with NFPA 80 listed, labeled, and acceptable to Authorities Having Jurisdiction, for fire ratings indicated.
- D. Refer to Section 08 1416 Wood Doors for Category A or Category B. Comply with UBC 7-2 and UL10C positive pressure where frame applied intumescent seals are required. Provide Hager # 722

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- F. Acceptable Manufactures:
1. Hager Companies
  2. **National Guard**
  3. **Pemko**

**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.
- B. Acceptable Manufactures:
1. Hager Companies: 417S/520S
  2. **National Guard**
  3. **Pemko**

**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.

**PROGRAMMABLE ELECTROMAGNETIC LOCK**

- A. E-Plex Series Electromagnetic Hardware by Dormakaba Model E5231-XS-WL-626, or approved equal by Schlage or Best.

**FINISHES**

Comply with base material and finish requirements indicated by ANSI/BHMA A156.18 designations in hardware schedule.

**PART 3 – EXECUTION**

**EXAMINATION**

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

**INSTALLATION**

- A. Install hardware per manufacturer's instructions and in compliance with:
1. NFPA 80.
  2. NFPA 105.
  3. ICC/ANSI A117.1.
  4. ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Steel Frames
  5. ANSI/BHMA A156.115W Hardware Preparation in Wood Doors with Wood or Steel Frames

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6. DHI Publication – Installation Guide for Doors and Hardware
  7. UL10C/UBC7-2
  8. Local building code.
  9. Approved shop drawings.
  10. 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.
- C. **HARDWARE LOCATIONS:**
- a. Door Pulls: 42" from finished floor to center of grip.
  - b. Push-Pull Bar: 42" from finished floor to center of bar of center between bars and combination.
  - c. Top Hinge: To frame Manufacturer's standard, but not greater than 10" from head of frame to centerline of hinge.
  - d. Bottom Hinge: To frame Manufacturer's standard but not greater than 12-1/2" from finished floor to centerline of hinge.
  - e. Intermediate Hinges: Equally spaced between top and bottom hinge.
  - f. Locks and Latches: ***per frame manufacturer's standard.***
  - g. Deadlocks (with separate latch-set and/or pull): 48" from finished floor to centerline of strike. ***Coordinate with push/pull plate.***
  - h. Locate pivots in accordance with Pivot Manufacturer's requirements.

**FIELD QUALITY CONTROL**

- A. After all finish hardware installation is complete and prior to building acceptance, General Contractor shall schedule a final walk through with hardware representatives to inspect hardware, make all necessary adjustments, and to carefully instruct the owner in proper use, servicing and maintaining hardware. Material supplier shall provide a written report detailing discrepancies of each opening to General Contractor within seven calendar days of walk through.
- B. **SIX MONTH SERVICE AND REPORT:** Six months after acceptance of each area of the project, readjust each item of hardware and restore to proper function. Install fixed locking screw in strike plate for exterior locksets after final adjustments made during 6-Month Service and Adjustment Inspection. Conduct walk through with Owner regarding recommended additions or modifications to maintenance procedures. Clean and lubricate as required. Replace items, which have deteriorated or failed due to faulty design, materials, or installation. Provide Architect with written report upon completion of above, with list of attendees.

**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.
- B. 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.

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**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.

**HARDWARE SET SCHEDULE**

- 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 GROUPS**

**HARDWARE GROUP 1 – DOORS 103A, 104A, 106A**

3	HINGE	BB81 4.5 X 4.5 26D	PBB
1	CLOSER	8616-ARP-FC-689	DORMA
1	KICKPLATE	KP50 8 X 34 32D	BURNS
1	PUSH PLATE	54 4 X 16 32D	BURNS
1	PULL PLATE	5425B 4 X 16 32D	BURNS
1	THRESHOLD	425 X 36"	NGP
1	SWEEP	200NA X 36"	NGP
1	GASKETING	155VA X 3070	NGP
1	DEADBOLT	D800 (key only no thumbturn)	DORMA
1	ELECTROMAGNETIC	E5231-XS-WL-626	DORMAKABA
1	WALL STOP	575 X 32D	BURNS

**HARDWARE GROUP 2 – DOORS 105A**

3	HINGE	BB81 4.5 X 4.5 26D	PBB
1	CLOSER	8616-ARP-FC-689	DORMA
1	THRESHOLD	425 X 36"	NGP
1	SWEEP	200NA X 36"	NGP
1	GASKETING	155VA X 3070	NGP
1	DEADBOLT	D800 (key only no thumbturn)	DORMA
1	CYL LOCKSET	C810-LCC-626 (Passage)	DORMA
1	WALL STOP	575 X 32D	BURNS

**HARDWARE GROUP 3 – DOORS 101A**

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3	HINGE	BB81 4.5 X 4.5 26D	PBB
1	CYL LOCKSET	C853-LCC-626 (Entry)	DORMA
1	GASKETING	155VA X 3070	NGP
1	DEADBOLT	D800 (key only no thumbturn)	DORMA
1	WALL STOP	575 X 32D	BURNS

**HARDWARE GROUP 4 – DOORS 102A**

3	HINGE	BB81 4.5 X 4.5 26D	PBB
1	CLOSER	8616-ARP-FC-689	DORMA
1	OVERHEAD STOP	575 X 32D	BURNS

**END OF SECTION 08700**

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**PART 1: GENERAL**

**RELATED DOCUMENTS:**

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this section.

**SUMMARY OF WORK:**

Provide glass and glazing and special fire glass as indicated below, complete.

**INDUSTRY STANDARDS:**

See section 01068 for a complete listing of names of industry standard agencies mentioned by abbreviation in this section.

**SUBMITTALS:**

Glass and Glazing: Submit samples of each type of glass specified as well as samples of sealed insulating glass units with representative construction for Architect's approval.

Product Data: Submit copy of manufacturer's specifications and installation instructions for each type of glass and glazing material. Include test data or certification substantiating that glass complies with specified requirements and manufacturer's warranties.

Submit manufacturer's standard 10 year warranty for insulated glass units.

**QUALITY ASSURANCE:**

Provide safety glass (tempered, laminated) complying with requirements of ANSI Z97.1 - American National Standard for Glazing Materials Used in Buildings -- Safety Performance Specifications and Method of Test.

Each piece of glass shall bear a label designating type and thickness of glass. Do not remove label prior to installation. Permanently identify each unit of tempered glass. Etch or ceramic fire identification on glass; All identification shall be visible when unit is glazed.

Fire Resistance Rated Glass: Each lite shall bear permanent, non-removable label of UL certifying it for use in tested and rated fire resistive assemblies

Thermal Movements: Provide glazing that allows for thermal movements resulting from ambient and surface temperatures changes acting on glass framing members and glazing components.

Warranty: Provide manufacturer's standard 10 year warranty, including include replacement of sealed glass units exhibiting seal failure or leakage, interpane dusting or misting.

**STORAGE, DELIVERY AND HANDLING:**

Deliver glass to site in suitable containers that will protect glass from weather and from breakage. Store products in manufacturer's unopened packaging in a safe place to prevent damage until ready for installation.

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Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other potentially damaging causes.

For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

**DESIGN AND PERFORMANCE REQUIREMENTS:**

Watertight and airtight installation of each piece of glass is required. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating doors) without failure of any kind including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials, and other defects in work.

Provide safety glass and impact resistant glass (tempered, laminated) complying with the requirements of and in all locations required by the current edition of the North Carolina State Building Code.

Sizes of glass indicated on Drawings are approximately only. Determine actual size required by measuring frames to receive glass at project site, or from guaranteed dimensions provided by Frame Supplier.

**PART 2: PRODUCTS**

**MANUFACTURERS:**

For purposes of designating type and quality for work under this Section, Drawings and Specifications are based on products manufactured or furnished by following manufacturers:

- Pilkington
- American St. Gobain Corporation
- Libby-Owens-Ford Glass Company
- Pittsburg Plate Glass Company
- Technical Glass Products

**GLASS:**

Low-E Impact Resistant Insulating Glass: Unless otherwise noted, 1" thick panels, 1/4" thick "neutral tint" plate glass to exterior, 1/4" clear plate glass to interior; Low-E shall be on the 3<sup>rd</sup> surface, with 1/2" space between glass by dessicant filled spacer and sealant device. For exterior locations, glazing shall comply with testing requirements of the Large Missile Test of ASTM E1996/E1886.

Opaque Insulating Glass: Provide where indicated in the drawings 1" thick panels, 1/4" thick "opaque tint" plate glass to exterior, 1/4" clear plate glass to interior; Low-E shall be on the 3<sup>rd</sup> surface, with 1/2" space between glass by dessicant filled spacer and sealant device. For exterior locations, glazing shall comply with testing requirements of the Large Missile Test of ASTM E1996/E1886.



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**GLAZING ACCESSORIES:**

Setting Blocks: ASTM C 864, neoprene, 80 to 90 Shore A durometer hardness; length 4 inches (100 mm), width of glazing rabbet space less 1/16 inch (1.5 mm), height required for glazing method, pane weight, and pane area.

Spacer Shims: ASTM C 864, neoprene, 50 to 60 Shore A durometer hardness; length 3 inches (75 mm), one half height of glazing stop, thickness required for application, one face self-adhesive.

**GLAZING MATERIALS:**

Sealant and Compound shall be Vulkem 116 by Master Mechanics Company, Maccolastic Acrylic Compound by Macco Division, Glidden Company, Betaseal 850 by Essex Chemical Company or approved equal.

Glazing Tape shall be Butyl compound tape with integral resilient tube spacer, 10 to 15 Shore A durometer hardness, black color, coiled on release paper; widths required for specified installation.

Compatibility: Where combination of sealing materials is required for glazing in same frame, manufacturer shall certify that all glazing materials furnished are compatible with each other and compatible with material used for setting blocks and spacer shims.

**PART 3: EXECUTION**

**EXAMINATION AND CONDITION OF SURFACES:**

Check all frames prior to glazing. Openings shall be square, plumb, and with uniform face and edge clearances. Maintain 1/8" minimum bed clearance between glass and frame on both sides.

Verify that openings for glazing are of the correct size and within tolerances (field measurements). When construction schedule permits, verify field measurements with drawing dimensions prior to fabrication of glass products. Verify that glazing channels and recesses are clean and free of obstructions, that weeps are clear and that channels and recesses are ready for glazing.

Clean all surfaces to be glazed with only solvents recommended by compound or sealant Manufacturer. Any defects affecting satisfactory installation of glass shall be corrected before starting of glazing.

**INSTALLATION:**

Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install any products under environmental conditions outside manufacturer's absolute limits.

Install sealants in accordance with ASTM C 804 for solvent release sealants. Install sealants in accordance with sealant manufacturers' instructions.

Workmanship: Apply glazing compound uniformly with accurately formed corners and bevels. Remove excess compound from glass and frame. Use only recommended thinners, cleaners and solvents. Do not cut or dilute glazing compound without approval from Architect. Make good contact with glass and frame when glazing and facing off.

Blocks and Spacers: Where setting blocks and spacer shims are required to be set into glazing compound or sealant, they may be butted with compound or sealant, placed in position, and allowed to set firmly prior to installation of glass.

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Miscellaneous Interior Glazing: Unless otherwise indicated, all interior glass shall be channel glazed with glazing compound. Apply as follows:

Apply ample back compound to rabbet so that it will ooze out when glass is pressed into position and completely cover glass in rabbet. Press glass into position.

Secure glass in place by application of stop beads. Bed stop beads against glass and bottom of rabbet with compound, leaving proper thickness between glass and stop beads. Secure stop beads in place with suitable fastenings. Strip surplus compound from both sides of glass and tool at slight angle to provide clean sight lines.

Glazing Aluminum Entrances and Window Wall System:

Glass shall be set in accordance with aluminum entrances and window walls Manufacturer's shop drawings and instructions.

Install moldings level, plumb and square. Moldings at corners shall be accurately cut, neatly fitted, and joined as recommended by Storefront manufacturer.

**REPLACEMENTS AND CLEANING:**

Remove glazing materials, excess sealants, and compounds from finish surfaces.

Remove labels after glass installation is complete.

Clean glass surfaces and adjacent surfaces.

At completion of work, all glass shall be free from cracks, sealant smears and other defects.

**PROTECTION:**

Protect glass surfaces and edges during the construction period. Keep glass free from contamination by materials capable of staining glass. Any glass that is defective before acceptance, or within one year warranty period, as result of manufacturing, transporting, or performance of Contractor, shall be removed and replaced with new glass without cost to Owner.

**END OF SECTION 08800**

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**RELATED DOCUMENTS:**

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this Section.

**PART 1: GENERAL**

**DESCRIPTION OF WORK:**

Provide gypsum board for walls, partitions, ceilings, ceiling access doors and fireproofing for beams and columns as indicated on drawings and as specified herein.

Note all gypsum drywall, except as noted on drawings shall be provided with a fine textured spray applied finish, applied prior to coats of paint, matching USG "Orange Peel" texture.

**INDUSTRY STANDARDS:**

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Section 01068.

**QUALITY ASSURANCE:**

Standard: For the purposes of designating type and quality for work under this Section, Drawings and Specifications are based on products manufactured or furnished by US Gypsum Company.

Acceptable Manufacturers: Products of following manufacturers which meet all requirements of these specifications will be acceptable:

- U.S. Gypsum Company
- Georgia-Pacific Gypsum
- National Gypsum Company

Single Source: All products for use on this Project shall be of one Manufacturer for same function (single source), unless otherwise noted below and shall be installed in strict accordance with manufacturers current printed instructions.

Install gypsum board in accordance with applicable requirements and recommendations of Gypsum Association GA 216, "Recommended Specifications for the Application and Finishing of Gypsum Board" except for more stringent requirements of manufacturer.

**SUBMITTALS:**

Submit Manufacturer's printed catalog cuts, installation instructions, and finishing instructions.

Submit test reports from Underwriter's Laboratories, ASTM or other acceptable testing agencies, on fire tests, impact resistant tests, finishes, acoustic ratings and moisture and mold tests of all products specified.

**PRODUCT HANDLING:**

All materials shall be delivered to the project site in manufacturers' original packages, containers or bundles bearing brand name and name of manufacturer or supplier for whom product is manufactured.

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All gypsum board and insulation material shall be stored in an enclosed dry, ventilated, shelter providing protection from damage and exposure to the elements. All material shall be stored off of the ground, and completely enclosed within weather tight covering. Stack all board materials on 2"x 4" risers, spaced 16" o.c. Weather tight covering shall also extend completely under stacked material to prevent seepage of moisture if over uncovered ground or damp slab.

Exercise care, during handling and storage, to avoid undue sagging or damage to edges, ends, and surfaces.

Damaged or deteriorated materials shall be removed from the premises.

**ENVIRONMENTAL CONDITIONS:**

Building: Application and installation of gypsum board materials shall commence only after structure is completely weather-tight.

Temperature: In cold weather and during period of gypsum board application and joint finishing maintain temperatures in building uniformly within range of 55 degrees to 70 degrees F. Adequate ventilation shall be provided to eliminate excessive moisture.

**PART 2: PRODUCTS**

**MATERIALS:**

GYPSUM BOARD: All gypsum Board shall be furnished in 48" widths and in lengths of at least 2" greater than height from floor to finished ceiling to permit vertical installation of all boards. Contractor shall have option to furnish boards for vertical installation full height to structure above where required in one sheet, 48" wide.

**BOARD TYPES:**

1. All 5/8" thick gypsum board shall be taper-edged, FIRECODE C Type X conforming to ASTM C 36.
2. Water-Resistant Gypsum Board shall be "Sheetrock Water Resistant Wallboard" 5/8" tapered-edge with treated manila paper finish and "Sheetrock W/R Fire-code C Wallboard, 5/8" tapered-edge with treated manila paper finish for 1 hour rated partitions. Use 5/8" water-resistant gypsum board for all custodial room and shower room ceilings.
3. Abuse resistant Gypsum Board where indicated on the plans shall be 5/8" FIBEROCK AR by US Gypsum or approved equal board.
4. Impact resistant Gypsum Board where indicated on the plans shall be 5/8" MOLD TOUGH VH1 by US Gypsum or approved equal board meeting level 3 (highest) ASTM C1629 testing for hard and soft body impact.
5. Tile Backer Board shall be DUROCK Brand by US Gypsum, or approved equal 5/8" Glass-mat board and shall be installed behind all areas scheduled to receive thin set ceramic tile. Backer Board consists of a treated water-resistant gypsum core that is covered with a fiberglass mat facer and back and has a cementitious surface.

Wall Spray Texture: SHEETROCK Wall & Ceiling Spray Texture, SHEETROCK Wall & Ceiling Texture (TUF-TEX), SHEETROCK Wall & Ceiling Spray Texture – Ready Mixed.

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**FASTENERS:**

Screws for attachment of board to metal studs, metal ceiling and wall furring shall be 1" (minimum length) Type S. Screws for fire rated systems shall be as indicated in the corresponding test report.

**Trim Accessories:**

1. Corner Angles to 2 ½" x 2 ½" x 24 ga. Corrosion resistant steel, lengths as required.
2. Corner reinforcement for all 90 degree external corners shall be DUR-A-BEAD Corner Bead 103. No. 800.
3. Metal Trim shall be 200 Series Sheetrock Brand sized for wallboard thickness.

**DRYWALL TAPE**

Tape shall be SHEETROCK brand fiberglass drywall tape or approved equal.

Compound for embedding, fill coat application and finishing shall be SHEETROCK brand Ready Mixed all purpose compound

**ADHESIVE AND CAULKING:**

Laminating Adhesive: Laminating adhesive for face layer application in double-layer systems shall be "Perf-A-Tape Joint Compound, embedding type".

Caulking Compound: Acoustical type sealant, furnished by Gypsum Board products manufacturer. Apply acoustical sealant in accordance with applicable requirements of ASTM C919.

**CRACK CONTROL JOINTS:**

Crack control joints shall be provided in pre-approved locations, at each jamb of windows exceeding 10' in width, and walls at a maximum 30' intervals. Provide manufacturer standard metal exp/control joint material.

**PART 3: EXECUTION**

**CONDITION OF SURFACES:**

Inspection: Examine surfaces to receive gypsum board for defects, which might impair quality of finished installation. Do not proceed with work until unsatisfactory conditions are corrected. Starting of work shall indicate acceptance of existing conditions.

Install framing to comply with ASTM C754 and with ASTM C840 requirements that apply to framing installation.

Install supplementary framing, blocking and bracing at terminations in gypsum board assemblies to support fixtures, equipment, heavy trim, grab bars, toilet accessories, furnishings or similar construction.

Coordination: Conduit, piping, retainers for corner guards and other items to be concealed by or penetrating, wallboard shall be installed and tested before applying wallboard.

**BOARD INSTALLATION:**

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Install strictly according to all manufacturer's printed instructions.

Single Layer Gypsum Board on Metal Studs:

1. Loosely butt gypsum board joints together and neatly fit.
2. Do not place butt ends against tapered edges.
3. Maximum allowable gap at end joints: 1/8 inch.
4. Stagger joints on opposite sides of partitions.
5. Apply ceiling boards first where gypsum board ceilings and wall occur.
6. Cut openings in gypsum board to fit electrical outlets, plumbing, light fixtures and piping snugly and small enough to be covered by plates and escutcheons. Cut both face and back paper.
7. Screw board in place securely with screws spaced according to manufacturer's recommendations.

Single Layer Gypsum Board on Furring:

1. Apply gypsum board with long dimension at right angles to furring channel.
2. Center end joints over channel web; stagger end joints from those in adjacent rows of board.
3. Fasten boards to furring channels with screws spaced according to manufacturer's recommendations.

Water-Resistant Gypsum Board:

1. Complete plumbing rough-in before gypsum board panels are erected.
2. Separate gypsum panels from rough-in and fixtures by 1/4 inch space.
3. Make necessary cut-outs and seal cut or exposed panel edges with thinned-down ceramic tile adhesive or with waterproof flexible sealant, as recommended by gypsum board manufacturer.
4. Install water-resistant board horizontally.
5. Do not place water-resistant board directly over vapor retarder.
6. [Prior to tile application, fill openings around pipes, fittings, fixtures, interior angles and other penetrations with waterproof flexible sealant, as recommended by gypsum board manufacturer. Do not fill 1/4 inch gap at bottom of panels.

Cementitious Backer Board Installation:

1. Install as indicated to comply with ANSI A108.11 and in accordance with manufacturer's instructions.
2. Complete plumbing rough-in before boards are erected.
3. Separate board from rough-in and fixtures and fill space as recommended by manufacturer.
4. Securely fasten boards to substrate as required.
5. Follow manufacturer's instructions for treatment of edge terminations.
6. At joints and corners, embed fiberglass tape in skim coat of mortar.

Ceilings:

1. Install gypsum base sheets with long direction at right angles to furring channels with end joints occurring over channels.
2. Stagger end joints.
3. Install ceiling boards prior to adjoining partition boards where feasible.
4. Fasten at not less than 12 inches on center at furring channels.
5. Double layer applications:
  - a. Apply base layer prior to base layer application on adjoining partitions; apply face layers in same sequence.

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- b. Apply gypsum base layer and face layer with long dimension parallel to supports. Offset joints of face layer at least 16 inches from base layer joints.
- c. Fasten both base and face layers separately to supports.
- d. Stagger and space fasteners in accordance with gypsum base manufacturer's instructions.

**Cutting and Fitting:**

1. Cut gypsum board by scoring and breaking, or by sawing. Work from face side.
2. Cut edges and ends of gypsum board shall be smoothed where necessary, in order to obtain neat jointing when board is erected.
3. Cut-outs for pipes, fixtures or other small openings shall be scored on face and back in outline before removal, or shall be cut out with saw or other suitable tools.
4. Where gypsum board meets projecting surfaces, scribe and cut neatly, fitting closely for caulked joint.

Apply acoustical sealant in accordance with applicable requirements of ASTM C919.

**Tolerances:**

1. Do not exceed 1/8 inch in 8'-0" variation from plumb or level in exposed lines of surface, except at joints between gypsum board units.
2. Do not exceed 1/16 inch variation between planes of abutting edges or ends.
3. Shim as required to comply with specified tolerances

**ATTACHMENT:**

Method: Space fasteners not less than 3/8" nor more than 1/2" from edge and ends of board. While fasteners are being driven, hold board in firm contact with under laying support. Application of fasteners shall proceed from central portion of board to ends and edges. If paper surface is broken by fastener in attachment, drive another fastener approximately 2" from faulty fastener.

Drive screws to provide screw head penetration just below gypsum board surface.

Spread adhesive over laminating surface of face or base layer gypsum board. Extend adhesive up to ends and edges of all board.

Spacing of Fasteners shall be as follows:

Screw Method: Space screws at maximum of 12" o.c. for ceilings and 16" o.c. for walls.

Corner Beads and Trim shall have fasteners spaced 6" o.c. driven through gypsum board into framing members.

**JOINT FINISHING AND FASTENER CONCEALMENT:**

Provide a "LEVEL 4" gypsum wallboard finish at all areas, unless indicated otherwise.

Method: Mix and use joint compound and topping compound in accordance with manufacturer's recommendations printed on bag. Apply by machine or hand tool. Allow minimum drying time of 24 hours between adhesive coats. Sand all coats as necessary after each application. Clean excess compound from surface of gypsum board as compound is applied.

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Reinforcement: Reinforce wall and ceiling angles and inside vertical corner angles with tape folded to conform to adjoining surfaces, and to form straight, true angle. All gypsum board joints except joints at metal trim shall be tapered.

Embedment Coat: Apply thin, uniform layer of joint compound (embedding type) approximately 3" wide over joint to be reinforced. Center tape over joint and seat into compound; leaving sufficient compound under tape to provide proper bond. Apply skim coat of compound immediately after embedding tape.

Fill Coat: After drying, cover embedding compound with fill coat of compound. Spread evenly over and slightly beyond tapered edge area of board. Feather at edges.

Topping: Cover fill coat with topping compound. Spread evenly over and slightly beyond edge of proceeding coat. Feather with smooth, uniform finish.

Fastener Concealment: Treat dimples at fasteners (and holes where temporary fasteners are removed) with three coats of joint compound applied as each coat is applied to joints.

Conceal flanges of all corner beads and trim members by minimum of two coats of compound applied strictly in accordance with Manufacturer's directions.

Caulking:

Joints at Penetrations: Where pipes, conduits, ducts, electrical devices, etc., penetrate gypsum board, seal joint around perimeter with caulking compound.

**All joints between ceilings and walls and between walls and floors shall be sealed continuously with acoustical sealant, as specified above.**

**END OF SECTION 09250**



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**PART 1: GENERAL**

**1.2 SCOPE:**

- A. Work shall include, but is not limited to, the following:
1. Wall Tile
  2. Tile Trim and Accessories
  3. Setting Materials and Beds

**1.3 RELATED SECTIONS:**

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this Section.

**1.4 REFERENCES/INDUSTRY STANDARDS:**

- A. See Section 01068.

**1.5 PERFORMANCE REQUIREMENTS:**

- A. Static Coefficient of Friction: Tile on walkway surfaces shall be provided with the following values as determined by testing in conformance with ASTM C 1028.
- Level Surfaces: Minimum of 0.6 (Wet).
  - Step Treads: Minimum of 0.6 (Wet).
  - Ramp Surfaces: Minimum of 0.8 (Wet).

**1.6 SUBMITTALS**

- A. Manufacturer's data sheets on each product to be used, including:
- Preparation instructions and recommendations.
  - Storage and handling requirements and recommendations.
  - Installation methods for all utilized types of installation
- B. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- C. Selection Samples: Samples of actual tiles for selection.
- D. Manufacturer's Certificate:
- Certify that products meet or exceed specified requirements.
  - For each shipment, type and composition of tile provide a Master Grade Certificate signed by the manufacturer and the installer certifying that products meet or exceed the specified requirements of ANSI A137.1.
- E. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

**1.7 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum two years experience.
- B. Single Source Responsibility: Obtain each type and color of tile from a single source. Obtain each type and color of mortar, adhesive and grout from the same source.

**1.8 DELIVERY, STORAGE, AND HANDLING**

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- A. Deliver and store products in manufacturer's unopened packaging until ready for installation.
- B. Protect adhesives and liquid additives from freezing or overheating in accordance with manufacturer's instructions.
- C. Store tile and setting materials on elevated platforms, under cover and in a dry location and protect from contamination, dampness, freezing or overheating.

**1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Do not install adhesives in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F (10 degrees C) during tiling and for a minimum of 7 days after completion.

**1.10 EXTRA MATERIALS**

- A. Provide for Owner's use a minimum of 5 percent of each color and size of tile specified.

**PART 2 PRODUCTS**

**2.1 MANUFACTURERS**

- A. For purposes of designating type and quality for work under this Section, Drawings and Specifications are based on products manufactured by the Daltile Corporation, which is located at: 7834 C.F. Hawn Fwy. P. O. Box 170130 ; Dallas, TX 75217; Toll Free Tel: 800-933-TILE; Tel: 214-398-1411; Fax: 214-309-4584; Email:[april.wilson@daltile.com](mailto:april.wilson@daltile.com); Web:[www.daltile.com](http://www.daltile.com).
- B. Other acceptable Manufacturers whose products are acceptable for this Project are:
  - American Olean
  - Crossville
- C. Requests for substitutions will be considered in accordance with general requirements.

**2.2 TILE**

- A. General: Provide tile that complies with ANSI A137.1 for types, compositions and other characteristics indicated. Provide tile in the locations and of the types colors and pattern indicated on the Drawings and identified in the Schedule and the end of this Section. Tile shall also be provided in accordance with the following:
  - Factory Blending: For tile exhibiting color variations within the ranges selected under Submittal of samples, blend tile in the factory and package so tile taken from one package shows the same range of colors as those taken from other packages.
  - Mounting: For factory mounted tile, provide back or edge mounted tile assemblies as standard with the manufacturer, unless otherwise specified.
  - Factory Applied Temporary Protective Coatings: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with a continuous film of petroleum paraffin wax applied hot. Do not coat unexposed tile surfaces.
- B. Wall Tile: (Field & Accents)

Wall tile for all restrooms and toilet rooms indicated on plans shall be Stonepeak Simply Modern Collection, Urban 2.0 or Offroad Polished 12" x 24". Tile to be capped with L-shaped

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Schluter Jolly A-100 Brushed Aluminum Cap. Color for tile shall be selected from manufacturers' full line and will be two color scheme with up to 50% of each color.

**2.3 TRIM AND ACCESSORIES**

- A. Ceramic Accessories: Glazed finish, same color and finish as adjacent field tile; same manufacturer as tile. Provide all required accessories and accessory shapes for a complete installation.
- B. Non-Ceramic Trim: Provide Satin natural anodized extruded aluminum, with style and dimensions to suit application, for setting using tile mortar or adhesive; use in the following locations:
  - Open edges of floor tile
  - Transition between floor finishes of different heights
  - Thresholds at door openings
  - Expansion and control joints, floor and wall
- C. Stone Thresholds: Provide ADA compliant stone thresholds with chamfered or tapered edges at all doors and transitions uniform in color and finish and fabricated as follows:
  - Material:
    - a. Marble, complying with ASTM C 503 for exterior use and with a minimum abrasive hardness of 10 when tested in accordance with ASTM C 241.
    - b. Slate complying with ASTM C 629, abrasion resistant, non-fading for interior use with a honed finish.
  - Color/Finish: As selected from the manufacturer's standard range.
  - Size:
    - a. Fabricate 2 inches (50 mm) wide by full width of wall or frame opening; 1/2 inch (12 mm) thick; beveled one long edge with radiused corners on top side; without holes, cracks, or open seams.
  - Provide transition between tile surface and adjoining finishes and at the following locations:
    - a. At doorways where tile terminates.
    - b. At open edges of floor tile where adjacent finish is a different height.

**2.4 SETTING MATERIALS**

- A. Organic Adhesive: ANSI A136.1, thinset bond type; use Type I in areas subject to prolonged moisture exposure.
- B. Epoxy Adhesive: ANSI A118.3, thinset bond type.
- C. Mortar Bed Materials:
  - Portland cement: ASTM C150, type 1, gray or white.
  - Hydrated Lime: ASTM C207, Type S.
  - Sand: ASTM C144, fine.
  - Latex additive: As approved.
  - Water: Clean and potable.
- D. Mortar Bond Coat Materials:
  - Dry-Set Portland Cement type: ANSI A118.1.
  - Latex-Portland Cement type: ANSI A118.4.
  - Epoxy: ANSI A118.3, 100 percent solids.
- E. Standard Grout: Cement grout, sanded or unsanded, as specified in ANSI A118.6; color as selected.

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- F. Polymer modified cement grout, sanded or unsanded, as specified in ANSI A118.7; color as selected by architect from manufacturers full line.
- G. Epoxy Grout: ANSI A118.8, 100 percent solids epoxy grout; color as selected by architect from manufacturer's full line.
- H. Silicone Sealant: Silicone sealant, moisture and mildew resistant type, white; use for shower floors and shower walls.
- I. Cleavage Membrane:
  - No. 15 (6.9 kg) asphalt saturated felt, ASTM D226, Type 1.
  - Polyethylene film, ASTM D4397, 4.0 mil thickness.
- J. Waterproofing Membrane at Floors: Membrane in accordance with ANSI A118.10 and as follows:
  - Chlorinated Polyethylene Sheet with polyester fabric reinforcing.
  - Fabric Reinforced, Fluid-Applied elastomeric membrane.
  - Un-Reinforced, Fluid-Applied elastomeric membrane.
  - Polyethylene Sheet Product.
  - Fabric-Reinforced, Modified-Bituminous Sheet Product.
  - Urethane Waterproofing and Tile-Setting Adhesive Product.
- K. Membrane at Walls: No. 15 (6.9 kg) asphalt saturated felt, ASTM D226, Type 1.
- L. Membrane at Walls: 4 mil (0.1 mm) thick polyethylene film, ASTM D4397.
- M. Membrane at Walls: Reinforced asphalt paper.
- N. Reinforcing Mesh: 2 by 2 inch (50 by 50 mm) size weave of 16/16 wire size; welded fabric, galvanized.
- O. Metal Lath: ASTM C847, Flat expanded diamond mesh, not less than 2.5 lbs/SY, galvanized finish.
- P. Cementitious Backer Board: ANSI A118.9; High density, cementitious, glass fiber reinforced with 2 inch (50 mm) wide coated glass fiber tape for joints and corners:
  - Thickness: 5/8 inch (16 mm)

**PART 3 EXECUTION**

**3.2 EXAMINATION**

- A. Verify that wall surfaces are free of substances which would impair bonding of setting materials, smooth and flat within tolerances specified in ANSI A137.1, and are ready to receive tile.
- B. Verify that sub-floor surfaces are dust-free, and free of substances which would impair bonding of setting materials to sub-floor surfaces, and are smooth and flat within tolerances specified in ANSI A137.1.
- C. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.
- D. Verify that required floor-mounted utilities are in correct location.

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- E. Work shall not be started until defects have been corrected that will adversely affect tile work.

**3.3 PREPARATION**

- A. Protect surrounding work from damage.
- B. Remove any curing compounds or other contaminants.
- C. Vacuum clean surfaces and damp clean.
- D. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- E. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.
- F. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

**3.4 INSTALLATION - GENERAL**

- A. Install tile and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCA Handbook recommendations.
- B. Lay tile to pattern indicated. Arrange pattern so that a full tile or joint is centered on each wall and that no tile less than 1/2 width is used. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install ceramic accessories rigidly in prepared openings.
- G. Install non-ceramic trim in accordance with manufacturer's instructions.
- H. Install thresholds where indicated.
- I. Sound tile after setting. Replace hollow sounding units.
- J. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
- K. Allow tile to set for a minimum of 48 hours prior to grouting.
- L. Grout tile joints. Use standard grout unless otherwise indicated. Follow grout Manufacturer's directions as to whether tile joints shall be soaked prior to applying grout. Follow grout Manufacturer's directions strictly and explicitly.
- M. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

**3.5 INSTALLATION - WALL TILE**

- A. Over cementitious backer units on studs, install in accordance with TCA Handbook Method W244, using membrane at toilet rooms and all wet areas.

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- B. Over gypsum wallboard on wood or metal studs install in accordance with TCA Handbook Method W243, thin-set with dry-set or latex-portland cement bond coat, unless otherwise indicated.
  - Where mortar bed is indicated, install in accordance with TCA Handbook Method W222, one coat method.
  - Where waterproofing membrane is indicated other than at showers and bathtub walls, install in accordance with TCA Handbook Method W222, one coat method.
- C. Over interior concrete and masonry install in accordance with TCA Handbook Method W202, thin-set with dry-set or latex-portland cement bond coat.
  - Kitchen wall tile to be installed with epoxy grout as specified.

**3.6 CLEANING**

- A. Clean tile and grout surfaces prior to sealing, using methods approved by tile mfg.

**3.7 PROTECTION OF FINISHED WORK**

- A. Do not permit traffic over finished floor surface for 72 hours after installation.
- B. Cover floors with kraft paper and protect from dirt and residue from other trades.
- C. Where floor will be exposed for prolonged periods cover with plywood or other similar type walkways

**END OF SECTION 09300**

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**PART 1: GENERAL**

**RELATED DOCUMENTS:**

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

**DESCRIPTION OF WORK:**

Painting and finishing of exposed interior and exterior items and surfaces throughout the project, except as otherwise noted. Extent of painting work is shown on drawings and schedules, and as herein specified.

Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.

"**PAINT**" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

Paint all exposed surfaces whether or not colors are designated in "schedules", except where natural finish of material is specifically noted as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint same as adjacent similar materials or areas. If color or finish is not designated, Architect will select these from standard light colors available for materials systems specified. Where indicated, "accent" colors are medium to deep shades, which shall require no more than one additional paint coat.

Following categories of work are not included as part of field-applied finish work, or are included in other sections of these specifications.

Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, miscellaneous metal, hollow metal work, and similar items. Also, for fabricated components such as architectural woodwork, wood casework, and shop-fabricated or factory-built mechanical and electrical equipment or accessories.

Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer finishing is specified for such items as (but not limited to) metal toilet enclosures, prefinished partition systems, acoustic materials, architectural woodwork and casework, finished mechanical and electrical equipment including light fixture, switchgear and distribution cabinets, elevator entrance frames, doors and equipment.

Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

**SUBMITTALS:**

Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use.

Samples: Submit samples for Architect's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.

On 12"x 12" hardboard, provide sample of each color and material, with texture to simulate actual conditions. ~~On CMU face shell, provide sample of each color and material, with texture to simulate actual~~

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conditions Resubmit samples as requested by Architect until acceptable sheen, color, and texture is achieved.

**DELIVERY AND STORAGE:**

Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

- Name or title of material
- Fed. Spec. number, if applicable
- Manufacturer's name, stock number and date of manufacturer
- Contents by volume, for major pigment and vehicle constituents
- Thinning and application instructions
- Color name and number

**JOB CONDITIONS:**

Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 degrees F (10 degrees C) and 90 degrees F (32 degrees C), unless otherwise permitted by paint manufacturer's printed instructions.

Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 degrees F (7 degrees C) and 95 degrees F (35 degrees C), unless otherwise permitted by paint manufacturer's printed instructions.

Do not apply paint in snow, rain, fog or mist; or when relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by paint manufacturer's printed instructions.

Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

**PART 2: PRODUCTS**

**COLORS AND FINISHES:**

Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

Paint Coordination: Provide finish coats which are compatible with prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates.

Federal Specifications establish minimum acceptable quality for paint materials. Provide written certification from paint manufacturer that materials provided meet or exceed these minimums.

Provide undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.



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**EXTERIOR PAINT SYSTEMS:**

A. METAL - (Galvanized)

1. Acrylic Systems

a. Gloss Finish

- i. Surface Preparation: Refer to Part 3 Surface Preparations of these specifications for Cleaning & Testing/Evaluations; Manufacturer's guidelines and recommendations stand as requirements of this work.
- ii. 1<sup>st</sup> Coat: S-W Pro-Cryl Universal Primer, B66-310 Series (10 mils wet, 4.0 mils dry film thickness)
- iii. 2<sup>nd</sup> Coat: S-W Sher-Cryl HPA High Performance Acrylic, B66-300 Series (10 mils wet, 4 mils dry film thickness)
- iv. 3<sup>rd</sup> Coat: S-W Sher-Cryl HPA High Performance Acrylic, B66-300 Series (10 mils wet, 4 mils dry film thickness)

B. METAL - (Misc. Iron, Ornamental Iron, Catwalks, Fire Escapes, Hydrants, Handrails, Ladders, Fences)

1. Acrylic Systems

a. Gloss Finish

- i. Surface Preparation: Manufacturer's guidelines and recommendations stand as requirements of this work
- ii. 1<sup>st</sup> Coat: S-W Kem Kromik Universal Metal Primer, B50Z Series (6 mils wet, 3 mils dry)
- iii. 2<sup>nd</sup> Coat: S-W Industrial Enamel, B54Z Series
- iv. 3<sup>rd</sup> Coat: S-W Industrial Enamel, B54Z Series (5 mils wet, 2 mils dry per coat)

C. METAL - (Shop Primed Metal Doors and Frames/ Panels, etc.)

1. Alkyd Systems

a. Gloss Finish

- i. Surface Preparation: Manufacturer's guidelines and recommendations stand as requirements of this work
- ii. 1<sup>st</sup> Coat: S-W Industrial Enamel, B54Z Series
- iii. 2<sup>nd</sup> Coat: S-W Industrial Enamel, B54Z Series (4 mils wet, 2 mils dry per coat)

**INTERIOR PAINT SYSTEMS**

A. TOILET ROOMS - (Toilet room walls, Ceilings, Cement Board) (See Special Preparations and Special Application requirements)

1. Acrylic Enamel Systems

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a. Semi-Gloss Finish

- i. 1<sup>st</sup> and 2<sup>nd</sup> Coat: S-W PrepRite Block Filler, B25W25 (tinted and rolled in twice to fill all pits and pores completely, as required)
- ii. 3<sup>rd</sup> Coat: S-W Pro-Classic Waterborne Acrylic, B31W51 Series
- iii. 4<sup>th</sup> Coat: S-W Pro-Classic Waterborne Acrylic, B31W51 Series (4 mils wet, 2 mils dry per coat)

B. CONCRETE FLOORS – (Shop Floors, Utility Platforms, Custodial Spaces, Stairwells, Equipment Rooms, Boiler Rooms)

1. Urethane Systems

a. Gloss Finish (clear or colored as selected by Architect)

- i. Surface Prep: Pressure wash
- ii. 1st Coat: S-W Armorseal Rexthane I, B65-60 Series
- iii. 2nd Coat: S-W Armorseal Rexthane I, B65-60 Series (shop floors with anti-slip additive)

C. CONCRETE FLOORS – (Toilet Rooms)

1. Water Based Epoxy Resin System with Vinyl Chips (15 to 20 Mil system)

a. Gloss Finish (clear)

- iv. Surface Prep: Abrasion Blasting Surface Preparation as recommended by Sherwin Williams. Following abrasion blasting surface shall be inspected for holes, voids, fins, bumps, ridges and other imperfections. Protrusions shall be ground smooth while voids shall be filled with a system compatible filler.
- v. 1st Coat (Primer): S-W Armorseal 8100 resin and S-W Armorseal 8100 hardener
- vi. 2nd Coat (Bonding Coat): S-W Armorseal 8100 resin and S-W Armorseal 8100 hardener
- vii. 3<sup>rd</sup> Coat (Paint Chips): S-W GPS6750 - 1/16" pre-blended paint chips (aka color flakes) colors as selected by Architect or Owner broadcast to excess
- viii. 4<sup>th</sup> Coat (Grout Coat): S-W Armorseal 8100 Clear Ultradeep Base
- ix. 5<sup>th</sup> Coat (Top Coat): S-W Armorseal 8100 Clear Ultradeep Base
- x. 6<sup>th</sup> Coat (Stain Protection Coat): S-W Pro Industrial Water Based Acrolon 100

D. METAL - (Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous Structural Steel Members, Miscellaneous & Ornamental Iron, Sashes, Doors, Door Frames, Partitions, Cabinets, Lockers, Radiators, Wall Louvers, Pumps, Motors, Machines, Convector, Ducts [Ventilating], Elevator Cabs, Copper, Non-Galvanized Metal)

1. Alkyd Systems

a. Gloss Finish

- i. 1<sup>st</sup> Coat: S-W Kem Kromik Universal Primer, B50Z Series (6 mils wet, 3 mils dry)
- ii. 2<sup>nd</sup> Coat: S-W Industrial Enamel, B54Z Series
- iii. 3<sup>rd</sup> Coat: S-W Industrial Enamel, B54Z Series (4 mils wet, 2 mils dry per coat)

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2. Dryfall Alkyd Systems (EXPOSED STRUCTURE WHERE SCHEDULED)

a. Gloss Finish

- i. 1<sup>st</sup> Coat: S-W Kem Bond HS Metal Primer, B50Z Series (8 mils wet, 5 mils dry)
- ii. 2<sup>nd</sup> Coat: S-W Super Save Lite Dryfall Gloss, B47W65 (5 mils wet, 2 mils dry)

E. METAL - (Galvanized)

1. Alkyd Systems

a. Gloss Finish

- i. Surface Preparation: Refer to Part 3 Surface Preparations of these specifications for Cleaning & Testing/Evaluations; Manufacturer's guidelines and recommendations stand as requirements of this work.
- ii. 1<sup>st</sup> Coat: Pro-Cryl Universal Primer, B66-310 Series (10 mils wet, 4.0 mils dry film thickness)
- iii. 2<sup>nd</sup> Coat: S-W Industrial Enamel, B54Z Series
- iv. 3<sup>rd</sup> Coat: S-W Industrial Enamel, B54Z Series (4 mils wet, 2 mils dry per coat)

F. WOOD - Walls, Ceilings, Doors, Trim, Cabinet Work, Counters, Partitions, Frames [Including Sitka Spruce, Southern Pine, Douglas Fir, Cedar, Redwood, Luan]

1. Stained & Varnished (Clear Finish)

a. Open Grained Wood

- i. 1<sup>st</sup> Coat: S-W Interior Oil Stain, A48 Series
- ii. 2<sup>nd</sup> Coat: S-W Sher-Wood Natural Filler, D70T1
- iii. 3<sup>rd</sup> Coat: S-W Oil Base Varnish, Gloss A66V91
- iv. 4<sup>th</sup> Coat: S-W Oil Base Varnish, Gloss or Satin A66 Series

b. Closed Grain Wood

- i. 1<sup>st</sup> Coat: S-W Interior Oil Stain, A48 Series
- ii. 2<sup>nd</sup> Coat: S-W Oil Base Varnish, Gloss A66V91
- iii. 3<sup>rd</sup> Coat: S-W Oil Base Varnish, Gloss or Satin A66 Series (4 mils wet, 1.5 mils dry per coat)

G. WOOD - (Floors-Painted, Stained, Varnished, Gym Floors [New], Stage Floors, Heavy Duty Ballroom, Convention, Etc.)

1. Urethane System

a. Gloss Finish (Low Lustre Satin Sheen For Stage Flooring)

- i. 1<sup>st</sup> Coat: S-W Oil Stain (Ebony Stain for Stage Flooring)
- ii. 2<sup>nd</sup> Coat: S-W Polyurethane Varnish, A67V1/A67F1
- iii. 3<sup>rd</sup> Coat: S-W Polyurethane Varnish, A67V1/A67F1 (4 mils wet, 1.5 mils dry per coat)

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H. NON-TEXTURED SMOOTH DRYWALL (Walls, Ceilings, Gypsum Board, Wood Pulp Board, Plaster Board, Etc.)

1. Latex Semi-Gloss Finish

- i. Primer: ProMar 200 Zero VOC Latex Primer, B28W2600
- ii. 1<sup>st</sup> Coat: ProMar Zero VOC Interior Latex Semi-Gloss, B31-2600 series
- iii. 2<sup>nd</sup> Coat: ProMar Zero VOC Interior Latex Semi-Gloss, B31-2600 series

I. NON-TEXTURED SMOOTH DRYWALL **for all TOILET ROOMS** (Gypsum Board Walls)

1. Epoxy Semi-Gloss Finish

- i. Primer: ProMar 200 Zero VOC Latex Primer, B28W22600
- ii. 1<sup>st</sup> Coat: Pro Industrial Pre=Catalyzed Waterbased Epoxy Semi-Gloss, K46 Series
- iii. 2<sup>nd</sup> Coat: Pro Industrial Pre Catalyzed Waterbased Epoxy Semi-Gloss, K46 Series

J. NON-TEXTURED SMOOTH DRYWALL **for all TOILET ROOMS** (Gypsum Board Ceilings and Soffits)

1. Interior Latex Flat Finish

- i. Primer: ProMar 200 Zero VOC Latex Primer, B28W2600
- ii. 1<sup>st</sup> Coat: ProMar 200 Zero VOC Interior Latex Flat, B30-2600 Series
- iii. 2<sup>nd</sup> Coat: ProMar 200 Zero VOC Interior Latex Flat, B30-2600 Series

K. CANVAS PIPE WRAP (exposed to view)

1. Alkyd Systems

a. Flat Finish

- i. 1<sup>st</sup> Coat: S-W PrepRite 200 Latex Primer, B28W200 (add fungicidal agent) (4 mils wet, 1.2 mils dry)
- ii. 2<sup>nd</sup> Coat: S-W ProMar Alkyd Flat Wall Paint, B32WZ1101(4 mils wet, 2 mils dry)

### **PART 3: EXECUTION**

#### **INSPECTION:**

Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of manner acceptable to Applicator.

Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.

Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

#### **SURFACE PREPARATION:**

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General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.

Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry for 48 hours before painting. All surfaces must be dry and in sound condition prior to proceeding.

Wood: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.

Ferrous Metals: Clean ferrous surface, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

Touch-up shop-applied primed coats wherever damaged or bare, where required by other sections of these specifications. Clean and touch-up with same type shop primer.

Galvanized Surfaces:

Hot-Dipped Galvanizing: Allow hot-dipped galvanized items to weather 6 months prior to surface preparations, and then steam clean per SSPC-SP 1. Do not use hydrocarbon solvents, vinegar or other mild acids for cleaning hot dipped galvanized surfaces. After cleaning, perform spot testing for any manufacturer's pre-treatments, using the procedure from ASTM D2092, Method B201, Volume 06.01. After pre-treatments testing, apply 2' x 2' paint test patch for evaluation of paint surface adhesion. Evaluate the adhesion at three locations of the surface area, by performing a tape adhesion test per ASTM Method D3359. Grade the tape adhesion of the coating by following ratings as set forth in ASTM D3359-97.

Galvalume: Clean free of grease, oil, dirt, soil, and other surface contaminants with hydrocarbon free solvent cleaner. Perform a light brush blasting per SSPC-SP7 if necessary. After cleaning, apply 2' x 2' paint test patch for evaluation of paint surface adhesion. Evaluate the adhesion at three locations of the surface area, by performing a tape adhesion test per ASTM Method D3359. Grade the tape adhesion of the coating by following ratings as set forth in ASTM D3359-97.

Special Food Service Area Wall Preparation: Special preparation will be required to assure that required Food Service area CMU wall surfaces are pointed and patched in strict accordance with the drawing's CMU surface preparation General Notes for on-site approval by local Health Department. All work resulting from inspection comments and requirements are to be provided at no additional cost.

**MATERIALS PREPARATION:**

Mix and prepare painting materials in accordance with manufacturer's directions.

Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

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**APPLICATION:**

General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

Special Food Service Area Wall Application: Roll-in two coats of masonry block filler coating in Food Service areas as necessary to completely fill all pits and pores prior to application of top coats. Final finished topcoat in Food Service areas to be free of all pits and pores, with a smooth completely washable surface. Apply additional coats when final coat of paint does not uniformly fill all pits and pores. Provide all work described as necessary to obtain an on-site approval by local Health Department.

Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.

Sand lightly between each succeeding enamel or varnish coat.

Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise indicated.

Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to those items exposed in occupied spaces.

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

**CLEAN-UP AND PROTECTION:**

Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.

Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others by protection of their work, after completion of painting operations.

At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

**END OF SECTION 09900**

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**PART 1: GENERAL**

**RELATED DOCUMENTS:**

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this Section.

**INDUSTRY STANDARDS:**

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Section 01068.

Americans with Disabilities (ADA) Standards for Accessible Design.

**PART 1: GENERAL**

**DESCRIPTION OF WORK:**

Work required under this Section shall include furnishing, delivering, and storing solid plastic (HDPE) toilet partitions, as shown on drawings and specified herein.

**SUBMITTALS**

Submit under provisions of Section 01050.

Product Data: Manufacturer's printed literature indicating typical panel, pilaster, door, hardware and fastening.

Shop Drawings: Submit five sets of the following:

1. Dimensioned plans indicating layout of toilet compartments.
2. Dimensioned elevations indicating heights of doors, pilasters, separation partitions, and other components; indicate locations and sizes of openings in compartment separation partitions for toilet and bath accessories to be installed in partitions; indicate floor and ceiling clearances.
3. Details indicating anchoring components and methods for project conditions; indicate components required for installation, but not supplied by toilet compartment manufacturer.

Samples: Two manufacturer's color cards representing manufacturer's full color palette. Architect to select from manufacturer's full color line.

**DELIVERY, STORAGE AND HANDLING**

Store compartment components until installation in unopened cartons laid flat, with adequate support to ensure flatness and to prevent damage to prefinished surfaces.

**QUALITY ASSURANCE**

Do not deliver materials or begin construction activities of this section until building is enclosed, with complete protection from outside weather, and building temperature maintained at a minimum of 60 degrees Fahrenheit.

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Obtain accessory manufacturer's installation instructions and installation templates for toilet and bath accessories to be installed in compartment separation partitions; supply instructions and templates to installer before beginning construction activities of this Section.

All products and installation shall comply with all applicable ADA Standards (ANSI A117.1)

**PART 2: PRODUCTS**

**MANUFACTURERS**

Acceptable Manufacturers:

- AMPCO
- ASI
- Accurate
- American Sanitary Partitions
- Other manufacturers meeting the requirements of these specifications

**SOLID PLASTIC HDPE TOILET COMPARTMENTS**

- A. Shall meet CLASS B flame spread rating.
- B. Panel:
  - 1. Nominal thickness: 1" thick with uniformly machined edges.
  - 2. Finish: Architect selection from tough texture, pebble grained, and hammered
  - 3. Color: Architect selection from full color line including metallic
- C. Overhead Braced Pilasters:
  - 1. Nominal thickness: 1".
  - 2. Finish: Architect selection from tough texture, pebble grained, and hammered
  - 3. Edges: Machine Finished smooth.
  - 4. Color: Architect selection from full color line including metallic
  - 5. Pilaster installation hardware preparation: Two holes, diameter to accept 3/8 inch threaded rod, drilled into core at pilaster base end, parallel to pilaster vertical axis, intersecting centerlines of two holes, diameter to accept Plug-Loc® installation hardware, drilled through pilaster perpendicular to pilaster face and 1 inch from pilaster base end.
- D. Doors:
  - 1. Nominal thickness: 1".
  - 2. Finish: Architect selection from tough texture, pebble grained, and hammered
  - 3. Edges: Machine Finished smooth.
  - 4. Color: Architect selection from full color line including metallic
- E. Color: Selected from manufacturer's full color palette (see above).

**ACCESSORIES**

- A. Pilaster Shoes: Die-formed Type 304 stainless steel assembly, No. 4 satin finish, hemmed top and bottom edges.
- B. Pilaster Anchors: Manufacturer's standard floor anchor with leveling adjustment, concealed by pilaster shoe after installation.



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- C. Pilaster, Wall Panel and Urinal Screen Brackets: All wall terminations and intersections are to be manufacturer's standard, heavy duty, continuous bracket, bright anodized extruded aluminum, prepared for fastening hardware. Bracket to be full height, length equal to the total length of partition, screen and pilaster less pilaster shoe height.
- D. Overhead Bracing: Continuous heavy duty .125" thick extruded aluminum headrail with anti-grip device profile, with integral reinforcing channel and curtain track. Bright anodized finish and 2" minimum height. Provide headrail corner brackets, wall brackets, and headrail end caps.
- E. Door Hardware:
1. Door hinge: Heavy-duty 14 gauge stainless steel continuous hinge, self closing gravity type.
  2. Slide Latch: Heavy-duty, non-ferrous, cast stainless steel slide latch, satin finish, through-bolted.
  3. Strike and Keeper: Permitting emergency access by lifting the door until latch is clear of keeper; heavy-duty cast stainless steel, satin finish; through-bolted.
  4. Pull Handles: Heavy duty cast stainless steel with satin finish.
  5. Door Stops: Heavy duty cast stainless steel with satin finish.
  6. Coat Hook and Bumper: Non-ferrous, heavy-duty cast stainless steel, with black rubber tip for doorstop.
  7. Fastening Hardware: Manufacturer's heavy-duty, No.304 stainless steel, No.4 satin finish, through-bolts and attachment fasteners with tamper-resistant heads.
  8. Hardware of chrome-plated "Zamac" is unacceptable.
- F. Toilet and Bath Accessories for Installation in Compartment Separation Partitions: Specified Section 10800.

**PART 3: EXECUTION**

**EXAMINATION**

- A. Verification of Conditions:
1. Measure areas to receive compartments; verify area dimensions are in accordance with shop drawings.
  2. Verify built-in framing, anchorage, bracing, and plumbing fixtures are in correct location.
- B. Installer's Examination:
1. Have installer of this section examine conditions under which construction activities of this section are to be performed, then submit written notification if such conditions are unacceptable.
  2. Transmit two copies of installer's report to Architect within 24 hr of receipt.

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3. Beginning construction activities of this section before unacceptable conditions have been corrected is prohibited.
4. Beginning construction activities of this section indicates installer's acceptance of conditions.

**PREPARATION**

Surface Preparation:

1. Prepare openings in compartment separation partitions for toilet and bath accessories to be installed in partitions; marring of partition finish is prohibited.
2. Locate openings in accordance with shop drawings and accessory manufacturer's installation instructions and templates.

**INSTALLATION**

- A. Install compartments to specified tolerances in accordance with shop drawings and manufacturer's printed installation instructions.
- B. Attach components to adjacent materials and to other components using purpose-designed fastening devices.
- C. Adjust pilaster anchors for floor variations; conceal anchors with pilaster shoes.
- D. Equip each compartment door with top and bottom hinges, and door latch.
- E. Install door strike keeper on pilasters in alignment with door latch.
- F. Equip each compartment door with one coat hook and bumper.
- G. Installation Tolerances:
  - Maximum variation from plumb or level: 1/8 inch.
  - Maximum displacement from indicated position: 1/8 inch.
  - Clearance between wall surface and panels or pilasters: 1-1/2 inch maximum.

**ADJUSTING**

Adjust door hardware for uniform clearance between doors and pilasters.

Adjust door hinges to swing freely, to locate in-swinging doors in partial open position when unlatched; and to return out-swinging doors to closed position.

Adjust door hardware to align door strike keeper on each pilaster with door latch and to operate properly.

**PROTECTION OF INSTALLED PRODUCTS**

Prevent damage to product finishes by subsequent construction activities.

Remove and replace damaged products, components, etc. that cannot be successfully repaired, as determined by Architect.

Remove factory protective coverings and clean finish surfaces in accordance with manufacturer's instructions before final inspection.

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**CLEANING**

Clean surfaces per manufacturer's instructions. Do not use abrasives.

**END OF SECTION 10900**

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