

SPECIFICATIONS

ROSEBURG URBAN SANITRY AUTHORITY
WRF Vehicle and Equipment Storage Building

3845 W. Goedek Avenue.

Roseburg, OR

June 2024

PROJECT: WRF Vehicle and Equipment Storage
Building
3845 W. GOEDEK AVENUE
ROSEBURG, OR 97471

OWNER:

ROSEBURG URBAN SANITARY AUTHORITY
1297 NE GRANDVIEW DRIVE
ROSEBURG, OREGON 97470

RUSA MANAGER:

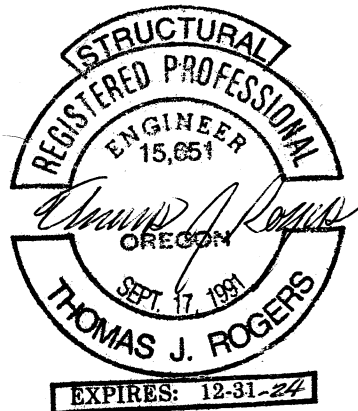
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SPECIFICATIONS FOR CONSTRUCTION OF WRF VEHICLE AND EQUIPMENT AND STORAGE BUILDING.

PART 1 GENERAL

1.01 SCOPE OF WORK:

The project consists of constructing a new 50 ft. by 120 ft. building for storage with a break room.

1.02 EXPLANATION OF CONTRACT DOCUMENTS:

The Conditions of the Contract and the General Requirements (Division 1) of these Specifications apply to the Work described under each Section hereof. The Contractor shall instruct each subcontractor to become fully familiar with them.

1.03 DIVISION AND PARAGRAPH NUMBERING:

Numbering and lettering of Divisions and Paragraphs in these Specifications are merely for identification and may not be consecutive. Divisions included are listed in the "Table of Contents." Contractor shall check his copies of the Project Manual with the Table of Contents to be sure they are complete.

1.04 ADDITIONAL DEFINITIONS

The term "Owner" means the "Roseburg Sanitary Authority" (RUSA).

The term "Project Manager" means the individual representing RUSA, and noted as Project Manager on the title sheet of these specifications.

Unless specifically noted otherwise, all notices and other correspondence with the Owner shall be directed to the attention of the Project Manager.

The term "approved" means "approved by the Project Manager and/or Engineer".

The term "for approval" means "for the Project Manager's and/or Engineer's approval".

The term "as directed" means "as directed by the Project Manager and/or Engineer".

The term "product" includes materials, systems, and equipment.

The term "furnish" means "supply and deliver to the project site".

The term "install" describes operations at the project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

The term "provide" means "furnish and install, complete, in place and ready for operation and use".

The term "Installer" means the Contractor or entity engaged by the Contractor, either as an employee, subcontractor, or sub-subcontractor for performance of a particular construction activity, including, installation, erection, application, and similar operations.

The term "selected" means "selected by the Project Manager and/or Engineer".

Where the words "or approved" are used, the Project Manager is the sole judge of quality and suitability of proposed substitution.

1.05 SUB-CONTRACTS:

Divisions of Specifications into trade Sections conforms roughly to customary practice. They are used for convenience only. The Project Manager and the Engineer are not bound to define limits of any subcontract and will not enter into disputes between the Contractor and his employees, including subcontractors.

1.06 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

Where references are made to other Sections regarding Related Requirements Specified Elsewhere, it is for the convenience of the Contractor only and shall not limit the Contractor's responsibility under other Sections not so referenced. As previously noted, each Section of the Specifications is bound by all applicable requirements of all Sections in Division 1.

1.07 WORDING OF SPECIFICATIONS:

These are abbreviated or "streamline" type specifications and frequently include incomplete sentences. The omission of words or phrases such as "The Contractor shall", "according to the drawings", "in conformity with", "shall", "shall be", "as noted", "a", "an", "and", are all intentional. Omitted words or phrases shall be supplied by inference, in the same manner as they are in the notes on the Drawings. Titles and headings

are frequently a part of the Specifications, and the same as the text of the article or paragraph. Where question arises as to wording in the Drawings and Specifications, consult the Engineer.

1.08 WORK COVERED BY CONTRACT DOCUMENTS:

Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, permits, fees, transportation, incidentals, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

1.09 CONTRACTS:

All Work shall be performed under a single contract. The General Contractor shall perform at least 51 percent of the Work.

1.10 WORK BY OTHERS:

Items specifically noted in the Contract Documents as:

1. "By Others"
2. "N.I.C." (Not in Contract)
3. "By Owner"

1.11 OWNER FURNISHED ITEMS:

- A. Items specifically noted: "Furnished by Owner"
- B. Owner furnished items shall be installed by the Contractor unless noted otherwise.

1.12 EXISTING CONDITIONS

The Contractor acknowledges that he has satisfied himself as to the nature and location of the Work, the general and local conditions, particularly those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, river stages, or similar physical conditions at the site, the conformation and conditions of the ground, the character, quality and quantity of surface and sub-surface materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the Work or the cost thereof under this Contract. Any failure by the Contractor to acquaint himself with all of the available information concerning these conditions will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the Work. The Engineer assumes no responsibility for any understanding or representations made during or prior to the bidding or execution of this Contract, unless (1) such understanding or representations are expressly stated in the Contract, and (2) the Contract expressly provides that responsibility therefore is assumed by the Engineer. Representations made, but not so expressly stated, and for which liability is not expressly assumed by the Engineer in the Contract shall be deemed only for the information of the Contractor and the Engineer shall not be liable or responsible therefore.

The Site information on the Drawings represents the best information available to the Engineer during preparation of the Contract Documents, but cannot be guaranteed to be complete to the bid date.

1.13 UNACCEPTABLE EXISTING CONDITIONS:

- A. Exposed to view, or noted in the Contract Documents, or otherwise accessible to verify prior to bid opening date:
 1. Repair or replace as part of this Work.
 2. No additional payments by Owner will be made.
- B. Concealed, and not accessible to verify prior to bidding:
 1. Repair or replace where necessary;
 2. Upon notification from Contractor, Owner will issue Change Order authorizing Contractor to perform this Work and Contract Sum will be adjusted accordingly.

1.14 CONTRACTOR USE OF PREMISES:

- A. The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents, and shall not unreasonably encumber the site with any materials or equipment.
- B. Confine operations to Project Areas directed by the Project Manager.
- C. Obtain Project Manager's permission for use of any existing facilities, utilities, areas, materials, etc., not specifically provided for the Contractor's use in the Contract Documents. Use of utilities is optional and not guaranteed available at all times by the Owner.

END OF SECTION

PART 1 GENERAL

1.01 QUALITY ASSURANCE

Specifications: The base bid specifications shall govern the Work of alternate bids unless noted otherwise.

1.02 SEQUENCE

Alternates are not necessarily listed as to preference, therefore Owner may select any of the following alternates in any order. Contractor to guarantee alternate bids for a minimum of 30 days from the date of bid.

1.03 DESCRIPTION OF ALTERNATES:

Alternate No. 1: Delete ceiling gypsum board and attic insulation in vehicle parking areas.

Alternate No. 2: Delete wall gypsum board, 8 ft. high plywood, and insulation in vehicle parking areas. Insulation in break room walls and plywood installed at exterior of break room installed as specified.

PART 1 GENERAL

1.01 SCOPE:

- A. Contractor is responsible for Project coordination.
- B. Cooperation between the various crafts and subcontractors shall be required for proper execution of the Work.
- C. Prior to the installation of materials or equipment with the Work of other Sections, by Owner, or by other contracts, verify the requirements of the other crafts, Owner, or other contract materials or equipment.
- D. Bring deviations to the attention of the Project Manager immediately.
- E. Maintain at the site, copies of all communications and directives from Authorities having jurisdiction. Notify Project Manager of all such communications and provide Project Manager with copies when requested.
- F. Neither the Project Manager nor the Engineer will interfere with the Contractor's right and responsibility to coordinate or divide the Work among the Subcontractors or to establish the extent of the Work to be performed by any Subcontractor. The Project Manager and the Engineer will not enter into disputes between the Contractor and his employees, including subcontractors.

1.03 SCHEDULES

A. Contractor's Construction Schedule:

Prior to proceeding with the Work, Contractor shall submit a proposed progress schedule. The progress schedule shall include dates of submission and dates reviewed submittals will be required for each product, as well as the dates for starting and completion of the various stages of construction.

Include critical dates for procurement of products. Indicate, at suitable scale, percentage of Work scheduled for completion at any time.

Enter actual progress on Chart prior to each progress payment for direct comparison with Schedule. If Contractor fails to deliver Schedule on time or properly update Schedule, with each payment request, Project Manager may withhold Progress Payment approval until such time as Contractor complies with these requirements.

Do not proceed with work at the site until Project Manager has approved the construction schedule.

If in Project Manager's opinion, Work progress falls behind approved Schedule, Contractor shall take necessary action to regain lost time. Contractor shall increase Work amount, or number of shifts, or establish overtime operations, or all of them, and submit for review Schedule revisions in which progress rate will be regained, all without additional cost to the Owner.

Contractor's failure to comply with any of these requirements shall be grounds for determination that the Contractor is not prosecuting the Work with such diligence as will insure Project completion within specified time. Upon such determination Owner may terminate Contractor's right to proceed with the Work, or any separable part thereof, in accordance with Contract Conditions.

B. Testing Schedule

Prior to proceeding with the Work, the General Contractor shall submit, for approval by the Project Manager, a schedule of required testing and Inspections, including the names addresses and phone numbers of the proposed testing agencies.

C. Schedule of Values

Before the first Application for Payment, the Contractor shall submit to the Project Manager a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to

substantiate its accuracy as the Project Manager may require. This schedule, unless objected to by the Project Manager, shall be used as a basis for reviewing the Contractor's Applications for Payment.

1.04 SUPERINTENDENT

- A. General Contractor shall identify a Superintendent (as defined in the General Conditions) which shall be on site and available as necessary to coordinate and direct construction.
- B. Superintendent shall not be changed or replaced prior to Final Completion of the project without the Project Manager's written consent.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.01 COORDINATION:

- A. Do all necessary work to receive or join work of all trades.
- B. Coordinate the Work to provide adequate clearances for proper installation and maintenance of materials and equipment.

END OF SECTION

PART 1 GENERAL

1.01 DESCRIPTION:

A. Related Work Specified Elsewhere

1. Substitutions and Product Options: Section 01 62 00
2. Closeout Submittals: Section 01 77 00

1.02 GENERAL REQUIREMENTS:

A. Submittals:

1. Submittals are defined as documents required by the Contract to be submitted to the Project Manager for review, and may include shop drawings, product data, samples, or a schedule of construction events.
2. Shop drawings, Product Data, Samples and other Submittals are not part of the Contract. Their purpose is to demonstrate, for those portions of the Work for which Submittals are required, the way the Contractor proposes to conform to the requirements of the Contract and the design concept expressed in the Contract.
3. The Contractor shall review, approve and submit to the Project Manager all Shop Drawings, Product Data, Samples and other Submittals required by the Contract regardless of whether the document originated with the Contractor or with some other subcontractor or supplier. They shall be submitted at the time required by the Contract, or, if no time is specified, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals made by the Contractor that are not required by the Contract may be returned without action or may not be returned at all.
4. Informational Submittals upon which the Project Manager is not expected to take responsive action may be so identified in the Contract.
5. The Project Manager's review of any Submittal does not relieve the Contractor from its responsibility to follow the requirements of the Contract. The Project Manager is not responsible for ensuring that Submittals are correct. Failure of the Project Manager to discover that a submittal varies from the requirements of the Contract Documents shall not relieve the Contractor of its responsibilities to conform to the Contract nor provide a basis for a change order. Nevertheless, the Project Manager shall review any Submittals provided in order to make a general determination about whether they appear to meet Contract requirements or the intended design of the project. The Contractor remains responsible for following the contract, including, but not limited to:
 - a. Confirming and correlating all dimensions;
 - b. Fabricating and construction techniques;
 - c. Coordinating the work with that of all other trades and subcontractors;
 - d. Satisfactorily performing the Work in strict accordance with the contract documents;
 - e. The means and methods of construction;
 - f. Conforming to all the requirements of the Contract.

B. Submittals Shall Include:

1. Date and revision dates.
2. Project title and number.
3. Name of Contractor, Supplier and Manufacturer.
4. Identification of product material.
5. Relation to adjacent structure or material.
6. Field dimensions, clearly identified as such; other dimensions critical to product installation, or relevant to installation of other adjacent products.
7. Specification Section number.
8. Applicable standards such as ASTM, Federal Specification, etc.
9. Identification of deviations from Contract Documents.
10. Contractor's note or stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract Documents.
11. Transmittal letter with all submittals containing: the number of drawings, data or samples submitted; notification of deviation from the Contract Documents; other pertinent data.

PART 2 - PRODUCTS

2.01 SHOP DRAWINGS:

- A. Defined as: Original drawings prepared by the Contractor, Subcontractor, Supplier or Distributor which illustrate some portion of the Work; showing fabrication, layout, setting or erection details.
- B. Prepared by qualified detailer.
- C. Identify details by reference to contract sheet and detail number.
- D. Minimum size sheet 8"x11", maximum 24"x36".

2.02 PRODUCT DATA:

- A. Defined as: Illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.
- B. Manufacturer's standard schematic drawings;
 - 1. Modify to delete extraneous information.
 - 2. Supplement standard information as applicable to project.
- C. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data;
 - 1. Clearly mark each copy to identify pertinent materials, products or models.
 - 2. Show dimensions, weights, and clearances required.
 - 3. Show performance data.

2.03 SAMPLES:

- A. Defined as: Physical examples to illustrate materials, colors, equipment or workmanship, and to establish standards by which completed work is judged.
- B. Office Samples: Sufficient size and quantity to illustrate:
 - 1. Functional characteristics of product or material, with integrally related parts and attachment devices.
 - 2. Full range of color samples.
- C. Field samples and mock-ups:
 - 1. Erect at Project site in location acceptable to the Project Manager.
 - 2. Include work of all trades required in finished work.
 - 3. After review, approved field samples may be used in construction of Project.

PART 3 - EXECUTION

3.01 CONTRACTOR'S RESPONSIBILITY:

- A. Review submittals prior to submission to Project Manager. When tendering a Submittal for review, the Contractor represents that it has determined and verified materials, field measurements and field construction criteria related thereto, or shall do so, and has checked and coordinated the information contained with such Submittals with the requirements of the Work and of the Contract. The Contractor shall expressly note where any submittal differs from or varies from the requirements of the Contract, notwithstanding any belief on the part of the Contractor that the variance is obvious.
- B. Verify: field measurements, field construction criteria, catalog numbers and similar data.
- C. Coordinate with requirements of Work and Contract Documents.
- D. Contractor's responsibility for errors and omissions in submittals is not relieved by Project Manager's or

Engineer's review of submittals.

- E. Contractor's responsibility for deviations from the Contract Documents is not relieved by review of submittals unless Project Manager gives written acceptance of specific revisions expressly requested by the contractor.
- F. Begin no work which requires submittals until return of submittals with appropriate stamp and initials or signature indicating approval.

3.02 SUBMISSION REQUIREMENTS:

- A. Submit at least 14 days before the date each reviewed submittal is needed.
- B. Submit copies of shop drawings and product data which the Contractor requires for distribution plus 2 copies which the Project Manager will retain.
- C. Unless a greater quantity is specified in the various Specifications Sections, submit the number of Office Samples Contractor requires for distribution plus 2 of all Office Samples which the Project Manager will retain.

3.03 ENGINEER'S REVIEW: The Engineer shall have seven (7) days to review any Submittals. The Engineer shall review the Submittals and return them to the Contractor stamped with one of the following notations:

- A. "APPROVED": This means that the Contractor immediately can begin the work encompassed by the Submittal.
- B. "APPROVED AS CORRECTED": This means the Contractor is required to make any revisions suggested by the Engineer and, upon correction, may immediately begin the work indicated by the Submittal or may incorporate the material or equipment covered by the Submittal into the Work.
- C. "REVISE AND RESUBMIT": This means the Contractor is required to revise the Submittal and resubmit it to the Engineer. No work shown on the Submittal, or which is dependent upon approval of the Submittal or material or equipment covered by the Submittal, may be incorporated into the Work until the Contractor has made the necessary revisions, resubmitted the Submittal and received the Submittal back marked either "APPROVED" OR "APPROVED AS CORRECTED"
- D. "NOT APPROVED": This means that the Engineer has found the Submittal, material or product data to be unacceptable and not in conformance with the Contract. Generally speaking, rejection of a Submittal simply indicates the Engineer's belief that the defects in the Submittal are so great that it cannot be revised in order to make it conform to the Contract. The Contractor may not begin work indicated by the Submittal, nor incorporate material or equipment, nor proceed with Work dependent upon approval of the Submittal, into the Work based on any Submittal, product data or material that has been marked "NOT APPROVED."
- E. "SUBMIT SPECIFIED ITEM": This means that additional information is required to permit a full review. Work may begin on incorporating the material or equipment covered by the Submittal into the Work, only if it is not affected by the item to be submitted. However, if any material or equipment is affected by the item to be submitted, then no work may begin until the Submittal is resubmitted and returned marked either "APPROVED" or "APPROVED AS NOTED."

3.04 RESUBMISSION REQUIREMENTS:

- A. Revise initial drawings as required and resubmit as specified for initial submittal.
- B. Indicate changes which have been made other than those requested by the Engineer.

END OF SECTION

PART 1 GENERAL

1.01 GENERAL

All Products and Execution of the Work shall comply with Reference Standards as specified and defined herein and as supplemented in the respective Sections of the Specifications.

1.02 REFERENCE STANDARDS

- A. The term Reference Standards as used throughout these specifications shall include Standard Specifications, Manufacturer's Directions or recommendations, and all applicable Codes, Policies, Regulations, and Ordinances, issued by authorities having jurisdiction.
- B. Reference Standards listed in the respective Sections of the Specifications shall be in addition to Reference Standards specified in this Section.

1.03 STANDARD SPECIFICATIONS

Reference herein to specifications issued by organizations or governmental bodies shall mean edition current on date of Invitation to Bid, unless otherwise noted. Wherever reference standard specifications contain provisions which conflict with these Contract Documents the Contract Documents shall govern.

Reference to ES reports, shall include current evaluation reports recognized by ICC, whether originated by ICBO, ICC, BOCA or other recognized code agency.

Comply with applicable Federal, State and Local Standards for VOC limitations, hazardous materials, etc.

1.04 MANUFACTURER'S DIRECTIONS

- A. All manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned, protected, and conditioned as directed by the manufacturer's printed instructions, unless specifically instructed to the contrary in writing by the Project Manager.
- B. The Contractor shall provide all accessories, incidentals, processes and labor required to complete the installation as provided in the manufacturer's recommendations.
- C. Should any provision in these Contract Documents be in conflict with manufacturer's recommendations, or in any other way reduce or nullify the manufacturer's warranty or responsibility, notify the Project Manager in writing prior to ordering the respective manufacturer's product.

1.05 CODE REQUIREMENTS

- A. The requirements of the Oregon Structural Specialty Code, Oregon Plumbing Specialty Code, Oregon Mechanical Specialty Code, the Oregon Electrical Specialty Code, the Oregon Fire Code, and the Oregon Energy Efficiency Specialty Code; current editions, shall govern all construction.
- B. Comply with all applicable local, State, and Federal environmental regulations.
- C. Comply with all applicable safety codes, including but not limited to the "Oregon Occupational Safety and Health Code", and Workmen's Compensation Board OAR 437-83-2754 and 2755.

END OF SECTION

PART 1 GENERAL

1.01 ABBREVIATIONS:

- A Reference to technical society, institutional, association or governmental authority is made in accordance with the following:

AA	Aluminum Association
AAMA	American Architectural Metals Assoc.
ACI	American Concrete Institute
ADA	Americans with Disabilities Act
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AITC	American Institute of Timber Construction
ANSI	American National Standards Institute
APA	American Plywood Association
ARI	Air-Conditioning and Refrigeration Institute
ARMA	Asphalt Roofing Manufacturer's Assoc.
ASHRAE	American Society of Heating, Refrigeration & Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Society
AWPA	American Wood Preservers' Assoc.
AWS	American Welding Society
AASHO	American Association of State Highway Officials
CPSC	Consumer Product Safety Commission
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard of the U.S. Dept. of Commerce
CSI	Construction Specifications Institute
CTI	Ceramic Tile Institute of America
DOC	Department of Commerce
EPA	Environmental Protection Agency
FCC	Federal Communications Commission
FDA	Food and Drug Administration
FHA	Federal Housing Administration (of HUD)
FS	Federal Specifications (from GSA)
GA	Gypsum Association
GSA	General Services Administration
HUD	U.S Dept. of Housing and Urban Development
IBC	International Building Code (as modified by OSSC)
ICBO	International Conference of Building Officials
ICC	International Code Council
KCMA	Kitchen Cabinet Manufacturers Assoc.
NAAMM	National Association of Architectural Metal Manufacturers
NCMA	National Concrete Masonry Association
NEC	National Electrical Code
NECA	National Electrical Contractors Assoc.
NEMA	National Electrical Manufacturers Assoc.
NFPA	National Fire Protective Association, Inc.
NRCA	National Roofing Contractors Association
OSHA	Occupational Safety and Health Administration
OSHC	Oregon State Highway Commission
ORSC	Oregon Residential Specialty Code (2014 ed)
OSSC	Oregon Structural Specialty Code (2014 ed.)
PS	Product Standard, U.S. Dept. of Commerce
SIGMA	Sealed Insulating Glass Manufacturers Assoc.
SDI or S.D.I.	Steel Door Institute or Steel deck Institute (depending on context)
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc.
TCA	Tile Council of America
UL	Underwriter's Laboratories, Inc.
UBC	Uniform Building Code (as modified by OSSC)
USDA	U. S. Department of Agriculture
WCLIB	West Coast Lumbermen's Inspection Bureau
WWPA	Western Wood Products Association

- B. Other abbreviations used in these documents are in accord with ANSI Y1.1 "Abbreviation for Use on Drawings and in Text", or are indicated in the Drawings or respective sections of the Specifications.

1.02 SYMBOLS AND MISCELLANEOUS ABBREVIATIONS

ACM	Aluminum Composite matl.	GYP	Gypsum	SL	Structural line (Metal Bldg)
BD	Board	GB, GBD or GYP.BD	= Gypsum Board	SG	Semi-Gloss
BOT	Bottom of	HPL	high pressure plastic lam	SQ	Square
B.U.	Built-Up			SS or S.STL.	Stainless Steel
C/C	Center to center	ILO	In lieu of	STL	Steel
CJ	Ceiling Joist(s)	IN	Inches	SW	Sidewalk
CONC.	Concrete	ISF	Inside Face	TO	Top of, eg. T0.PL
CMU	Conc. masonry units	LB or #	Pounds	TC	Top of Curb
CMP	Corrugated metal panel	LSL	Laminated strand lumber	T&B	Top and Bottom
EA.	Each	LVL	Laminated veneer lumber	UNO	Unless Noted Otherwise
E/W	Each Way	Matl.	Material	WD	Wood
E.N.	Edge nailing (sheathing)	MAX.	Maximum	WP	Water Proof
ENAM	Enamel	MIN.	Minimum	W/	With
ES	ICC Evaluation Service report	MTL	Metal	W/O	Without
FNDN	Foundation	NTS	Not to Scale	WR	Water Resistant eg. WR.GB
FO	Face of; eg FO.CMU	OC	On Center	"	Inches or second
FOM	Face of Masonry	OSB	Oriented Strand Board	'	Feet or Minute
FOC	Face of Concrete or Curb	OSF	Outside Face	+	Plus
FOS	Face of Studs	PG	Paving Grade or Page	-	Minus
FSH	Face of sheathing	PL or	Property Line or Plate	/	Per; eg lb/sf
FT	Feet	P.LAM or HPL	Plastic laminate.	#	Number or Pounds
FTG	Footing	PSF	Pounds/sq.ft.	X	By ; eg. 2 x 4
GVP	Gypsum Veneer Plaster	PSI	Pounds/ sq.in.	%	Percent
G.I	Galvanized Steel / Iron	PSL	Parallel strand lumber	@	At

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for quality-control services.
- B. Quality control services include inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Engineer and Project Manager.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 2. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.
 3. Requirements for Contractor to provide quality-control services required by Engineer, Project Manager, or authorities having jurisdiction are not limited by provisions of this Section.
- E. Repair and restore construction disturbed by inspection and testing activities.
- F. Related Sections: The following Sections contain requirements that relate to this Section:
1. Section 01 73 29 Cutting and Patching
 2. Section 01 31 13 Coordination.
 3. Section 03 20 00 Concrete Reinforcement.
 4. Section 03 30 00 Cast-In-Place Concrete

1.03 RESPONSIBILITIES

- A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. Costs for these services are included in the Contract Sum.
1. Inspections and testing required by the OSSC and in particular OSSC Chapter 17 relating to Structural Tests and Special inspections are applicable to this project. Inspections and Tests required by OSSC shall be the Contractor's responsibility unless specifically indicated elsewhere in the contract documents to be the Owner's responsibility. Costs for these services will be paid by the Owner.
 2. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Contractor's responsibility, the Contractor shall employ and pay a qualified independent testing agency to perform quality-control services. Costs for these services are included in the Contract Sum.
 3. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Owner's responsibility, the Owner will employ and pay a qualified independent testing agency to perform those services. The Contractor shall coordinate and cooperate with the Owner's testing agency.

- B Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.
1. The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.
- C. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
1. Provide access to the Work.
 2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
 3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
 4. Provide facilities for storage and curing of test samples.
 5. Deliver samples to testing laboratories.
 6. Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
 7. Provide security and protection of samples and test equipment at the Project Site.
- D. Duties of the Testing Agency: The independent agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Engineer, Project Manager, and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.
1. The agency shall notify the Engineer, the Project Manager, and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
 3. The agency shall not perform any duties of the Contractor.
- E. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities, and shall include these events in the Contractor's Construction Schedule. Times for proposed inspections, tests, and sampling shall be incorporated into the Contractor's Construction Schedule."

1.04 SUBMITTALS

- A. Testing Schedule
Prior to proceeding with the Work, the General Contractor shall submit, for approval by the Project Manager, a schedule of required testing and Inspections, including the names addresses and phone numbers of the proposed testing agencies.
- B. Unless the Contractor is responsible for this service, the independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Engineer and Project Manager If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.
1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
 2. Submit a final report with closeout submittals, documenting all required special inspections and correction of any discrepancies noted in the inspections. This may be a copy of report required by OSSC 1704.1.2.

3. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
- a. Date of issue.
 - b. Project title and number
 - c. Name, address, and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making the inspection or test.
 - f. Designation of the Work and test method.
 - g. Identification of product and Specification Section.
 - h. Complete inspection or test data.
 - i. Test results and an interpretation of test results.
 - j. Ambient conditions at the time of sample taking and testing.
 - k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
 - l. Name and signature of laboratory inspector.
 - m. Recommendations on retesting.

1.05 QUALITY ASSURANCE

- A. Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are prequalified as complying with the American Council of Independent Laboratories' Recommended Requirements for Independent Laboratory Qualification and that specialize in the types of inspections and tests to be performed.
1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.

PART 2- PRODUCTS (Not Applicable)

PART 3- EXECUTION

3.01 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.
- C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE:

A. Removal of temporary facilities: 01 74 00 CLEANING & WASTE MANAGEMENT

1.02 REQUIREMENTS OF REGULATORY AGENCIES:

A. Comply with all applicable codes, ordinances and laws. Pay all permits and fees required for temporary facilities and controls.

1.03 UTILITIES:

A. Temporary Heat:

1. Furnish as required to protect the work, and to provide proper conditions for installation and curing of work of the respective trades.
2. The General Contractor shall provide all fuel or energy for temporary heat generated by independent heating devices and shall be responsible for all damage to the building, its contents and persons.
3. Fuel or energy for operation of the permanent heating equipment until the date of Substantial Completion shall be paid for by the Owner.

B. Temporary Lights and Power:

1. Furnish adequate lights and power for safe working conditions, as required by O.S.H.A. or other applicable regulatory agencies.
2. Temporary power and light service equipment, installation, and fees paid for by the General Contractor.
3. Each Contractor shall provide extension cords and lamps as necessary for the work under his contract, and shall provide his own connections to and extensions from the power panel.
4. When available and approved by the Project Manager, the Contractor may use Owner provided power available at the construction site. Power provided by the Owner is not guaranteed at all times due to unforeseen outages. Cost of electrical power provided by the Owner will be paid for by the Owner.

C. Temporary Toilets:

1. Contractor responsible to meet all State and Local requirements for sanitary facilities.
2. Provide adequate toilet facilities for all those connected with the project.
3. Maintain in sanitary condition.
4. Remove when directed and disinfect the premises.

D. Water:

1. Provide from a proven safe drinking source for all those connected with the work; serve in single service containers or drinking fountain.
2. When available and approved by the project manager, the Contractor may use Owner provided water for construction. Cost of Owner provided water will be paid for by the Owner.

1.04 CONSTRUCTION AIDS:

A. Provide all necessary construction aids, including, but not limited to ladders, ramps, hoists, runways, etc.

B. Contractor shall be responsible for all such apparatus, equipment and construction meeting the requirements of labor and State and local laws.

1.05 BARRIERS:

- A. Construct barricades, fences, railings, and similar safety precautions in accordance with, but not necessarily limited to applicable safety codes, including but not limited to the "Oregon Occupational Safety and Health Code", and WCD Administrative Rules 437-83-2754 thru 437-83-2755.
- B. Project Limits Barricade: At Contractor's option.

1.06 PROJECT ACCESS LOCATIONS:

- A. Limit to locations approved by the Project Manager or noted on the drawings.
- B. Upon completion of the Project restore to original condition, unless noted otherwise.

1.07 SPECIAL CONTROLS:

- A. Noise Control: The Contractor shall prevent all unnecessary noise from his operations and those from his employees and subcontractors.
- B. Dust Control: During the entire period of construction, the Contractor shall exercise all reasonable and necessary means to abate dust. Necessary sprinkling and wetting shall be performed so that the site will not become excessively dusty at any time and the amount of dust carried in the air will be kept to a minimum.
- C. Water Control: Perform pumping, trenching, damming, and underdraining necessary to keep site free from water during construction. Dispose of water in a manner acceptable to local regulation, taking care that no existing water disposal facilities are impeded, clogged, damaged, or interfered with in any way.
- D. Rubbish and Debris: Allow no excess accumulation of non-reusable material at the job site. Dispose of accumulations of rubbish and debris in a satisfactory manner, in accordance with the rules and regulations of the pollution control agencies having jurisdiction.
- E. Protection of Existing Improvements:
 - 1. The Contractor is hereby cautioned and notified that he is responsible for the protection of existing improvements which are to remain in place, throughout the execution of this contract. Temporary enclosures, walls, covers, or other protection shall be provided and maintained.
 - 2. Excavation and grading operations shall be conducted in such a manner that the streets, curbs, sewers, storm drains, utilities and other public and private facilities and improvements which are to remain in place permanently, or which are to remain in place temporarily during the performance of the contract work, will not be subject to damage, vertical settlement or horizontal movement. The Contractor shall furnish and install sheet piling, cribbing, bulkheads, shores, and other protective means as necessary. When no longer required, they shall be removed and disposed of by the Contractor.
 - 3. At points where the Contractor's operations are adjacent to or cross properties of railways, telegraph, telephone, power, gas, oil and water companies, or are adjacent to other property, (damage to which might result in significant expense, loss or inconvenience) no work shall be started until all arrangements necessary for the protection thereof have been made.
 - 4. The Contractor shall be solely and directly responsible to the Owners and Operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damages which result from carrying out the work to be done under the contract.

1.08 RESTORATION OF EXISTING IMPROVEMENTS:

- A. Restoration of Damage: Except as shown on the plans or as provided elsewhere in these specifications, the Contractor shall at his expense repair or replace curbs, sidewalks, driveways, utilities, street surfaces, plant materials, and any and all structures, substructures, and finishes damaged by his operations. This requirement extends to all such work now in place or completed prior to the time damage is incurred. These repairs and replacements shall be similar and equal in every respect to the original work, and acceptable to the Project Manager.
- B. Restoration of Services: In the event of interruption to domestic water, or to other utility services as a result of the Contractor's operations, the Contractor shall promptly notify the proper authority. He shall cooperate with said authority in restoration of service as promptly as possible, and shall bear all costs of repair. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior approval is received.

1.09 FIELD OFFICE BUILDING:

- A. The General Contractor shall provide a weather tight office building on the premises, where directed, for joint use of the Contractor, the Engineer, and Project Manager.
- B. Provide layout table for drawings; adequate light; storage for protection of Project Record Drawings.
- C. Remove from premises upon completion of the Project, or sooner if requested.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE:

- 01 41 13 Codes and Standards
- 01 33 23 Shop Drawings, Product Data, and Samples
- 01 62 00 Substitutions and Product Options

1.02 PRODUCT DELIVERY STORAGE AND PROTECTION

A. Transportation and Handling:

1. Timing: Arrange Product deliveries in accord with Construction Progress Schedule; coordinate to avoid conflict with Work and site conditions.
2. Delivery and inspection: Deliver Products undamaged, in Manufacturer's original containers or packaging, and with legible identifying labels intact. Immediately upon delivery, inspect shipments to assure that Products are properly protected and undamaged.

B. Storage and Protection:

1. General: Follow Manufacturer's instructions. Maintain product identity labels legible and intact. Store Products subject to weather damage in weather tight enclosures. Maintain storage at room temperature and humidity within ranges required by Manufacturer's recommendations.
2. Exterior Storage: Store fabricated Products above ground, on blocking or skids; prevent Product damage and discoloration. Cover Products subject to deterioration with impervious sheet coverings; provide adequate ventilation to prevent condensation.
3. Inspection of Stored Products: Arrange storage to permit easy access for inspection. Make periodic inspections of stored Products to assure that Products are maintained as specified and are free from damage, discoloration, and deterioration.
4. Protection after Installation: Provide substantial coverings as necessary to protect installed Products against damage. Remove covering when no longer needed.

1.03 INAPPROPRIATE PRODUCTS AND METHODS:

- A. Should any materials be found to be contrary to the Contract, the material no matter in what stage of completion, may be rejected by the Project Manager and if rejected shall be removed from the site at once.
- B. If the Contractor believes that any specified product, method, or system is inappropriate for use, or any specified result cannot be achieved, he shall so notify the Project Manager at least 7 days prior to Bid opening, or prior to execution of the Agreement if the project is not bid. Failure to deliver such notice of objection within the specified time limit, shall for the purposes of this Contract, establish that the Contractor agrees that the specified products, methods, or systems are appropriate, and achievable, and the Contractor's responsibility to provide and warrant such product, method, or system shall not later be voided or reduced. If after the agreement is signed, the Contractor notifies the Project Manager that a specified result, product, or system cannot be provided, then it shall be the Contractor's responsibility to provide a substitute which is acceptable to the Project Manager.

PART 2 PRODUCTS

2.01 NUMBER OF ITEMS SPECIFIED:

Wherever in these specifications an article, device, or equipment is referred to in the singular number, such reference shall apply to as many such articles as are shown on the Drawings or are required to complete the installations.

2.02 CONFORMANCE WITH SPECIFIED PRODUCT DESCRIPTIONS

- A. Conform to applicable Specifications and Reference Standards.

- B. Furnish all materials of a kind by one manufacturer, except component parts of an assembly need not be the product of a single manufacturer unless otherwise indicated.
- C. Furnish all items new and free from defects, of size, type, and quality specified.
- D. Refer to Section 01 62 00 for requirements concerning proprietary specifications and product options.
- E. Items shown on the drawings, but not otherwise described or noted, shall be provided in conformance with applicable code requirements.

PART 3 EXECUTION

3.01 PREPARATION AND INSPECTION

- A. No Product shall be applied or installed until conditions and surfaces are acceptable to Applicator or Installer. Prior to ordering products, field verify existing conditions and dimensions critical to product installation.
- B. Notify Project Manager of unacceptable condition or surfaces.
- C. Failure to notify Project Manager of unsatisfactory condition or subsurface before Work is started shall place full responsibility for final results upon the installer or applicator. This shall not relieve the General Contractor from any responsibilities under this Contract.
- D. Prior to covering, concealing or otherwise affecting the Work of other trades, verify with General Contractor that the Work of the other trade is complete and may be so concealed, covered, or affected. A Subcontractor who fails to make such verification shall assume complete responsibility for any necessary corrective measures. This requirement shall not relieve the General Contractor from any responsibilities under this Contract.

3.02 MANUFACTURER'S INSTRUCTIONS:

Perform Work in accord with manufacturer's instructions. Do not omit preparatory or installation procedures required by Manufacturer, unless specifically modified or exempted by Contract Documents. When Contract Documents require Work to comply with Manufacturer's instructions, obtain and distribute such instructions to parties performing Work, and if requested, include copy to the Manager. Maintain one copy of Manufacturer's instructions at job site during installation and until acceptance. Handle, install, connect, clean, condition, and adjust Products in strict accordance with Manufacturer's instructions and in conformance with specified requirements. Should job conditions or specified requirements conflict with Manufacturer's instructions, consult Project Manager for further instructions. Do not proceed with Work without clear instructions.

3.03 RESTORATION OF DAMAGE:

Except as shown on the plans or as provided elsewhere in these specifications, the Contractor shall at his expense repair or replace curbs, sidewalks, driveways, utilities, street surfaces, plant materials, and any and all structures, substructures, finishes and other work damaged by his operations. This requirement extends to all such work now in place or completed prior to the time damage is incurred. These repairs and replacements shall be similar and equal in every respect to the original work, and acceptable to the Engineer and Project Manager.

END OF SECTION

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE:

01 33 23 Shop Drawings Product Data and Samples
01 60 00 Product Requirements

1.02 PRODUCTS LIST

Before Contractor's first request for payment, submit to Project Manager complete list of major Products proposed for use; include proprietary names, Manufacturer's name, and installing subcontractor's name.

1.03 CONTRACTOR'S OPTIONS

- A. Definition of Descriptive Specification: For the purposes of this Contract Descriptive Specification shall mean one or more listed requirements describing a Product, or reference to Standard Specifications or Standards issued by a named Agency, Manufacturer or similar Organization.
- B. For Products specified only by Descriptive Specifications select any product meeting specified requirements.
- C. For Products specified by listing proprietary names of Products:
1. If no Descriptive Specification is included, select any named Product.
 2. If descriptive specification is included it shall take precedence. Contractor shall verify with supplier that the named Product may be provided to meet the requirements of the descriptive specification including requirements in addition to named manufacturers regular standards. If Product cannot be provided to meet the specifications, notify Project Manager at least seven days prior to Bid Opening, or prior to execution of the Agreement if the Project is negotiated. Failure to deliver such notice within the specified time limit shall for the purposes of this Contract establish that the Contractor has made the required verifications, and he shall be responsible either to provide the Product as specified, or to provide an approved substitute Product at no additional cost to the Owner.
- D. Items shown on the drawings, but not otherwise described or noted, shall be provided in conformance with applicable code requirements.

1.04 SUBSTITUTIONS:

- A. Submit requests for substitution approvals are to be submitted by the Contractor. Submit two copies and include complete data substantiating compliance of proposed substitution with Contract Documents as follows:
1. Identity of product for which substitution is requested, including specification page and paragraph.
 2. Identity of proposed substitution, including drawings, photographs, performance and test data, and any other information necessary for evaluation.
 3. Quality comparison of proposed substitution with specified product.
 4. Changes required in other Work because of substitution.
 5. Effect on Construction progress schedule.
 6. Cost comparison of proposed substitution with specified product.
 7. Any required license fees or royalties.
 8. Availability of maintenance service.
 9. Source of replacement materials.
- B. In making request for substitution, Contractor represents:
1. He has personally investigated proposed Product, and determined that it is equal to or superior in all respects to that specified.
 2. He will provide the same guarantee for substitutions as for product specified.
 3. He will coordinate installation of proposed substitution into Work, making such changes as may be required for the Work to be complete in all respects.
 4. He waives all claims for additional costs related to substitution which consequently become apparent.
 5. Data submitted with substitution request is complete and accurate.

C. During Bidding Period:

1. No request for approval will be considered unless submitted in accordance with C2 of the invitation to bid.
2. Project Manager will issue addenda prior to Bid Opening listing all approved substitutions.

D. After Contract Award approval will be granted only when:

1. Specified product cannot be delivered without project delay, or
2. Specified product has been discontinued, or
3. Specified product has been replaced by a superior product, or
4. Specified product cannot be guaranteed as specified, or
5. Specified product will not perform properly, or
6. Specified product will not fit within the designated space, or
7. Specified product does not comply with governing codes or regulations, or
8. Substitution will be clearly in Owners interest.

E. Substitutions will not be considered if:

1. They are indicated or implied on shop drawings or project data submittals without formal request for substitution as described herein above.
2. Acceptance will require substantial revision of the Contract Documents.
3. Project Manager does not agree that the proposed substitution meets the requirements listed herein above.

SUBSTITUTION REQUEST FORM

TO: Jim Baird, Manager
1297 NE Grandview Drive
Roseburg, OR 97470

PROJECT: WRF Vehicle and Equipment Storage Building

We hereby submit for your consideration the following product instead of the specified item for the above project:

Section	Paragraph	Specified Item
---------	-----------	----------------

Proposed Substitution:

Attached data includes product description, specifications, drawings, photographs, performance and test data, adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes description of changes to Contract Documents which proposed substitution will require for its proper installation.

The Undersigned also states that the following paragraphs, unless modified on the attachments, are correct.

1. The proposed substitution does not affect dimensions shown on the Drawings.
2. The Undersigned will pay for changes to the building design, including engineering, design, detailing, and construction costs caused by the requested substitution.
3. The proposed substitution will have no adverse effect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.

Submitted by:

Signature	For Use by Design Consultant	
	[] Accepted	[] Accepted as Noted
Firm	[] Not Accepted	[] Received Too Late

Address _____ By _____

Telephone _____ Date _____

Remarks _____

Attachments:

END OF SECTION

PART 1 GENERAL**1.01 DESCRIPTION:****A. Related requirements specified elsewhere:**

1. Section 01 11 00: Summary of Work
2. Section 01 31 13: Coordination
3. Section 01 50 00: Temporary Facilities and Controls

B. Execute cutting, patching and fitting required to:

1. Make all Work fit properly.
2. Uncover Work to provide for installation of ill-timed Work.
3. Remove and replace defective Work, or Work not conforming to the Contract Documents.
4. Repair and restore construction disturbed by inspection and testing activities.

1.02 PAYMENT FOR COSTS:

Costs caused by defective or ill-timed Work or Work not conforming to the Contract Documents, including costs of additional professional services shall be borne by the Contractor.

PART 2 PRODUCTS

2.01 Materials for the replacement of Work removed shall comply with the Contract Documents for type of Work to be done.

PART 3 EXECUTION**3.01 PREPARATION AND PROTECTION:**

- A. Obtain written permission from Engineer or his representative prior to removing, bending, boring, or making cuts or cores in any structural element other than as specifically indicated in the Drawings and Specifications.
- B. Provide shoring, bracing and support as required to maintain structural integrity of the Project.
- C. Provide protection for other portions of the Project, including protection from the weather or other sources of damage.

3.02 PERFORMANCE:

- A. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances and finishes.
- B. Execute cutting and demolition work by methods which will prevent damage to other Work, and will provide proper surfaces to receive installation of repairs and new Work.
- C. Restore Work which has been cut or removed; install new products to Provide completed Work which is in compliance with the Contract Documents.
- D. Refinish entire surfaces as necessary to provide an even finish, to nearest intersections. Unless noted or detailed otherwise repairs and replacements shall match existing adjacent surfaces,

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE:

Rubbish Control and removal: Section 01 50 00 Temporary Facilities
Project Closeout: Section 01 77 00

PART 2 PRODUCTS

2.01 CLEANING MATERIALS

Use only those which will not create hazards to health or property, and which will not damage surfaces.
Use only those recommended by Manufacturer of surface to be cleaned.
Use only on surfaces recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.01 GENERAL

Follow cleaning Material and Surface Manufacturer's instructions.

3.02 DURING CONSTRUCTION

- A. Remove rubbish and debris on regular basis.
- B. Clean surfaces prior to painting and continue cleaning as needed until painting is complete.
- C. Schedule cleaning so that resultant dust and contaminants will not fall on wet or newly coated surfaces.

3.03 FINAL CLEANING

- A. Perform final cleaning prior to Owner Occupancy or Final Completion, whichever of the two is earlier.
- B. Employ skilled workmen for final cleaning.
- C. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign matter from all exposed interior and exterior surfaces.
- D. Clean and polish glass, mirrors, fixtures, hardware, resilient floor covering and other glossy surfaces.
- E. Vacuum clean carpets.
- F. Hose clean exterior paved surfaces; rake clean other surfaces of grounds, after removal of temporary facilities. Remove nails and other ferrous metal debris from grounds with magnetic pick-up.
- G. Ventilating System: Clean permanent filters and replace disposable filters if units were operated during construction. Clean ducts, blowers, and coils if units were operated without effective filters during construction.
- H. Remove rubbish dirt and extraneous materials from the interiors of conduits, catch basins, manholes, and other construction work.

END OF SECTION

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Comply with Contract Conditions and specified administrative requirements in closing out Work. In particular note the following requirements:
1. Liquidated damages: General Conditions
 2. Warranties and Bonds: General Conditions; Section 01 78 36
 3. Partial Owner Occupancy: General Conditions
 4. Cleaning and Trash Removal: 01 74 00 Cleaning
 5. Record Documents: 01 78 39 Project Record Documents
 6. Operation and Maintenance Data: 01 78 23

1.02 SUBSTANTIAL COMPLETION

- A. When Contractor considers Work Substantially Complete, as defined in the General Conditions he shall submit to Engineer and Project Manager:
1. Written notice that Work, or designated portion thereof is Substantially Complete.
 2. List of items to be completed or corrected.
- B. Engineer and Project Manager will, as soon as possible after receipt of notice, inspect to verify completion status.
- C. Should Engineer and Project Manager consider that Work is not Substantially Complete:
1. Project Manager will notify Contractor in writing, giving reasons therefore.
 2. Contractor shall remedy Work deficiencies, and send second notice of Substantial Completion to Project Manager.
 3. Project Manager and Engineer will reinspect Work.
- D. When Project Manager concurs that Work is Substantially Complete, he will:
1. Prepare Certificate of Substantial Completion, accompanied with Contractor's list of items to be completed or corrected, as verified by Project Manager.
 2. Submit Certificate to Project Manager and Engineer for their written acceptance of the responsibilities assigned to them in the Certificate.

1.03 FINAL COMPLETION

- A. When Contractor considers Work complete, he shall submit written certification that:
1. Contract Documents have been reviewed.
 2. Contractor has inspected Work for compliance with Contract Documents.
 3. Work has been completed in accordance with the Contract Documents.
 4. Equipment and Systems have been tested in presence of Project Manager and are operational.
 5. Work is complete and ready for final inspection
- B. Project Manager and Engineer will, as soon as possible after receipt of Contractor's Certification, inspect to verify completion status.
- C. Should Project Manager and Engineer consider Work incomplete or defective:
1. Project manager will notify Contractor in writing, listing incomplete or defective Work.
 2. Contractor shall immediately remedy deficiencies, and send second written certification to Project manager and Engineer that Work is complete.
 3. Project Manager and Engineer will reinspect Work.
- D. When Project Manager and Engineer find Work acceptable under Contract Documents, final closeout submittals will be requested.

1.04 REINSPECTION FEES

- A. Should Engineer be required to make more than two final inspections due to Contractor's failure to correct specified deficiencies, Owner will compensate Engineer for additional services, and deduct Engineer's compensation amount from Contractor's final payment as follows:
1. Engineer's time at \$100.00 per hour.
 2. Engineer's employees at 2.5 times the direct personnel expense.
 3. Others at 1.20 times the direct cost incurred.
 4. Charges will be made for necessary travel time, commercial air fare, auto expense computed at 50 cents per mile, room and board, and all other expenses incurred in making inspections.

1.05 CONTRACTOR'S CLOSEOUT SUBMITTALS TO PROJECT MANAGER

- A. All closeout submittals shall be made at one time to Project Manager, except that extra materials shall be delivered at one time to the Project site, with letter of transmittal verifying signature of receipt by Project Manager.
- B. Contractor shall submit evidence of payments and release of liens as follows:
1. Contractor's Affidavit of Payment of Debts and Claims, AIA Document G706.
 2. Contractor's Affidavit of Release of Liens, AIA Document G706A including:
 3. Consent of Contractor's Surety to Final Payment, AIA Document G707.
 4. Contractor's release or Waiver of Liens.
 5. Duly sign and execute all submittals before delivery to Project Manager.
- C. Submit the following documents and extra materials as required by code or specified elsewhere:
1. Building Official's Certificate of Mechanical and Electrical Inspections.
 2. Building Official's Certificate of Occupancy.
 3. Certificate of Insurance for Products and Completed Operations.
 4. Owners Operating and Maintenance Manuals; see Section 01 78 23.
 5. Project Record Documents; see Section 01 78 39.
 6. Warranties and Bonds; see Section 01 78 36, and the following:
Roofing, Flashing, Damproofing: see Division 7, all Sections.
- D. Submit final statement of accounting to Project Manager, including the following:
1. Original Contract Sum.
 2. Additions and deductions resulting from:
Deductions for uncompleted Work.
Penalties and Bonuses.
Previous change orders.
Deductions for Liquidated Damages.
Deductions for Reinspection Payments.
Other adjustments.
 3. Total Contract Sum, as adjusted.
 4. Previous payments.
 5. Sum remaining due.

1.06 FINAL ADJUSTMENTS AND FINAL PAYMENT

- A. Project Manager will prepare and issue final Change Order, reflecting approved adjustments to Contract Sum not previously made by Change Orders.
- B. Contractor shall follow procedures specified in Supplementary Conditions in making final application for payment.

END OF SECTION

1.01 GENERAL

Compile full details for care and maintenance of materials, equipment, and systems, where specified herein or in other Specification Sections.

Instruct Owner's personnel in maintenance of Products and in operation of equipment and systems.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

01 33 23 Shop Drawings, Product Data, and Samples.

01 77 00 Closeout Procedures

01 78 39 Project Record Documents.

Demonstrating Mechanical and Electrical Equipment; Divisions 23 and 26 respectively.

1.03 PREPARATION AND FORM OF SUBMITTALS

A. Data preparation shall be done by personnel:

1. Completely familiar with the requirements of this Section.
2. Trained and experienced in maintenance and operation of described products.
3. Sufficiently skilled as technical writer to communicate essential data.
4. Sufficiently skilled as draftsman to prepare required drawings.

B. Prepare data in form of instruction manual as follows:

1. Bind with 8-1/2 x 11 inch, commercial quality three ring binders with durable covers, tabs and index.
2. Bind in drawings with edges reinforced against tear-out, and folded to match size of text pages.
3. Provide fly-leaf with labeled tabs for each separate product.
4. Label Binder Cover "Operation and Maintenance Instructions" and list:
Project Title, Identity of Separate Structures if applicable, and Identity of Subject matter in manual.

1.04. GENERAL CONTENT OF ALL MANUALS:

A. Table of contents, neatly typed and systematically ordered, listing:

1. Contractor, name of responsible principal, address, and telephone number.
2. Each Product including name, address, and telephone
number of Subcontractor or installer
Recommended Maintenance Contractor
Local source for replacement parts

B. Product Data:

Include only those sheets which are pertinent to specified Product. Annotate each sheet to clearly identify specific product or part installed and data applicable to installation. Delete references to inapplicable data.

C. Drawings:

1. Supplement product data where necessary to clearly illustrate relationship of component parts, and control or flow diagrams.
2. Do not use Project Record Documents as Maintenance Drawings.

D. Written Text:

1. Provide where necessary to supplement Product Data and Drawings.
2. Provide logical sequence of instructions for each procedure.
3. Organize text with separate headings for different procedures.

E. Warranties, Bonds, and Maintenance Contracts:

1. Provide copy of each.
2. Include proper procedures in event of failure.
3. Include instances which might affect validity of Warranties, bonds, or Contracts.

1.05 MANUAL FOR MATERIALS AND FINISHES

- A. Include Manufacturer's Data as follows:
 - Catalog number, size, composition, color and texture designations.
 - Required reordering information.
 - Recommended cleaning materials, methods, and maintenance schedules.
 - Cautions against detrimental cleaning materials and methods.

- B. Submit specified information for the following: Finish
 - Hardware: Section 08 70 00
 - Painting: Section 09 90 00
 - Miscellaneous Specialties: Section 10 20 00

1.06 MANUAL FOR WEATHER PROTECTION MATERIALS

- A. Include Manufacturer's data as follows:
 - Applicable manufacturing standards.
 - Instructions for inspection, maintenance and repair.

1.07 MANUALS FOR MECHANICAL AND ELECTRICAL EQUIPMENT AND SYSTEMS

- A. Include the following Data:
 - 1. Equipment Directory:
 - List equipment, by nameplate designation, location and area served.
 - Describe function, operating characteristics, and limiting conditions.
 - List complete nomenclature and commercial number of replaceable parts.
 - Performance curves, engineering data and tests.
 - 2. Operating procedures including:
 - Start-up, break-in, routine and normal operating instructions.
 - Special operating instructions (including summer-winter variations)
 - Sequences required, regulation, shutdown, and emergency
 - 3. Maintenance Procedures, including:
 - List of equipment requiring routine maintenance or servicing.
 - Recommended schedule and routine operations for maintenance.
 - Disassembly, repair and reassembly.
 - Adjusting and Checking.
 - Manufacturer's printed operating and maintenance instructions.
 - Parts list, and recommended parts to remain in storage.
 - 4. As installed control system diagrams, and description of sequences of operation.
 - 5. Color-code Legend, if any.
 - 6. Electrical panelboard circuit directories indicating:
 - Electrical Service
 - Controls
 - Communications, if any.

- B. Submit specified information for the following:
 - Electrical and Mechanical Equipment specified in Divisions 21 through 28

1.08 ADDITIONAL DATA

- Prepare and include additional data:
 - When need becomes apparent during instruction of Project Manager.
 - As specified in other Sections of Specifications.

1.09 SUBMITTAL SCHEDULE

A. Preliminary Draft:

1. Submit one copy of proposed format.
2. Project Manager will review, and return with comments.

B. Final Submittal:

Submit in final form, one complete copy, 15 days prior to Final inspection. Copy will be returned with comments
Submit 2 copies, in approved final form, with closeout submittals.

1.10 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to final acceptance, instruct Owner's Personnel in necessary operation, adjustment and maintenance of Products, Equipment and Systems.
- B. Operating and Maintenance Manual shall constitute basis of instruction.
- C. Review manual with Owners personnel in detail to explain all aspects of operations and maintenance.

END OF SECTION

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Bonds and Insurance required prior to Construction, and General and Extended Warranties by General Contractor, are specified in the General Conditions.
- B. Submittal of Bonds and Warranties specified herein:

1.02 CERTIFICATES OF WARRANTY

- A. Provide for all Products incorporated into the Work when required by the respective Sections of the Specifications.
- B. Certificates of Warranty or Guarantee required by this Section or in the respective Sections of the Specifications, are in addition to warranties or guarantees required from the General Contractor and Specified in the Supplementary Conditions, and will in no manner reduce or nullify the General Contractor's warranty or guarantee responsibilities.
- C. All Certificates of warranties and guarantees shall:
 - 1. Be type written or professionally printed and be duly signed by the installing Subcontractor, or representative of the Product Manufacturer, authorized to legally bind the Subcontractor or Product Manufacturer.
 - 2. Warranty that the Product will be replaced or properly repaired, without delay and without cost to Owner, should the Product fail to properly function or provide proper service within the specified warranty period.
 - 3. Warranty period shall begin upon Substantial Completion, or if a Certificate of Substantial Completion is not issued, or if Work which is to be covered by warranty is not then complete, Warranty period shall begin upon the date of Final Acceptance.
 - 4. Additional warranty conditions shall be as specified in the respective Sections of the Specifications.
- D. Warranty Submittals Shall include:
 - Project name and address
 - Description of Product, and reference to Specification Section
 - Length of Warranty as specified.
 - Date of beginning for Warranty Period.
 - Conditions of warranty as specified above.
 - Additional conditions of warranty as required for Product by Specifications. Statement that the signator agrees to provide said warranty.
 - Typed Name of individual signing warranty, signature, and date.
- E. Submit with Project Closeout Submittals as specified in Section 01 77 00.
- F. Where extended Warranties or specific conditions of Warranty are called for in the respective Sections of the Specifications or in the Supplementary Conditions, but where no Certificate of Warranty is required to be submitted, the General Contractor may, at his option, and to protect his own interests, require the respective Subcontractors or Suppliers to provide him with Certificates of Warranty covering his Warranty obligations to the Owner.

1.03 UNCOVERING AND CORRECTION OF WORK - WARRANTIES

- A. Warranty Period:
 - 1. The warranty period relating to faulty Products and workmanship will begin on the date appearing on the Certificate of Substantial Completion, or if a Certificate of Substantial Completion is not issued, on the date appearing on the final Certificate for Payment to the Contractor, whichever is earlier. The Owner's occupancy or use of the Project will not alter the Warranty Period herein defined.

2. The Contractor shall and hereby does warrant against ordinary wear and usage the following Work as noted, and for the following periods of time after the start of the Warranty Period as defined above:
- a. Warranties for Work and for periods of service as called for in the respective Sections of the Specifications, regardless of limitations or conditions written into any certificates of warranty or guarantee which might be submitted.
 - b. 10 years: Weather tightness of Sealants, Roofing, Moisture barrier, Damproofing, Flashing, Roof Accessories, and other Work which is a component part of Roofing or other weather protective or moisture protective elements of the Work.
 - c. 3 years: Applied finishes against delaminating from surface to which applied.
 - d. 2 years: Effectiveness of soil sterilizers; Mechanical and electrical work and equipment specified in Divisions 22, 23 and 26.

The above warranties are an extension to run concurrently with the one-year statutory warranty, and are in addition to any Guarantee, Bond or warranties called for elsewhere in the Contract Documents.

Should any Work covered by Warranty fail to properly function or to provide proper service within the Warranty period, the Contractor shall correct the defect immediately, at no cost to the Owner, following receipt of written notice from the Owner. Should any other damage be incurred, either as a direct result of the subject defect, or as a result of the Contractor's failure to promptly correct the defect, then the Contractor shall also correct the resulting damage to the Owner's satisfaction, at no additional cost, whether or not said damage is to Work provided under this contract. If delay in correction of a defect covered by warranty can reasonably be expected to create a risk of significant future damage, contingent expenses, or danger to persons or property, and if the Contractor does not act with promptness commensurate to such risk, or if the Owner cannot contact the Contractor after making a reasonable effort, then the Project Manager may at his option, have the defect corrected and the Contractor shall pay all related costs billed to the Owner.

Disclaimers and Limitations: 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 special warranties with the Contractor.

Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty except that the remaining warranty period shall be a minimum of one year following acceptance of the subject correction Work.

END OF SECTION

1.01 MAINTENANCE OF DOCUMENTS

- A. Maintain at Project Site for Owner one record copy each of:
1. Contract Drawings and Project Manual.
 2. Addenda, Field Orders, Change Orders and other Contract Modifications.
 3. Other written instructions.
 4. Approved Shop Drawings, Product Data, and Samples.
 5. Field Test Reports.
- B. Store Project Record Documents in field office apart from documents to be used for construction, and maintain in clean dry, legible condition; available at all times for inspection by Project Manager.
- C. Keep Record Drawings Current; do not Conceal any Work until required information has been recorded. Lack of current Record Documents shall be grounds for withholding progress payments.

1.02 RECORDING

- A. Documents shall be maintained by a competent draftsman. If Project Manager considers submitted drafting to be unacceptable, redraft until acceptable at no additional cost to Owner. Marking shall be by waterproof, felt tip pens.
- B. Label each Document "PROJECT RECORD" in 1" high printed letters.
- C. Required Drawings:
1. Maintain one print of Contract Drawings as "work set"; using Marking devices specified to record all Contract changes.
 2. Prior to submittal, transfer recorded information to one additional print. Contractor may retain "work set" for his records.
- D. Mark Drawings to record:
1. Depths of foundation elements in relation to floor elevation.
 2. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 3. Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
 4. Field changes of dimensions and details.
 5. Changes made by Change Order or other Contract Modifications.
 6. Details not on original Contract Drawings.
- E. Specifications and Addenda: Legibly mark to record the following:
1. Manufacturer, trade name, catalog number, and Supplier of each Product actually installed.
 2. Changes made by Change Order or other Contract Modification.

1.03 SUBMITTALS

- A. Submit Record Documents as specified in Section 01 77 00 Closeout Procedures, accompanied by transmittal letter, in duplicate, containing:
1. Project Title.
 2. Date.
 3. Contractor's name and address.
 4. Title and number of each Record Document.
 5. Signature of Contractor, or his authorized representative.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.
03 20 00 Concrete Reinforcing
03 30 00 Cast-In-Place Concrete

1.02 QUALITY ASSURANCE

- A. Reference Standards: Conform to recommendations of ACI 318 and ACI 347.
- B. Design and Engineering Formwork Design and Engineering are Contractors responsibility.

PART 2 PRODUCTS

2.01 FORM MATERIALS

- A. Plywood: APA Exterior "Plyform", or approved, class I, or class II, thickness as required to support concrete without visible deflection, at rate poured.
- B. Lumber Forms: 2 inch solid douglas fir, No. 2 grade.
- C. Round Column Forms: Seamless coated tube forms; Slek, Sonotube, or Burke approved.
- D. Metal Forms: Conform to Standards of CRSI.
- E. Form Release Agent: Non staining, non grain-raising, free of mineral oils, and leaving no bond inhibiting residues.

2.02 ACCESSORY ITEMS

- A. Ties and Spreaders: Metal type acting as spreaders leaving no metal within 1" of concrete face, and no fractures, spalls, depressions or other surface disfiguration greater than 3/4 inch in size. Strap and wire ties acceptable on footing forms.
- B. Expansion Joint Filler: W.R.Meadows (Sealtight) Asphalt joint filler meeting ASTM D 994 or Fiber Joint filler meeting ASTM D1751. Non extruding, 1/2" thick unless noted otherwise.
- C. Expansion Joint sealer: W.R. Meadows #164, HI-SPEC®, Cold-Applied SOF-SEAL®, Sonolastic ® NP1, or approved.

PART 3 EXECUTION

3.01 COORDINATION

- A. Coordinate with others for installation of all cast in place items, allowing sufficient time between the erection of forms and placing of concrete to allow the various trades to properly install their work.
- B. Do not core or sleeve columns, beams or joists without Engineer's specific approval.

3.02 INSTALLATION

- A. Construct formwork to meet tolerances specified in ACI 347, section 203.1. Provide for openings, offsets, keyways, reglets, chamfers, blocking and other features required on the Work. Conform to shapes, lines, and surfaces shown in the Drawings and Specified.
- B. Build formwork to prevent washing out of mortar, leakage, spreading, shifting, settling, and visible deflection.
- C. Form all concrete surfaces. Earth sidewalls permitted only with Engineer's specific written approval.

3.03 TREATMENT OF FORMS

- A. General: Apply form release agents in strict accordance with Manufacturer's instructions, with special attention to rate and method of application.
- B. Board Forms: Keep wet prior to pouring; wet thoroughly just before placing concrete.

3.04 ACCESSORY ITEMS

- A. Ties and Spreaders:
Set in straight rows, evenly spaced, pattern as approved or as shown in the drawings. No form ties in columns.
- B. Construction Joints:
Provide where shown or as approved. Form to profiles detailed. Coat one side of metal key joints with bond breaking agent. Install as recommended by manufacturer. Refer to 03 20 00 for reinforcing at construction joint locations.
- C. Slab Expansion Joints:
 - 1. Provide where shown in Drawings and unless noted otherwise: Wherever slabs abut vertical surfaces,
Wherever slabs extend through door openings at ends of foundation walls. Not over 20 feet spacing in any direction in slabs.
Not over 15 feet spacing in exterior curbs and walks.
 - 2. Bring joint material to within 1/2" of surface, and fill remainder with joint sealing compound.
 - 3. Unless noted otherwise on the Drawings, provide smooth dowels (3/8" diameter x 30" long at 12" oc unless noted otherwise) centered on expansion joint; one end heavily coated with bond breaking agent and capped with plastic dowel cap similar to Heckman no.87, opposite end clean for good bond.
- D. Anchor Slots:
Set in true vertical position, anchored securely in place. Provide for masonry abutting concrete, and for masonry veneer and furring; one slot for each abutment not more than 24" oc. for veneer.
- E. Chamfers, Reglets, and Nailing strips:
 - 1. Chamfer exposed external corners with 3/4" triangular strip in forms, except where corner is to form flush joint with other materials.
 - 2. Provide nailing strips flush to concrete surface; shapes and locations as shown.
 - 3. Provide reglets in maximum standard lengths for watertight installation.

3.05 FORM REMOVAL

Leave forms in place until concrete has attained sufficient strength to safely support its own weight plus any loads imposed upon it. Formwork not supporting weight of concrete may be removed in 48 hours, provided concrete has hardened sufficiently not to be damaged by form removal, and curing and protection operations are maintained.

3.06 REUSE OF FORMS

Engineer will approve reuse of forms provided they are in good condition and have been cleaned, repaired and resealed as required to achieve concrete finish equal to new forms.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.

01 45 00 Quality Controls (Sampling and Testing)
03 11 00 Concrete Formwork
03 30 00 Cast In Place Concrete

1.02 QUALITY ASSURANCE

Reference Standards:

CRSI Manual of Standard Practice, and current ASTM Standards.
OSSC Chapters 17 Testing and 19 Concrete.
ASTM C 94 - Standard Specification for Ready-Mixed Concrete.

Synthetic Fiber Reinforcement Manufacturer's Qualifications:

1. Synthetic fiber reinforcement manufactured in ISO 9001:2000 certified facility.
2. Satisfactory performance history of specified synthetic fiber reinforcement.

1.03 SUBMITTALS

A. Steel Reinforcing:

Shop Drawings: Bending and placing drawings prepared in conformance with "Manual of Standard Practice for Detailing Reinforced Concrete Structures, ACI 315".

1.04 DELIVERY STORAGE AND PROTECTION

A. Metal bar and wire mesh reinforcing:

Identification: Each piece of reinforcing steel grade marked or each shipment accompanied by a certificate of compliance. Deliver all reinforcement to site, bundled, tagged and marked. Use tags indicating bar size, lengths and other information corresponding to markings shown on placement drawings.

Store on site to protect from ice, mud, oil, and rust or other damage.

Coordinate for special inspections and testing where required by OSSSC chapter 17, or ACI 318.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Bars: ASTM A615, Grade 60, unless noted otherwise. ASTM A706, Grade 60, for all bars to be welded, unless noted otherwise.
- B. Accessories: Conform to requirements of Reference Standards. Provide all items necessary for proper placing, spacing, supporting, and fastening of reinforcement in place. Provide galvanized or stainless steel metal accessories where portions will be exposed in finished surfaces.

PART 3 EXECUTION

3.01 GENERAL

Conform to requirements of reference standards.

3.02 FABRICATION

- A. Conform to approved shop drawings except as such requirements may be exceeded by Drawings or Specifications. Welding, where required, by AWS certified welders only.
- B. Shop fabricate and cold bend in a manner that will not injure the material.

3.03 INSTALLATION OF METAL BAR

- A. Positioning:
1. Accurately position, support and secure against displacement. Do not cut, bend or displace reinforcing for convenience of other trades. Insure that reinforcing is protected by required thickness of concrete.
 2. Mesh reinforcing for slabs poured on grade shall be set on sand/gravel aggregate masonry dobies. Do not attempt to hook mesh up into slab during pour without dobies.
- B. Splicing:
- Tightly wire and tie with bars in tight contact.
 Minimum lap of bar splices: 36 diameters unless detailed otherwise.
 Provide standard splices at corners, and as required, except do not splice in self-supporting slabs, beams, joists or headers unless specifically detailed and shown on approved placement drawings.
- C. Tying:
- Wire tie and support at intersections and at intervals not over 3'-0" horizontally and 6'-0" vertically. Suspend reinforcement by wires from forms in footings, or set on wide base wire chairs. Bars balanced on blocks, rocks or bricks not acceptable.
 Wire tie footing dowels in place before pouring.
 Stabbing dowels into wet concrete not acceptable.
- D. Minimum Concrete Cover
1. Concrete cover cast against earth (below footing reinforcing): 3" Minimum.
 2. Form Cast and exposed to earth or weather: No. 5 and smaller: 1-1/2"
No. 6 and Larger: 2"
 3. Not exposed to weather or earth: 3/4" unless noted otherwise.
 4. Wall reinforcing.
Single layer reinforcing: centered; 1/2" tolerance ea. way.
 5. Welded Wire Mesh in earth supported slabs: 1" top cover, minimum bottom cover = 2/3 slab thickness.

3.04 MINIMUM REINFORCEMENT

- A. Unless exceeded by reinforcing requirements shown in the Drawings and shown on approved placement drawings, provide minimum reinforcing specified hereinafter.
- B. Walls and self-supporting slabs: 1/4 of 1% steel each way per cross sectional area of concrete; maximum spacing = 1-1/2xthickness.
- C. Top, bottom and discontinuous ends of all walls: 2 no. 4 bars continuous.
- D. Corners and Intersections: 2' x 2' bars; size and number to match horizontal reinforcing.

3.05 CLEANING AND DEFECTIVE MATERIALS

Remove all oil, grease, dirt, scale, loose rust and other bond reducing coatings not specified herein, and replace severely rust-pitted reinforcing.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.
01 45 00 Quality Controls (Sampling and Testing)
03 11 00 Concrete Formwork
03 20 00 Concrete Reinforcing

1.02 QUALITY ASSURANCE

- A. Reference Standards: ACI 318 and OSSSC Chapter 19 (2010 edition), as supplemented herein.
- B. Manufacturer's Qualifications: Manufacturer shall be regularly engaged in the manufacture and delivery of ready mixed concrete.
- C. Delivery Tickets: Delivery tickets as required by OSSC and ASTM C-94 Standard specification for Ready Mix Concrete shall be filled out completely for each concrete delivery, and tickets shall be sent to the Project Manager.

1.03 TESTING

- A. Not used.

PART 2 PRODUCTS

2.01 GENERAL

Concrete shall be ready Mixed, complying with ASTM C94, and Reference Standards.

2.02 COMPOSITION AND STRENGTH

- A. Design Mix: Manufacturer fully responsible for mix design and performance. Fly ash content shall be as high as practical based on manufacturer's design mix requirements, weather, and specific product application. Indicate proposed content on design mix submittal prior to delivery.
- B. 28 Day Minimum Compressive Strength:
 - Interior: 3000 psi.
 - Exterior: 4000 psi
- C. Maximum Slump: 5"; water added only by written permission of Project Manager. Concrete ticket to bear signature and amount of water added.
- D. Maximum Aggregate Size: 3/4" unless otherwise noted or approved for special finishes.
- E. Air Entrainment:
 - Interior: Maximum 3%
 - Exterior: Minimum 5%; Maximum 7%.

2.03 OTHER MATERIALS

- A. Floor Sealer: Sealtight "CS-309", AC Horn "Clear Seal 150", or approved.
- B. Bonding Agent: Larson Products "Weld-Crete", or approved.
- C. Construction Joints, Expansion Joints: Section 03 11 00.
- D. Membrane Under Interior Slabs on Grade: Section 31 20 00.
- E. Non-Shrink Grout: Factory premixed high strength grout similar to Embecco, Por-Rok, or Speed Crete.

PART 3 EXECUTION

3.01 GENERAL

Conform to reference standards, as supplemented herein.

3.02 PREPARATION

A. General:

1. Arrange for specified testing; contact Project Manager and Engineer at least 48 hours before intended pour. Notify Project Manager and Engineer immediately if pour is called off.
2. Check forms for accuracy, rigidity, completion of embedded items and reinforcing; clean out forms and coat as specified prior to pour.

B. Bonding:

Except where bond is obtained by use of concrete bonding agent, roughen adjacent concrete to expose bonded aggregate uniformly. Clean all contact surfaces and remove laitance, coatings, loose particles and foreign matter prior to placing adjacent pour.

3.03 ENVIRONMENTAL CONDITIONS

A. Cold Weather:

Conform to recommendations of ACI-306. Protect all Concrete Work from reduced strength caused by frost, freezing, or low temperatures. Provide adequate means of maintaining temperatures of not less than 50 degrees F. when air temperature has fallen to or is expected to fall below 40 degrees F. Remove or replace frozen or frost damaged concrete at Contractor's expense.

B. Hot Weather:

Conform to recommendations of ACI-305, "Recommended Practice for Hot Weather Concrete", as supplemented herein. Cover reinforcing steel with water soaked burlap, or shade as required to maintain steel temperatures at that or below that of ambient air temperatures. Wet forms thoroughly before placing concrete.

- C. Discontinue placement when, climatic conditions of sun, wind, and heat prevent proper placement and finishing, or when directed by the Project Manager.

3.04 PLACING CONCRETE

- A. Employ high frequency mechanical vibrators supplemented by hand spading as necessary to avoid honeycombing and achieve proper consolidation. Extend tip of vibrator into previous layer placed.
- B. Place Concrete in horizontal layers of uniform depth not more than 18" deep. Place as near final location as possible. Movement by vibrator not permitted. Stop pours only at joints where shown or approved. Concrete may be placed by pumping, but the use of aluminum pipe is prohibited.
- C. Avoid segregation of material due to excessive vibration, or drops in excess of 6 feet. Avoid damage to forms.
- D. Support mesh for slabs on chairs or lift completely above slab and work down approximately 1" with grid tamp.

3.05 CONSTRUCTION JOINTS

Verify locations and conformance with details; provide only where shown or approved by Engineer. Prepare as specified for proper bonding.

3.06 CONCRETE FINISHES

A. Slab Finishes - General:

1. Screed to true levels or slopes; remove surface water, laitance, and dirt; bring sufficient mortar to surface for proper finishing.
2. Do not use chemical dryers or absorb wet spots with neat cement or sand and cement mixtures.
3. Rough screed slabs to receive setting beds; finish other slabs monolithically without topping, unless noted otherwise.
4. Wait until surfaces are sufficiently dry for finishing.
5. Maximum variation in finished slab: 1/8" measured from 10 ft. straight edge, laid on slab in any direction.

- B. Trowel Finish:
 - 1. Trowel to produce smooth, hard, dense surface, free from trowel marks.
 - 2. Provide trowel finish for all interior slabs unless noted otherwise.
 - 3. Avoid surface crazing or cracking due to over floating or troweling.
- C. Broom Finish:
 - 1. Light trowel finish, followed by light brooming at right angles to slab length.
 - 2. Mark slab with 1/2" deep score lines where score joints are indicated.
 - 3. Provide for all exterior slabs, walks and steps unless noted otherwise.

3.07 CURING

- A. General:
 - 1. Protect concrete from direct rays of sun, freezing, wash by rain, and drying for a minimum of 5 days, and until thoroughly hardened.
 - 2. Keep forms wet until removed; if removed during curing period, keep walls wet with wet burlap or water spray.
 - 3. Cover, apply heat, and/or use other approved means to prevent damage from freezing or premature drying.
- B. Slab Curing:
 - 1. Apply approved sealer in strict compliance with manufacturer's directions for application as a curing compound.
 - 2. When temperature exceeds 75 degrees F. within 5 day curing period follow one of the following procedures in addition to the above:
 - Maintain fine fog spray to cover entire surface being cured.
 - Completely cover area being cured with wet sand or burlap, and keep wet.
 - Dam or curb slab edges and flood with minimum 1" of water for curing period.

3.08 CLEANING AND PATCHING

- A. Immediately following removal of forms or curing membranes, inspect all concrete surfaces and patch all pour joints, voids, form tie holes, honeycombed areas and other imperfections before concrete is thoroughly dry. Patch shall match adjacent surfaces unless noted otherwise for special finishes.
- B. Remove bituminous materials, form release agents, bond breakers, or other materials employed in concreting which would otherwise prevent proper application of sealants, waterproofing, or other finishes or treatments.
- C. Remove ledges and bulges:
- D. Where Concrete is under strength, out of line, exceeds tolerances, or shows objectionable cracks, honeycombing, staining, discoloration, rock pockets, or is otherwise defective, remove and replace or repair as directed by the Project Manager at Contractor's expense.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies materials and services required for installation of cold-formed steel, including tracks and required accessories as shown and specified. This Section includes the following:
 - 1. Interior steel stud walls.

1.2 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data: Showing steel component sections and specifying structural characteristics.

1.3 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Iron and Steel Institute (AISI):
Specification and Commentary for the Design of Cold-Formed Steel Structural Members
- C. American Society of Testing and Materials (ASTM):
 - A36/A36M-08Standard Specifications for Carbon Structural Steel
 - A123/A123M-09Standard Specifications for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - A153/A153M-09Standard Specifications for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - A307-10Standard Specifications for Carbon Steel Bolts and Studs
 - A653/A653M-10Standard Specifications for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - E1190-95(R2007)Standard Test Methods for Strength of Power-Actuated Fasteners Installed in Structural

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Sheet Steel for joists, studs and accessories 16 gage and heavier: ASTM A653, structural steel, zinc coated G60, with a yield of 50 ksi minimum.
- B. Sheet Steel for joists, studs and accessories 18 gage and lighter: ASTM A653, structural steel, zinc coated G60, with a yield of 33 ksi minimum.
- C. Galvanizing Repair Paint: MIL-P-21035B.

2.2 WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs of web depth indicated, with lipped flanges, and complying with the following:
 - 1. Design Uncoated-Steel Thickness: 0.0346 inch
 - 2. Flange Width: 1-1/4 inches
 - 3. Web: Punched.
- B. Steel Track: Manufacturer's standard U-shaped steel track, unpunched, of web depths indicated, with straight flanges, and complying with the following:
 - 1. Design Uncoated-Steel Thickness: Matching steel studs.
 - 2. Flange Width: Manufacturer's standard deep flange where indicated, standard flange elsewhere.

2.3 JOIST FRAMING:

- A. Not used

2.4 FRAMING ACCESSORIES:

- A. Fabricate steel framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33 ksi.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 - 1. Supplementary framing.
 - 2. Bracing, bridging, and solid blocking.
 - 3. Web stiffeners.
 - 4. Gusset plates.
 - 5. Deflection track and vertical slide clips.
 - 6. Stud kickers and girts.
 - 7. Joist hangers and end closures.
 - 8. Reinforcement plates.

2.5 ANCHORS, CLIPS, AND FASTENERS:

- A. Steel Shapes and Clips: ASTM A36, zinc coated by the hot-dip process according to ASTM A123.
- B. Cast-in-Place Anchor Bolts and Studs: ASTM A307, Grade A, zinc coated by the hot-dip process according to ASTM A153.
- C. Mechanical Fasteners: Corrosion-resistant coated, self-drilling, self-threading steel drill screws. Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.6 REQUIREMENTS:

- A. Furnish members and accessories by one manufacturer only.

PART 3 - EXECUTION

3.1 FABRICATION:

- A. Framing components may be preassembled into panels. Panels shall be square with components attached.
- B. Cut framing components squarely or as required for attachment. Cut framing members by sawing or shearing; do not torch cut.
- C. Hold members in place until fastened.
- D. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
 - 1. Locate mechanical fasteners and install according to cold-formed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.

3.2 ERECTION:

- A. Handle and lift prefabricated panels in a manner as to not distort any member.
- B. Securely anchor tracks to supports as shown.
- C. At butt joints, securely anchor two pieces of track to same supporting member or butt-weld or splice together.
- D. Plumb, align, and securely attach studs to flanges or webs of both upper and lower tracks.
- E. All axially loaded members shall be aligned vertically to allow for full transfer of the loads down to the foundation. Vertical alignment shall be maintained at floor/wall intersections.
- F. Install jack studs above and below openings and as required to furnish support. Securely attach jack studs to supporting members.

- G. Install headers in all openings that are larger than the stud spacing in that wall.
- H. Attach bridging for studs in a manner to prevent stud rotation. Space bridging rows as shown.
- I. Studs in one piece for their entire length, splices will not be permitted.
- J. Provide a load distribution member at top track where joist is not located directly over bearing stud.
- K. Provide joist bridging and web stiffeners at reaction points where shown.
- L. Provide end blocking where joist ends are not restrained from rotation.
- M. Provide an additional joist under parallel partitions, unless otherwise shown, when partition length exceeds one-half joist span and when floor and roof openings interrupt one or more spanning members.
- N. Provide temporary bracing and leave in place until framing is permanently stabilized.
- O. Do not bridge building expansion joints with cold-formed metal framing. Independently frame both sides of joints.
- P. Fasten reinforcement plate over web penetrations that exceed size of manufacturer's standard punched openings.

3.3 TOLERANCES:

- A. Vertical alignment of studs shall be within 1/960th of the span.
- B. Horizontal alignment of walls shall be within 1/960th of their respective lengths.
- C. Spacing of studs shall not be more than 1/8 inch +/- from the designed spacing providing that the cumulative error does not exceed the requirements of the finishing materials.
- D. Prefabricated panels shall be not more than 1/8 inch +/- out of square within the length of that panel.

3.4 FIELD REPAIR:

Touch-up damaged galvanizing with galvanizing repair paint.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.

01 45 00 Quality Control

03 30 00 Cast in Place Concrete

1.02 WORK INCLUDED

Steel angles, lintels, ledgers, bollards and similar items.

1.03 QUALITY ASSURANCE

A. Reference Standards: Conform to requirements of:

AWS "Code for Welding in Building Construction".

AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings".

ASTM E 935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2000.

ASTM E 985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000.

B. Qualifications of Welders: All welders qualified as prescribed in "Qualification Procedure" of the American Welding Society (AWS).

1.04 SUBMITTALS

A. Submit shop drawings in accordance with Section 01 33 23 for all shop or field fabricated assemblies.

B. Show all locations, markings, quantities, materials, sizes, shapes, joints and methods of joining, connecting, anchoring, fastening and attachment to work of other trades.

PART 2 PRODUCTS

2.01 MATERIALS:

A. Steel "W" Shapes: Conform to ASTM A36, grade 36.

B. Steel "M", "C", "S", and "L" Shapes: Conform to ASTM A36.

C. Welding Rods and Welding: Conform to requirements of AWS for intended use.

D. Galvanizing:

1. Hardware items, including fasteners: Conform to ASTM A153.

2. Items both under 1/8" thickness and fabricated from rolled, pressed, and forged shapes, plates, bars and strip: Conform to ASTM A386.

3. Other galvanizing: Conform to ASTM A123.

E. Bolts, Nuts, Screws, Washers:

1. Typical unfinished: ASTM A307 unless otherwise noted.

2. Expansion Bolts: Hilti "Kwik-Bolt Concrete Anchors"; Molly "Parabolt" concrete anchors, or approved.

F. Steel Plate: Conform to ASTM A283, Grade C.

G. Steel Tubing: Conform to ASTM A501, $F_y=36$ ksi.

H. Bars, Flats, Rounds: Conform to ASTM A36.

-
- I. Cast Iron: Conform to ASTM A48, soft grey iron.
 - J. Malleable Iron Castings: Conform to ASTM A47.
 - K. Shop Prime for Ferrous Metal: Rustoleum Corporation "960 Zinc Chromate Primer", "X-60 Red Bare Metal Primer", or "769 Damp Proof Red Primer", or approved.

PART 3 EXECUTION

3.01 PREPARATION:

- A. Coordinate with other adjoining and supporting work.
- B. Verify sizes, designs and location of all items; do so at site whenever construction progress permits.

3.02 FABRICATION:

- A. Fabricate in accordance with specified Reference Standards, the Drawings and the approved shop drawings, from specified materials, and true to shapes, with sharp lines and angles.
- B. Miter corners and angles of frames and moldings unless otherwise noted.
- C. Punch, drill, shear, cut, thread and tap as required for items and adjacent Work.
- D. Drill or punch holes; do not cut holes with torch.
- E. Perform shearing and punching to leave clean lines and surfaces.
- F. Conform to minimum bending radii as required by specified reference standards. (Minimum bend 2 x plate thickness for plate up to 1" thick)
- G. Fabricate exterior items for assembly and installation on site without field welding of joint, unless specifically noted or approved.

3.03 FASTENING:

- A. Provide fasteners and anchor assemblies required for complete fabrication, field assembly and erection.
- B. Conceal fastenings wherever practicable.
- C. Permanent shop connections in ferrous metal welded wherever practicable; avoid bolts and screws.
- D. Exterior items fabricated for bolted field joints.
- E. Bolted Connections:
 - 1. Use for field connections only, then only as noted; countersink heads, finish smooth and flush.
 - 2. Provide washers under heads and nuts bearing on wood.
 - 3. Use beveled washers where bearing on sloped surfaces.
- F. Screws: Where necessary for permanent connections in ferrous metal use flat head type; countersink, fill screw holes and finish smooth and flush.
- G. Evenly space exposed heads; all heads in same direction.

3.04 WELDS

- A. Use electric shielded-arc process according to AWS code.
- B. Maintain shape and profile of item, prevent blisters, run throughs, and surface distortion.
- C. Exposed Welds: Remove burrs, flux, welding oxide, air spots and discoloration; grind smooth, polish or otherwise finish to match material welded.

- D. Field welding of interior or exterior items to be encased in concrete will be permitted: field welding of exposed exterior items not permitted.

3.05 FINISHES

A. Preparation of Surfaces:

1. Thoroughly clean to remove mill scale, rust, dirt, grease and other foreign matter from ferrous metal prior to painting, galvanizing, or hot phosphate treatment.
2. Completely eliminate burrs, rough spots, and pitting from exposed ferrous metal items.

B. Galvanizing:

1. Where galvanizing is noted, perform in accordance with specified ASTM Standards, after fabrication and in largest sections practicable.
2. Where galvanizing is removed by welding or other assembly procedures, touch up with molten zinc or zinc rich paint.

C. Painting:

1. Apply one coat of specified primer to all ferrous metals not noted or scheduled to be galvanized.
2. Apply in strict accordance with manufacturer's recommendations.
3. Spot paint abrasions and field connections after assembly.

3.06 INSTALLATION

- A. General: Install Work plumb, true, rigid, and neatly trimmed out.
- B. Fastenings: Do not clinch fastenings through finish alone without washer; fasten Work tightly to prevent rattle except where expansion-contraction tolerances are required.
- C. Protect dissimilar metals from contact with each other or with other materials causing corrosion.
- D. Use non-shrink grout as specified in Section 03 30 00 for setting frames, plates, sills, bolts, or other items in contact with concrete. Conform to grout manufacturer's recommendations for mixing placing and curing.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.
 03 11 00 Concrete Forming
 06 17 53 Shop Fabricated Wood Trusses
 06 20 00 Finish Carpentry
 06 41 14 Wood Cabinets: Modular Prefinished
 07 27 00 Water Resistive Barrier.

1.02 QUALITY ASSURANCE

Evidence of Grade:

1. Framing Lumber: Each piece stamped with grade mark and trademark of Western Wood Products Association (WWPA), except that exposed lumber shall be stamped in a concealed location or supplied with a certificate of inspection with each delivery.
2. Plywood: Identify as to grade, species, panel index, and glue type by stamp of American Plywood Association (APA); stamp on back side of exposed panels.
3. Other materials: Provide certificate of compliance or other proof of compliance with these specifications if requested by Project Manager.

1.03 DELIVERY STORAGE AND PROTECTION

- A. Protect from moisture, damage and discoloration. Do not store ferrous metal or wood products in damp areas or in contact with ground.
- B. Identify wood products as to grades and store respective grades separated.

PART 2 PRODUCTS

2.01 GENERAL

- A. Lumber:
 1. Dimensions: Specified lumber dimensions are nominal unless specifically noted as "net".
 2. Surfacing: Provide all lumber surfaced four sides (s4s) to standard net dimensions unless otherwise scheduled or noted on the drawings.
 3. Moisture Content: Kiln Dried, or 19% maximum at time of closing in of structure, for 2" or less nominal thickness. Other lumber cured dry as market affords.
 4. Species: Douglas Fir, Larch unless scheduled or noted otherwise.
 5. Grade: as scheduled or noted in the Drawings for specific application.
- B. Plywood and OSB (Oriented Strand Board):
 1. All panels shall be APA grade stamped and shall meet the requirements of the latest edition of U.S. Product Standard PS-1 and/or APA PRP-108 performance standards, as applicable.
 2. Dimensions, surfacing, grade and span rating as scheduled or noted in the drawings for specific application. Where span rating is not scheduled or noted, provide panels with span rating as required by code for framing spaced 6" wider than actual conditions of installation.
 3. All panels which have any edge or surface exposed to the weather shall have APA "Exterior" exposure classification. Unless otherwise scheduled or noted all other panels shall have "Exposure 1" exposure classification.
 4. Plywood: All panels shall be Douglas Fir (APA Group 1), and shall be minimum 5 ply, regardless of the number of layers; as defined by APA.
 5. Oriented Strand Board (OSB): All panels shall have HUD/FHA materials release for the intended material use.
- C. Preservative Treatment
 1. All wood products faced with metal or in contact with earth, concrete, or masonry shall be preservative pressure treated. Wood preservative shall be ACQ or approved preservative that does not contain arsenic, chromium or other EPA classified hazardous preservatives. Treatment shall comply with AWPA specifications and preservative retentions applicable to the intended use of the treated material.
- D. Fasteners and other Rough Hardware:
 1. Type and sizes specified, noted on Drawings, or required by code.

2. Manufactured Framing Connectors and hangers shall be ICC approved, and shall be attached only with the fastener type recommended by the manufacturer.
 3. All Fasteners and other rough hardware exposed to moisture shall be hot dip galvanized per ASTM 123, type 316 stainless steel, or approved type nonferrous metal.
 4. Fasteners shall meet the following standards:
 - Bolts: Fed Spec. FF-B-575. - ASTM A307
 - Nuts: Fed Spec. FF-N-836. - ASTM A307
 - Expansion Shields: Fed Spec. FF-S-325.
 - Lag Screws and Lag Bolts: Fed. Spec. FF-B-561.
 - Toggle Bolts: Fed. Spec. FF-B-588.
 - Wood Screws: Fed. Spec. FF-S-111.
 - Nails and Staples: Fed. Spec. FF-N-105B
 5. Provide washers under all Nuts and under heads of bolts and lags; bevel type where on sloped bearing.
 6. Trex Decking Screws:: Fastenmaster, "TrapEase" #7 X 2.1/2", or approved, Corrosion resistant, square drive, color to match specified Trex decking.
- E. Other Materials:
1. Provide, all materials required to properly complete carpentry Work which are not specifically required to be provided by Others, or by trades under other Sections of these Specifications.
 2. All materials shall be: new, in conformance with reference standards, suitable for the intended use, and subject to the approval of the Project Manager.

2.02 MATERIALS SCHEDULE

- A. Studs - Exterior Walls:
2"to 4" thick, 6"and wider: No. 2 and better.
- B. Concealed Horizontal Wood Framing:
2"to 4" thick, 2"to 4" wide: No. 2 and better. 2"to 4" thick, 6"and wider: No. 2 and better.
- C. Exposed Structural Wood Framing:
Select Structural
- D. Other Structural Wood Framing:
No. 1 and better
- E. Plywood Roof Sheathing:
APA CD-INT, with exterior glue, except APA AC-EXT at exposed soffits. Panels 5/8" thickness with 40/20 span rating unless noted otherwise.
Option: With the exception of exposed eave areas roof sheathing may be 19/32" or 5/8" thick OSB type APA Rated Sheathing grade with 40/20 span rating, Exposure 1 durability classification.
- F. Exposed Plywood Siding and soffits:
APA 303 Exterior plywood, premium face veneers, 16" span rating, (OC grade without patches), 5/8" thick unless detailed otherwise. Pattern noted
- G. Framing Connectors and Hangers:
Simpson, Silvers, K/C Metals, or approved; type recommended by manufacturer for condition of use. Type referenced in ES reports, and recognized by OSSC, whether originated by ICBO, ICC, BOCA or other recognized code agency. Obtain Engineer's approval prior to substitution for items specifically described by Manufacturer and Model No. in the Drawings.
- H. (For wood framed buildings) Water Resistive Barrier (WRB) and Penetration Flashing Wrap:
See Section 07 27 00 Water Resistive Barrier.
DuPont™ Tyvek® DrainWrap™, or approved, vapor permeable, polyethylene fiber sheeting; 9 ft. widths.
Water resistive barrier shall meet the requirements ASTM 2273 and ORSC R703 for an enhanced drainage WRB.
Flashing Wrap DuPont "FlexWrap NF™" or approved self-adhering flashing material complying with AAMA 711-07.and ORSC R703..
Seam Tape: 2 or 3 inch wide, DuPont™ Tyvek® Tape or approved.
Fasteners: Tyvek® Wrap Caps or other manufacturer approved (#4 nails w/ 1" plastic cap fasteners).
- I. Construction Adhesive / Subfloor Adhesive:
Liquid Nails "LN-902/LNP-902", Chem Link Inc. "BuildSecure" construction adhesive or approved low VOC construction adhesive meeting APA Specification AFG-01, and ASTM D3498. All construction adhesives shall have a VOC rating of 70 gpl or less.

- J. Materials specified in other Sections:
Trusses: Refer to 06 17 53 Shop Fabricated Wood Trusses
Water Resistive Barrier (WRB): Section 07 27 00 Water Resistive Barrier

PART 3 EXECUTION

3.01 GENERAL

- A. Preparation:
Verify suitability of construction and surfaces to receive Work of this Section. Verify field measurements prior to fabrication. Notify General Contractor of unsuitable conditions, and variations from Drawing dimensions. Notify Engineer of significant variations from Drawing dimensions. Do not proceed with Work until all conditions are satisfactory.
- B. Workmanship:
1. Accurately locate, lay out, cut, fit, and install rough carpentry items and framing items furnished under other sections.
 2. Provide for installation and support of Work furnished by other trades, including backing, blocking, clearances etc.
 3. Install Work to true lines, plumb and level unless shown otherwise.
 4. Set Horizontal or sloping members with crown up.
- C. Selection of Lumber Pieces:
1. Carefully select individual pieces so that knots and obvious defects will not interfere with placing bolts, proper nailing or making proper connections.
 2. Cut out and discard all defects which will render a piece unsuitable for its intended function. Lumber may be rejected by the Project Manager, whether or not installed, for excessive warp, twist, bow, crook, mildew, fungus, stain, or mold as well as for improper cutting and fitting.
- D. Shimming:
Do not shim sills, studs, joists, headers, beams, or other framing components, without specific approval of the Engineer
- E. Notching and Boring:
1. Do not notch, bore, or cut members except as noted in the Drawings or approved in advance by the Engineer.
 2. Studs: Maximum notch = 20% of stud width; Maximum bored hole = 33% of stud width with minimum 3/4" between edge of hole and stud edge.
 3. Joists: Do not notch joists without specific approval of Engineer. Maximum bored hole = 15% of joist depth in center 1/3 of span and with hole bored at centerline of joist depth.
- F. Bearings:
1. Make all bearings full unless shown otherwise.
 2. Finish all bearing surfaces on which structural members are to rest to ensure even support. Where Lumber members slope, cut or notch ends as required to give uniform bearing.
- G. Alignment:
1. On all framing members to receive a finish material, align the finish subsurface to vary not more than 1/8" from plane of surfaces of adjacent framing members or 1/180 x distance between the members, whichever is less.
 2. Alignment along length of any framing member shall remain within 1/8" of true line or 1/240 of any portion, whichever is less.

3.02 PRESERVATIVE TREATED LUMBER

- A. Pressure treated Lumber:
Use only preservative pressure treated lumber for all applications in contact with earth, masonry, or concrete, whether or not separated by moisture barrier.

Wood preservative shall be ACQ or approved preservative that does not contain arsenic, chromium or other EPA classified hazardous preservatives. Treatment shall comply with AWPA specifications and preservative retentions applicable to the intended use of the treated material.

- B. Brush coat or dip with ACQ or approved preservative that does not contain EPA classified hazardous preservatives.
 - 1. Cut surfaces of pressure treated materials.
 - 2. All faces of wood faced with metal.
 - 3. Ends of members bearing on plates required to be pressure treated; minimum 6" from bearing end.

3.03 SILL SEALER (Capillary break)

Apply fiberglass sill sealer under sill plates of all exterior walls in contact with concrete or masonry. Apply continuous bead of specified construction mastic, or approved caulking under all plates, rim joists and perimeter blocking of all exterior walls and all party walls which are not in contact with masonry or concrete. Refer to sections and details in the drawings for sealant locations.

3.04 FASTENING

A. General:

- 1. Provide necessary nails, spikes, screws, and bolts for proper installation of carpentry work; sizes and quantities required by building code and approved by the Engineer.
- 2. Use only hot dipped galvanized or approved non-ferrous type hardware in locations exposed to exterior or extremes of humidity.
- 3. Do all fastening without splitting wood, preboring as required; replace all split members.
- 4. Use washers under all nuts and under heads of bolts, and lag screws which bear on wood; beveled type for even bearing on sloped surfaces.

B. Bolting:

- 1. Drill holes 1/16" larger than nominal bolt diameter.
- 2. Bolt threads shall not bear on wood.

C. Lag Screws and Wood Screws:

- 1. Prebore holes same diameter as root of thread; enlarge holes to shank diameter for length of shank.
- 2. Screw, do not drive to install.

D. Framing Connectors:

- 1. Secure with nails, screws or bolts recommended by manufacturer.
- 2. Nail and/or bolt all spaces provided in the specified connector or hanger.

E. Nailing:

- 1. Drive nails perpendicular in lieu of toe nailing where feasible.
- 2. Spot galvanized nail heads with zinc rich paint if finish abraded.
- 3. Conform to OSSSC for nailing requirements not specified herein or noted on the Drawings. Nailing requirements scheduled in the Drawings shall take precedence in the event they exceed those specified herein.

3.05 WALL FRAMING

A. Plates and Sills

- 1. Nominal 2 x width shown unless noted otherwise.
- 2. Single plates at floors and bottoms of openings, top plates doubled.
- 3. Unless detailed otherwise, provide double 2 x header on edge of minimum nominal depth in inches equal to 1-1/2 times opening width in feet.
- 4. Stagger ends of double plates 4'-0"; splice plates abutting at corners.
- 5. Anchor to masonry or concrete with 1/2" x 10"-J bolts at 48"oc unless noted otherwise.
- 6. Anchor bolts within 12" of each end of each piece; minimum 2 bolts per piece.

B. Studs and Furring:

- 1. Nominal 2x6 spaced 16" oc unless noted otherwise.
- 2. Double studs at openings, triple studs at corners and intersections.
- 3. Double trimmer studs at openings 6 feet and wider.
- 4. Provide backing for anchoring all edges of finish materials.
- 5. Anchor to abutting masonry with 3/8" anchor bolts top, bottom and 36"oc.

C. Blocking:

1. Install 2" nominal blocking as detailed and as required for installation of finishes, cabinets, equipment, mirrors, specialties and other items.
2. Provide firestopping as required by OSSC Chapter 7.
3. Solid block joists and rafters at each bearing, and not over 48"oc in doubled joists that are spaced under walls to clear piping.
4. 2x12 flat block for traverse rods at all windows and doors.
5. 2x6 or wider flat block at wall mounted door stops, towel bars, grab bars, etc.

D. Sheathing Paper:

See Section 07 27 00 Water Resistive Barrier.

3.06 PLYWOOD SHEATHING

A. Sheathing

1. Lay with face grain perpendicular to supports, unless noted otherwise.
2. Joints centered over supports; staggered; spaced 1/16".

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.
06 10 00 Rough Carpentry

1.02 QUALITY ASSURANCE

A. Manufacturers Qualifications:

Firm licensed and inspected in accordance with the requirements of the Oregon State Dept. of Commerce for prefabrication of truss systems of the type required.

B. Engineering:

Manufacturer shall assume complete responsibility for engineering of structural components and accessories provided under this Section, in conformance with established engineering practice, applicable codes, and design loadings specified herein.

1.03 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01 33 23 showing all dimensions, loads, and installation details. Indicate all bridging, bracing, and other accessories required to meet manufacturer's engineering requirements. Include stamp of Engineer, and adequate specifications for Building Department approval.
- B. Certificate of Compliance: Manufacturer shall inspect completed installation, and provide certificate of compliance on Manufacturer's letterhead stating installation is in conformance with Manufacturer's engineering design.

1.04 DELIVERY STORAGE AND PROTECTION

Protect from moisture, damage, and if final installation is in exposed location protect from staining or discoloration. Store off of the ground in upright position; do not lay members on sides, even temporarily.

PART 2 PRODUCTS 2.01 FABRICATION

- A. Conform to Reference Standards including approved Manufacturer's published specifications for stress grade lumber trusses with pressed in place steel connectors.
- B. Provide in conformance with approved shop drawings, capable of supporting the design loads indicated. 1/8" maximum dimension or camber variation.

Design Loads:

- | | | |
|----|--|-----------|
| 1. | Scheduled loads are imposed loads in addition to weight of truss. | |
| 2. | Snow load on top chord | 25 psf. |
| 3. | Live load on bottom chord (not concurrent with top chord LL) | (10 psf.) |
| 4. | Dead load on top chord | 10 psf |
| 5. | Dead load on bottom chord | 7 psf. |

- B. Maximum Deflection = 1/2" or Span/480 whichever is smaller.

2.03 ACCESSORIES FURNISHED BY TRUSS MANUFACTURER

Bridging, blocking, erection bracing, and other accessories as required for proper installation in accordance with manufacturer's engineering design. Furnish other accessories noted or specified elsewhere as by truss manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with Section 06 10 00, Reference Standards, the approved shop drawings, and Manufacturer's installation requirements.
- B. Install plumb and true in a straight line to spacing shown. Temporarily brace trusses until properly anchored to supports and bearings detailed. Do not cut or remove web or chord members.
- C. Anchor with Simpson SDWC15600 truss screw, or approved, each end of each truss. See section 06 10 00 for anchorage at intermediate non-bearing walls.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.
 06 10 00 Rough Carpentry – blocking and support
 09 90 00 Painting

1.02 QUALITY ASSURANCE

Reference Standards:

Conform to the requirements of Architectural Woodwork Standards (AWS) Publication "Architectural Woodwork Standards" 1st edition, 2009, published jointly by the Architectural Woodwork Institute, AWMAC, and Woodwork Institute, as the Engineer judges it applicable and as supplemented herein.

1.03 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01 33 23, for all Work except standard dimension standing and running trim, and lumber. Identify each item as to location, grade, specie, and finish type.
- B. Samples: Submit approved manufacturer's full line of colors, patterns and textures for color selection and approval of all factory prefinished Products used in finish carpentry.

1.04 DELIVERY STORAGE AND PROTECTION

Protect from moisture, damage and discoloration. Do not deliver to job site until notified by General Contractor that project is conditioned and prepared to handle and store Products without damage. Maintain 50 degree F. minimum in interior spaces where Finish Carpentry Materials are located.

PART 2 PRODUCTS

2.01 GENERAL

- A. Conform to AWS "Custom" grade requirements unless noted otherwise.
- B. Provide all necessary rough and finish hardware items, including screws, anchors, brackets, etc. required for completion of the Work, but not specifically required to be furnished under other Sections.

2.02 TRIM

- A. Definition: Frames, casings, surrounds, fascia, and other millwork not specified elsewhere.
- B. Maximum moisture content at time of surfacing: 15% exterior, 10% interior.
- C. Minimum lengths:
 - Opening trim - 1 piece, single length
 - Standing trim - Joints no less than full story height apart.
 - Running Trim - Joints no closer than 12 feet apart.
- C. Interior:

Species:	Douglas Fir or Pine
Grain:	Vertical
Surface Texture:	Smooth
- D. Exterior:
 - 1. Building corners and Window and door trim
 - Metal trim provided by metal products supplier.

2.03 PLASTIC LAMINATE COUNTER TOPS

- A. Manufacturer: Formica, Wilson Art, Nevamar, or approved.
- B. Type: Federal Specification L-P-508f type I; 1/16" thick, general purpose plastic laminate unless noted otherwise.
- C. Colors: 3 colors to be selected from submitted samples.

PART 3 EXECUTION

3.01 GENERAL

- A. Preparation:
 - 1. Inspection: Verify that surfaces to receive Finish Carpentry are straight, plumb, true, solid, rigid, properly prepared, and completed to the point that Work of this Section may properly commence and be completed in accordance with the original design.
 - 2. Field Measurements: Prior to fabrication, verify field dimensions as required for accurate fit. Notify Engineer of significant variations from plan dimensions.
 - 3. Discrepancies: Do not proceed until all discrepancies have been resolved, and all conditions are satisfactory.
- B. Workmanship: Conform to AWI "Custom" grade requirements unless noted otherwise.
- C. Finishing:
 - 1. Sand all finished wood surfaces as required to produce uniformly smooth surface, except do not sand wood scheduled to be rough or textured.
 - 2. Use proper size nails or screws to hold members without splitting wood; set for puttying unless noted otherwise; galvanized for exterior applications.
 - 3. Coarse or cross grain sandpaper marks, hammer marks, scratches, stains or other imperfections will not be accepted.
- D. Installation Of Items Furnished Under Other Sections:
 - 1. Install in accurate locations shown on the Drawings, in accordance with approved shop drawings.
 - 2. Install plumb and level; moving parts without rattle, drag, or binding.

3.02 TRIM INSTALLATION

Accurately miter exterior corners, cope interior corners, miter or scarf end to end joints and scribe to abutting surfaces; Joints located only over solid support. Kerf backs of flat grained members over 5" wide or 1" thickness.

3.03 DOOR AND WINDOW INSTALLATION

- A. See Section 07 27 00 Water Resistive Barrier. Do not install exterior windows or doors until WRB including sill flashing, is in place and approved.
- B. Door clearances
 - 1. The clearance between the door and frame head and jambs shall be 1/8" (3.2 mm) in the case of both single swing and pairs of doors.
 - 2. The clearance between the meeting edges of pairs of doors shall be 1/8" (3.2 mm) to 1/4" (6.3 mm), for fire rated doors 1/8" (3.2 mm) \pm 1/16" (1.6 mm).
 - 3. The clearance at the bottom shall be [3/4" (19.1 mm)] [5/8" (15.8 mm)].
 - 4. The clearance between the face of the door and door stop shall be 1/16" (1.6 mm) to 1/8" (3.2 mm).
 - 5. All clearances shall be, unless otherwise specified, subject to a tolerance of \pm 1/32" (0.8 mm).
- C. Install labeled doors in accordance with code and UL rating requirements.

3.04 FINISH HARDWARE AND SPECIALTIES INSTALLATION

- A. Install in accordance with manufacturer's recommendations.
- B. Remove hardware, with the exception of prime coated items, tag, box, and reinstall after finish painting work is completed.

3.05 CABINET INSTALLATION

- A. Set and secure cabinets in place, assuring they are rigid, plumb and level.
- B. Secure as required to insure permanence and rigidity; with no nails screws or other anchors in exposed locations. Secure cabinets to floor using appropriate angles and anchorage. Shelving and wall hung cabinets secured to blocking, and capable of supporting 35 lb per square ft., of shelf in addition to cabinet weight. Wall hung cabinets secured with no.10 FHWS x length required for 1-1/2" penetration into framing.
- C. Scribe casework abutting other components, with maximum gap of 1/32 inch. Do not use additional overlay trim for this purpose.
- D. Adjust moving parts to function smoothly and correctly.
- E. Clean Casework, counters, shelves, hardware, fittings, and fixtures.

3.06 PLASTIC LAMINATE COUNTER TOPS

- A. Install in accordance with manufacturer's recommendations with waterproof adhesive over 3/4" exterior grade plywood unless detailed otherwise.
- B. Use full sheets, without cross seams except where counter runs are longer than laminate is commercially available; "ELL" shaped pieces not allowed.
- C. Seal with clear silicone sealant as required to prevent leakage of water from deck without the use of metal trim unless specifically detailed.
- D. Backsplash:
Install over 3/4" self-edged, high density particle board.
Return along end walls to counter front unless noted otherwise.
Kerf backing to facilitate wall fit.
Scribe top edge of backsplash to wall and bottom edge to countertop.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.

06 10 00 Rough Carpentry – blocking and support

06 20 00 Finish Carpentry – installation of cabinets

09 90 00 Painting

Divisions 22, 23 and 26. plumbing, mechanical, electrical Work in Cabinets

1.02 QUALITY ASSURANCE

- A. Reference Standards:
Conform to the requirements of ANSI/KCMA A161.1 "Recommended Minimum Construction and Performance Standards for Kitchen Cabinets" as the Engineer judges it applicable and as supplemented herein.
- B. Manufacturer's Qualifications: Cabinets shall be licensed by and bear "KCMA Certified Seal".

1.03 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01 33 23, showing location of cabinets, AWS quality grade, species, type of finish, dimensions, details of joints, connection to adjoining construction, cut outs for sinks and other equipment, and all measurements beyond the control of the mill.
- B. The Cabinet Supplier is responsible for details and dimensions not controlled by job conditions and shall show on his shop drawings all required field dimensions beyond his control. The General Contractor and Cabinet Supplier shall cooperate to establish and maintain these field dimensions.

1.04 DELIVERY STORAGE AND PROTECTION

- A. Protect from moisture, damage and discoloration.
- B. Maintain 50 degree F. minimum temperature and 60% maximum relative humidity in storage areas.
- C. Do not deliver to job site until notified by General Contractor that project is conditioned and prepared to handle and store Products without damage.
- D. Provide temporary skids under large or heavy cabinets.

PART 2 PRODUCTS

2.01 GENERAL

- A. Conform to approved shop drawings, and Reference Standards including approved Manufacturer's published specifications.
- B. Provide all necessary rough and finish hardware items, including screws, anchors, brackets, etc. required for completion of the Work of this Section, and not specifically required to be furnished under other Sections.

2.02 MANUFACTURER AND TYPE

Manufacturer: Aristokraft "Augusta" or approved modular cabinets with solid core raised panel doors and drawer fronts; "Thermofoil" face and back, Exposed face frames and end panels same finish as door and drawer panels.

Cabinet sides: 3/8" 5 ply - plywood.

Drawer construction: 3/4" dovetailed sides with concealed full extension guides, and 1/4" plywood bottoms.

Shelves: 3/4" thick.

Hinges: Steel, concealed, self-closing.

2.03 COUNTERS

3/4" thick APA BC Exterior plywood with 1x2 softwood face for self-edging. Total width of counter and facing 1" wider than cabinet depth to front of face frame.

PART 3 EXECUTION

Installation: Refer to Section 06 20 00 Finish Carpentry.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.

1.02 QUALITY ASSURANCE

- A. Warranty: Refer to Supplementary Conditions

1.03 SUBMITTALS

- A. Shop Drawings & Product Data:

1. Submit in accordance with Section 01 33 23, showing manufacturer, R-values, vapor barriers, colors, installation recommendations, and other pertinent data, for each type or insulation specified.
2. After installation submit record indicating number of bags and/or total weight of blown insulation actually installed in each separate attic space. Provide documentation indicating that weights and depths equal or exceed minimums listed by manufacturer for specified R-values.

1.04 DELIVERY STORAGE AND PROTECTION

Deliver and store materials protected from moisture or damage, in original containers bearing identification of manufacturer, R-Values, UL ratings, and type of material. Maintain seals intact until time of use.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Thermal Batt Insulation:

1. Type: Rock or Glass Wool Batts.
2. Manufacturer: Owens Corning, CertainTeed, Gustin/Bacon, or approved.
3. Vapor Barriers:
 - a. General: one face vapor permeable, other face vapor barrier, with perm rating of 1 or less.
4. R - Values:
 - Ceiling – Break Room R-38
 - Ceiling: – Parking R-30 (Ceiling scuttle and as required to supplement blown insulation)
 - Walls: R-21

- B. Blown Insulation:

1. Type: Chopped fiberglass with 1/k value of 2.658 per inch or greater.
2. Manufacturer: CertainTeed , or approved.
3. R - Values: R-30 minimum. (See comments regarding density in Part 3 - installation)

- C. Spray foam Insulation:

1. Type: Low pressure, low VOC, closed cell polyurethane spray foam insulation.
2. Manufacturer: CertainTeed Corp., or approved.

PART 3 EXECUTION

3.01 GENERAL

- A. Conform to Reference Standards, including Manufacturer's recommendations.
- B. All interior spaces to be contained in a complete and continuous envelope of insulation.

3.02 LOCATION AND INSTALLATION

- A. Batt or Blanket Insulation:

1. Install in ceilings, framed walls and floors.
2. Install with vapor barrier facing space to be insulated.
3. Fit ends of batts or blankets tight.
5. Pack spaces around windows, doors, electrical outlets etc., with low VOC closed cell polyurethane

spray foam insulation.

6. Install vinyl faced insulation over purlins and girts of metal building, locating horizontal seams behind framing members, and sealing vinyl face with vinyl tape to match vapor barrier.

D. Blown Insulation:

1. Install in accordance with manufacturer's recommendations with uniform depth and density. Record number of bags and/or total weight of insulation actually installed in each separate attic space. Provide insulation in weights and depths to equal or exceed minimums listed by manufacturer for specified R-values.
2. Provide insulation baffles and maintain vent opening area as required by code.
3. Engineer will verify depth and may direct the removal and replacement of insulation from 2'X2' areas selected at random (not over 1 location per separate attic space) for verification of insulation weight and density. In the event testing indicates less than specified depth or density the contractor shall install additional insulation as required at no additional cost.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.

06 10 00 Rough Carpentry - (Framing to receive finish)

06 20 00 Finish Carpentry - (Installation of siding, trim, windows, and doors)

07 60 00 Flashing and Sheet Metal

07 90 00 Joint Protection - Caulking and Sealants

1.02 WORK INCLUDED

- A. Furnish and install WRB over exterior of studs or wall sheathing at all locations regardless of whether or not indicated on drawings to protect exterior sheathing and interior walls.

1.03 QUALITY ASSURANCE

A Reference Standards:

1. Conform to approved manufacturer's published recommendations.
2. WRB shall meet the 75% drainage efficiency requirements of ASTM E-2273 or other recognized national standard.
3. ASTM E96; Test Method for Water Vapor Transmission of Materials

B. Warranties and Guarantees:

1. Contractor's Warranty: 3 years minimum against defect, leaking or delamination from substrate. Warranty shall include cost of materials and installation.
2. Refer to Supplementary Conditions, and to Paragraph 1.03.D

C. Installation Instructions:

1. Installation instructions shall be maintained in the Field Office Building and available for review by the Project Manager, Engineer and Building Official.
2. Maintain Manufacturer's installation instructions for each cement board type used on the job.
3. Maintain a copy of WRB manufacturer's approved installation recommendations

D. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.

1.04 SUBMITTALS

- A. Samples: Submit 2 each, 4"x 4" or larger samples of WRB membrane, tape, Self-adhering flashing, and fasteners.
- B. Manufacturer's Literature: Submit manufacturer's written description and installation procedures.
- C. Submit current ES report indicating approval of applicable codes.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Refer to Section 01 60 00 Product Requirements.
- B. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Store weather barrier materials as recommended by system manufacturer.

1.06 SCHEDULING

- A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly, meeting OSSC requirements..

In general, all WRB sheeting and sill flashing shall be in place prior to installing windows.

PART 2 PRODUCTS

2.01 MATERIALS

A. Water Resistive Barrier (WRB) and Penetration Flashing Wrap:

1. All products used in WRB shall be manufactured or approved by the same sheeting manufacturer, and shall

comply with applicable OSSC requirements.

2. DuPont™ Tyvek® DrainWrap™, or approved, vapor permeable, polyethylene fiber sheeting; 9 ft. widths. Water resistive barrier shall meet the requirements ASTM 2273 and ORSC R703.1.1 Exception 1 for an enhanced drainage WRB.
3. Flashing Wrap: DuPont "FlexWrap NF™" or approved self-adhering flashing material complying with AAMA 711-07.and OESC R703..
4. Seam Tape: 3 inch wide, DuPont™ Tyvek® Tape or approved.
5. Fasteners: Tyvek® Wrap Caps or other manufacturer approved (#4 nails w/ 1" plastic cap fasteners).
6. Adhesive: SIA 655 or approved adhesive recommended by weather barrier manufacturer and meeting California VOC requirements.
7. Sealants recommended by the weather barrier manufacturer. See Section 07 90 00 Joint Protection.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.02 Installation

- A. Install weather barrier over exterior face of exterior wall studs or sheathing (as applicable) in accordance with manufacturer recommendations.
- B. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap. Make sure stud marks align with studs and that skeet is plumb.
- C. Apply wrap with grooved surface pattern in vertical direction.
- D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with grooved surface pattern in vertical position. Maintain weather barrier plumb and level.
- E. Extend bottom roll edge over sill plate 2" to 3". Seal weather barrier with sealant or tape. Shingle weather barrier over back edge of weep screed. Seal weather barrier with sealant or tape to weep screed. Ensure weeps are not blocked.
- F. Subsequent layers shall overlap lower layers a minimum of 6 inches horizontally in a shingling manner.
- G. Window and Door Openings: Extend weather barrier completely over openings.
- H. Weather Barrier Attachment: Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 12 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.

3.03 SEAMING

- A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.
- B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.04 OPENING PREPARATION

- A. Cut weather barrier membrane in a modified "I-cut" pattern.
 1. Cut weather barrier horizontally along the bottom of the header.
 2. Cut weather barrier vertically 2/3 of the way down from top center of window opening.
 3. Cut weather barrier diagonally from bottom of center vertical cut to the left and right corners of the opening.
 4. Fold side and bottom weather barrier flaps into window opening and fasten.
- B. Cut a head flap at 45-degree angle in the weather barrier membrane at window head to expose 8 inches of sheathing. Temporarily secure weather barrier membrane flap away from sheathing with tape.

3.05 FLASHING

- A. Cut 9-inch wide approved self-adhering flashing wrap a minimum of 12 inches longer than width of sill rough opening. Apply primer to sheathing as recommended by manufacturer.
- B. Cover horizontal sill by aligning flashing wrap edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan flashing wrap at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Insure that bottom edge or sill flashing extends and adheres over inner (upper) flange of "Z" flashing through siding under window sill.
- D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.

- E. Install window according to manufacturer's instructions.
- F. Apply 4-inch wide strips of DuPont™ StraightFlash™ at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.
- G. Apply 4-inch wide strip of DuPont™ StraightFlash™ as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.
- H. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.
- I. Tape head flap in accordance with manufacturer recommendations
- J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.

07 20 00 Insulation other than rigid type specified in this section.

07 61 00 Preformed Metal Siding and Standing Seam Roofing

07 90 00 Joint Protection - Caulking and Sealants

1.02 QUALITY ASSURANCE

- A. Reference Standards:
Conform to recommendations of "Architectural Sheet Metal Manual" of the Sheet Metal and Air Conditioning Contractors National Association, Inc., (SMACNA) as modified herein and on the Drawings.
- B. Installer's Qualifications: Minimum of 4 years experience installing the subject Products.
- C. Warranty: Contractor's Warranty: Refer to Supplementary Conditions.

1.03 DELIVERY STORAGE AND PROTECTION

Deliver and store materials protected from damage and discoloration.

Nonferrous and Stainless Steel sheet metal Products which are not scheduled to be painted and which are to be visible upon completion of the Work, shall be delivered with a continuous adhesive applied protective plastic or paper film, which shall be left in place until ready for final cleaning and finishing. Regardless of sequence or methods of fabrication, it shall be the responsibility of the installing subcontractor to coordinate and maintain protection of sheet metal surfaces until Final Completion, maintaining them free from damage, stain or discoloration.

~~PART 2 PRODUCTS~~

- A. Gages: Sheet metal gages specified are minimums; provide heavier gages where required to maintain shape and alignment without waves and buckles.
- B. Galvanized Steel:
 - 1. Zinc-Coated Steel: Commercial quality with 0.20 percent copper, ASTM A526, except ASTM A527 for lock-forming, G90 hot-dip galvanized.
 - 2. Gage: 26 gage minimum, unless noted otherwise.
 - 3. Primer: Alkyd type Zinc Chromate Primer; Rodda, Sherwin Williams, or approved.
 - 4. Locations: All sheet metal work unless noted otherwise.
- C. Baked Enamel Prefinished Galvanized Steel:
 - 1. Prefinished Zinc-Coated Steel: Hot-dip galvanized steel, commercial quality A1 S1 G90 extra smooth, primed on both sides and finished on 1 side with 70 percent KYNAR 500® based fluorocarbon coating of minimum 0.70 mils (1.8 mm) total dry film thickness. Minimum 10 year warranty against visible fade, blister, or rust.
 - 2. Strippable coating: Shop-applied liquid to front side of pre-finished metal to protect finish during fabrication, shipment, and field handling.
 - 3. Locations: As required for exposed flashing in connection with prefinished metal roofing.

2.02 OTHER MATERIALS

- A. Nails, Rivets and fasteners:
 - 1. Connecting Ferrous Metals: Use only soft rivets having rust resistive coating, galvanized barb type nails and cadmium plated or stainless steel screws and washers.
 - 2. Connecting Copper and High Copper Alloy Metals: Use only copper or copper clad stainless steel fasteners, nails, rivets, screws and washers, except that unclad stainless steel fasteners may be used if not visible upon completion.
 - 3. Connecting Aluminum and Aluminum Alloys: Use only aluminum or stainless steel fasteners, nails rivets, screws, and washers.

- B. Sealant: Silicone Type; Dow, GE, or approved.

PART 3 EXECUTION

3.01 PREPARATION

- A. Inspection:
1. Prior to starting Work of this Section, carefully inspect the installed Work of other trades and verify that they are complete and acceptable for proper installation of approved roofing products.
 2. Field verify shapes and dimensions of surfaces to be covered prior to fabrication.
 3. Coordinate with roofing and others trades affecting sheet metal Work.
- B. Discrepancies:
1. Do not proceed until all unsatisfactory conditions have been corrected.
 2. Proceeding with installation implies acceptance by the installing Subcontractor of all subsurfaces and other conditions affecting this Work.

3.02 INSTALLATION

- A. General
1. Provide all sheet metal Work shown and as required for weather tight job.
 2. Form materials accurately to shapes indicated, with lines and angles in true alignment, without waves, buckles, or tool marks using the best standards of modern sheet metal practice, and in conformance with Reference Standards.
 3. Make work weather tight.
 4. Conceal fastenings, do not drive nails tight enough to warp metal.
 5. Make proper allowance for expansion and contraction.
 6. Reinforce corners as required for stiffness.
 7. Unless noted otherwise, Hem exposed edges, and angle bottom edges of exposed vertical surfaces to form drip.
 8. Protect contacting dissimilar metals from corrosion with approved asphaltic coating compound applied to each face, or hold separation with approved type glazing tape continuous between faces.
- B. Painting:
1. Shop prime all sheet metal except copper, stainless steel, and factory finished materials, with specified primer.
 2. Touch-up damage to prime coat after installation.
- C. Cleats:
1. Space 24" oc., unless continuous Cleats or other spacings are specified hereunder or shown in the Drawings.
 2. Secure Cleats to substrate with two fasteners, and cover heads with Cleat Tabs.
 3. Secure continuous cleats to substrate with Fasteners spaced 12" oc.
- D. Gravel Stops, Copings, and Caps:
1. Hem bottom edges; corners shop formed and soldered, except materials not scheduled to be painted which are located where discoloration would be visible, shall be hem or flat seamed in accordance with SMACNA Manual, and made water tight with sealant bead concealed under seam tabs.
 2. Fabricate for tight fit; exterior (visible) edges locked over continuous cleat.
 3. Unless detailed otherwise use cover plate type seams; space abutting sheets 1/4", set in sealant over 12" wide back-up plate and cover with 4" wide cover plate, set in sealant.
- E. Step Flashing:
1. Install shingle fashion in accordance with NRCA Steep Roofing Manual and roofing manufacturer's recommendations. Extend 3" minimum under adjacent siding. Overlap base flashing or shingles 4" minimum. Form drip diverter at bottom edge per NRCA manual.
 2. Miter, Lap seam, and close corner joints with solder.
 3. Provide wherever roof meets vertical surface.
- F. Drip Edge Flashing: 28 gage; nominal 1-1/2" x 3" with 1/4" hemmed drip edge, unless detailed otherwise. Provide along all bottom edges (eaves), over roofing felts, per recommendations of NRCA Steep Roofing Manual.

- G. Rake Edge Flashing: 28 gage; Provide along all rake edges per manufacturer's specifications, over roofing felts, per recommendations of NRCA Steep Roofing Manual.
- H. Continuous Ridge Vent: Provide specified ridge vent full length of ridge where noted on drawings. Install per manufacturer's recommendations, and ICC ES report 21-85, with end caps and wind deflector flashing.
- I. Rain Leaders:(down spouts)
 - 1. Telescope joints 1-1/2" in direction of flow and make watertight.
 - 2. Install clear of wall on hangers compatible with rain leader but 2 gauges heavier, spaced at top, bottom, and not over 6 ft. oc. in between.
 - 3. Provide mitered down spout elbows where required.
- J. Gutters:
 - 1. 5" K-style aluminum gutter.
 - 2. Secure to adjacent construction with appropriate fastener type as indicated in SMACNA manual

END OF SECTION

PART 1 GENERAL

1.01 DESCRIPTION

A. Work in this section includes furnishing and installation, preformed Steel standing seam roofing on all sloped portions of buildings, preformed standing seam siding on vertical portions of buildings, and metal accessories and trim necessary for a water-tight building.

1.02 RELATEDWORK

A. Installation of Flashing and Sheet Metal - Section 07 60 00

1.03 AUTHORIZATION OF INSTALLER

A. The installer of the system shall be factory trained and authorized by the manufacturer to install the products specified herein. Evidence of manufacturer's certification for this project will be required.

1.04 SUBMITTALS

A. Description Data: Submit manufacturer's descriptive data on materials to be provided. Data shall be sufficient to indicate conformance to all specified requirements including finish.

B. Installation Instructions and Diagrams: Submit manufacturer's instructions and diagrams required to install complete system.

C. Shop drawings as necessary to supplement the instructions and diagrams. Drawings shall be thorough and show all typical and special conditions including flashings, materials and thickness, all dimensions, all anchoring methods, sealant locations, fastener, layout sizes, and spacing, and provisions for thermal movement. Shop drawings shall be reviewed by the manufacturer's technical engineering department before submittal to the Owner.

D. Calculations by a Professional Structural Engineer registered in the State of Oregon verifying that system supplied meets the design loads indicated. Coordinate calculations with manufacturer's test results.

E. Manufacturer's Certificates of Conformance or Compliance: Submit certificates for all materials to be provided under this section.

F. Laboratory Test Reports: Test reports on previously tested material is of the same type, quality, manufacturer and make as that proposed for this project.

G. Samples: One sample of each of the following:

1. 2 foot long section of typical panel in color specified.
2. Any Special Flashing designed specifically for this project.

1.05 WARRANTY

A. The Contractor shall warrant for two years from substantial completion that the standing seam roofing is free from defective materials and workmanship. While roofing is under warranty, repairs shall be performed by the Contractor within 7 days after notification, unless additional time is approved by the Contracting Officer Representative. Failure to perform repairs within the specified period of time will constitute grounds for having the repairs performed by others and the cost billed to the Contractor.

B. Manufacturer's standard warranty for 30 years, following delivery date, that under normal usage, panels will not rupture, fail structurally or perforate due to corrosion.

C. Manufacturer's standard paint warranty for 30 years (non-prorated) that:

1. Paint will not peel, check, chip, crack (except for such crazing or slight cracking as may occur on tightly roll formed edges or brake bends at the time of forming pre-painted sheet and which is accepted as standards).
2.
 - a. Chalk in excess of a numerical rating of eight (8) when measured in accordance with the standard procedures specified in ASTM D659-80; or
 - b. Fade or change in color in excess of five (5) E units (NBS), calculated in accordance with ASTM D2244-85, paragraph 6.3. Color change shall be measured on an exposed painted surface that has been cleaned of surface soils and chalk, and the corresponding values measured on the original or unexposed painted surface. It is understood that fading of color changes may not be uniform if the surfaces are not equally exposed to the sun and elements.

1.06 DELIVERY HANDLING AND STORAGE

A. Deliver, store and handle preformed panels and other manufactured items so that they will not be damaged or deformed.

B. Delivery: provide adequate packaging for materials which will protect them during shipment. Crated materials shall not be uncrated until ready to use, except for inspection. Immediately upon arrival of the materials at the job site, the Contractor shall inspect materials for damage, dampness, and staining. Damaged or permanently stained materials that cannot be restored to like-new condition shall be replaced with satisfactory material. If materials are wet, remove the moisture and restack and protect the panels until used.

C. Handling: Handle material carefully to avoid damage to surface, edges and ends.

D. Storage: Stack materials stored on the site on platforms or pallets and cover with tarpaulins or other suitable weather tight covering which prevents water trapping or condensation. Store panels so that water which might have accumulated during transit or storage will drain off. Do not store the panels in contact with materials that might cause staining, such as mud, lime, cement, fresh concrete or chemicals. Protect stored panels from wind damage.

1.07 SYSTEM REQUIREMENTS

A. Panels shall be continuous lengths with no joints or seams, except where indicated. Individual panels shall be removable for replacement of damaged material.

B. There shall be no exposed or penetrating fasteners except where needed for trim flashings.

C. Roof panel standing seams shall have continuous bead of flexible sealant applied between seams when roof pitch is 2/12 or less.

1.08 PERFORMANCE REQUIREMENTS

A. Wind uplift - resistance to wind uplift from winds 97 mph, exposure B.

B. Panels shall have a minimum snow load capacity of 25 psf.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

A. Taylor Metal Products; 4566 Ridge Drive NE, Salem, OR 97301 800-574-1388

2.02 GENERAL

A. Single Source: Roof and wall panels, flashings and other accessories shall be the product of a single manufacturer.

1. Pre-coated Galvanized Steel: ASTM A653- (A446)C, 40,000 pounds per square inch minimum yield strength. 26 gauge (asg). G90 Galvanized coated.

2. Finish:

a. Exterior:

(1) Poly-vinylidene Fluoride (PVF2) 70% Kynar 500, Hylar 5000 Resin coating 0.2 mil corrosion resistant primer. 0.8 mil PVF2 = 1.0 Dry film thickness.

b. Interior:

(1) 0.15 mi Corrosion resistant primer.

(2) Finish Coat: 0.35 mu off-white backer.

c. Colors:

Roofing – Hemlock Green SRI-36

Siding – Zinc Grey – SRI-39

Trim & Gutters – match roofing

3. Panel Lengths: Where physically possible and/or practical, panels are to be full length, from ridge to eave on roof or top to bottom of wall.

B. Non – insulated Wall Panels

C. Non - insulated Roof Panels

1. Panels: Roll formed, 1 inch vertical standing seam “Snap - Lock”, vertical ribs at 16” o.c. complete with performed corners, fasteners and accessories. Inside rib must be min. 7/8 inch.

2.03 CLOSURES

A. Vented Ridge Closure: Up bent panel tops 1” to match install panel configuration, conforming to ASTM D 1056-91. Insect screen across opening in ridge.

2.04 OTHER ACCESSORIES

A. Accessories: Sheet metal flashings, trim, closure strips, caps and other similar sheet metal accessories used in conjunction with preformed metal panels shall be of the same material and finish as used for the panels.

B. Concealed Fasteners: Ultra Z low profile pancake head. Electro Zinc -Carbon Steel fasteners. #12 14 x 1 self drilling for metal applications. #12 11 x 1 bugle screw for wood applications. Atlas Bolt and Screw Co. or approved equal.

C. Exposed Fasteners: Electro Zinc - Carbon Steel. Painted Hex head with neoprene washer. #12 x 2 selfdriller for metal applications. #12 x 2 woodfast for wood applications. Atlas Bolt and Screw Co. or approved equal.

D. Sealant: Kraton G block copolymer based elastomeric sealant, conforming to ASTM G-53-77. Adhesion Minimum 40 PLI on steel. Tensile and elongation conforming to ASTM D-2370. Flexoseal or approved equal.

E. Underlayment: Synthetic underlayment.

PART 3- EXECUTION

3.01 INSPECTION

A. Inspect surface to receive standing seam metal roofing and flashing. Substrate shall be plumb and true, clean, even, smooth and as dry as possible and free from defects and projections which might affect the installation. Report unsuitable conditions to Contracting Officer.

3.02 INSTALLATION

A. Underlayment:

1. Install in accordance with manufacturer's specifications and instructions.

B. Metal Panels:

1. Apply panel with the standing seam parallel to the slope of the roof and vertical at walls. Provide panels in full lengths, with no transverse joints except at the junction or ventilators, curbs translucent panels, and similar openings. Install flashing to assure positive water drainage away from penetrations. Flash and seal at the ridge, at eaves and rakes.

2. Install in accordance with manufacture's specifications and instructions.

C. Flashing: All flashing and related accessories in connection with the preformed metal panels shall be provided as indicated and as necessary to provide a weather tight installation. Details of installations which are not indicated shall be in accordance with NRCA Construction Details, SMACNA Architectural Sheet Metal Manual *7th* ed., AA Specifications for Sheet Metal Work, panel manufacturer's printed instructions and details of the approved shop drawings. Installation shall allow for expansion and contraction of flashing.

D. Flashing Fasteners: Fastener spacing shall be in accordance with the panel manufacturer's recommendations and as necessary to withstand the design loads indicated. Install fasteners in roof valleys as recommended by the manufacturer of the panels. Drive exposed penetrating type washers properly and drive so as not to damage factory applied coating. Exercise extreme care in drilling pilot holes for fastenings to keep drills perpendicular and centered. After drilling, remove metal filings and burrs from holes prior to installing fasteners. Fasteners shall not exceed that recommended by the manufacturer. Remove panels deformed or otherwise damaged by over-torqued fastenings, and provide new panels.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.
06 10 00 Rough Carpentry - Construction Mastic
06 20 00 Finish Carpentry - Sealants for plastic laminate counter tops.
07 60 00 Flashing and Sheet Metal

1.02 QUALITY ASSURANCE

Warranty: Refer to Supplementary Conditions.

1.03 DELIVERY STORAGE AND PROTECTION

Deliver and store materials protected from damage, in original tightly sealed containers bearing identification of manufacturer, and type of material. Maintain seals intact until time of use.

PART 2 PRODUCTS

2.01 SEALANTS

A. General:

1. Unless noted otherwise all sealants shall be approximate color of adjacent surfaces.
2. Sealant materials shall be type recommended by manufacturer for use in application for which sealant is proposed.

B. Acrylic Latex Sealant:

DAP® ALEX PLUS®, 3M "Weatherban" acrylic sealant 606-NF, or approved paintable acrylic latex based sealant.

C. Polyurethane Sealants:

Sikaflex-1a, or approved, one part, gun grade sealant meeting Federal Specification TT-S-00230C type II class A, Conforming to ASTM C920 type S Grade NS class 25.

D. Silicone, Polysulfide Sealants:

Dow Corning® 790 SILICONE or approved, one part, gun grade sealant complying with ASTM C920 Elastomeric Joint Sealants.

2.02 ACCESSORY PRODUCTS

- A. Primer and Surface Conditioner: Products recommended by Manufacturer of sealant to be applied.
- B. Backer Rod: Closed cell, polyethylene gasketing rod, by same manufacturer as sealant with which to be used; and with diameter 1/4 greater than width of joint in which to be installed.

PART 3 EXECUTION

3.01 PREPARATION

A. Inspection:

Examine all surfaces upon which this Work is to be applied and notify General Contractor of all conditions detrimental to proper installation. Do not proceed until all unsatisfactory conditions have been corrected. Proceeding with installation implies acceptance by the installing Subcontractor of all subsurfaces and other conditions affecting this Work.

B. Surface Preparation:

1. Allow concrete to dry at least 4 weeks before caulking or sealing.
2. Remove all dust and dirt and make sure that joints are dry and free of any bond reducing matter before proceeding.
3. Prime unpainted surfaces as recommended by Manufacturer of sealant.

3.02 BACKING INSTALLATION:

- A. Joints to receive acrylic latex sealant:
If joint is deeper than 3/4" and no suitable backstop is provided, pack with rope yarn to within 1/2" of surface before applying sealant.
- B. Joints to receive other sealant types:
Install Backer Rod behind sealant in accordance with Manufacturer's directions.
Stretch taut and force into joint to uniform depth, approximately 1/2 joint width, but not to exceed 1/2".
Replace any punctured backer rod with undamaged material.

3.03 SEALANT SELECTION

- A. Read Manufacturer's recommendations, and verify that sealant is intended for use with materials and conditions of application to be encountered.
- B. Sealants:
 - 1. Use specified Polyurethane Sealant, or Silicone Sealant for general sealing applications, unless specifically noted otherwise.
 - 2. Acrylic Latex Sealant may be used for joints in wood frame construction, and in all interior applications to be painted, unless noted otherwise.
 - 3. Joint sealing in interior areas subject to high moisture or humidity, such as bathrooms, showers, etc. shall be done with silicone sealant.
 - 4. Sealant types called for in the Drawings shall take precedence.

3.04 APPLICATION OF SEALANT

- A. Install in strict accordance with Manufacturer's current recommendations, taking care to produce beads of proper width and depth. Seal joints using gun type dispenser, before applying final coat of paint. Install flush with adjacent surfaces, tool smooth and remove all surplus sealant immediately.
- B. In addition to sealant locations specified elsewhere or noted in the Drawings:
 - 1. Caulked or glue soleplate to subfloor, and caulk rim joist between stories.
 - 2. Set window and door nailing flanges and thresholds in sealant bead, and seal perimeters after siding installation.
 - 3. Seal all holes in building envelope (i.e. exterior ceilings, walls, and floors), including all electrical, plumbing, and HVAC penetrations.
 - 4. Seal outlets, switch boxes, and recessed fixtures on exterior walls with approved sealant or have foam face gaskets installed.
 - 5. Seal recessed fixtures to the ceiling sheetrock.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.
06 10 00 Rough Carpentry – Blocking for stops.
06 20 00 Finish Carpentry - Installation

1.02 SCOPE OF WORK

- A. General: This Section Includes standard steel doors and door frames.

1.03 QUALITY ASSURANCE

- A. Reference Standards:
Conform to ANSI A250.8 - 2003 **SDI-100** "Recommended Specifications for Standard Steel Doors and Frames published by Steel Door Institute, as the Project Manager judges it applicable and as modified herein.
- B. Regulatory Requirements: Fire rated steel frames shall be of the types tested and approved by a testing agency that is acceptable to regulatory agency having jurisdiction. Fire rated steel frames shall bear labels of testing agency.

Provide Underwriters (UL) label on doors and frames for class indicated on door schedule.

1.04 SUBMITTALS

Shop Drawings: Submit in accordance with Section 01 33 23 showing manufacturer's standard details of stock items and detailed shop drawings of variations from standards. Show anchors, rough openings, cut-outs, joints, welds, profiles, reinforcing, core, label compliance, etc., for every door and frame required.

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 schedule to avoid construction delays.

1.05 DELIVERY STORAGE AND PROTECTION

Protect from moisture, damage and discoloration; store upright in dry area off of the ground, with bottom ends of frames braced against displacement.

PART 2 PRODUCTS

2.01 GENERAL

All products shall conform to Reference Standards and Regulatory Requirements.

2.02 DOORS

- A. HM on schedule
1. Exterior Doors: SDI Level 2 _ Performance level B - Heavy Duty, Model 2 - seamless composite, 18 ga. min., 1-3/4" thick; flush sealed end closure treatment required at top of doors.

2.03 FRAMES

- A. HM on schedule:
1. Type: Welded unit type; 16 ga. exterior; 16 ga. interior. Profiles as detailed in the drawings. No seams or penetrations visible at joints.
 2. Anchors: Special types where indicated, standard elsewhere; minimum 4 per jamb including floor clip. for doors up to 7'-6" high; add 1 anchor per 24" or fraction thereof over 7'-6" high. Stud anchors weld to frame type; friction fit or twist in type not approved.
 3. Casings: Refer to drawings. Casings not applicable

2.04 PREPARATION

- A. Hardware:
 - 1. Provide cut-outs and reinforcing for all hardware indicated.
 - 2. Do all drilling and tapping for hardware at factory.
 - 3. Reinforce all doors for closers.
- B. Shop Finish:
 - 1. Dress surface irregularities to smooth surface.
 - 2. Electrolytically zinc coated, chemically treat and cleaned and bonderized by steam chemical process.
 - 3. Prime with rust inhibitive primer.
 - 4. Where scheduled: Frames and doors electrolytically zinc coated to smooth finish prior to dressing and cleaning.

2.05 FINISH

- A. All doors, frames and frame components shall be cleaned, phosphatized and finished as standard with one coat of baked-on rust inhibiting prime paint in accordance with the ANSI A224.1 "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames".

2.05 OPENINGS:

- A. General: Make provisions for openings where indicated, as detailed, and in accordance with Reference Standards.
- B. Glazing Beads shall be rectangular in profile and be held in place with oval head countersunk screws.

PART 3 EXECUTION

3.01 Reference Standards

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.
- B. Conform to Reference Standards, Regulatory Requirements, and to door installation requirements specified in Section 06200.
- C. Doors and frames shall be installed in accordance with "Door and Hardware Institute" publication, "Installation Guide for Doors and Hardware" and manufacturer's recommendations.

3.02 Examination

- A. Field verify dimensions prior to fabrication.
- B. Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.
 - 1. Verify rough openings sizes and wall thickness are acceptable.
 - 2. Verify finish hardware requirements for each opening; verify frame reinforcement, preparation and anchorage. Verify requirements and coordinate with door and hardware supplier.

3.03 Installation

- A. Steel Door Frames:
 - 1. Install frames plumb and square, per shop drawings and manufacturers printed instructions. Verify opening and dimensions with the shop drawings. Use door as a template to insure proper alignment and clearances.
 - 2. Install frames as indicated on drawings.
 - a. Comply with manufacturer's recommendations for fasteners every 11" (279 mm) minimum.
 - 3. Secure frame to wall with appropriate type fasteners. Install casings on slip-on type frames.
 - a. Anchor slip-on type frames with one drywall-type screw adjacent to each casing clip.
 - b. Use pre-fit template door or actual door in opening to ensure proper alignment and clearances.
 - 4. Align parts with proper clearances to ensure proper fit, tight miters and performance requirements.

5. Install silencers on interior door frames.
6. Adjust strike plate to hold door tight to stops when closed.

B. Final Inspection:

1. Inspect each opening for operation, hardware, appearance and installation. Make required adjustments.

3.04 Cleaning

- A. Cleaning: Remove temporary coverings and protection of adjacent work areas.

END OF SECTION

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.
06 10 00 Rough Carpentry – Blocking for stops.
06 20 00 Finish Carpentry - Installation
08 11 13 Hollow Metal Doors and Frames
08 70 00 Finish Hardware
09 90 00 Painting

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. DHI - Door Hardware Institute: The installation of commercial steel doors and steel frames, insulated steel doors in wood frames and builders hardware.
2. AWI - Quality Standards of Architectural Woodwork Institute.
3. ANSI 117.1 - Handicap Code
4. International Building Code as adopted
5. AAMA/WDMA/CSA 101/I.S.2/A440, NAFS — *North American Fenestration Standard/Specification for windows, doors, and skylights.*

B. Suppliers Qualifications:

1. The wood door supplier shall be a manufacturer or distributor regularly engaged in supplying architectural wood doors and related accessories in this geographic area that has competent personnel available to correct damaged or defectively manufactured products. He shall have competent personnel available to consult with the engineer or contractor regarding conflicts, applications or field installation problems.
2. It is the intent of this specification to provide a general guideline for the quality, function, and design of the architectural wood doors and accessories. It is the specific responsibility of the wood door supplier to furnish products which are fully functional, in full compliance with State and local building codes, fire codes, and handicap codes. Any supplier bidding this section of the work shall notify the Engineer prior to bidding of discrepancies or shall be assumed to have included correct material to make this compliance.

C. Regulatory Requirements:

1. Wood doors shall be in full compliance with the OSSC Code as adopted, NFPA 80, NFPA 101, NFPA 105 and ANSI 117.1.
2. Provide Underwriters (UL) label on doors and frames for class indicated on door schedule.

D. Warranty: Wood doors shall be warranted as follows:

1. Interior Doors: Lifetime of the installation by the manufacturer. A distributor or supplier warranty is not acceptable.
2. The manufacturer's warranty shall include assumption of responsibility for reasonable replacement, rehanging, and refinishing for any door that does not satisfy the industry quality standards as defined by AWI and NWWDA I.S. 1-87 Sections 3.5.3.1 and 3.5.3.2 and these specifications. The manufacturer is not responsible for rehanging and refinishing if the defect is apparent prior to hanging.

1.04 SUBMITTALS

A. Shop Drawings:

1. Submit in accordance with Section 01 33 23 listing openings by engineer's opening numbers showing product construction, sizes, reinforcing, species, material grades, cutouts, louvers or other special features, elevations, finish, and if option to prehang doors is used, show frames as required by Section 06 20 00.
2. Submit notes with the shop drawings indicating items that vary from the plans and specifications, have conflicts for label compliance, are not in compliance with standards referenced above, have door, frame, hardware of function conflicts, or require review and clarification by the engineer.
3. Provide installation instructions with shop drawings.

B. Samples:

1. Submit one door corner sample in specified veneer and edge grain material for each type of door

construction required. (e.g. non-labeled, label).

2. For doors scheduled to be prefinished, submit two full sets of samples showing manufacturer's full range of finishes, including all colors, textures and patterns, for selection by the Engineer.

1.05 DELIVERY STORAGE AND PROTECTION

- A. Protect from moisture, damage and discoloration; store in dry well ventilated area; store flat, except store prehung doors upright, with bottom ends of frames braced against displacement.
- B. Door edges sealed prior to delivery and doors individually wrapped or packaged for complete protection. Do not seal door edges prior to preservative treatment.

1.06 OPTIONS

At Contractor's option, wood doors may be prehung or job-hung. No modification of requirements or hardware allowed without Engineer's approval.

PART 2 PRODUCTS

2.01 GENERAL

- A. Conform to requirements of Regulatory Agencies and Reference Standards.
- B. Sizes, thickness, and core as scheduled.
- C. Some of these doors are scheduled to be undercut 1-1/2" in order to improve return air flow. Coordinate with door manufacturer for custom door heights. Do not make field modifications that would affect warranty.

2.02 MANUFACTURER

- A. ProCore Solid Core Flush all panel by Jeld-Wen, Inc. or approved.
- B. Substitutions: Substitutions will be considered under conditions of Section 01 62 00. All requests for substitution shall be accompanied with a certification and recognized test laboratory results substantiating compliance with construction and test requirements noted in this section.

2.03 CORE - (Note: where core is not scheduled PB solid particle board core is implied)

- A. Particle Board Core: (PB) on schedule
 1. Match Jeld-Wen Solid particle board core smooth surface doors
 2. Molded 1/8" thick MDF faces.
 3. Provide with UL labels where scheduled.

2.03 FACE SPECIES OR MATERIAL

- A. Unless scheduled otherwise, interior doors shall have factory preprimed MDF faces.PART 3 EXECUTION

3.01 Refer to Section 06200 Finish Carpentry for installation.

3.02 Installation

- A. Door Frames:
 1. Install frames plumb and square, per shop drawings and manufacturers printed instructions
 2. Align parts with proper clearances to ensure proper fit, tight miters and performance requirements.
 3. Adjust strike plate to hold door tight to stops when closed.
- B. Final Inspection:
 1. Inspect each opening for operation, hardware, appearance and installation. Make required adjustments

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.

06 10 00 Rough Carpentry — Blocking for stops.

06 20 00 Finish Carpentry - Installation

08 70 00 Finish Hardware

09 90 00 Painting

1.02 SUBMITTALS

Shop Drawings: Submit in accordance with Section 01 33 23 showing operators, hardware, clearances, connections, anchors, rough openings, glazing, cut-outs, joints, and other details of construction, and accessories.

1.03 DELIVERY STORAGE AND PROTECTION

Protect from moisture, damage and discoloration; Each Door stored sealed and individually wrapped or packaged for complete protection.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

A. Specifications are based on Wayne-Dalton Models (Thermospan® 150) as manufactured by Wayne-Dalton Corp. or the approved equal by the Engineer and RUSA Project Manager. Equivalent doors by the following manufacturers may be substituted subject to approval of the RUSA Project manager.

1. General American Door Co.
2. Raynor Garage Doors.
3. Overhead Door Company.
4. Winsor

2.02 DOOR SECTIONS

A. Door Sections will be of steel/polyurethane/steel sandwich type construction to include a thermal break and have a calculated "R"-value of 14.16 (Thermospan 150), in accordance with industry guidelines. The exterior skin of structural quality, hot-dipped galvanized .009" (min.) steel, with stucco texture will be factory-finished with baked-on polyester primer and white polyester finish coats, and features 1/4" wide pin striping. The interior skin will be .012" (min) structural quality, hot-dipped, galvanized steel, factory-finished with a polyester primer and white polyester finish coats. The interior skin will have two 1-3/4" roll-formed integral struts per section. Ends of sections have full-height 18 ga. (min.) (16 ga. available) hot-dipped galvanized steel end caps. The void between the interior and exterior skins will be completely filled by foamed-in-place CFC free polyurethane core and separated by a factory extruded thermal break. Doors will be equipped with factory-installed joint seals between sections, a top seal on the top section to seal against the header, with a two-piece "bulb" shaped astragal for the bottom section. Air infiltration will be independently tested at less than or equal to .07 CFM per square foot of door area, in accordance with ASTM E-283- 91 at a pressure difference of .122" H₂O - 15 MPH. 2.02 Track

B. All track, vertical mounting angles and brackets will be commercial quality steel minimum 16 ga. thickness, hot-dipped galvanized. Track is (3") standard or as specified. Vertical track to be graduated providing wedge type weathertight closing with (continuous angle mounting for wood jambs) (continuous reverse angle mounting for steel jambs), and are fully adjustable to seal door at jambs. Horizontal track will be reinforced with continuous angle of adequate length and gauge to help prevent deflection.

2.03 HARDWARE

Hinge & Roller Assembly - All hinges and brackets will be made from hot-dipped, galvanized steel. Track rollers will be case-hardened inner steel races with 10-ball, (three-inch rollers). All factory authorized attachments will be made at locations indicated and reinforced with additional backup plates. Doors will have 3 rollers, double end stiles and long stem 3-inch rollers.

2.04 COUNTERBALANCE

- A. Springs will be torsion type, low-stress, helical wound, oil-tempered spring wire to provide minimum (25,000 standard for Thermospan 150) cycles of use - or meet specified cycles - on continuous steel shaft; (solid CRS). Spring fittings and drums will be made of die cast, high-strength
- B. Thermospan 150 Specifications. Pre-formed galvanized steel aircraft cable shall provide a minimum of a 5:1 safety factor. Long life springs of 50,000, cycles

2.05 WEATHERSTRIPPING

- A. Install jamb/perimeter seals.

2.06 LOCKS

Will engage the right-hand vertical track and utilize an interior side lock.

2.07 GLAZING

Will be FULL VIEW 1/8" Lexan set in two-piece molded high-impact polymer frames)

2.08 WIND LOAD

97 mph per OSSC

2.09 OPERATORS

- A. General: Doors shall be operated by chain hoist or electric motor operators with chain hoist back-up system as scheduled in the drawings. Also refer to alternate bids for possible effect on overhead door operators.
- B. Manual Chain Hoist Operators: Manufacturer's standard
- C. Electric Motor Operators:
 - 1. General: Provide UL listed electric operator, size and type as recommended by manufacturer, and shall have the following features:
 - a. Motor: Continuous-duty, high starting torque motor with instant reverse and overload protection. 1/2 HP;115 Volt, capacitor start single phase. Removable without affecting limit switch settings.
 - b. Drive Reduction: First stage heavy-duty 5L V-belt; second stage #41 chain.
 - c. Emergency Disconnect: Spring-loaded disconnect for emergency manual operation.
 - d. Wiring Type: C2, B2 D1 and E2 wiring types are all standard and easily selectable using the Logic Control Board (L). T and TS wiring can be activated with the use of the CPS II option board. Reversing Contactor Units (M) may have C2 wiring standard and B2 available by simply moving a jumper wire. All operators are pre-wired to accept a sensing edge, photoelectric control, radio controls and most types of access control equipment.
 - e. Bearings: Ball bearings on output shaft; heavy-duty, oil filled bushings on reductions shafts.
 - f. Brakes: Solenoid-actuated brake is standard on 3/4 HP units to prevent coasting of door..
 - g. Friction Clutch: Adjustable friction clutch helps protect against major damage to door and operator should the door meet and obstruction.
 - h. Construction: NEMA 1 type electrical box, heavy-duty 11-gauge steel frame with durable powder coat finish, all reduction sprockets drilled and pinned to shafts.
 - i. Pushbutton Station: 3-button station for OPEN/CLOSE/STOP functions is standard for all operators. Other controls available.
 - j. Quick-Mount Header Bracket: For fast, swing-up mounting.
 - k. Rail Assembly: High strength dual L-rail track with exclusive nylon quiet gliding chain guides on rail spacers for quiet, smooth operation. Includes quick-mount header bracket which provides fast, swing-up installation. Standard on the LiftMaster Logic Control (L):
 - l. Standard on the LiftMaster® Logic Control (L):
 - m. Maintenance Alert System: This important feature provides an accurate method for tracking door use and establishing safe and effective maintenance programs for the door and the operator. The Maintenance Alert System features and internal programmable cycle timer that actually counts each time the door cycles. This system is easily preset by the installer for the particular door and application. Once the preset number is reached, an indicator light on the 3-button station flashes to signal that it is time for routine door and operator maintenance.
 - n. Maximum Run Timer: Protects against damage to the door and operator

- o. Auxiliary Reversal System: If a closing door strikes an obstruction, the system will detect the slip of the clutch and reverse the door to the full open position. This system is not a substitute for a safety sensing device such as a photo cell or a reversing edge.
- p Delay-on-Reverse Circuit
- q. Programmable Mid-Stop
- r. Control Accessories and Options
- s. Sensing Edge: (Recommended) Designed to sense an obstruction and signal door operator to stop or reverse as desired. Either an electric or pneumatic sensing device can be added to bottom edge of door.
- t. Interlock Switch: Prevents accidental operation of the door by interrupting the control circuit.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until openings have been properly prepared.
- B. Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- C. Verify electrical power is available and correct characteristics.
- D. If preparation is the responsibility of another installer, notify Project Manager of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- 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 project conditions.

3.03 INSTALLATION

- A. Install overhead doors and track in accordance with approved shop drawings and the manufacturer's printed instructions.
- B. Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.
- C. Anchor assembly to wall construction and building framing without distortion or stress.
- D. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- E. Fit and align door assembly including hardware.
- F. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

3.04 ADJUSTING

- A. Test for proper operation and adjust as necessary to provide proper operation without binding or distortion.
- B. Adjust hardware and operating assemblies for smooth and noiseless operation.

3.05 CLEANING

- A. Clean doors, frames, and glass using non-abrasive materials and methods recommended by manufacturer.
- B. Remove labels and visible markings.
- C. Tough-up, repair, or replace damaged products before Substantial Completion.

3.06 PROTECTION

- A. Do not permit construction traffic through overhead door openings after adjustment and cleaning
- B. Protect installed products until completion of project.

END OF SECTION

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

Contract Conditions, Division 1, and accompanying Drawings.
06 10 00 Rough Carpentry – Blocking for stops.
06 20 00 Finish Carpentry - Installation
08 11 13 Hollow Metal Doors and Frames
09 90 00 Painting

1.02 SCOPE OF WORK

- A. Provide hardware for all doors scheduled in the drawings.
- B. Hardware supplier shall prepare a complete vertical schedule in compliance with the specifications and drawings.

1.02 QUALITY ASSURANCE

- A. Regulatory Requirements:
Conform to requirements for Underwriters (UL) label for class indicated on door schedule.

1.03 SUBMITTALS

Materials List:

- A. Hardware Schedule (see 2.02 below)
Submit 2 copies of draft hardware schedule for Project Manager's approval.
Resubmit as required with modifications requested by Project Manager.
Submit 2 copies of final schedule in accordance with Section 01 33 23.
Include with each copy a complete description showing appearance and function of each item of hardware.
Show for each opening, all hardware, indicating Manufacturer's name and numbers, finish, keying, fastening, dimensions, clearances, and calling attention to any deviations proposed from specified hardware and reason for proposed deviation.

Manufacturer's Recommendations:
Prior to installation, deliver to all installing personnel, complete manufacturer's recommendations for installation.

Template Hardware:
Send direct to door and frame Manufacturer prints or physical templates together with approved hardware materials list, for all metal doors.

1.04 DELIVERY STORAGE AND PROTECTION

Coordinate with General Contractor and ship hardware for prehung doors direct to manufacturer, together with approved hardware materials list.

Package each item separately, and each package marked with item number shown on Contractors hardware list. Include all necessary screws, fasteners, templates.

Store protected from moisture and damage.

PART 2 PRODUCTS

2.01 KEYING

- A. Furnish Construction cylinders with keying method independent of final keying system.
- B. Final Keying: By Owner

2.02 HARDWARE SCHEDULE

- A. Hardware supplier shall prepare a complete vertical schedule in compliance with the specifications and drawings including the following:

For each opening list opening number, door size, door hand, and frame material, door label, and each hardware item indicating Manufacturer's name and numbers, finish, keying, fastening, dimensions, clearances.

Detailing and selection of hardware to provide clearances, swings, etc. specified, or shown on the Drawings shall be the responsibility of the Contractor.

All doors shall be accessible for use by the handicapped, and shall comply with requirements of ANSI A117.1 and the American With Disabilities Act. Make hardware selections and adjustments accordingly.

All Butts shall be ball bearing type. 3 per door. Butt size per hardware manufacturer recommendation for door size and conditions of installation.

All exterior butts shall be stainless steel or nonferrous base metal.

Provide Stops for all interior doors.

Provide closers for all exterior doors.

All hardware shall be - dull chrome finish.

Schedule shall be prepared by a member of the American Society of Architectural Hardware Consultants or a person who is responsible and the equivalent thereof. This individual shall be available for consultation at all times and make one final inspection to verify that all hardware items have been properly installed in accordance with applicable codes and the manufacturer's recommendations.

Hardware finish and function shall be subject to the Owner's final approval prior to ordering any hardware item.

All exterior hardware shall be ANSI grade 1

All interior hardware shall be ANSI grade 1 or grade 2.

- B. Approved Manufacturers:

Locksets and Latches	Schlage
Butts	McKinney
Kick Plates, Push, Pull, Flush Bolts	Cipco
Stops, Silencers	Glynn Johnson
Thresholds, Weather-stripping.....	Pemko
Closers	LCN

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in strict accordance with Manufacturer's instructions and in accordance with requirements of Section
- B. Adjust as required to operate smoothly and silently, without rattle, bind or drag.
- C. Contact contractor if there is no blocking behind door stop locations. Do not mount stops to plaster or gypsum board without proper backing.

3.02 LOCATIONS

- A. Hinges: Top hinge 6" from hinge top to edge of door rabbet; Bottom hinge 10" between hinge bottom and finish floor; intermediate hinge centered between top and bottom hinges.
- B. Lock and Latches: Center at 36" above finish floor; dead locks 50" above finish floor.
- C. Thresholds set in heavy sealant bead entire length both sides of threshold.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.
06 10 00 Rough Carpentry - Wood to receive Gypsum Drywall.
07 90 00 Joint Protection - Sealants And Caulking: Acoustical Sealants.
09 90 00 Painting

1.02 QUALITY ASSURANCE

- A. Reference Standards: Conform with OSSC Chapter 25, and applicable requirements of ASTM C840.
- B. Allowable Tolerances: Maximum deflection or deviation from true plane 1/360 of span or 3/8" whichever is less.

1.03 DELIVERY STORAGE AND PROTECTION

Deliver and store protected from moisture or other damaging elements. Compounds and finish products in original unopened containers, Manufacturer's original labels thereon and intact until time of use.

1.04 COORDINATION

Coordinate with painting subcontractor. If required to maintain uniform texture and/or paint sheen, painting subcontractor and gypsum drywall subcontractor shall coordinate for application of primer sealer by painting subcontractor prior to application of sprayed texture. Irregularities in drywall finish texture, color or paint sheen will not be accepted.

PART 2 PRODUCTS

2.01 MANUFACTURER

All gypsum panels to be of one manufacturer; Celotex, US Gypsum, Gold Bond, or approved.

2.02 MATERIALS

- A. Standard Panels: Fire Resistive Finish Panels: Type "X" fire rated board, 1/2" thickness unless scheduled otherwise, tapered edges, conforming to ASTM C-36.
- B. Joint System: ASTM C745, as recommended by panel Manufacturer.

2.04 OTHER MATERIALS

Other Materials: Provide all other materials, not specifically described, but required for a complete and proper installation, as recommended by gypsum panel Manufacturer.

PART 3 EXECUTION

3.01 GENERAL

- A. Preparation and Inspection:
 - 1. Verify that surfaces to receive Work specified herein are straight, true, plumb, square, secure, rigid, dry and otherwise properly prepared. Notify General Contractor of defects requiring correction
 - 2. Obtain verification from General Contractor that blocking has been installed and properly located for door stops, grab bars, towel bars, cabinet mounting, and similar items.
 - 3. Do not proceed until all conditions are satisfactory.
- B. Surfaces to be finished:

Refer to finish schedule. Unless noted otherwise finish closets and alcoves same as scheduled for spaces to which they are adjacent.

3.02 INSTALLATION

- A. General:
 - 1. Install wallboard in accordance with Reference Standards, including Manufacturer's directions, and applicable Codes.
 - 2. Install all panels parallel, using maximum lengths, staggering end joints away from center of surface.
 - 3. Abut all edges without forcing; all ends on framing.
 - 4. Install wall panels horizontal, all ends and edges on framing (studs, plates or 2" solid blocking).
 - 5. Install top layer of multiple layer panels with long dimensions perpendicular to framing.
 - 6. Install ceiling panels with long dimensions perpendicular to framing. End and edge joints of face layer offset 24" from joints in base layer in double layer construction.
 - 7. Provide metal trim at all exterior corners and at exposed edges; apply joint compound in three coats as indicated below.
- B. Fastening: Comply with OSSC requirements. Refer to OSSC table 2508.1 and GA-216 for minimum fastener size and spacing, as modified by OSSC Chapter 23 for gypsum board used as sheathing, and OSSC Chapter 7 for fire resistive requirements. Nail or screw all panels using single nailing method as described in reference standards, except screw attach panels at ceilings and where applied over metal framing or furring. Double nailing system not allowed for fire rated assemblies.
- C. Nail and Joint Treatment: Conform to ASTM C745; 3 coat application.
- D. Finishes:
 - 1. Coordinate with painting contractor to provide sealer coat over taped and filled joint areas prior to applying texture finishes.
 - 2. Interior: Spray Splatter Finish: USG "Spray Texture" or approved, on all gypsum board surfaces scheduled to be painted unless "smooth" or other texture noted. Knock down splatter finish with trowel prior to setting. Sample texture is subject to Project Manager's approval.
 - 3. All exposed gypsum board to receive Gypsum Association "level 4" finish.

3.03 CLEANING AND REPAIR

After trim has been applied, and prior to painting, correct surface damage and defects. Leave Work clean, uniform, and without defects which will be apparent after finish is applied.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.
Division 5 Metals - shop prime coatings
07 60 00 Flashing and Sheet Metal - shop primed and prefinished metals.
08 11 13 Hollow Metal Doors and Frames - shop priming
Divisions 22 through 26: shop priming of equipment, exposed duct interiors etc.

1.02 DESCRIPTION

The term "Paint" as used herein includes enamels, paints, sealers, fillers, emulsions, stains, and other coatings, whether or not pigmented and whether used as a prime, intermediate or top coat.

1.03 QUALITY ASSURANCE

- A. Labels: Each Product container shall bear Manufacturer's label indicating: Manufacturer's name, Type of Material, Manufacturer's stock or product number, and if applicable color and instructions for reducing.
- B. Warranty: Refer to Supplementary Conditions. Work of this Section is subject to specified warranty against delamination of applied finishes, and where design is dependent upon integrity of coating for moisture protection of structure it is subject to specified warranty for moisture resistive elements of the Work. Also refer to Section 01 60 00 Product Requirements regarding responsibility for inappropriate methods or materials.
- C. Interior paints shall be low VOC meeting Green Seal Standard (GS-11) with Certified VOC less than 25g/L. Submit certification for interior paints.

1.04 SUBMITTALS

- A. Color Samples:
 - 1. Submit Manufacturer's full line of colors for material type specified, for selection by Project Manager. Provide stained wood samples on type and quality of wood specified for Work. Specifically note any limitations on availability.
 - 2. If requested by Project Manager, submit duplicate samples approximately 8"x10" for each color and texture selected, and if so directed, furnish actual brush-outs on walls and panels in designated areas.
- B. Test Samples: If requested by Project Manager, obtain test samples from material proposed for use, or used on Project. Submit 1 quart samples from each 50 gallons or part thereof, selected at random from sealed containers. Stir thoroughly before taking sample. If test results indicate nonconformance with specifications, replace with conforming product and pay test costs.
- C. Extra Stock: Provide one extra unopened 1 gallon container of each top coat material and/or color used.
- D. Maintenance Instructions: Submit with Closeout Submittals Manufacturer's printed instructions for proper maintenance of any finishes requiring special attention or special maintenance procedures.

1.05 DELIVERY STORAGE AND PROTECTION

- A. Deliver materials in original sealed containers; Manufacturer's labels intact and legible at time of use.
- B. Store only approved materials at job site, and store only in a suitable area as designated by General Contractor. Protect from contamination or damage by the elements.
- C. Use all means necessary to insure safe storage and use of materials. Remove waste ,debris, rags, and empty cans daily.
- D. Do not deliver or store any painting material in building until Project Manager and painting contractor agree that the area in question is thoroughly dry and proper temperatures will be maintained.
- E. Protect Painting Work and Work of other trades with suitable coverings.

1.06 COORDINATION

Coordinate with drywall subcontractor. If required to maintain uniform texture and/or paint sheen, painting subcontractor and gypsum drywall subcontractor shall coordinate for application of primer sealer by painting subcontractor prior to application of sprayed texture. Irregularities in drywall finish texture, color or paint sheen will not be accepted.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Materials selected for coating systems for each type surface shall be the product of a single Manufacturer.
- B. Wood stains as manufactured by Olympic or Rez, and other coating products the "best grade" and "highest quality" Products manufactured by Rodda, Glidden, Fuller-O'Brian, Pittsburgh, Pratt and Lambert, Sherwin-Williams, or approved.
- C. Use only products which are recommended by approved Manufacturer for use with the materials, and under conditions of service to be encountered by the Work. Refer to Section 01 60 00 for further requirements.

2.02 MIXING AND TINTING

- A. Color and sheen as directed by the Project Manager.
- B. Unless noted otherwise, or color is scheduled, all Products shall be available in a wide range of custom colors, including deep tones and accent colors. Doors, Frames, Trim, and approximately 10% of walls deep tone colors.
- C. Use tinting colors recommended by Manufacturer for each type of finish.
- D. Fungicidal agent shall be incorporated into the paint by the Manufacturer, otherwise add fungicide to coating mix, in accordance with Manufacturer's recommendations prior to application.

PART 3 EXECUTION

3.01 GENERAL

- A. Inspection and Coordination:
 - 1. Inspect surfaces to receive Finishes. Notify General Contractor of unsatisfactory conditions requiring correction. Do not proceed until all conditions are satisfactory.
 - 2. Coordinate with General Contractor and verify that Work of other Trades is sufficiently completed, cured, approved, and ready to receive finishes. Do not proceed until directed by General Contractor.
 - 3. Test surfaces to be painted with standard moisture meter and do not apply initial coating until moisture content is within required limits.
 - 4. Do not paint putty, caulking or sealants, concrete, plaster, or other similar products (which are required to cure), until thoroughly cured.
 - 5. Obtain Project Manager's color schedule before priming.
- B. Job Conditions:
 - Apply paint only under dry and dust free conditions; maintain conditions until paint is cured.
 - Provide 40 foot candles minimum lighting for preparation and painting.
- C. Surfaces to be finished:
 - 1. Unless otherwise noted on the Drawings, all surfaces shall be painted except the following: glass, flat concrete, galvanized fences, rubber, plastic laminate, ceramic tile, resilient flooring, acoustic tile, fire rating and instruction labels, anodized aluminum, items specified as "prefinished", and items specifically noted or scheduled not to receive finish.
 - 2. Unless noted or scheduled otherwise finish closets and alcoves same as scheduled for spaces to which they are adjacent.
 - 3. Frames and Trim and wood siding: Back prime with scheduled primer, prior to installation, touch-up with same material prior to finish coats.
 - 4. Doors: Remove to paint bottom edges; Prime top, bottom, side edges and cut outs with two coats of specified primer.
 - 5. Hardware: Remove hardware from doors and other items to receive finish coatings; replace upon completion.

3.02 SURFACE PREPARATION

- A. General: Strictly comply with Product Manufacturer's recommendations.
- B. Galvanized Metal and Zinc Alloy: Thoroughly clean with surface conditioner, and dry with clean cloth.
- C. Non-galvanized Steel: Remove all oil, rust, scale and dirt; touch up damaged Shop Coat areas. Where shop coat is asphalt Base Paint, apply one coat Polyvinyl Acetate Asphalt sealer before applying Finish Coats hereinafter specified.
- D. Aluminum: Clean with mineral spirits.
- E. Copper: Buff or polish to bright color; Clean with mild phosphoric acid cleaner in accordance with approved Manufacturer's recommendations; Apply finish while surface is clean and bright.
- F. Wood Preparation:
 - 1. Clean soiled surfaces with alcohol.
 - 2. Except where rough sawn or bandsawn textures are specified, sand wood to smooth and even surface, then dust or vacuum clean.
 - 3. Apply sealer to all knots, pitch and resinous sap wood before priming.
 - 4. Fill holes, cracks, open joints, and other defects with plastic wood.
 - 5. Test for moisture, and do not paint if moisture content is over 14%.
 - 6. Apply clear primer sealer to smooth surfaced softwoods before applying penetrating stain.
- G. Plaster and Gypsum wallboard Preparation:
 - 1. Fill narrow, shallow cracks and small holes with spackling compound, notify General Contractor to repair cracks wider than 1/16" and holes over 1/8", and other larger defects, and surface irregularities.
 - 2. Sand untextured surfaces smooth without raising nap of paper on wallboard.
 - 3. Remove surface salts from plaster by dry brushing; fill holes and cracks.
 - 4. Test surface for moisture content and proceed as follows:
 - Moisture content over 12%: Do not paint.
 - Moisture content 8 to 12%: Treat with Alkali-Proof Sealer before painting.
 - Moisture content less than 8%: Paint as scheduled.
- H. Concrete Masonry and Cement Stucco Preparation:
 - 1. Fill cracks and irregularities with portland cement grout to provide uniform surface texture.
 - 2. Etch with 5% solution (by weight) of muratic acid.

3.03 APPLICATION

- A. General:
 - 1. Do not apply initial coating until moisture content of surface is within limitations recommended by paint Manufacturer. Test with Moisture meter.
 - 2. Apply coating with suitable brushes, rollers or spraying equipment. Rate of application shall not exceed that as recommended by paint Manufacturer for the surface involved. Keep brushes, rollers, and spraying equipment clean, dry, free from contamination, and suitable for the finish required. Apply stain by brush unless noted otherwise.
 - 3. Comply with Product Manufacturer's recommendations for drying time between succeeding coats.
 - 4. Vary slightly the color of succeeding coats.
 - 5. Sand and dust between each coat to remove defects visible at 5 ft. distance.
 - 6. Finish coats shall be smooth, free of brush marks, streaks, laps, pile-up, and skipped or missed areas.
 - 7. Leave all parts of moldings and ornaments clean and true to details without excessive coating build-up in corners or depressions.
 - 8. Cut paint edges clean and sharp against other materials or colors, without overlap.
- B. All Painted Wood: Backprime all Frames, Trim and Siding immediately upon delivery to Site. Face runs not permitted. Notify Project Manager if exterior frames have not been treated with "Wood Life" or approved clear preservative by millwork supplier.
- C. Stained and Natural Finished Wood: Adjust natural finishes as necessary to match appearance of different adjacent materials or species.

- D. Coverage: Provide additional coats as required to meet the following requirements:
1. With the exception of semi-transparent stains and clear finishes, all paint films shall be completely and uniformly opaque, regardless of the Dry Mil Thickness (DMT) or number of coats specified.
 2. Dry Mil Thickness (DMT) shall be no less than recommended by Manufacturer or scheduled herein, whichever is greater.
 3. Both the number of coats and Dry Mil Thickness (where scheduled) are minimums and independent of each other.

3.04 CLEANING AND REPAIR

- A. Immediately remove spills, and splatters. Repair or replace when directed all Work, including Work by Others, damaged or stained by this Trade and leave in top condition at time of final acceptance.

3.05 PAINTING SCHEDULE

- A. General:
1. Work scheduled herein is in addition to shop coats specified.
 2. Prime coats may be omitted from existing finished surfaces, provided existing coating is sound.
 3. DMT (Dry Mil Thickness) is minimum total including primers where scheduled.
 4. The terms "gloss", "semi-gloss", "egg shell", etc. are subjective and vary between coating manufacturers. The degree of sheen or gloss shall be modified as directed by the Project Manager and demonstrated on approved samples, regardless of such terms used in the plans or specifications to describe the degree of sheen or gloss.
- B. Exterior Coatings: (As applicable)
1. Galvanized Metal:
Prime: 1 coat galvanized iron primer
Finish: 2 coats semigloss alkyd enamel
DMT: 5.4 mils
 2. Non-galvanized ferrous metal
Prime: 1 coat rust inhibiting primer
Finish: 2 coats semigloss alkyd enamel
DMT: 4.0 mils
 3. Aluminum
Prime: 1 coat zinc chromate primer
Finish: 2 coats semigloss alkyd enamel
 4. Siding, fascias and trim
Test cementitious siding and trim for pH, if the pH is higher than 8, prime with Sherwin Williams Loxon Concrete & Masonry Primer.
Prime: Face and back and edges prior to installation.
1 coat Sherwin Williams "Duration" Exterior Acrylic Latex Flat coating.
(Cut edges and touch-up only for factory primed siding)
Finish: 1 coat Sherwin Williams "Duration" Exterior Acrylic Latex Flat coating after installation.
- C. Interior Coatings: (Refer to room finish schedule)
1. Metals: same as for exterior
 2. Wood Doors and Trim
Prime: 1 coat sealer recommended by finish coat Manufacturer.
Finish: 2 coats acrylic latex semigloss enamel.
 3. Gypsum Wallboard:
Prime: 1 coat wall primer sealer prior to drywall texture.
1 coat wall primer sealer after application of drywall texture.
Finish: 2 coats acrylic latex semigloss enamel

4. Casework:

Exposed surfaces: Finish same as noted in room finish schedule for trim in room.

Concealed surfaces: 1 coat clear polyurethane sealer on interiors, and surfaces against floors, and walls

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General and Supplementary Conditions, Division 1, and accompanying Drawings.
06 10 00 Rough Carpentry - backing and blocking
06 20 00 Finish Carpentry - installation

1.02 SUBMITTALS

- A. Shop Drawings:
Submit in accordance with Section 01 33 23, showing hardware, layouts, reinforcing, dimensions, anchoring methods and other pertinent items; Include templates and other information showing installation recommendations. Call attention to any deviations proposed from specified items and reason for proposed deviation. Include complete materials list.
- B. Maintenance Data: Refer to Section 01 78 23 Operation and Maintenance Data.

1.03 DELIVERY STORAGE AND PROTECTION

Protect from moisture, damage and discoloration; store in dry, well ventilated area off of the ground. Package each item separately, and each package marked with item number shown on Shop Drawing materials list. Include all necessary screws, fasteners, templates.

PART 2 PRODUCTS

2.01 GENERAL

- A. The types and numbers scheduled are to be used as a guide for quality and type. Detailing and selection of specialty items to provide clearances, swings, etc. as shown on the Drawings shall be the responsibility of the Contractor.
- B. Where clearances, finish, size, or shape of members taking specialty items are such as to prevent or make unsuitable the use of exact types specified, suitable types shall be provided having as nearly as practicable the same style and quality as the type specified, at no extra cost. Note such deviations on the shop drawings submitted for approval and indicate the reasons for the proposed deviations.

2.02 TOILET ACCESSORIES

- A. Approved Manufacturers: Nutone-Hall Mack, Bobric, Bradley, Parker, Lawson, Ketcham, Miame-Carey or approved.
- B. Toilet Paper Holders:
 - 1. Bobrick B667, recess mount, single roll, polished stainless steel.
 - 2. Provide 1 per water closet in all units.
 - 3. Location: See interior elevations.
- C. Grab Bars:
 - 1. Bobric B6206 series; 1-1/2" diameter, 18 gauge satin finished stainless steel with concealed mounting.
 - 2. Locations and Lengths: 1 each 42" long, 1 each 36" long and one each 18"long at each restroom.
- D. Mirrors
 - 1. Bobrick B165 2436 Stainless steel channel framed mirror. 24"X36" size.
Provide one per lavatory
 - 2. Location: See interior elevations.

2.03 SIGNS

- A. Signs for Toilet Room Entries:
 - 1. Engraved plastic sign with contrasting raised numerals and letters, with standard accessibility symbol pictogram, men/women pictogram, and equivalent Braille verbal description. Sign to comply with requirements of Section 4.30 of the Americans with Disabilities Act Accessibilities Guidelines.
 - 2. Install 60" above floor, on wall adjacent to latch jamb of restroom doors.
 - 3. Colors selected by Project Manager from manufacturer's standards.

2.04 FIRE EXTINGUISHERS & CABINETS

- A. Extinguishers:
 - 1. Provide fire extinguishers JL Cosmic 5X, or approved with UL 2A-10BC rating. Wall mount.

PART 3 EXECUTION

3.01 GENERAL

- A. Preparation:
 - 1. Verify that surfaces to receive Specialty items are properly prepared and that field measurements correspond to the Drawings and approved shop drawings.
 - 2. Verify that required blocking has been installed.
 - 3. Verify that medicine cabinet wall openings center on bathroom sinks.
 - 4. Notify General Contractor of defects requiring correction.
 - 5. Do not start installation until all conditions are satisfactory.
- B. Installation
 - 1. Coordinate with carpentry contractor for installation of all necessary blocking and backing. Install in strict conformance to Manufacturer's recommendations, the approved shop drawings, and applicable requirements of Section 06 20 00.
 - 2. Adjust moving parts to operate satisfactorily; clean, repair, touch-up, or replace when directed, all Products which have been soiled, discolored, or damaged by Work of this Section.
 - 3. Follow Manufacturer's directions. Install items plumb, straight and level; secured firmly, and neatly aligned and trimmed for proper fit.

END OF SECTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUBMITTALS

- A. Provide Shop Drawings for the following:
 - 1. Valves
 - 2. Piping Specialties
 - 3. Pipe Supports

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Refer to Division 1, Summary of Work for description of work.

1.04 WORK INCLUDED

- A. Provide all materials, labor, equipment together with all incidental items not shown or specified, which are required by code and good practice to provide complete systems. Refer to Division 1, Summary of Work.

1.05 COORDINATION

- A. Coordinate all work in Division 22 with work specified in other Divisions to provide a complete installation. Expense of changes required because of lack of supervision or coordination shall be borne by the Contractor. Such changes shall be to the satisfaction of and directly supervised by the Project Manager.

1.06 CONTRACT DRAWINGS

- A. Location of piping and equipment on Drawings is approximate. Plan exact location with respect to measurements on the job and work of other trades prior to work. If measurements differ slightly, modify work. If measurements differ substantially, notify Engineer prior to fabrication.

1.07 SITE VISIT

- A. Examine site of proposed work and become familiar with job conditions affecting work. No additional allowance will be granted due to lack of information of existing conditions.

1.08 SUBSTITUTIONS

- A. Manufacturer's and catalog numbers indicate quality of equipment or materials. Manufacturers not listed require prior approval. Substitution requests must be made in writing to the Project Manager prior to bid in accordance with Division 1, Product Requirements. Provide sufficient information indicating compliance with these Specifications.

1.09 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- A. Provide shop drawings in accordance with Division 1, Submittal Procedures. Submittals shall include all information necessary as required for complete check including any changes or modifications to the drawings necessary.

1.10 RECORD DRAWINGS

- A. Provide record "as-built" drawings in accordance with Division 1, Project Record Drawings. Show all deviations from Contract Drawings, including addenda and change order items. Show depth of all stub outs and underground lines. Dimension all concealed piping from column grids or building lines. Transfer all information to reproducible drawings as required at the completion of the project.

1.11 PERMITS, CODES, AND INSPECTIONS

- A. Permits: Obtain all permits and pay fees required by governing agencies having jurisdiction over this work.
- B. Codes, Standards: Applicable codes and standards contained therein shall determine minimum requirements for materials, methods, and labor practices not otherwise stated herein.
- C. Inspections: Arrange and pay for inspections and tests required by codes or ordinances.

1.12 CUTTING AND PATCHING

- A. In accordance with Division 1, Cutting and Patching.

1.13 TEMPORARY SERVICES

- A. Provide in accordance with Section Division 1, Temporary Facilities and Controls as required for completion of Work.

1.14 OPERATING AND MAINTENANCE DATA

- A. Submit in accordance with Division 1, Operation and Maintenance Data. Include information only on the exact equipment installed. Include the following information where applicable:
 - 1. Manufacturer's printed operating, maintenance, and service information.
 - 2. Approved shop drawings.
 - 3. Manufacturer's parts list.
 - 4. Service and dealer directory listing.
 - 5. Written certification of disinfection of the domestic water system.
 - 6. Valve directory listing with valve number, type, size, location, function, and normal position.

1.15 STARTUP

- A. The Mechanical Contractor shall be responsible for proper operation of all systems and shall coordinate startup procedures, calibration and system checkup with subcontractors present. System operational problems shall be diagnosed and corrected as required for system operation.

1.16 COMPLETION

- A. General: When installation is complete, cleaned and adjustments specified herein made, operate system to demonstrate to Project Manager that system is complete and operating in conformance with these Specifications.
- B. Final Inspection: Work hereunder will not be inspected for Substantial Completion until operating and maintenance data, record drawings and directories specified herein have been approved.
- C. Final Completion: Entire installation turned over to the Owner in finished and satisfactory working condition.

1.17 WARRANTY

- A. Provide a written warranty covering Work of the Division for a period of one year in accordance with Division
 - 1. Include manufacturer's written warranties for material and equipment.

PART 2 – PRODUCTS

2.01 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle materials and equipment in a manner to prevent damage and deterioration. Store in original container. Indoor units, if stored outside, must be covered.

2.02 MATERIALS

- A. All materials employed in permanent construction shall be new, full weight, in first class condition and suitable for space provided. All similar materials shall be of one manufacturer.

2.03 VARIATIONS IN EQUIPMENT

- A. If approved mechanical equipment of other manufacturer requires modification or additions to any Work as shown on the drawings, Mechanical Contractor shall arrange for and pay costs of such changes as part of this Work.

2.04 PIPES AND PIPE FITTINGS

- A. Steel Pipe: Schedule 40 pipe, black or galvanized, conforming to ASTM A120. Size 2" and smaller fittings shall be threaded.
- B. Copper Tube: Hard drawn copper conforming to ANSI H23.1 and ASTM B88. Type L above grade, type K below grade. Fittings shall be wrought copper 95-5 solder joint fittings, type K, conforming to ANSI B16.22.
- C. Plastic Sewer Pipe: PVC gravity sewer pipe and fittings conforming to ASTM D2665 with solvent weld DWV fittings and tracer wire where below grade.
- D. Plastic Pressure Pipe: PVC or ABS pressure pipe conforming to ASTM D2665 with solvent weld DWV fittings and tracer wire where below grade.

2.05 VALVES

- A. All valves of a given type shall be of one manufacturer. Manufacturer's name and number listed are intended to indicate quality. Valves manufactured by Crane, Appollo, Nibco, Powell, Jenkins, Watts, Stockham, Hammond, as listed below, or approved.
- B. Ball Valves: Size 2" and Smaller: Bronze two piece body, 150 WSP, full port, lever handle with stops. Threaded or soldered ends to match pipe. Brass stem and chrome plated ball. Teflon or ethylene propylene seats. Provide stem extender for insulated valves. Must meet Federal Specification MSS SP-110 and WW-V-35, Type II. Hammond 8501, 8511.
- C. Gate Valves: Size 2-1/2" and Smaller: Bronze body, Class 125. Malleable iron wheel handle, ends to match pipe, bronze stem, non-rising. Must meet Federal Specifications MSS-SP-80 and WW-V-54, Type 1, Class A. Hammond IB645, IB647.
- D. Check Valves: 3" and Smaller: Bronze body, Class 150, ends to match pipe. T-pattern, replaceable teflon disc. Must meet Federal Specification MSS-SP-80. Hammond IB945, IB946.
- E. Drain Valves: Bronze, compression stop with nipple and cap or hose thread.

SUPPORTS AND ACCESSORIES

- A. Use adjustable pipe hangers on suspended pipe. Chain or perforated strap hangers are not permitted.
Provide supports between piping and building structure where necessary to prevent swaying.
- B. Pipe Hangers:
 1. Size 3" and smaller cast iron, Schedule 40 steel: Adjustable, malleable iron, solid or split ring, black. UL and FM approved. PHD 505, Grinnell, or equal.
 2. Size 3-1/2" and larger cast iron, Schedule 40 steel: Carbon steel, black finish. UL and FM approved. PHD 450, Grinnell, or equal.
 3. Copper tubing hangers: Steel hanger; PHD 151, Grinnell, or equal. On uninsulated piping provide calcium silicate inserts of same diameter as pipe insulation.
- C. Insulation Protection: Shields for insulated 4" and smaller cold water or storm drain shall be 18 ga. x 12" length. Galvanized steel shield to encompass 1/2 circumference. PHD 170, Grinnell, or equal.
- D. Supports for exposed piping routed along finished walls shall be metal framing channels with pipe clamps. Superstrut Series 1000 Channel with 702 Pipe Clamp.

2.07 PIPING SPECIALTIES

- A. Escutcheons: Cast brass, nickel or chrome, split ring type, plated, size sufficient to cover pipe sleeve or opening.
- B. Unions: Iron body with brass seat for steel pipe, bronze or brass for copper pipe, 125 lb. MWP.
- C. Insulating Unions: 250 lb. MWP, ends to match piping. Flow of electric current must be below 1% of the galvanic current. Gasket material as recommended by manufacturer for service intended. Epco or equal.
- D. Pipe Sleeves: Minimum 20 gauge galvanized steel with diameter 1/2" larger than outside diameter of pipe including insulation. Must fully encircle pipe. Extend sleeve 1 inch above finished floor.

2.08 EXCAVATION AND BACKFILL

- A. General: Refer to Division 2.
- B. Bedding and Backfill Material: Unclassified or native material shall be excavated materials, free of roots, large rocks, debris, clay or other foreign material.
- C. Crushed Rock: 3/4" minus, conforming to the latest Oregon State Highway Specification for base rock.
- D. Gravel: 1/2" by No. 4 washed pea gravel.
- E. Sand: Washed concrete sand or washed fill sand.

PART 3 – EXECUTION

3.01 CLEANING SYSTEMS

- A. After all fixtures and piping systems are installed, system shall be thoroughly cleaned per Division 1. Remove all stickers and tags from fixtures. Clean fixtures. Clean all piping systems prior to installation of insulation or painting. Repair or replace any discoloration or damage to system, building finish, or furnishing resulting from failure to properly clean systems.

3.02 ACCESS TO EQUIPMENT AND ACCESSORIES

- A. Install equipment with adequate access for service. Provide access doors where shown or required for proper access to valves, P-traps, trap primers, cleanouts, shock absorbers, vacuum breakers, and all other mechanical equipment requiring maintenance where area is not accessible by other means.
- B. Access doors shall be minimum size of 12 X 12 inches. Access doors shall have handles and shall be lockable where required. Access doors shall have same fire rating as the surface they are installed in. Type, size, and exact location of access doors shall be coordinated with Engineer prior to Work.

3.03 SEISMIC REQUIREMENTS

- A. All piping, equipment, and fixtures shall be provided with hangers, transverse bracing, longitudinal bracing, bolts, and connection types per OSSC. Seismic calculations shall be provided by the Contractor. Coordinate with Structural Engineer

3.04 PIPES

- A. Route piping in general locations indicated. Coordinate with other piping, ducts, conduits and equipment making necessary offsets. Install to conserve headroom and interfere as little as possible with use of available space. Group piping at common elevations wherever possible.
- B. Slope piping and arrange for drainage at low point.
- C. Provide clearance for proper installation of insulation and for access to other pipes, valves, and equipment as required. Install horizontal lines parallel with walls and partitions, vertical risers plumb and straight. Conceal piping above ceiling and within furring and walls unless otherwise indicated. Piping shall not be installed on the floor without prior approval.
- D. Install piping on warm side of building insulation.

3.05 VALVES

- A. Valves shall be the full size of pipes in which they are installed unless otherwise noted on Drawings. Install valves in groups where possible. All valves shall be accessible. All valves to be installed with stem above horizontal.
- B. Valve Application:
 - 1. Install valve types as specified herein and as designated by symbols on the Drawings. Unless otherwise noted provide ball valves in domestic water systems.
 - 2. Install valves for shut off and to isolate equipment, parts of systems, and vertical risers.

3.06 PIPE SUPPORTS AND ACCESSORIES

- A. Supports for hot water pipes shall rest directly on the pipe insert with insulation tight to insert. Supports for cold water pipes shall rest on the insulation with specified protection. Supports for all piping not more than two feet from each change of direction.
- B. Vertical Pipe Supports:
 - 1. Vertical pipes adjacent to walls: Support by means of bracket formed of steel straps bolted to wall, with clamps around pipe. Super Strut with series 700 clamps or equal.
 - 2. Vertical pipes not adjacent to walls: Riser clamp at each floor, steel on steel pipe and copper-plated on copper pipe.
- C. Horizontal Pipe Supports:
 - 1. Support cast iron piping at each joint and at each branch fitting with same size rod diameter as specified below.
 - 2. Spacing for horizontal steel and copper piping supports as follows unless otherwise indicated on Drawings:

Pipe size	Rod Diameter	Max. Spacing
		Steel & Copper
Up to 1"	3/8"	6'-0"
1-1/4" thru 2"	3/8"	10'-0"
2-1/2" thru 3-1/2"	1/2"	10'-0"
4"	5/8"	14'-0"
6"	3/4"	17'-0"

3.07 PIPING SPECIALTIES

- A. Escutcheons: Install on exposed pipes passing through walls, floors, or ceilings where pipes are exposed in finished areas and within cabinets. Escutcheons not required in Mechanical Rooms.
- B. Unions: Place in line at all equipment and where shown or required to facilitate maintenance or removal.
- C. Insulating Unions: Place in line in accessible locations wherever ferrous and non-ferrous metals come in contact in plumbing systems. Place in line at water heaters.
- D. Pipe Sleeves: Install where pressure or hot pipes pass through concrete or masonry construction. Install flush with finished surfaces, secure sleeve against displacement by caulking with grout or equal to make watertight. Extend sleeve 1 inch above finished floor.

3.08 COMPONENT IDENTIFICATION

- A. Piping: Identify all piping size 1" and larger with the name and direction of flow on the pipe at 20' intervals, at each take-off, and at penetrations through structure. Lettering shall be 1" high block. Marking Services MS-900 or equal.
- B. Equipment: Identify all equipment with nameplate attached to the equipment or adjacent to it. Use equipment designation per schedule on drawings, where possible. Nameplate shall be black bakelit or phenolic resin with 1/2" high white letters.
- C. Valves: Identify all valves with a tag attached to the equipment. Tags shall be a 1-1/2" numbered brass or plastic disc and shall indicate system served. Include valve number on disc and provide list of location, function, normal position, and lines controlled. Insert list into Operating and Maintenance Manuals and mount on wall in mechanical rooms.

3.09 PAINTING

- A. All pipe hangers, ferrous piping, supports, and equipment without factory finish installed in mechanical room or outside the building shall be painted flat black.
- B. Prepare all mechanical equipment and piping for painting if painting is required in Division 1, Painting.

3.10 PIPE PENETRATION

- A. Where pipes pass through walls, ceilings, or floors, seal off void between opening and duct, or pipe and sleeve. Provide escutcheon in exposed locations.
- B. Where pipes or other material pass through or penetrate any fire-resistant wall, ceiling, or floor use approved fire resistant materials and completely seal voids the full thickness of material being penetrated. USG Firestop Firecode System, Pro Set, or equal.

3.11 FLASHING

- A. All exterior building penetrations shall be flashed for weather tightness. Coordinate with General Contractor.

3.12 EXCAVATION AND BACKFILL

- A. Refer to Division 31. Determine location and elevation of underground utilities and uncover by hand digging. If damaged by Contractor, replace immediately at no expense to the Owner and as approved by Project Manager.
- B. Completely de-water trenches and excavations before pipe is laid or concrete is placed. When necessary to prevent caving, excavation shall be adequately shored and braced. Shoring shall remain in place for 12" above pipe until testing and inspection are complete. Remove from site excavated materials not suitable for backfill. Delay backfill of trenches until all tests are performed and until after inspection and approval by governing authority. Repair any damage to existing streets, sidewalks, concrete piping, etc., at Contractor's expense.
- C. Excavation: Unless otherwise shown, piping outside the building shall have the following minimum cover over pipes:
 - 1. Building Sewer = 24"
 - 2. Domestic Water = 36"
 - 3. Piping inside building shall have depth as required.
- D. Width of trench shall be adequate to provide working space, but in no case less than 12" plus the inside diameter of the pipe to be placed therein. Provide 6" minimum between adjacent pipes.
- E. Grade Bottom of Trenches: Construct to lines and grades as shown or as required with proper allowances for pipe thickness and gravel base. Over excavation shall be corrected with approved materials, thoroughly compacted.
- F. Pipe Bedding: Provide the following minimum bedding materials:
 - 1. Sanitary Piping = 4" crushed rock.
 - 2. Domestic Water Piping = 4" sand.

G. Backfilling:

1. Under building slabs, concrete slabs, paved areas, streets or sidewalks, all backfill shall be pea gravel or crushed rock. Fill material shall extend from the bedding material to the bottom of surfacing material. Fill all voids around pipe. Fill in 8" lifts and compact to 95% density of AASHTO-T-180.
2. Should backfilled ditch show settlement at any time through one year guarantee period, Contractor shall bring ditch back to grade with compacted fill and repair any damage to concrete or paved areas caused by settlement.

3.13 EXPANSION COMPENSATION

- A. Provide structural work and equipment required to permit free expansion and contraction of piping without causing undue stress. Provide pipe loops and offsets, swing joints, and flexible connectors where required or as shown.
- B. Securely anchor pipe and provide pipe guides as necessary for proper installation of expansion loops. Provide thrust blocks on underground hot water elbows and tees as required to control and direct expansion.

3.04 PIPE TEST

- A. Test all piping per code requirements. Make all tests before pipes are concealed. Provide valves and temporary plugs or caps as needed to isolate sections of piping for testing.
- B. Building Drainage, Waste and Vent Piping: Test hydrostatically by filling piping system with water to the highest point. The water shall be kept in the system for at least 15 minutes before inspection starts. System shall be tight at all points.

3.05 CLOSING IN UNINSPECTED WORK

- A. Do not cover up or enclose Work until it has been properly and completely inspected and approved.
- B. Should any of the Work be covered up or enclosed prior to all required inspections and approvals, uncover the Work as required, make all repairs and replacement with such materials as are necessary to the approval of the Project Manager and at no additional cost to the Owner.

3.06 CLEANING UP

- A. Prior to acceptance of Work building, thoroughly clean all exposed portions of the installation, removing all labels and all traces of foreign substances, using only a cleaning solution approved by the manufacturer of the plumbing item and being careful to avoid all damage to finished surfaces.

END OF SECTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.03. SUBMITTALS

- A, Provide Shop Drawings for all insulation products to be used on this project.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All glass fiber coverings and liners shall have a composite fire and smoke hazard rating as tested by procedure ASTM-E-84, NFPA 255 and UL-723, not exceeding 25 flame spread, 50 smoke developed. All accessories, such as adhesive, mastic cements, tape, and fabric cloths for fitting shall have the same component ratings as listed above. Materials must conform to the Uniform Mechanical Code, latest edition. Insulating characteristics shall meet OEESC, latest edition.

2.02 PIPE INSULATION

- A. Fiberglass: Preformed pipe insulation with a thermal conductance of 0.23 BTU per inch per square foot per deg. F. per hour at a mean temperature of 75F. White kraft and foil reinforced with glass fibers (all service jacket), self-sealing lap. Vapor barrier on cold pipes. Schuller "Micro-Lok AP-T Plus", Owens-Corning "24ASH", or equal.
- B. Flexible Closed Cell: Flexible, closed cell polyolefin thermal insulation, 1.5 lbs. per cubic foot density with a maximum K factor of 0.23 BTU per inch per square foot per deg. F. per hour at a mean temperature of 75F, non-toxic, non-corrosive with zero water vapor transmission. Unslit, slip-on type for below ground applications. Nomaco, Imcolock, or equal.
- C. Insulation Kit: Preformed, vinyl coated, white or beige insulation kit for exposed waste, cold water, and hot water piping. Insulation kit shall be able to be reinstalled after removal. Access to stop valve without removing insulation. Trap Wrap 500R, Truebro, or equal.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

- A. Inspection:
 - 1. Prior to all Work of this section, carefully inspect the installed Work of other trades and verify that all such Work is complete to the point where installation may properly commence.
 - 2. Verify that the Work of this section may be installed in accordance with all pertinent codes and regulations and the approved Shop Drawings.
- B. Discrepancies:
 - 1. In the event of discrepancy, immediately notify the Engineer.
 - 2. Do not proceed with installation in the areas of discrepancy until all such discrepancies have been fully resolved.

3.02 APPLICATION

- A. Pipe Insulation: Provide the following minimum insulation thickness or as required by Code.
 - 1. Potable cold water piping above grade - 1" fiberglass.
 - 2. Potable hot water piping above grade - 1" fiberglass.
 - 3. Potable water piping below grade - 3/4" flexible closed cell.
 - 4. Piping below handicap accessible fixtures - Insulation kit.

3.03 INSTALLATION

- A. General:
 - 1. Insulation shall be applied on clean, dry surfaces, after inspection and release for insulation.
 - 2. Insulation shall be continuous through wall and ceiling openings and sleeves.
 - 3. Insulate and cover all fittings, valve bodies, etc., as specified herein.
- B. Pipe Insulation:
 - 1. Fiberglass (cold surfaces) - All joints firmly butted together. Seal jacket lap joints on top or back so as to be least noticeable with vapor barrier adhesive. Vapor barrier must be applied with a continuous unbroken seal.
 - 2. Fiberglass (hot surfaces) - All joints firmly butted together. Seal jacket lap joints on top or back so as to be least noticeable.
 - 3. Fiberglass Joints - Cover all fittings including mechanical groove type fittings with one-piece premolded PVC fittings and inserts which meet the composite fire and smoke hazard ratings as tested by procedure ASTM-E-84. Seal fittings on cold surfaces with vapor barrier retarder. Secure PVC fittings with tape.
 - 4. Flexible Closed Cell (below ground)- Un-slit insulation shall be slipped on the pipe prior to connection. Insulation shall be overstuffed by 2 inches for every 6 feet of pipe. Insulation shall be pushed back and clamped at each joint to allow for connection of joint without damaging insulation and for testing of piping. Radial joints shall be sealed with hot melt welding system per manufacturer's recommendations for a complete water tight seal. Fittings cover insulation shall be fabricated and installed according to the manufacturer's recommended procedures.

3.04 CLOSING IN UNINSPECTED WORK

- A. Do not cover up or enclose Work until it has been properly and completely inspected and approved.
- B. Should any of the Work be covered up or enclosed prior to all required inspections and approvals, uncover the Work as required; and, after it has been completely inspected and approved, make all repairs and replacements with such materials as are necessary to the approval of the Project Manager and at no additional cost to the Owner.

3.05 CLEANING UP

- A. Prior to acceptance of the building, thoroughly clean all exposed portions of the insulation installation, removing all labels and all traces of foreign substance. Remove all debris accumulated by this Work.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SHOP DRAWINGS

- A. Provide Shop Drawings for the following equipment:
 - 1. Piping
 - 2. Plumbing Specialties

PART 2 – PRODUCTS

2.01 PIPING

- A. Domestic water pipe above grade: Type L copper, or PEX tubing.
- B. Domestic water pipe below grade: Type K copper. Silver brazed joints.

2.02 PLUMBING SPECIALTIES

- A. Shock Absorbers: Water Hammer Arrestors - precharged bellows type shock absorbers with integral flow orifice. Josam Series 75000, JR Smith Series 5000, Zurn, Wade, or equal.
- B. Primer Valves: Cast brass trap seal primer valve with automatic vacuum breaker. JR Smith 2699, Josam, Zurn, Wade, P.P.P., E&S Valve Co., or equal.
- C. Vacuum Breaker: Pressure vacuum breaker. Febco or equal.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

- A. Prior to all Work of this section, carefully inspect the installed Work of all other trades affected by Work of this section and verify that all such Work is completed to the point where installation may properly commence. Verify that plumbing may be installed in strict accordance with all pertinent codes and regulations and approved Shop Drawings.
- B. In the event of discrepancy, immediately notify the Project Manager. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 CUTTING STRUCTURAL FRAMING

- A. Exposed Members: Not permitted unless shown on Drawings or otherwise approved.
- B. Concealed Joists and Rafters:
 - 1. Notches prohibited in middle 1/2 of member length Notches shall not be greater than 1/6 of member depth. 2 Bored holes allowed in middle 1/3 of member length, prohibited within 2 inches of member top or bottom. Bored holes shall be no greater than 1/3 of member depth.
- C. Concealed Studs:
 - 1. Maximum notching depth and size of bored holes: At exterior and bearing walls - 25% of member width. At all other walls - 40% of member width.
- D. Beams, Columns, and Posts: Not permitted without prior approval.

3.03 PIPE AND FITTINGS

- A. Route piping in general locations indicated. Coordinate with other piping, ducts, conduits and equipment making necessary offsets. Install to conserve headroom and interfere as little as possible with use of available space. Group piping at common elevations wherever possible.
- B. Slope piping and arrange for drainage at low point.
- C. Provide clearance for proper installation of insulation and for access to other pipes, valves, and equipment as required.
- D. Install horizontal lines parallel with walls and partitions, vertical risers plumb and straight. Conceal piping above ceiling and within furring and walls unless otherwise indicated. Piping shall not be installed on the floor without prior approval.
- E. Install piping on warm side of building insulation.
- F. For noise reduction isolate piping with resilient mounts where piping passes through studs and joists. Caulk pipe openings in floor and wall penetrations.
- G. Copper Tube: All joints shall be silver brazed, or 95-5 tin antimony solder. All joints below grade permitted only where necessary and only with silver brazed joints.

3.04 SHOCK ABSORBERS

- A. Water Hammer Arrestors: Locate water hammer arrestor in supply line as shown and in accordance with recommendations of Plumbing and Drainage Institute Standard PDI-WH2O1. Install ahead of all solenoid or quick closing valves. Determine size of arrestor by the fixture unit value of the fixtures supplies using PDI symbols to designate sizes:

Size A	1-11	Fixture Units
Size B	12-32	Fixture Units
Size C	33-60	Fixture Units
- B. All installations of water hammer arrestors shall be provided with means for access for repair or replacement without disturbing finished construction. Type, size, and exact location of access doors shall be coordinated with Engineer prior to Work.

3.05 PRIMER VALVES

- A. Provide for all drains, including shower drains. Provide screwdriver stops on primer valves not so equipped. Provide shut off valve upstream of valve. Slope primer lines to drain. Install unions on all connections. Provide access doors when primer valves are located in concealed locations. Type, size, and exact location of access doors shall be coordinated with Project Manager prior to Work.

3.06 PIPE TEST

- A. Test and disinfect all piping per code requirements. Make all tests before pipes are concealed. Provide valves and temporary plugs or caps as needed to isolate sections of piping for testing.
- B. Domestic Water Piping:
 1. Test hydrostatically at 125 psi. Remain under pressure for minimum of two hours with no leakage.
 2. Follow Oregon State Board of Health requirements for disinfection. Employ firm specializing in disinfection. Provide written certification at completion of Work to the Project Manager.

3.07 CLOSING IN UNINSPECTED WORK

- A. Do not cover up or enclose Work until it has been properly and completely inspected and approved.
- B. Should any of the Work be covered up or enclosed prior to all required inspections and approvals, uncover the Work as required, make all repairs and replacement with such materials as are necessary to the approval of the Project Manager and at no additional cost to the Owner.

3.08 CLEANING UP

- A. Prior to acceptance of Work building, thoroughly clean all exposed portions of the installation, removing all labels and all traces of foreign substances, using only a cleaning solution approved by the manufacturer of the plumbing item and being careful to avoid all damage to finished surfaces.

END OF SECTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SHOP DRAWINGS

- A. Provide Shop Drawings for the following equipment:
 1. Piping
 2. Plumbing Cleanouts

PART 2 - PRODUCTS 2.01 PIPING

- A. Waste and vent within building: ABS Schedule 40 plastic sewer pipe and fittings.

2.02 PLUMBING CLEANOUTS

- A. Plumbing cleanouts shall be installed in the drainage system where noted on Drawings or where specifically required by the governing plumbing code. Cleanouts to be full line size.
- B. Cleanout types as follows:
 1. Wall Cleanout: Taper thread, bronze countersunk plug. In frame construction, round stainless steel flush access cover with satin top. Coverplate secured with vandal proof screws. Josam Series No. 58700, J.R. Smith 4472-U, Wade, Zurn, or equal.
 2. Floor Cleanout, Finished Areas: Adjustable cast iron body, inside caulking connection with internal bronze cleanout plug. Scoriated satin nikaloy top, secured with vandal proof screw. Josam Series No. 56000, JR Smith 4023NB, or equal. Use square top in ceramic tile floors, Josam Series No. 56020, J.R. Smith 4043NB, Wade, Zurn or equal.
 3. Floor Cleanout: Unfinished Concrete - cast iron cleanout with scoriated cut-off sections. Bronze internal plug same size as cleanout. Vandal proof heavy duty scoriated cover. Josam 59450, J.R. Smith 4223, Wade, Zurn or equal.
 4. Outside Areas, Concrete or Paving (non-traffic): Cast iron cleanout with straight body for caulking into hub, countersunk brass plug same size as soil pipe. Set flush with finish grade in 18" x 18" x 8" concrete pad. Josam 58860, JR Smith 4253, Zurn, Wade or equal.
 5. Outside Areas, unfinished or landscaped: Cast iron frame and cover marked "Clean out" set in concrete pad 24" by 24" by 8" deep. Extend pipe into frame area and plug pipe with mechanical plug. IFCO, Olympic or equal.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

- A. Prior to all Work of this section, carefully inspect the installed Work of all other trades affected by Work of this section and verify that all such Work is completed to the point where installation may properly commence. Verify that plumbing may be installed in strict accordance with all pertinent codes and regulations and approved Shop Drawings.
- B. In the event of discrepancy, immediately notify the Engineer. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 CUTTING STRUCTURAL FRAMING

- A. Exposed Members: Not permitted unless shown on Drawings or otherwise approved.
- B. Concealed Joists and Rafters:
 1. Notches prohibited in middle 1/2 of member length Notches shall not be greater than 1/6 of member depth.
 2. Bored holes allowed in middle 1/3 of member length, prohibited within 2 inches of member top or bottom. Bored holes shall be no greater than 1/3 of member depth.
- C. Concealed Studs:
 1. Maximum notching depth and size of bored holes: At exterior and bearing walls - 25% of member width. At all other walls - 40% of member width.

- D. Beams, Columns, and Posts: Not permitted without prior approval.

3.03 PIPE AND FITTINGS

- A. Route piping in general locations indicated. Coordinate with other piping, ducts, conduits and equipment making necessary offsets. Install to conserve headroom and interfere as little as possible with use of available space. Group piping at common elevations wherever possible.
- B. Slope piping and arrange for drainage at low point.
- C. Provide clearance for proper installation and for access to other pipes, valves, and equipment as required.
- D. Install horizontal lines parallel with walls and partitions, vertical risers plumb and straight. Conceal piping above ceiling and within furring and walls unless otherwise indicated. Piping shall not be installed on the floor without prior approval.
- E. For noise reduction isolate piping with resilient mounts where piping passes through studs and joists. Caulk pipe openings in floor and wall penetrations.
- F. Waste Piping: Drainage piping sloped at 1/4" per foot unless otherwise noted on plans. Changes in size made with reducing and wye fittings.
- G. Vent Piping: Install piping sloped at minimum of 1/2" per 10 feet. Hold exposed piping as near framing as possible, parallel and plumb to building lines. Vents through metal roof shall be flashed with flexible, pleated metal roof penetration flashing with flexible, corrosion resistant base ring, Dektite DF209RE or equal.

3.04 PIPE TEST

- A. Test all piping per code requirements. Make all tests before pipes are concealed. Provide valves and temporary plugs or caps as needed to isolate sections of piping for testing.
- B. Building Drainage, Waste and Vent Piping: Test hydrostatically by filling piping system with water to the highest point. The water shall be kept in the system for at least 15 minutes before inspection starts. System shall be tight at all points.

3.05 CLOSING IN UNINSPECTED WORK

- A. Do not cover up or enclose Work until it has been properly and completely inspected and approved.
- B. Should any of the Work be covered up or enclosed prior to all required inspections and approvals, uncover the Work as required, make all repairs and replacement with such materials as are necessary to the approval of the Project Manager and at no additional cost to the Owner.

3.06 CLEANING UP

- A. Prior to acceptance of Work building, thoroughly clean all exposed portions of the installation, removing all labels and all traces of foreign substances, using only a cleaning solution approved by the manufacturer of the plumbing item and being careful to avoid all damage to finished surfaces.

END OF SECTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SHOP DRAWINGS

- A. Provide Shop Drawings for the following equipment:
 - 1. Fixtures and Trim

PART 2 - PRODUCTS

2.01 FIXTURES AND TRIM

- A. Furnish and install plumbing fixtures, traps, trims, escutcheons, hangers, supports, ledge rims, and accessories as listed. Manufacturer's name and number indicate typical quality and features of the fixture. Fixtures shall be of types approved by State Health Department. Manufacturers per Schedule on Drawings or as listed below.
 - 1. Water closets, urinals, lavatories: American Standard, Kohler, or approved equal.
 - 2. Lavatory faucets: Moen, American Standard, Kohler, Sloan or approved equal.
 - 3. Sinks: Just, Moen Commercial, Elkay, or approved equal.
 - 4. Sink Faucets: Moen, American Standard, Kohler, or approved equal.
 - 5. Drains: JR Smith, Josam, Zurn, Mifab, or equal.
 - 6. Hose Bibbs, Hydrants: Woodford, Zurn, or equal.
 - 7. Water Heater: Eemax, Chronomite, Rheem, Bradford White, AO Smith, or equal.
- B. Flush Valves: Chrome plated valve, quiet action, screwdriver stops, vacuum breaker, sweat solder adapter with escutcheon, and seat bumpers. Provide drop-ear elbows. Delany, Zurn, Sloan or equal.
- C. Carriers: Carriers supported from floor and angle iron supports per details on drawings and manufacturer's recommendations. Chromeplated cap screwed, single or double as required. Provide bottom bearing plates on urinal carriers. Horizontal carrier, adjustable foot support and pipe fittings, JR Smith 0210-M54-XX, Wade, Josam, Zurn, or equal.
- D. Traps: Exposed traps which are readily accessible shall be not less than 17 gauge chrome plated brass tube, metal to metal ground joints. Standard brass of fixture, Dearborn Brass, Moen Commercial, or equal.
- E. Floor Drain Traps: Coated cast iron "P" trap. Coated cast iron body, double drainage flange with weep holes, primer connection, vandal proof screws, flashing clamp device, adjustable strainer with minimum open grate area 1.75 times the outlet area. Josam, Zurn, J.R. Smith, Wade or equal.
- F. Supplies and Stop Valves: All fixtures shall be fitted with chrome plated solid brass stops, replaceable neoprene seat, 3/8" tube riser, 1/2" brass nipple to wall, loose key handle, escutcheon. Provide drop ear elbows and solid blocking as required for rigid installation. Brasscraft, American Standard, Kohler, Moen Commercial, or equal.
- G. Closet Seats: Solid white reinforced plastic, open front, non-metallic bumper, hinge with insert molded integrally in seat, concealed check. Color to match fixture. Olsonite, Church, Beneke, American Standard, Bemis or equal.
- H. Water Heaters: Water heaters shall meet the requirements of NAECA.

PART 3 – EXECUTION

3.01 SURFACE CONDITIONS

- A. Prior to all Work of this section, carefully inspect the installed Work of all other trades affected by Work of this section and verify that all such Work is completed to the point where installation may properly commence. Verify that plumbing may be installed in strict accordance with all pertinent codes and regulations and approved Shop Drawings.
- B. In the event of discrepancy, immediately notify the Engineer. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 FIXTURES

- A. Fasten fixtures securely to supports and building structure. Fixtures shall be installed parallel and plumb to finish surfaces. All fixtures in contact with finished walls shall be caulked with waterproof, non-hardening, silicone sealant, color to match fixture.

3.03 DRAINS

- A. Install with top of drain or extended rim flush with finished floor, or as shown on Drawings. Prime all floor drain, shower drain, and trench drain traps from primer valves, or as shown on Drawings.

3.04 CLOSING IN UNINSPECTED WORK

- A. Do not cover up or enclose Work until it has been properly and completely inspected and approved.
- B. Should any of the Work be covered up or enclosed prior to all required inspections and approvals, uncover the Work as required, make all repairs and replacement with such materials as are necessary to the approval of the Project Manager and at no additional cost to the Owner.

3.05 CLEANING UP

- A. Prior to acceptance of Work building, thoroughly clean all exposed portions of the installation, removing all labels and all traces of foreign substances, using only a cleaning solution approved by the manufacturer of the plumbing item and being careful to avoid all damage to finished surfaces.

END OF SECTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Refer to Division 26 related electrical work.
- B. Refer to Division 1, Summary of Work.

1.03 WORK INCLUDED

- A. Provide all materials, labor, equipment together with all incidental items not shown or specified, which are required by code and good practice to provide complete systems.

1.04 COORDINATION

- A. Coordinate all work in Division 23 with work specified in other Divisions to provide a complete installation. Expense of changes required because of lack of supervision or coordination shall be borne by the Contractor. Such changes shall be to the satisfaction of and directly supervised by the Project Manager.

1.05 CONTRACT DRAWINGS

- A. Location of ductwork, piping, and equipment on Drawings is approximate. Plan exact location with respect to measurements on the job and work of other trades prior to work. If measurements differ slightly, modify work. If measurements differ substantially, notify Contractor prior to fabrication.

1.06 SITE VISIT

- A. Examine site of proposed work and become familiar with job conditions affecting work. No additional allowance will be granted due to lack of information of existing conditions.

1.07 SUBSTITUTIONS

- A. Manufacturer's and catalog numbers indicate quality of equipment or materials. Manufacturers not listed require prior approval. Substitution requests must be made in writing to the Project Manager prior to bid in accordance with Section 01 60 00, Product Requirements. Provide sufficient information indicating compliance with these Specifications.

1.08 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- A. Provide shop drawings in accordance with Section 01 76 39, Product Requirements. Submittals shall include all information necessary as required for complete check including any changes or modifications to the drawings necessary. Include fan curves.

1.09 RECORD DRAWINGS

- A. Provide record "as-built" drawings in accordance with Section 01 78 00, Closeout Submittals. Show all deviations from Contract Drawings, including addenda and change order items. Dimension all concealed piping from column grids or building lines. Transfer all information to reproducible drawings as required at the completion of the project.

1.10 PERMITS, CODES, AND INSPECTIONS

- A. Permits: Obtain all permits and pay fees required by governing agencies having jurisdiction over this work.
- B. Codes, Standards: Applicable codes and standards contained therein shall determine minimum requirements for materials, methods, and labor practices not otherwise stated herein.
- C. Inspections: Arrange and pay for inspections and tests required by codes or ordinances.

1.11 CUTTING AND PATCHING

- A. In accordance with Division 1, Cutting and Patching.

1.12 TEMPORARY SERVICES

- A. Provide in accordance with Section 01 50 00, Temporary Facilities and Controls as required for completion of Work. Permanent heating system shall not be used for heating during construction without prior approval by the Project Manager. Provide separate portable heaters as required.

1.13 OPERATING AND MAINTENANCE DATA

- A. Submit in accordance with Section 01 78 00, Closeout Submittals. Include information only on the exact equipment installed. Include the following information where applicable:
 1. Manufacturer's printed operating, maintenance, and service information.
 2. Approved shop drawings.
 3. Manufacturer's parts list.
 4. Service and dealer directory listing.
 5. Balance report.
 6. Nameplate directory of equipment with location and area served.

1.14 INSTRUCTION

- A. After all equipment and systems are operating, instruct Owner's operating personnel in the operation and maintenance of all systems. Training shall be by individuals who are familiar and have minimum three years experience with the systems. Provide the following minimum instruction: HVAC systems - 2 hours

1.15 STARTUP

- A. The Mechanical Contractor shall be responsible for proper operation of all systems and shall coordinate startup procedures, calibration and system checkup with subcontractors present. System operational problems shall be diagnosed and corrected as required for system operation.

1.16 COMPLETION

- A. General: When installation is complete, cleaned and adjustments specified herein made, operate system to demonstrate to Project Manager that system is complete and operating in conformance with these Specifications.
- B. Final Inspection: Work hereunder will not be inspected for Substantial Completion until operating and maintenance data, record drawings and directories specified herein have been approved.
- C. Final Completion: Entire installation turned over to the Owner in finished and satisfactory working condition.

1.17 WARRANTY

- A. Provide a written warranty covering Work of the Division for a period of one year in accordance with Division 1. Include manufacturer's written warranties for material and equipment.

PART 2 – PRODUCTS

2.01 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle materials and equipment in a manner to prevent damage and deterioration. Store in original container. Indoor units, if stored outside, must be covered.

2.02 MATERIALS

- A. All materials employed in permanent construction shall be new, full weight, in first class condition and suitable for space provided. All similar materials shall be of one manufacturer.

2.03 ELECTRICAL EQUIPMENT

- A. All electrical equipment UL and NEMA labeled or acceptable to electrical inspection authorities having jurisdiction. All equipment which requires electrical service of 50 amps or more shall have lugs suitable for either copper or aluminum supply conductors.
- B. Provide any interlocking devices as required for automatic control. All wiring (and electrical Work pertaining to mechanical system) by Mechanical Contractor unless specified in Division 26.

- C. Motors: Motors 1/2 HP or over voltage and phase as shown on Drawings. Motors rated less than 1/2 HP wound for 120 volt 60 cycle, single phase, 1750 rpm, unless otherwise specified. Provide manual switch with overload protection when required. All motors protected by thermal overload protection. Motor starters and fused disconnects shall be provided by the Mechanical Contractor unless specified in Division 26.

2.04 VARIATIONS IN EQUIPMENT

- A. If approved mechanical equipment of other manufacturer requires modification or additions to any Work as shown on the drawings, Mechanical Contractor shall arrange for and pay costs of such changes as part of this Work.

2.05 EQUIPMENT SPECIALTIES

- A. Machinery Guards: All moving parts of machinery, such as shaft couplings and belt drives, adequately covered with removable metal guards to protect personnel from possible injury.
- B. V-Belt Motor Drives: Rated at 150% of motor capacity with adjustable cast iron drive sheave and enclosed with protective belt guard secured to equipment.

PART 3 – EXECUTION 3.01

CLEANING SYSTEMS

- A. After all equipment, pipes, and duct systems are installed, system shall be thoroughly cleaned per Division 1. Remove all stickers and tags from equipment and fixtures. Clean all piping systems prior to installation of insulation or painting. Repair or replace any discoloration or damage to system, building finish, or furnishing resulting from failure to properly clean systems.

3.02 ACCESS TO EQUIPMENT AND ACCESSORIES

- A. Install equipment with adequate access for service. Provide access doors where shown or required for proper access to valves, dampers, motors, and all other mechanical equipment requiring maintenance where area is not accessible by other means.
- B. Access doors shall be minimum size of 12 X 12 inches. Access doors and filter rack access shall have handles and shall be lockable where required. Access doors shall have same fire rating as the surface they are installed in. Type, size, and exact location of access doors shall be coordinated with Project Manager prior to Work.

3.03 SEISMIC REQUIREMENTS

- A. All piping, ductwork, and equipment shall be provided with hangers, transverse bracing, longitudinal bracing, bolts, and connection types per OSSC and SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems. Seismic calculations shall be provided by the Contractor. Coordinate with Structural Engineer.

3.04 COMPONENT IDENTIFICATION

- A. Piping: Identify all piping size with the name and direction of flow on the pipe at 20' intervals, at each take-off, and at penetrations through structure. Lettering shall be 1" high block. Marking Services MS-900 or equal.
- B. Equipment: Identify all equipment with nameplate attached to the equipment or adjacent to it. Use equipment designation per schedule on drawings, where possible. Nameplate shall be black bakelit or phenolic resin with 1/2" high white letters.
- C. Controls: Identify all controls, switches, and indicating lights with nameplate securely attached to the device or adjacent to it. Nameplate shall be attached on the inside face of thermostats. Phenolic labels or approved.

3.05 PAINTING

- A. Inside ducts visible through face of grilles or diffusers, paint one coat flat black.
- B. Prepare all mechanical equipment, piping, and ductwork for painting if painting is required in Division 1, Painting.
- C. All outside equipment without factory finish and outside duct work shall be painted. Provide necessary protection of work installed by other trades. Prepare surfaces to receive paint using a cleaning solution as recommended by paint manufacturer. Paint with one coat of primer followed by two coats Rustoleum enamel, and one coat enamel as selected by Project Manager.

3.06 PIPE AND DUCTWORK PENETRATION

- A. Where ducts and pipes pass through walls, ceilings, or floors, seal off void between opening and duct, or pipe and sleeve. Provide escutcheon in exposed locations.
- B. Where ducts, pipes, conduit, equipment, or other material passes through or penetrates any fire-resistant wall, ceiling, or floor use approved fire resistant materials and completely seal voids the full thickness of material being penetrated. USG Firestop Firecode System, Pro Set, or equal.

3.07 FLASHING

- A. All pipe and duct penetrations through roof shall be manufactured piping penetration packages or flashing cones compatible with roofing material and acceptable to Roofing Contractor. Coordinate with General Contractor and Roofing Manufacturer. Stormtite Multiflash or equal.

3.08 VIBRATION ISOLATION AND EQUIPMENT BASES

- A. Provide complete vibration isolation supports for all equipment where required to prevent transmission of vibration to the building. Size springs in accordance with manufacturer's recommendations. Where fan and motor are mounted separately, provide integral steel fan and motor base. Maximum of 10% transmissibility. Provide minimum 3" high concrete equipment bases for pumps, boilers, tanks, etc., as required.

END OF SECTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUBMITTALS

- A. Provide Shop Drawings for all insulation products to be used on this project.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. All glass fiber coverings and liners shall have a composite fire and smoke hazard rating as tested by procedure ASTM-E-84, NFPA 255 and UL-723, not exceeding 25 flame spread, 50 smoke developed. All accessories, such as adhesive, mastic cements, tape, and fabric cloths for fitting shall have the same component ratings as listed above. Materials must conform to the Uniform Mechanical Code, latest edition. Insulating characteristics shall meet OEESC, latest edition.

2.02 PIPE INSULATION

- A. Flexible Closed Cell: Flexible, closed cell polyolefin thermal insulation, 1.5 lbs. per cubic foot density with a maximum K factor of 0.23 BTU per inch per square foot per deg. F. per hour at a mean temperature of 75F, non-toxic, non-corrosive with zero water vapor transmission. Pre-slit for above ground applications. Nomaco, Imcolock, or equal.
- B. Field Applied Jackets and Fitting Covers: One piece, molded PVC jacket or aluminum jacket 0.016 inch thick.

PART 3 – EXECUTION

3.01 SURFACE CONDITIONS

- A. Inspection:
 - 1. Prior to all Work of this section, carefully inspect the installed Work of other trades and verify that all such Work is complete to the point where installation may properly commence.
 - 2. Verify that the Work of this section may be installed in accordance with all pertinent codes and regulations and the approved Shop Drawings.
- B. Discrepancies:
 - 1. In the event of discrepancy, immediately notify the Engineer.
 - 2. Do not proceed with installation in the areas of discrepancy until all such discrepancies have been fully resolved.

3.02 APPLICATION

- A. Pipe Insulation: 1. Refrigeration piping - 1/2" flexible closed cell.
- B. Field Applied Jackets: 1. Provide aluminum jacket over exterior exposed flexible closed cell insulation.

3.03 INSTALLATION

- A. General:
 - 1. Insulation shall be applied on clean, dry surfaces, after inspection and release for insulation.
 - 2. All insulation shall be continuous through wall and ceiling openings and sleeves.
 - 3. Insulate and cover all fittings, valve bodies, etc., as specified herein.
- B. Pipe Insulation:
 - 1. Flexible Closed Cell (above ground)- Insulation shall be slipped on the pipe prior to connection wherever possible, and the radial seams sealed with adhesive. Where the slip-on technique is not possible, pre-slit insulation shall be slit and snapped over the pipe with longitudinal and radial seams sealed with adhesive. Fitting cover insulation shall be fabricated and installed according to the manufacturer's recommended procedures. Provide aluminum jacket over exterior exposed insulation.

3.04 CLOSING IN UNINSPECTED WORK

- A. Do not cover up or enclose Work until it has been properly and completely inspected and approved.
- B. Should any of the Work be covered up or enclosed prior to all required inspections and approvals, uncover the Work as required; and, after it has been completely inspected and approved, make all repairs and replacements with such materials as are necessary to the approval of the Project Manager and at no additional cost to the Owner.

3.05 CLEANING UP

- A. Prior to acceptance of the building, thoroughly clean all exposed portions of the insulation installation, removing all labels and all traces of foreign substance. Remove all debris accumulated by this Work.

END OF SECTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SHOP DRAWINGS

- A. Provide Shop Drawings for the following equipment:
 - 1. Fans

PART 2 - PRODUCTS

2.01 GENERAL

- A. All fans shall be AMCA certified for sound and air performance and shall be UL listed.

2.02 EXHAUST FANS

- A. Ceiling and small in-line fans shall be centrifugal fans with insulated housing, aluminum grille, backdraft damper, and vibration isolator kit for suspended installation. Motor mounted on vibration isolators. UL listed, AMCA certified. Provide a minimum of three diameters of straight duct at connection to fan. Maximum sound rating and rpm as shown on schedule. Low profile ceiling or in-line fans are not acceptable. Manufactured by Greenheck, Carnes, Penn, Cook, Acme, or equal.
- B. Control by fan manufacturer supplied, wall mount, occupancy sensor with 20 minute time delay feature. Similar to Greenheck MDW. Termination to have built in bird screen and backdraft damper.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install all equipment and accessories with adequate access for service and per Manufacturer's recommended instructions. Systems shall be cleaned prior to startup. All moving and rotating parts shall be lubricated per Manufacturer's recommendations prior to equipment startup. Mechanical Contractor shall coordinate startup of all equipment and systems.
- B. Provide woven fiberglass fabric connector at duct connection to fan with 4" fabric, 2" clearance between metal work.
- C. Provide backdraft/barometric dampers at all outside air intakes and exhaust outlets where damper is not an integral part of the fan and as shown on drawings.

3.02 CLOSING IN UNINSPECTED WORK

- A. Do not cover up or enclose work until it has been properly and completely inspected and approved.
- B. Should any of the work be covered up or enclosed prior to all required inspections and approvals; uncover the work as required and, after it has been completely inspected and approved, make all repairs and replacements with such materials as are necessary to the approval of the Project Manager and at no additional cost to the Owner.

3.03 CLEANING UP

- A. Prior to acceptance of the Work, thoroughly clean all exposed portions of the installation. Remove all labels and all traces of foreign substance, using only a cleaning solution approved by the manufacturer of the equipment and being careful to avoid all damage to finished spaces. Remove all debris accumulated by this Work.

END OF SECTION

PART 1 – GENERAL

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General Conditions, Division 1, and accompanying Drawings.
31 20 00 EARTHWORK

1.02 DEFINITIONS

- A. The term "clearing grubbing and demolition" includes removal of all existing objects (except those objects designated to remain) down to the existing ground level, plus other work as described in this Section.
- B. The term "debris" includes all non-reusable materials.

1.03 JOB CONDITIONS

- A. General: Protect construction, vegetation, bench marks and monuments in areas to remain undisturbed until Final Completion. Leave in as good condition as found. Protect all trees not designated to be removed.
- B. Special controls: Refer to Section 01 50 00

PART 2 PRODUCTS (As noted in the Drawings or Specified in Section 31 20 00 Earthwork)

PART 3 EXECUTION

3.01 PREPARATION AND SITE INSPECTION

- A. Notify Project Manager at least 2 full days prior to starting Work of this Section.
- B. Inspect entire site and all objects to be removed and to be preserved; determine all requirements for disconnection, capping or protection of existing utilities, as applicable.

3.02 Permits and Protections

- A. Remove materials using proper methods. Comply with Oregon DEQ. Obtain proper permits for removal, transportation, and disposal. Permits must be obtained by the contractor or their sub-contractor.
- B. Maintain a copy of disposal permits and dump records for all materials requiring disposal permits
- C. Specific care must be taken not to contaminate the interior of the existing building space with Asbestos, lead base paint or other hazardous materials.

3.03 DEMOLITION

Remove all existing construction designated to be removed or required to be removed for the completion of the Work.

3.04 CLEARING AND GRUBBING

Completely clear areas to be occupied by structures, fills or other improvements indicated on the Drawings, and scalp to remove all roots, grass, and other debris. Remove all stumps and roots to a depth of 18", and treat remaining ends of such stumps and roots over 3" in diameter with herbicide to prevent regrowth. Remove trees only where so noted on the Drawings.

3.04 DISPOSAL OF DEBRIS

Remove from site and legally dispose of all debris unless otherwise noted on the Drawings.

END OF SECTION

SECTION 26 0500
BASIC ELECTRICAL MATERIALS & METHODS

PART 1 - GENERAL

1.01 Description

- A. Furnish labor, supervision, permits, materials and equipment to complete the work required in Division 26 and by the contract documents.
- B. It is the intention of this Section of the Specifications and the accompanying drawings to describe and provide for the furnishing, installing, testing and placing in satisfactory and successful operation all equipment, materials, devices and necessary appurtenances to provide a complete electrical system, together with such other miscellaneous installations and equipment hereinafter specified and/or shown on the Plans.

1.02 Contract Documents

- A. The Contract Documents are complimentary, and what one affecting this Division requires shall be binding as if repeated herein.
- B. Separation of this Division from other Contract Documents shall not be construed as complete segregation of the work.
- C. Electrical work shall include both this Division as well as other Divisions as applicable, such as:
 - 1. Division 27, Communications
 - 2. Division 28, Safety & Security
 - 3. Division 33, Utilities.

1.03 Codes

- A. Meet requirements of State of Oregon Electrical Specialty Code, Oregon Administrative Rules Chapter 437, American Society of Testing and Materials (ASTM) Federal Specifications, American National Standards Institute (ANSI), National Electrical Manufacturers Association (NEMA), National Fire Protection Association (NFPA), Underwriters Laboratory (UL), National Electrical Code, National Electrical Safety Code, all rules and regulations of the local serving utility, National Board of Fire Underwriters and Oregon Structural Specialty Code. All Codes, rules, and regulations shall be the current or latest edition adopted by authorities having jurisdiction at time of permit.
- B. Code requirements shall be considered a minimum guide for the work. Where contract documents require work materials in excess of Code minimum, install work as called for in contract documents.

1.04 Permits, Licenses And Taxes

- A. The Contractor shall obtain and pay for all licenses, permits and inspections required by laws, ordinances and rules governing work specified herein. The Contractor shall arrange for inspection of work by the inspectors and shall give the inspectors all necessary assistance in their work of inspection. Division 26 Contractor shall make all necessary arrangements for installation of electrical services indicated on plans.
- B. Utility installation fees will be paid by the Owner.

1.05 Layout And Coordination

- A. See General Conditions.
- B. Before starting work, carefully examine Drawings to become thoroughly familiar with conditions governing work on this project. Verify elevations, measurements, rough-in requirements of equipment and its installation location before proceeding with the work. Install equipment with access as required by NEC.
- C. Prior Installation. Any electrical work installed prior to approval of coordination drawings shall be at the Contractor's risk. Subsequent relocations required to avoid interferences shall be made without additional expense to the Owner. In case interference develops, the Engineer will decide which work shall be relocated, regardless of which was installed first.
- D. The existence of any wires, conduits, pipes, ducts or other service facilities is shown in a general way only. The Contractor is responsible for making the exact determination of the location and condition of these facilities.
- E. The Drawings indicate outlet and equipment locations, directions and locations of branch circuit wiring and homeruns. Verify all locations with actual field conditions.
- F. The horsepower of motors and apparatus wattages indicated on the plans and in the panel schedules are estimated requirements of equipment furnished under other Divisions of this contract and bid shall be based on these sizes. Overload elements, contactors, circuit breakers, fuses, conductors, etc., shall be furnished to suit actual equipment installed. Advise Engineer of any equipment changes affecting electrical circuits.
- G. The location of utilities indicated on the plans is taken from existing public records. The Contractor must determine the exact location and elevation of public utilities. The Contractor shall ascertain whether any additional facilities other than those shown on the Drawings may be present.
- H. The general directions and location of homeruns are indicated on Drawings and are to be extended to panels as though routes were completely shown. No homeruns or branch circuits are to be combined. Items which are installed other than as shown on Drawings and without receiving prior written approval will be ordered removed and installed as shown without additional cost to Owner.
- I. Owner shall not be responsible for any loss of unanticipated costs that may be suffered by the successful bidder as a result of such bidder's failure to fully inform himself in advance in regard to all conditions pertaining to the work and character of the work.
- J. Coordinate work with other crafts employed on the project. Should rearrangement or relocation of equipment be necessary, provide for approval the simplest layout possible for that particular portion of the work. Under no condition are beams, girders, footing or columns to be cut for electrical items unless so shown on Plans or written approval is obtained from the Engineer or Engineer.
- K. Special attention shall be given for the following items and all conflicts shall be reported to the Engineer before installation for decision and correction:
 - 1. Door swings; switches shall be located on the "strike" side of the door.
 - 2. Location of radiators, grilles, pipes, ducts and other mechanical equipment so that all electrical outlets, lighting fixtures and other electrical outlets and equipment are clear from and in proper relation to these items.

3. Location of cabinets and counters so that electrical outlets and equipment are clear from and in proper relation to these items.
 4. Within the limits indicated on the drawings, the maximum practicable space for operation, repair, removal and testing of equipment shall be provided.
 5. Contractor shall coordinate with HVAC installer (if separate from the Contractor) to wire the HVAC system when the installer is ready for power.
- L. Outlet locations shown on the drawings are approximate. Contractor shall study the building drawings in relation to spaces and equipment surrounding each outlet so that the lighting fixtures are symmetrically located according to ceiling tile and room layout. When necessary, with the Engineer's approval, outlet shall be relocated to avoid interference with structural features of the building.
- M. Call to the attention of the Engineer any error, conflict or discrepancy in Plans and/or Specifications. Do not proceed with any questionable items of work until clarification of same has been made.
- N. Supplementary Details and Plans may be supplied as required and they will become a part of the Contract Documents. The Engineer or Engineer reserves the right to make minor changes prior to installation of specific electrical systems in the location of the conduits, outlets, etc., from those shown on the plans without extra charge to the Owner.
- O. Arrange work to reduce interruption of any existing service to minimum. When interruptions are unavoidable, consult Owner or Utility involved and agree in writing, with copy to the Engineer, upon a mutually satisfactory time and duration.

1.06 Substitution Requests

- A. Substitution of Equipment. (Prior To Bid).
1. Bids shall be based only upon the materials, construction and equipment specifically identified in the bidding documents, except as hereinafter provided.
 2. If Contractors wish to use items of equipment other than those named in their base bid, Contractor shall apply in writing to the Engineer for approval of substitution at least 10 days prior to opening of bids, submitting with his request for approval complete descriptive and technical data on the items he proposes to furnish.
 3. Equipment and materials proposed for substitution shall be similar in design and equal in quality and function to those specified.
 4. Submittal shall be in triplicate with identification of the item to be substituted and clearly marked with all pertinent data depicting proper characteristics of proposed item.
 5. Contractor's description of his proposed substitution shall specifically note all differences between the item specified and the proposed substitution.
 6. If the Engineer approves any proposed substitution, such approval will be set forth in an Addendum or in writing to the person submitting equipment for approval.
 7. Where a substitution alters the design or space requirements indicated, Contractor shall include all items of cost for the revised design and construction including cost of all allied trades.
 8. Unless requests for changes in base bid specifications are received and approved prior to the opening of bids, as defined above, the successful Contractor

will be held to furnish specified items under his base bid. After Contract is awarded, changes in specifications will be made only as defined under Substitution of Equipment. (After bid).

- B. Substitution of Equipment or Materials. (After Bid).
1. After execution of the Contract, substitution of equipment or makes other than those specifically named in the Contract Documents will be approved by the Engineer for the following reasons only:
 2. That the equipment proposed for substitution is equal to and/or superior to equipment named, in construction, efficiency and utility, and further that the equipment named in the specifications cannot be delivered to the job in time to complete the work in proper sequence to work of other Contractors, due to conditions beyond the control of the Contractor.
 3. To receive consideration, requests for substitutions must be accompanied by documentary proof of equality or difference in price and delivery, if any, in the form of certified quotations from suppliers of both specified and proposed equipment.
 4. In case of a difference in price, the Owner shall receive all benefit of the difference in cost involved in any substitution and the Contract altered by Change Order to credit Owner with any savings so obtained.

1.07 Submittals: Shop Drawings And Material Lists

- A. In addition to the requirements of General Conditions of Division 01, submit manufacturers data and Shop Drawings and Material Lists as required by individual sections of Division 26 (and otherwise associated Divisions).
- B. Before commencing work and within 30 days after award of contract, furnish six (6) copies of complete Shop Drawings and Material Lists to the Engineer or Engineer.
- C. Include only information on exact equipment installed; not complete "line" of manufacturer. Where sheets show proposed equipment as well as other equipment, identify proposed equipment with black arrow, underlining or circling. Contractor is not to use red. Diagrams for systems to be complete Drawings for specific system installed. "Typical" line diagrams not acceptable unless properly marked to indicate exact system for this project.
- D. Single Submission. Data and shop drawings shall be supported and included in a single submission. Multiple submissions are not acceptable except where prior approval has been obtained from the Engineer. In such cases, a list of data to be submitted later shall be included with the first submission.
- E. Shop Drawings. Shop drawings shall include complete construction details, dimensions, material descriptions, diagrams or pictures showing physical characteristics, performance and test data, description of operation, installation methods, wiring diagrams and any other data or information necessary for a complete evaluation. (Note: do not re-draw the contract drawings. The drawings to be submitted under this subsection are all the supplemental drawings and manufacturers' specification drawings which are not included in the contract drawings.) Shop drawings are in addition and supplemental to the contract drawings.
- F. Identification. In addition to the requirements of Special Provisions, submittals shall be identified by the name of the system and applicable specification paragraph number.

- G. Delivery Prior to Approval. No item of material or equipment shall be delivered to the site or installed, until approved. After the proposed materials have been approved, no substitution will be permitted except where approved by the Engineer.
- H. Compliance. Should the Contractor fail to comply with the requirements of these provisions, the Engineer reserves the right to select any or all items of materials and systems. Selection shall be final and binding upon the Contractor. Materials so selected or approved shall be used in the work at no additional cost to the Owner.
- I. Departures. If departures from the contract drawings are deemed necessary by the Contractor, details of such departures, including changes in related portions of the project and the reasons therefore, shall be submitted with the drawings. Where such departures require raceways or equipment to be supported otherwise than as shown, the details submitted shall include loadings and type and kind of frames, brackets, stanchions, or other supports necessary. Approved departures shall be made at no additional cost to the Owner.
- J. Electrical Diagrams. A complete electrical connection diagram for each item of equipment furnished under Division 26, which has electrically controlled components having more than one automatic or manual control device, shall be submitted for approval. Wiring diagrams shall identify each component, and one diagram shall show all interconnected or interlocked components. It is understood that the contract electrical drawings do not have to be submitted or copied for inclusion in this submittal.
- K. Contractor agrees that submittals processed by the Engineer are not change orders; that the purpose of submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.
- L. Late submittals will not be considered an excuse for time extension for the project.
- M. Data not in conformity with these requirements will be returned for resubmittal.
- N. Organization:
 - 1. Assemble Shop Drawings and submittal data in hard cover loose-leaf ring binder. Provide cover with permanently attached typewritten or printed label with name of project, job number and heading reading "ELECTRICAL SUBMITTAL DATA".
 - 2. Organize data in each set in basic categories listed in index for Division 26 (and otherwise associated Divisions). Provide submittal data with typewritten index having same sequence, numbering and wording as index for Division 26 (and otherwise associated Divisions). In addition, provide divider sheets between each section with identifying tabs having same designations as index. Organize material in each section in same order and identify with same number and wording as paragraphs of specification section.
 - 3. Submit neat, clean copies of data, 8-1/2 inch by 11-inch size. Accordion fold required drawings to 8-1/2 inch by 11-inch size and include in submittal binder.

1.08 Electrical Equipment Operation and Maintenance Manuals

- A. In addition to the requirements of the General Conditions of Division 01, submit manuals as required by individual Sections of Division 26 (and otherwise associated Divisions).

- B. Provide all electrical equipment and control information. The purpose of this manual is to provide one comprehensive document that illustrates and describes all the electrical equipment and instrumentation installed in the plant.
- C. For final acceptance of Division 26 work, provide to the Engineer or Engineer six (6) copies of complete electrical operating and maintenance manuals for servicing of all equipment installed.
- D. Information included must be exact equipment installed, not complete "line" of manufacturer. Where sheets show equipment installed as well as other equipment, identify installed equipment with black arrow, underlining or circling. Contractor is not to use red. Diagrams for each system to be complete Drawings for specific system installed. "Typical" line diagrams not acceptable unless properly marked to indicate exact system for this project.
- E. Information shall include all revisions noted in shop drawings. Copies of stamped drawings are not acceptable.
- F. Provide General Contractor's name, contact person, telephone/fax numbers, include similar information for the sub-contractors.
- G. Include all electrical devices provided under all Divisions. Coordinate with other Division Contractors. The Contractor shall coordinate with the Division 17 contractor and the Software Integrator to include pertinent documentation from their responsibilities in this submittal.
- H. Manuals and documentation shall include calibration curves of every sensing device and a programming documentation sheet for every programmable device. The programming documentation sheet shall show the final operational value of every programmable parameter of every device. The purpose of this sheet is to provide maintenance personnel with a convenient source of information for programming the parameters of a replacement device should the old device fail.
- I. Organization:
 - 1. Assemble Shop Drawings and submittal data in hard cover loose-leaf ring binder. Contractor shall insert printed spine and cover title sheets to match font style and size of the rest of the plant O&M manual set. Coordinate with the General Contractor.
 - 2. Organize data in each set in basic categories listed in index for Division 26. Provide submittal data with typewritten index having same sequence, numbering and wording as index for Division 26. In addition, provide divider sheets between each section with identifying tabs having same designations as index. Organize material in each section in same order and identify with same number and wording as paragraphs of specification section.
 - 3. Submit neat, clean copies of data, 8-1/2 inch by 11-inch size. Accordion fold required drawings to 8-1/2 inch by 11-inch size and include in submittal binder.

1.09 Project Record Drawings

- A. Maintain at the site one complete set of full-sized original prints for recording installed conditions (As-Builts). Keep record Drawings clean, undamaged and up to date as work progresses. Accurately indicate electrical work as actually installed with indications of all deviations, additions and omissions in red ink. Locate all buried exterior raceways or cables by actual dimensions from walls, center-lines or fixed points of reference.

- B. The purpose of these Record drawings is to provide the Engineer with an easy to read, complete record of the installation so that at the end of the project the Engineer can revise the original contract drawings to represent the actual installation. Color-coded and highlighted notes shall be used if these would make the Record Drawings easier to read.
- C. At the completion of the work, Contractor shall furnish the Engineer this original set of marked-up drawings. Final payment to the Contractor will not be authorized until these drawings have been submitted to and accepted by the Engineer.

1.10 Certificates

- A. For final acceptance of Division 26 work (and that of otherwise associated Divisions), provide certificate of approval from the applicable regulatory and permitting agencies certifying that the electrical work has been inspected and that the work conforms with the minimum requirements of the State Electrical Codes.

1.11 Warranty

- A. See Division 01.

PART 2 - PRODUCTS

2.01 Materials

- A. Unless otherwise specified, all material to be new of recent manufacture, carrying full factory warranty, UL approved or approved by local inspection authority.
- B. All like materials shall be by the same manufacturer throughout the project.
- C. All material shall be new and bear manufacturer's name, model number, electrical characteristics and other identification and shall be the standard product of manufacturer regularly engaged in production of similar material.
- D. Access Panels:
 - 1. Provide access panels of adequate size for equipment requiring service and installed above plaster or gypsum board ceilings, behind walls or in furring.
 - 2. Furnish complete with correct frame for type of building construction involved. Size, number and location of access panels is not necessarily shown on Drawings.
 - 3. Use no panel smaller than 12 inches by 12 inches for simple manual access, nor smaller than 16 inches by 20 inches where personal must pass through.
 - 4. Access panels shall maintain ceiling fire rating.
 - 5. Acceptable Manufacturers: Milcor A, K, L, or M panels or equivalent Bilco or Potter - Roemer as required by construction.

PART 3 - EXECUTION

3.01 Excavation/Trenching

- A. Provide trenching, backfilling, compaction, repaving or other site restoration as required by the work done in this Division.

- B. Determine location of all existing underground gas, water, sewer, telephone and electric lines. Locate accurately on ground surface and for depth of same before excavation. Uncover by hand digging. Contractor shall be responsible for any damage or interruptions to these utilities, caused by himself, and other costs incurred by these interruptions.
- C. Do not undermine footings or bearing walls.
- D. Use power-digging equipment only in direction away from existing facilities.
- E. Exercise standard safety precautions in excavation near power cables by using insulated handles, rubber gloves and footwear, etc.
- F. Do not place backfill until installation to be covered has been tested, inspected and approved.
- G. Minimum conduit burial depth shall be 24 inches, unless otherwise noted.
- H. Install a detectable six inch wide yellow vinyl tape with letter "Caution: Buried Electrical Line Below" 18 inches above all buried services conduit and wire not under structures.
- I. Backfill:
 - 1. Backfill material for all trenches under paved areas shall be coarse sand or crushed rock, installed in layers not to exceed six inches and compacted to 95% of maximum density at optimum moisture content to preclude subsequent settlement.
 - 2. The top 18 inches of trenches in landscaped or grassed areas shall be backfilled with native soil and tamped.
- J. Conduits piercing a building waterproof membrane shall be provided with flanges, using two neoprene washers, one washer on each side of membrane, between each flange and membrane.
- K. All underground conduits which enter the building penetrating poured-in-place slabs:
 - 1. Shall be sloped to drain away from the building and shall be water sealed to prevent moisture from passing through the conduit into the building. All joints to be threaded and taped or glued to prevent entry of water into the conduits.
 - 2. Shall be poured-in-place, or provide with watertight conduit sleeves and rubber seals, Link-seal system by Thunderline Corporation or equivalent.
 - 3. Shall be rigid galvanized steel a minimum of 12-inches under the slab and 6-inches above the slab.

3.02 Cutting

- A. Perform or arrange and pay for required cutting of concrete, masonry, wood, structural framing, etc.
- B. Cutting or channeling of underpinning or structural members is not permitted without prior permission of the Engineer.
- C. No weakening of structural parts is permitted and the Contractor will correct any work impaired.

3.03 Patching

- A. Where trenching is done through existing paving, walks, curbs, etc., the Contractor is responsible to patch and repair these structures to original condition.
- B. Patch all openings in and through concrete and masonry with dry pack.
- C. In new work, patch and refinish all finished surfaces damaged by this contractor to match adjacent surface.
- D. Where new electrical work is installed in the existing building, patch and refinish surfaces damaged to match existing. Refinishing to be as directed by the Engineer or Engineer.

3.04 Framing And Blocking

- A. Structural framing will be done by the Contractor.
- B. Blocking required for sole use of electrical work such as fastening and support of outlet boxes, fixtures, panels, conduit, etc., will be by the Electrical Contractor.

3.05 Housekeeping Pads

- A. Provide concrete housekeeping pad under Motor Control Centers, transformers, pumps, or any floor mounted switchboard.

3.06 Protection

- A. Cap or plug all raceway openings during construction.
- B. Protect all completed work against dirt, water or chemical damage, mechanical accident or injury.
- C. Equipment found damaged or in other than new condition will be rejected as defective.

3.07 Sleeves

- A. Where conduit passes through masonry or concrete, install sleeves during construction of same.
- B. Where conduit must by necessity pass through beams or columns, install sleeves located as directed by Engineer.

3.08 Identification

- A. Label complete electrical system to indicated use of each item of equipment or load served.
- B. Identification of Disconnecting Means: Provide identification of disconnects in accordance with Section 110-22 and Section 240-83 of the National Electrical Code.
- C. Identification of Conductors and Components for Distribution Systems Operating at Two or More Different Voltages: Identify components in accordance with Section 210-4(d) of the National Electrical Code. Required labeling shall be by Micarta plate.
- D. Provide black laminated white core engraved nameplates with lettering not less than 3/16 inch high attached to the outside of junction boxes larger than 4-11/16 inch; surface mounted cabinets, panelboards, time switches; disconnect switches, starters, contactor, relays; subdistribution and branch circuit panelboards, dry transformers and other items

indicating equipment or load served. At flush mounted cabinets, panelboards, time switches and similar items mount nameplate on inside of door at finished areas and on outside of door at mechanical, storage rooms and other non-public spaces. Attach nameplates with epoxy glue.

- E. Flush mounted devices with stainless steel or plastic finish plates requiring identification to be engraved with lettering not less than 1/8 inch high with black color filling.
- F. Provide typewritten circuit schedules for panelboards, cross-connect panels and terminal cabinets. Schedules shall be covered with minimum of 0.018 inch thick clear rigid plastic installed in permanently attached metal frame holder located on inside face of door. Schedules to use final assigned room names/numbers, loads not plan designations.
- G. When making modifications to existing equipment or panelboards, provide labels as indicated in this section. Provide new typewritten circuit schedules for all modified panelboards.
- H. At Main Distribution Panels provide black laminated white core engrave nameplates attached to panel exterior with epoxy glue. Size of nameplate and lettering as directed. Label distribution breakers, main breakers, sub-breakers and panel sections to identify all components and voltage and phase of system. In addition, provide master nameplate indicating project name, date, Engineer (when applicable), Electrical Engineer, and Electrical Contractor. Lettering minimum of 1/4 inch high. Provide half-sized electrical one-line diagram (s) framed and mounted on wall near main distribution panel (s).
- I. At buildings having multiple services provide additional engraved nameplate at each service indicating location of additional services.

3.09 Installation

- A. Wiring Requirements: Install wiring complete to every outlet with all devices shown and/or required. All wiring to be in raceways and concealed throughout finished areas unless specifically noted otherwise. For the purpose of electrical specifications, all areas, with the exception of boiler rooms, mechanical rooms and mechanical spaces, are to be considered as finished areas.
- B. Provide raceway connections between outlets, outlets and panels and equipment and panels as shown on Drawings. Size raceways according to governing codes unless otherwise noted.
- C. Locations:
 - 1. Verify all locations with actual field conditions, and plans to avert possible installation conflicts.
 - 2. Coordinate work with that of other trades to assure symmetrical placing of fixtures in respect to ceiling tile, grilles, etc.
 - 3. Cabinets: Where electrical outlets occur in face, decks or base of cabinets or in walls above counters, carefully coordinate with details and arrangements of same.
 - 4. Any work, which is incorrectly installed without prior verification with General Contractor, Engineer, Engineer and Drawings, will be ordered removed and relocated and any damage to other work shall be repaired at no cost to the Owner.
 - 5. In general, locate outlets as indicated in symbol schedule on Drawings.

- D. All mounting heights shown on drawings are from finish floor to centerline unless otherwise shown. Mounting heights at non-typical locations shown with (+) sign and height required noted adjacent to outlet. Outlets located in concrete block, brick or tile walls are to be adjusted in height to coordinate with modular joints of the materials.

3.10 Painting

- A. Painting in general will be covered under another Division of this specification, except items furnished under this Division that are scratched or marred in shipment or installation and/or require custom painting.
- B. Install equipment with manufacturer's standard finish and color unless otherwise specified. Refinish any marred or oxidized items restored to manufacturer's factory finish.
- C. Required surfaces or equipment with no standard finish; clean off grease and scale. Restore to smooth finish. Give one coat of primer, two coats finish.
- D. Paint and color as selected by Engineer or Engineer.
- E. All exposed conduits on painted walls shall be painted to match wall and trim colors. Conduit labels shall be neatly affixed and shall not be painted over.
- F. All electrical equipment and conduit exposed in finished areas and on exterior walls shall be painted to match surrounding surfaces.
- G. Contractor shall coordinate the timing of painting requirements.
- H. Refer to specifications for methods and materials.

3.11 Noise Control

- A. To minimize noise transmission between occupied spaces, outlet boxes at opposite sides of partitions are not to be placed back to back and installation of straight-through boxes is not permitted.
- B. Contactors, transformers, starters and similar noise producing devices shall not be placed on walls, which are common to occupied spaces unless specifically called for on Plans. Where equipment is mounted on wall common to occupied spaces, provide shock mounting or noise isolators to effectively prevent transmission to occupied spaces.
- C. Ballasts, contactors, starters and like equipment found noticeably noisier than similar equipment of same type are to be removed and replaced as directed by Engineer at no cost to Owner.

3.12 Fire-Stopping

- A. Where raceways penetrate floors, ceilings, ducts, chases and fire walls, provide fire stopping to maintain integrity of the fire assembly. The code authority having jurisdiction shall approve fire-stopping method.
- B. Where electrical boxes exceeding 16 square inches are located in fire resistive walls, fire stopping shall be provided to maintain integrity of the fire assembly.

3.13 Continuity Of Service

- A. Keep outages to occupied areas to a minimum and prearrange all outages with Owner, Engineer and utilities involved. Requests for outages shall state the specific dates and hours and the maximum durations, with the outages kept to these specified times. When power interruptions will last longer than 5 minutes and cover more than 10% of the building, or affect public areas, they shall be performed on the weekend between 1 and 5 AM.
- B. Contractor shall coordinate with Owner or Engineer so that work can be scheduled not to interrupt operations, normal activities, building access, etc. Coordinate work with other crafts for proper scheduling.
- C. No circuits shall be turned off without prior approval from Owner or Engineer. Coordinate with the operations, normal activities, building access, etc. Coordinate work with other crafts for proper scheduling.
- D. This contractor shall be liable for any damages resulting from unscheduled outages or for those not confined to the preapproved times. Include all costs for overtime labor as necessary to maintain electrical services in the initial bid proposal. Temporary wiring and facilities, if used, shall be removed and the site left clean before final acceptance. Requests for outages must be submitted at least (5) days prior to intended shutdown time.
- E. When applicable, include in bid cost of minimum temporary power to Fire Alarm System, Security, Telephone/Data equipment and any other equipment designated by Owner, during time when primary building power has been interrupted.

3.14 Safety

- A. The Drawings and the specifications do not include design or construction details or instructions relating to the Contractor's safety precautions or to means, methods, techniques, sequences or procedures required for the Contractor to perform his work.
- B. The Contractor shall provide necessary shoring, railing, barricades, protective devices, safety instructions and procedures to perform the work safely and to comply with State Safety Requirements and OSHA requirements.

3.15 Cleanup

- A. Contractor shall continually remove debris, cuttings, crates, cartons, etc., created by his work. Such clean up shall be done at sufficient frequency to eliminate hazard to the public, other workmen, the building or the Owner's employees. Before acceptance of the installation, Contractor shall carefully clean cabinets, panels, wiring devices, cover plates, light fixtures, etc., to remove dirt, cuttings, paint, plaster, mortar, concrete, etc. Blemishes to finished surfaces of apparatus shall be removed and new finish equal to the original applied.

3.16 Asbestos Bearing Materials

- A. If during the course of his work, the Contractor observes the existence of asbestos or asbestos bearing materials, the Contractor shall immediately terminate further work on the project and notify the Owner of the condition. The Owner will, after consultation with the Engineer, determine a further course of action.

3.17 Polychlorinated Biphenyls (PCB's)

- A. If during the course of his work, the Contractor observes the existence of polychlorinated biphenyls (PCB's), the Contractor shall immediately terminate further work on the project

and notify the Owner of the condition. The Owner will, after consultation with the Engineer, determine a further course of action.

3.18 Testing.

- A. Test the entire electrical installation to assure compliance with code and proper system operation.
 - 1. Circuit Tests. The Contractor shall test all wiring and connections for continuity and ground before any fixtures or other loads are connected. Tests shall be made with a 500 volt DC "Megger" type tester. If tests indicate faulty insulation (less than 2 megohms) such defects shall be corrected and tested again. Contractor shall provide all apparatus and material required to make tests and shall bear all expense of required testing.
 - 2. Load Balancing. Checks shall be made for proper load balance between phase conductors and make adjustments as necessary to bring unbalanced phases to within 15% of average load.
 - 3. Ground Testing. Measure the OHMIC value of the Electric Service Entrance metallic "System Ground" with references to "Earth Ground" using the "Multiple Ground Rod" method and suitable instruments. Maximum resistance to ground shall be less than 10 ohms. If this resistance cannot be obtained with the ground system shown, notify the Engineer immediately for further instruction. Certify in writing to the Engineer that the grounding test has been made and that the requirements of this portion have been met for the "System Ground".
 - 4. Motor Tests. Check all motors for proper rotation and for actual load current. Submit tabulation of motor circuits.
- B. Materials and instrumentation shall be provided by the Contractor.
- C. The Contractor shall notify the Engineer ten (10) working days prior to performance of any test.
- D. The Contractor shall certify in writing that the above tests have been completed and shall provide documentation of test data.

3.19 Instruction Of Owner Employees

- A. Instruct operation and maintenance personnel selected by Owner's representative at a single designated time in operation and maintenance of the entire electrical system and its components.
- B. Electrical Contractor shall provide one 8-hour working day of instruction to Owner designated personnel. Software Integrator shall provide one 8-hour working day of instruction to Owner designated personnel after all equipment is fully operational and functional. The time for this instruction shall be scheduled shortly after start-up and at mutually agreed times. Contact Engineer for coordination.
- C. Specific sections elsewhere in this Division may require additional training.
- D. On completion of instructions, obtain from Owner certification in writing that demonstration had been given and instructions had been understood.

3.20 Demonstration Of Completed Electrical System And Controls

- A. At the point of substantial completion of the project, the Electrical Contractor shall provide necessary personnel to demonstrate the essential features of the following electrical systems:
 - 1. Lighting system.
 - 2. Heating system.
 - 3. Ventilation.
 - B. Demonstrate each system once after all malfunctions have been corrected.
 - C. Time. Demonstration shall be held upon completion of all systems at a date agreed upon in writing by the Owner or his representative. This time shall be in addition to the instruction allowances provided.
 - D. Attending Parties. The demonstration shall be held by the Contractor and Electrical Subcontractor in the presence of the Owner or his designated representative, Electrical Engineer, Project Engineer, and the Equipment Manufacturer's representative.
 - E. Demonstration.
 - 1. Demonstrate the functions and locations of each system, and indicate its relationship to the Riser Diagram in the Drawings.
 - 2. Demonstrate by "start-stop operation" and "automatic operation", how to work the controls, how to reset protective devices or replace fuses, and what to do in case of emergency.
 - 3. All systems shall be exercised through operational tests in order to demonstrate achievement of the specified performance. Operational tests depend upon completion of work specified elsewhere in these Contract Documents. The scheduling of tests shall be coordinated by the Contractor among all parties involved so that the tests may proceed without delays or disruption by uncompleted work.
 - F. Certificate of Complete Demonstration. Submit a Job Completion Form found at the end of this Section. Provide documentation of all test data.
- 3.21 Payment for Work.
- A. Payment for work under this Division shall be covered and included as part of the Basic Bid on the project, or as outlined under any schedules.

END OF SECTION

**SECTION 26 2400
ENTRANCE & DISTRIBUTION**

PART 1 GENERAL

1.01 Description

- A. This section shall include the furnishing and installing of all necessary equipment for a new electrical distribution complete as shown on the Plans and specified. The work in this section includes cable plowing and installation of conduit (i.e. trenching, laying pipe, backfilling, pulling of service line, and making the necessary connections).
- B. Provide branch circuit panelboards with components as indicated. Incorporate switching and protective devices of the number, ratings and type shown and noted herein.
- C. All panelboards and breakers to be fully-rated, Series rated panel boards and breakers are not acceptable.

1.02 Grounding and Bonding

- A. Provide a complete grounding system for all electrical equipment in accordance with NEC Article 250 and established safety practices.
- B. Provide grounding grid at pad-mounted transformers.
- C. Provide a main grounding electrode consisting of a bare No. 4 copper grounding electrode conductor connected to a concrete-encased electrode. Concrete-encased electrode provided by others. See detail on Architectural Drawings.
- D. Provide a complete grounding electrode system. All building electrodes must be tied into this system per 250.50 of the NEC. These building electrodes are: the main concrete-encased electrode, any metal underground water pipe that is in direct earth contact for at least ten feet, and the metal frame of the building where effectively grounded.
- E. The grounding electrode system is to include, but is not limited to: grounding conductors, fitting connectors and all other devices and material as required rendering the system complete.

1.03 Related work in other sections includes:

- A. Providing concrete housekeeping pad for floor-mounted equipment under Division 03.
- B. Providing identification, Section 26 500, Basic Electrical Materials and Methods.
- C. Providing grounding, Section 26 0526, Grounding and Bonding.

1.04 Quality Assurance

- A. American National Standards Institute (ANSI).
 - 1. 67 Panelboards (ANSI/UL 67).
 - 2. ANSI Z55.12 gray finishes for industrial apparatus and equipment.
- B. National Fire Protection Agency (NFPA).
 - 1. NFPA 70 National Electrical Code.

- C. Underwriters' Laboratory (UL).
 - 1. UL 50: Cabinets and Boxes.
 - 2. UL 67 Panelboards.
 - 3. UL 869: Service Disconnects.
- D. National Electrical Manufacturers Association (NEMA)
 - 1. NEMA AB-1: Molded Case Circuit Breakers.
 - 2. NEMA KS-1: Enclosed Switches.
 - 3. Standards for Panelboards.
- E. Federal Specification W-C-375B/GEN for Switchboards.

1.05 Submittals

- A. Shop Drawings
 - 1. Submit complete shop drawings with dimensions, components and internal connections in accordance with Division 01 or Section 26 0500, Basic Electrical Materials and Methods (when included).
- B. Submit operation and maintenance data in accordance with Division 01 or Section 26 0500, Basic Electrical Materials and Methods (when included).

1.06 Product Delivery, Storage And Handling

- A. Deliver with UL label and bearing manufacturer's name. Provide all equipment and each section with appropriate UL labels located in conspicuous places. Provide readily accessible nameplates.
- B. Provide starters in manufacturers original cartons with labels intact.
- C. Panelboard exterior trim separately packed to prevent damage during delivery and storage on site.
- D. Store and handle panelboards so as not to subject panels to corrosion or mechanical damage and in a manner to prevent damage from environment and construction operation. Keep switchboards wrapped or otherwise protected with plastic and stored on wood pallet on floor.

PART 2 PRODUCTS

2.01 Branch Circuit Panelboards:

- A. Type:
 - 1. NQOB for 120/208-volt panelboards with bolted breakers having minimum interrupting capacity of 22,000 amperes RMS symmetrical, unless noted otherwise at the bottom of the panel schedules. Breaker trip sizes and number of poles as indicated on the Drawings.
- B. Bussing:
 - 1. Copper or aluminum.

2. Tap Arrangement: Phase sequence type, permitting a two (2) or three (3) pole breaker to be installed at any location.
 3. All bolts used to connect current-carrying parts together shall be accessible for tightening from the front of the panel.
 4. Wiring terminals: Compression or set screw type for copper conductors; bolted to bus.
- C. Construction: Flush or surface mounted as indicated with following:
1. Door with lock to match existing branch circuit panel locks. Verify on site.
 2. Flush mounted panels: Concealed mounting hardware for exterior trim and door. No exposed fastenings or holes permitted. Flush mounted panel located side by side are to be of same length unless otherwise indicated. Flush panels of depth greater than available wall thickness provided with box type exterior trims with edges returned to wall. Depth of return as required making up difference in depth between panel and available wall depth. Panelboards 400 amp or less shall not exceed 6" depth.
 3. Gutters minimum of five inch with six inch required at feeder end of panel or where feeder runs inside of gutters. Separate feeder lugs and terminals for each feeder connection with lugs as specified in Section 26 0519 Conductors and Cables. Split door split bus panels provided with two-inch separation of sections.
- 2.02 Sub-distribution panels:
- A. Flush or surface mounted as indicated on Drawings.
 - B. Provide nameplate reading "SUBDISTRIBUTION PANEL 4A1, etc." and separate nameplate at each section indicating voltage and phase.
 - C. Finish industrial gray on all exposed surfaces.
 - D. All other items to be as specified for branch circuit panelboards.
 - E. Similar to Square D I-line series.
- 2.03 Circuit Breakers
- A. Multiple breakers common trip.
 - B. Combination breaker and ground fault interrupter: 10,000 amps or 20,000 IC rated, bolted connection.
 - C. Breakers for panel switched lighting to be labeled "SWD" for multiple operations.
 - D. Location of circuit breakers in panels: Install circuit breakers in panels at locations as indicated in the panel schedules.
 - E. Main breaker, when so equipped, shall be individually mounted separate from branch breakers. Where used as service disconnect, breaker and panelboard shall be listed for use as service entrance equipment.
 - F. Branch circuit breakers shall be bolt-on.

- G. Provide circuit breaker handle guards to prevent accidental shut-off of equipment for breakers supplying obviously constant circuits for clocks, time switches, refrigeration, freezers, sound systems, fire alarm and other like systems as directed.

2.04 Identification:

- A. Panelboards: In accordance with Section 26 0500. Locate nameplates attached to top center of interior trim. Nameplate to indicate panel, voltage and phase characteristics such as Panel 2AA, 120/208 volt, three phase. Panel labeling to correspond to distribution system labeling.
- B. Circuit breakers: Number circuit breakers as indicated in panel schedules. Numbers engraved and filled in interior trim or permanently attached metal numbers equal to Wilson Heard markers or plastic numbers. Adhesive backed printed numbers not approved. Other methods of numbering as approved by Engineer.
- C. Provide typewritten circuit schedules for panelboards, cross-connect panels and terminal cabinets. Schedules shall be covered with minimum of 0.018-inch thick clear rigid plastic installed in permanently attached metal frame holder located on inside face of door. Schedules to use final assigned room names/numbers, loads not plan designations.
- D. When making modifications to existing equipment or panelboards, provide labels as indicated in this section. Provide new typewritten circuit schedules for all modified panelboards.

2.05 Panel finish:

- A. All panels shall be provided with a rust-inhibiting phosphatized primer coating approved by the paint manufacturer.
- B. At all finished areas factory finish to match adjacent surfaces. Rodda Baking Enamel.
- C. In unfinished or utility areas standard factory industrial gray.
- D. Paint sides, top and front of surface mounted panels.

2.06 Lugs:

- A. In accordance with Section 26 0519, Conductors and Cables.
- B. Compression or set-screw type, bolted to bus or CB output.
- C. Provide double or feed thru lugs at panels where feeders are extended to additional panels.
- D. Provide double capacity neutral lugs for all panelboards having an isolated bus.
- E. Provide oversized lugs as required for aluminum panel feeders to accommodate sizes shown in feeder schedule on drawings.

2.07 Weatherproof Enclosures: All exterior mounted panelboards shall be provided with a minimum rated NEMA 3R enclosure.

2.08 Grounding and Bonding

- A. Ground connectors: Bronze clamp type. All clamp accessories such as bolts, nuts and washers shall also be bronze to assure a permanent corrosion resistant assembly. Bolts used to fasten lugs to enclosures must be case hardened and sized for lug hole and hole drilled into enclosure. O-Z Gedney, Burndy, IlSCO or approved.
 - B. Ground rod clamps: Exothermic welding type or one piece cast bronze with safety set screw. Cadweld "G" series, Copperweld 6500 series, or approved.
 - C. Ground rods: Copper or steel core copper covered, minimum 5/8 inch by 10'-0". Copperweld 9400 series, or approved.
 - D. All ground cable splices and joints to be made with an exothermic welding process that shall provide a weld with current-carrying capacity not less than that of the conductors welded. Soldered connections not to be used.
- 2.09 Acceptable Manufacturers: Square-D, GE, Cutler-Hammer, or approved. For electronic grade panelboard suppression/filter system: GE, Current Technologies, Liebert, or approved.

PART 3 EXECUTION

3.01 Inspection

- A. Coordinate NEC clearance requirements space provided to assure adequate clearances are maintained. Notify Engineer if space provided is inadequate for specified equipment and/or for maintaining required code clearances. Do not order equipment until any space inadequacies are resolved.

3.02 Installation

- A. Install panelboard in accordance with manufacturer's written instructions.
- B. Furnish and install three spare one-inch conduits from the top of each recessed panel, to an accessible point above the ceiling.
- C. Conduit shall be securely fastened to all panelboards and sheet metal outlet, junction, and pull boxes with galvanized locknuts, and one bushing installed in accordance with standard practice. The full number of threads shall project through to permit the bushing to be drawn tight against the end of the conduit, after which the locknut shall be made up sufficiently tight to draw each into firm electrical contact with the box.
- D. Do not install exterior trims until finish painting is completed. Clean interior of panel (construction dust, paint over-spray, etc...) prior to installation of exterior trim.
- E. Keys: Collect all panel keys. Combine all keys on one key ring and submit at time of substantial completion.
- F. No low voltage wiring (less than 120 volt) to be installed in panel enclosures.
- G. Breaker handle guards shall be provided on each circuit supplying obviously constant loads to prevent accidental shutting off. Such loads are refrigeration, contactor controlled circuits, freeze protection, etc.
- H. Care shall be taken to terminate ground conductors from isolated ground receptacles only on the isolated ground bus in a panel. Do not terminate bonding conductors on an isolated ground bus.

- I. Bolt panelboards to wall structure as required for appropriate seismic zone. Provide adequate backing as required.
- J. All nameplates, labels, screws, bolts, or other hardware shall be in place prior to acceptance.
- K. Install floor-mounted equipment on a three-inch high concrete pad extending three inches beyond front and sides of said equipment. Level and securely fasten equipment to concrete pad.
- L. Provide four-foot wide rubber insulation mats on floor in front of switchboard for its entire length.

3.03 Power One-Line Diagram

- A. Mount one-line diagram from Plans at main distribution assembly. Use a clean copy and mount under clear plastic cover, set in a metal frame.

3.04 Field Test

- A. Prior to energizing distribution equipment, perform following test and adjustments according to manufacturer's recommendations and instructions.
- B. Continuity check.
- C. Insulation level (megger) tests.
- D. Short circuit test.

3.05 Adjustment And Cleaning

- A. Tighten bus connections and mechanical fasteners. Check bus-to-bus and breaker-to-bus connection for correct torque tightening.
- B. Tighten feeder and circuit breaker connections as recommended by the manufacturer.
- C. Clean all foreign matter from interior and exterior of equipment and touch-up scratched or marred surfaces to match original finish.
- D. Adjust interior trim to fit tight against exterior trims.
- E. Check all moving mechanical parts for proper operation.

3.06 Grounding and Bonding

- A. Install in accordance with NEC Article 250.
- B. Except where specifically indicated otherwise, all exposed non-current carrying metallic parts of electrical equipment to be bonded together to limit any difference of potential voltage. Metallic raceway systems may be considered the equipment grounding system where specifically noted or where approved in the NEC. Equipment grounding conductors must be installed in all non-metallic conduit systems. All load side equipment to have the neutral system isolated from the equipment grounding system. The equipment grounding system must provide a low impedance path from the equipment back to the source equipment-grounding bar. This equipment-grounding bar to be connected to the system neutral at the source by a main bonding jumper sized per NEC 250.28, 250.102,

and 250.168. The equipment grounding conductors to be sized at least as large as required by NEC 250.122.

- C. The grounding electrode system to connect to the service neutral, if required, or to the system grounded conductor if a neutral is not required. The electrode system may terminate on the equipment-grounding bar at the main service where a properly sized main bonding jumper has been installed. Water system bonding must utilize the proper size water pipe bond clamp to match the size of the water pipe.
- D. Electrical Equipment Grounding (Safety Ground):
 - 1. Ground non-current carrying metal parts of electrical equipment enclosures, frames, man-holes, conductor raceways or cable trays to provide a low impedance path for line-to ground fault current and to bond all non-current carrying metal parts together.
 - 2. Equipment grounding conductor to be electrically and mechanically continuous from the electrical circuit source to the equipment to be grounded. Size ground conductors per NEC 250.122 unless larger conductors are shown on drawings.
 - 3. Grounding conductors to be identified with green insulation. Where green insulation is not available, on larger sizes, black insulation to be used and suitably identified with green tape at each junction box or device.
 - 4. Install metal raceway couplings, fittings and terminations secure and tight to ensure good ground continuity. Provide grounding bushing and bonding jumper where metal raceway is not directly attached to equipment metal enclosure, at concentric knock-outs, or at concentric or eccentric knockouts for circuits of over 250v to ground.
 - 5. Lighting fixtures to be securely connected to equipment grounding conductors. Outdoor lighting standards to have a factory installed ground lug for terminating the ground wire.
 - 6. Motors to be connected to equipment grounding conductors with a conduit ground bushing and with a bolted solderless lug connection on the metal frame. A separate equipment-grounding conductor to be run with each motor branch circuit.
 - 7. Bonding to be provided to assure electrical continuity and the capacity to conduct safely any fault current likely to be imposed.
 - 8. All plug-in receptacles to be bonded to the boxes, raceways and grounding conductor.
 - 9. Equipment grounding conductors to be provided for all lengths of flexible metallic conduit. All equipment provided with two conductor cords to be rewired to provide a three-conductor type "S" cord and grounding attachment plug caps.
- E. Neutrals throughout the system to be solidly grounded to one point at the system source.
- F. Lighting and power panelboard to be grounded by connecting a conductor to the grounding stud and to the incoming and outgoing feeder conduits grounding bushings. Each grounding-type bushing to have the maximum ground wire accommodation available in standard manufacturer for the particular conduit size. Connection to the bushing to be with wire of this maximum size.
- G. The grounding stud of each secondary voltage dry type, three phase transformer to be connected separately to the grounding lug on the panelboard serving the transformer. Connection to be by means of an insulated conductor run in conduit, sized as shown on the drawings.

- H. Provide a No. 6 green coded insulated conductor from each telephone terminal board to the closest effectively grounded water pipe or structural steel.
- I. When included as part of the project, the central equipment for the fire detection and alarm system is to have its grounding terminal connected to the ground lug on the panel-board serving the system by means of a No. 6 green coded insulated conductor, run in 3/4 inch metal conduit, utilizing a ground clamp.

3.07 Testing

- A. Grounding Electrode Conductor (GEC):
 - 1. Measure resistance between service equipment ground bus and each grounding electrode, using a Megger and a single length of additional wire, if necessary. Measure resistance between both ends of the additional wire used. Isolate and correct any poor connections as indicated.
- B. System Ground Continuity:
 - 1. At panels and selected outlets, measure the ground loop resistance between the neutral conductor and raceway using a megger or equivalent. Or, at selected outlets, measure the ground loop impedance using a ground loop impedance tester.
 - 2. Ground loop impedance shall not exceed a value in ohms that is the voltage to ground divided by five (5) times the rated current.
 - 3. Isolate and correct the cause of the poor connection. If the source of the high reading cannot be practically corrected, pull a separate ground conductor into the raceway and re-test.
 - 4. Report findings to Engineer.

END OF SECTION

SECTION 26 2726
WIRING DEVICES AND FLOOR BOXES

PART 1 - GENERAL

1.01 Description

- A. Provide all wiring devices and finish plates as required unless specifically indicated otherwise.
- B. Related work in other sections includes:
 - 1. Providing identification, Section 26 0500, Basic Electrical Materials and Methods.
 - 2. Providing conductors, Section 26 0519, Conductors and Cables.
 - 3. Providing boxes, Section 26 0533, Raceways and Boxes.

1.02 Quality Assurance

- A. American National Standards Institute (ANSI): 467 Grounding and Bonding Equipment (ANSI/UL467). 498 Attachment Plugs and Receptacles (ANSI/UL498). C73 Series Dimensions of Attachment Plugs and Receptacles.
- B. Federal Specification (FS): Electrical Power Connector, Plug, Receptacle and Cable Outlet. W-C-596D, E and F. Switches, Toggle (toggle and lock), Flush Mounted WS 896-E.
- C. National Electrical Manufacturer's Association (NEMA): WD 1-79 General Purpose Wiring Devices.
- D. National Fire Protection Association (NFPA): NFPA 70 National Electrical Code.
- E. Underwriters' Laboratory (UL): UL-20 Standard for Snap Switches.

1.03 Submittals

- A. Submit product data sheets per Division 01 or Section 26 0500, Basic Electrical Materials and Methods (when included).
- B. Occupancy sensor system submittals shall include:
 - 1. Floor plans, same scale as the electrical drawings, showing device locations, sensor coverage pattern, and sensor type.
 - 2. Wiring diagrams.
 - 3. Mounting details.
 - 4. Complete material list with catalog sheets showing all components to be used in the system.
- C. Submit operation and maintenance data per Division 01 or Section 26 0500, Basic Electrical Materials and Methods (when included).

1.04 Product Delivery, Storage And Handling

- A. Deliver with UL label and bearing manufacturer's name in manufacturer's original unopened and undamaged cartons with labels legible and intact.

- B. Store and handle material so as not to subject them to corrosion or mechanical damage and in a manner to prevent damage from environment and construction operation.

PART 2 - PRODUCTS

- 2.01 Acceptable manufacturers: Arrow-Hart, General Electric, Hubbell, Leviton, Pass & Seymour or approved.
- 2.02 Switches: Specification Grade, Quiet Type, Minimum rating 120/277 volt, 20 amp unless otherwise noted. Finish gray with stainless steel covers
 - A. Toggle and lock switches: Federal Specifications as listed in Quality Assurance.
 - 1. Single Pole Switch: Arrow-Hart 1991 or approved.
 - 2. Double Pole Switch: Arrow-Hart 1992 or approved.
 - 3. Three-way Switch: Arrow-Hart 1993 or approved.
 - B. Occupancy Sensors:
 - 1. Private Offices: Wall mount, passive infrared, 180n degree, 900 square foot coverage with off override and adjustable from 30 seconds to 30 minutes. Watt-Stopper WS-120 or WS-277, Sensor Switch WS-120 or WS-277 or approved.
 - 2. Ceiling mounted in restrooms and open office areas: Ultrasonic, 360 degrees, 1000 square foot coverage adjustable from 15 seconds to 15 minutes, with power pack and isolated relay (for HVAC control). Watt Stopper W-1000A (with A120-E or A277-E), Novitas 01-100-071-072 one-way, Sensor Switch (Ultrasonic) or approved.
 - 3. Wall/ceiling mounted in classrooms: Dual technology (passive infrared and ultrasonic) with integral isolated relay (for HVAC control) 1500 square foot coverage adjustable from 15 seconds to 15 minutes, with power pack and ceiling mount attachment. Watt Stopper DT-100L (with A120-E or A277-E and CM-100), Novitas 01-074-184 (dual technology), Sensor Switch (dual technology) or approved.
 - 4. Provide occupancy sensors ahead of light switches and tied into Manufactured Wiring System Junction Module (JM) where applicable. Any inter-tie to DDC energy management control system will be by mechanical contractor.
 - 5. Provide 12" x 12" metal access panels at locations where power packs are installed above inaccessible ceilings.
 - 6. All occupancy sensor products shall be the same manufacturer.
 - C. Photocells
 - 1. Flush mounted photo control with stainless steel finish plate and neoprene gasket, 1800 watt tungsten, 120 volt, Intermatic K-4021, 2000 watt tungsten, 208 volt, Intermatic K4024, 3000 watt tungsten, 277 volt, Intermatic K4033, 3000 watt tungsten 480V, Intermatic K4035.
 - 2. Conduit mounting, heavy duty, relay type, photo control, 1800 watt tungsten, 120 volt. Intermatic K-4121 or approved.
- 2.03 Receptacles: Specification Grade. Conform to Federal Specifications as listed in Quality Assurance. Finish gray with stainless steel covers

- A. Duplex, double parallel slot 20 ampere, 120 volt, typical locations, Arrow-Hart 5362 or approved.
- B. Ground fault circuit interrupter receptacle: 20 ampere, duplex, double parallel slot, Arrow-Hart GF5362 or approved.

2.04 Finish plates:

- A. At surface wiring, raised galvanized industrial type. National Association of Electrical Distributors 12000 Series.
- B. At all typical location: Stainless steel type 302, minimum thickness .035 inches, brushed finish. Arrow-Hart or approved.
- C. Plate Securing Screws: Metal with heads finished to match finish plate.

PART 3 - EXECUTION

3.01 Inspection

- A. Determine outlet boxes, raceways and conductors are properly installed and outlet boxes are cleaned of all foreign matter before installing devices and finish plates.
- B. Inspect each wiring device for defects.

3.02 Installation

- A. Install wiring devices in accordance with NECA "Standard of Installation".
- B. Do not install devices or finish plates until final painting is complete.
- C. Switches:
 - 1. Install switches with the OFF position down.
 - 2. Do not group or gang switches in outlet boxes unless they can be so arranged that voltage between adjacent switches does not exceed 300 volts, or installed in boxes equipped with permanently installed barriers between adjacent switches.
- D. Verify mounting location of photo controls to insure proper operation from outside lighting. In general, photo control mounting exposed to north.
- E. Receptacles:
 - 1. Install receptacles with the ground pole on top.
 - 2. Install a separate green or bare wire between the receptacle strap grounding (green) screw and a screw into the outlet box. Self-grounding strap not approved as grounding means.
- F. Finish Plates:
 - 1. Install devices and finish plates plumb with building lines.
 - 2. Use jumbo size plates for outlets installed on masonry walls.
 - 3. Do not install finish plates until final painting is complete.

G. Occupancy Sensors:

1. Manufacturer to design complete occupancy sensor system for all areas where occupancy sensors are called out on the drawings.
2. It shall be the contractor's responsibility with the suppliers assistance to locate and aim all occupancy sensors in the correct location required for complete and proper volumetric coverage within the range of coverage of controlled areas.
3. Rooms shall have ninety (90) to one hundred (100) percent coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room.
4. The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only rooms that are to be provided with sensors.
5. The contractor shall provide additional sensors if required to properly and completely cover the respective room.
6. Proper judgment must be exercised in executing the work to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components.
7. Final location of ceiling mounted ultrasonic occupancy sensors shall be a minimum of 48 inches away from any HVAC diffuser.

3.03 Identification

1. Switches: Where 2 or more switches are ganged and where indicated, identify each switch with approved legend engraved on wall plate.
2. Receptacles: Identify the panelboards and circuit number from which served. For nylon faceplates, engrave panel and circuit number on face and highlighted in contrasting color. For stainless steel plates use machine printed, pressure sensitive, abrasion resistant label tape on face of plate and durable wire markers or tags within outlet box.

3.04 Testing

- A. Operate each wall switch with circuit energized and verify proper operation.
- B. Verify that each receptacle devices is energized.
- C. Test each receptacle for proper polarity.
- D. Test each drive for ground continuity.
- E. Test each ground fault circuit interrupter operation with both local and remote fault simulations according to manufacturers recommendations.

3.05 Cleaning

- A. Internally clean device, device outlet box and enclosure.
- B. Replace stained or improperly painted finish plates or devices.

END OF SECTION

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE:

General and Supplementary Conditions, Division 1, and accompanying Drawings.
31 10 00 CLEARING AND GRUBBING
03 30 00 CAST IN PLACE CONCRETE

1.02 WORK INCLUDED BUT SUBJECT TO COST ADJUSTMENTS:

A Rock:

1. Definition: All material which by actual demonstration cannot in the Owner's representative's opinion, be reasonably excavated with a 3/4 yard manufacturer's rated backhoe equipped with a general duty ripper and rock points, or similar approved equipment and which is, in fact, systematically drilled and blasted.
2. Reimbursed Expense: Should rock, as defined herein, be encountered Owner will pay extra for removal and take credit for Earth Excavation omitted, in accordance with the General Conditions.
3. Volume: The volume of rock for which the Owner will pay extra will be defined as that which is within the required vertical depth of the excavation and 1'-0" on either side of the footing. No payment shall be made for any method of rock removal other than systematic drilling and blasting. If material which would be classified as rock as defined above is mechanically removed with excavating equipment of a larger size than specified above, it shall be understood that any added costs for the removal of material by this method shall be included in the unit price for common excavation.

B Quicksand and Plastic Soils:

1. Definition: Soft, loose, or wet ground that is incapable of supporting material, equipment, personnel, or structure.
2. Reimbursed Expense: Should quicksand or plastic soils, as defined herein be encountered, which are not indicated in the Contract Documents, Owner will pay extra for dewatering or removal in accordance with the General Conditions.

C Buried objects:

Should Wells, Cisterns, Tanks, Cesspools, etc., be encountered, which are not indicated in the Contract Documents, the Owner will pay extra for removal or filling as directed by the Project Manager, in accordance with the General Conditions.

D Contract Quantities:

Drawings indicate contract quantities; adjustments will be made for variations in accordance with the General Conditions.

1.03 TESTING

A Soil Bearing:

1. Notify Engineer when excavations are complete.
2. Do not begin fills, formwork or concrete work until Engineer approves.
3. Engineer may order tests at Owner's expense.

B Compaction:

1. Definition: Ratio expressed as percentage of dry density of material compacted in field to maximum dry density of same material as described by ASTM D1557-70 or AASHTO T180.
2. Compaction tests taken when and where directed by Engineer.
3. Tests paid for by Owner if test results indicate specified compaction has been achieved, otherwise tests paid for by Contractor.

1.04. PROTECTION AND CONTROLS: Refer to Section 01 50 00.

PART 2 PRODUCTS

2.01 FILL MATERIAL

- A. General: All fill material is subject to Engineer's approval.

- B. Bar-Run Gravel:
1. Round water-worn, washed, sound, durable, uniform, evenly graded Rock free of soft, friable, thin, elongated, or laminated pieces, disintegrated material, organic matter, oil, alkali, clay, or other deleterious substances.
 2. Size: Minimum-Not more than 10% passing a No.8 sieve; Maximum-specified below.
- C. Crushed Rock or Crushed Gravel:
1. Washed, sound, durable, uniform, evenly graded Rock free of soft, friable, thin, elongated, or laminated pieces, disintegrated material, organic matter, oil, alkali, clay, or other deleterious substances.
 2. Mechanically crushed with at least 80% of particles fractured on 2 faces, and maximum of 5% of particles unfractured.
 3. Size: Minimum-Not more than 5% passing a No.8 sieve; Maximum-specified below.
- D. Gabion Rock and Rip-Rap: Not required
- E. Drain Rock:
1. Round water-worn, washed, sound, durable, uniform, free of soft, friable, thin, elongated, or laminated pieces, disintegrated material, organic matter, oil, alkali, clay, or other deleterious substances.
 2. Size: 1.1/2" - 3/4" size.
- F. Sand:
Fine granular material, naturally produced by rock disintegration and free from organic material, mica, loam clay, and other deleterious substances.
- G. Topsoil:
Fertile, friable, natural loam, free of subsoil, stones, clay chunks, seeds, roots, noxious weeds, and approved by Engineer. Soil amendments other than those specified herein are Contractor's responsibility prior to approval of topsoil. Submit representative sample.

2.02 OTHER MATERIALS

- A. Moisture barrier: Sisalkraft "Moistop" or approved reinforced waterproof craft paper.
- B. Soil Cloth (Referred to as "Filter Fabric", and "Geotextile Fabric" in the drawings)
1. Non-woven, heat fused, 100 percent polypropylene stable fiber, freely permeable to moisture transmittal. Minimum nominal weight 5-oz per sq.yd; Dupont "Tyvar 3601" or approved.
- C. Mulch: Ground bark, aged, no chunks permitted, size to prevent wind erosion.

PART 3 EXECUTION

3.01 PREPARATION

Prior to starting work of this Section, verify that site clearing has been properly completed and existing grades agree with Drawings. Notify General Contractor of defects requiring correction, and do not start until conditions are satisfactory.

3.02 EXCAVATION

- A. General:
1. Excavate as necessary for Work shown on Drawings or specified.
 2. Remove rocks, pavements and other obstructions as required.
 3. Allow ample space for formwork and Utility trenching.
 4. Leave bearing surfaces undisturbed, true and level.
 5. Shore, brace, sheet and slope excavations to prevent caving, erosion, danger to persons and structures or interference with construction operations as required to comply with safety laws.
 6. Repair slides and cave-ins should they occur.
 7. Remove shoring before backfilling.
- B. Topsoil:
1. Before excavating topsoil, remove any vegetation, sticks, clods, rocks larger than 1-1/2 inches, excessive gravel, and debris.

2. Stockpile topsoil for reuse on site where directed.
- C. Depth of Excavations:
1. Excavate to solid bearing at elevations no higher than shown on Drawings.
 2. Notify Engineer if adequate solid bearing is not reached.
- D. Temporary Stockpiling:
- Locate in area indicated in Drawings or at location approved by Owner, at least 2 feet away from trench edges. If stockpiles are to remain during rainy periods, grade and cover as required to prevent compaction, erosion, and water infiltration.
- E. Excess Excavation:
1. Should excavation, through error, be carried to elevations lower than those shown on the Drawings, fill at Contractor's expense.
 2. Fill under footings with compacted gravel as required.
 3. Fill under slabs with compacted gravel, or crushed rock as required.
- F. Water and Frost:
1. Keep earth under footings free from frost.
 2. Provide and operate pumping equipment, and provide temporary drainage structures as required to keep excavations free from standing water.
 3. Should bearing surfaces be softened by water or frost, re-excavate to solid bearing and fill as specified for excess excavation.
- G. Excess Material:
- Unless otherwise noted on the Drawings, remove excess excavated and fill materials from site and legally dispose.

3.03 FILLING AND COMPACTION

- A. Subgrade Preparation:
1. Do not place fill or backfill until forms, debris and decayable materials have been removed, waterproofing measures completed and areas approved by the Engineer.
 2. Scarify areas to receive fill or backfill to 6 inch depth and until surface is free from ruts or other uneven features. Disc or blade scarified surface until free from large clods.
 3. Bring scarified material to proper moisture content and compact to specified density.
 4. If the above specified conventional methods cannot achieve specified compaction for subgrade, consult the Engineer. The intent is to provide an even dense surface below the specified minimum fill depth. Cost adjustments for variations in excavation and fill, or in procedures required by the Engineer to obtain acceptable subgrade conditions, shall be made in accordance with the General Conditions.
- B. Fill and Compaction Sequence:
1. After subgrade compaction has been approved by the Engineer, install specified geotextile fabric over subgrade, lapping all edges 36 inches.
 2. Over geotextile fabric spread approved fill material in layers not exceeding 8" in uncompacted depth.
 3. Water or aerate fill material as necessary, and thoroughly mix to obtain moisture content to permit proper compaction.
 4. Compact each layer to specified minimum degree and repeat compaction process until plan grade is attained.
- C. Density Requirements:
1. Subgrade and Fills under slabs, paving, and foundations 95 percent..
 2. Subgrade and Backfill against walls for full depth and width ... 95 percent.
 3. Other fills..... 90 percent.
 4. Compact topsoil and mulch only as required to minimize settlement.
- D. Fills Under Interior Slabs:
1. Base Layer on compacted subgrade: 6" minimum depth, crushed rock 1-1/2" minus size.
 2. Top Layer: 2" minimum depth, gravel 3/4" minus size.
 3. Moisture Barrier: Cover top layer with Moisture Barrier; lap 6" at joints and up vertical surfaces..

E. Fills Under Exterior Slabs:

Base Layer on compacted subgrade: 6" minimum depth, crushed rock 1-1/2" minus size. No Top Layer, Moisture Barrier, or Sand Bed required.

F. Fills Against Walls:

1. Where walls are Damproofed: fill against wall and around drain tiles with approved 1-1/2"-3/4" size drain rock, to within 8" of final grade, and 24" minimum out from face of wall, remainder of fill same as for fill against other walls. Lay continuous blanket of approved filter fabric in trench prior to installing drain rock. Fold filter fabric over drain rock prior to final backfill to create continuous separation between drain rock and adjacent earth cut and backfill materials.
2. Other Walls: Fill with approved material from excavations or with approved imported fill.

G. Fills Under Paving

1. Base Layer on compacted subgrade: 6" minimum depth, crushed rock 1-1/2" minus size.
2. Top Layer: 2" minimum depth, gravel 3/4" minus size.

H. Other Fills:

Unless otherwise noted on the Drawings, fill with approved materials from site or from approved local source, allowing for required finish grading materials.

3.04 GRADING**A. General:**

1. Contractor responsible for grading and staking shall verify all grades prior to starting grading and when finish grading is completed, to insure proper drainage.
2. Should site conditions, elevations or slopes conflict with elevations shown on the Drawings, consult the Engineer prior to beginning grading operations.
3. Grade entire area to smooth, level or evenly sloped uniform surfaces between elevations indicated on Drawings.
4. Allow for specified finish grading materials and fills.
5. Round abrupt changes in slope.
6. Slope ground away from building walls and to insure water is conducted to area drains, gutters, etc.
7. Refill to required levels, any areas which settle within warranty period.

B. Finish Grading

1. Remove rocks or clods over 1" in largest dimension, and all sticks and twigs.
2. Machine drag where possible, otherwise hand rake.
3. Do no finish grading when moisture content is such that soil balls or clods.
4. Hold finish grade approximately 3/4" below top of walks and curbs, unless noted otherwise on the Drawings.

C. Topsoil and Mulch placement and Grading:

1. If subsoil has not been freshly graded, scarify at least 4 inches deep.
2. Place Topsoil approximately 6" deep in lawn and planting areas.
3. Place Mulch approximately 6" deep in planting areas over topsoil.
4. Roll and tamp lightly to prevent wind erosion and future settlement.
5. Remove stones and clods larger than 3/4" and all sticks and twigs.
6. Leave surfaces ready for soil preparation by Landscaper.

END OF SECTION